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SOCIOECONOMIC DETERMINANTS OF HEALTH – A MATTER OF ECONOMIC OR SOCIAL CAPITAL?

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ABSTRACT

Background: There is currently a growing interest in the role of social structures, social conditions and social relationships in explaining patterns of population health, as well as the need to connect individual health outcomes to their socio-economic context. This thesis contributes to this young, but fast growing field by analyzing the role of social and economic conditions in determining health.

Aim: To study the socioeconomic determinants of health by focusing on the relevance of economic and social capital.

Methods: The thesis comprises four studies, three of which are based on cross-sectional data from the National Public Health Survey 2006 (N= 56,889) and 2009 (N= 51,414) (Study II, III and IV) and one based on longitudinal data from the Swedish Survey of Living Conditions (ULF) panel study from the years 1981–1997 (N= 3,780) (Study I). While Study I and II analyzed associations between measures of economic capital and health outcomes, Study III focused on associations between measures of social capital and health outcomes. Finally, in Study IV independent associations, and interactions, of a lack of economic capital and social capital on health outcomes were analyzed. Low economic capital (i.e. economic hardships) was measured by low household income and self-reported financial stress (inability to meet expenses and a lack of cash reserves). Social capital was measured on the individual level by social participation, interpersonal (horizontal) and institutional (vertical) trust. Health outcomes included self-rated health, psychological health (severe anxiety, GHQ-12, anti-depressant medication), physical health (musculoskeletal disorders) and health behaviors (harmful alcohol consumption).

Results: In Study I, based on longitudinal data, a dose-response effect on women's health was observed with an increasing score of cumulative exposure to financial stress, but not for low income. The results for men were more inconclusive. Cumulative exposure to financial stress seemed to affect men's self-rated health, while exposure to low income seemed to affect men's psychological distress, and neither exposure to low income nor financial stress seemed to affect men's musculoskeletal disorders. In Study II, financial stress (but not low income) was significantly associated with both women's and men's mental health problems (all indicators). Additionally, a graded association was found between mental health problems and levels of economic hardships (as measured by a combined economic hardships measure capturing both self-reported financial stress and low income). In Study III, low social capital (as measured by institutional trust in ten main welfare institutions in Sweden) was associated with increased likelihood of harmful alcohol consumption. Furthermore, a graded association was found between harmful alcohol consumption and levels of institutional trust. In Study IV, a measure of economic hardships (including both self-reported financial stress and low income) and low social capital (i.e., low interpersonal and institutional/political trust and low social participation) were significantly associated with men's and women's poor health status, with only a few exceptions. Furthermore, statistically significant interaction effects measured as a synergy index were observed between economic hardships and all different types of social capital. Gender

differences in health outcomes related to low economic and social capital were analyzed in all studies. However, only very small gender differences were revealed throughout the studies with the exception of Study I where financial stress was consistently associated with poor health outcomes for women, but not for men.

Conclusions: This thesis adds to the scientific evidence that economic and social capital at the individual level are multifaceted concepts independently connected to poor health outcomes, both physical and mental. However, when combined they seem to be associated with a further increased magnitude of poorer health. Hence, the social and the economic determinants should not be considered as exclusive and separate in relation to health. Policy initiatives minimizing the extent to which individuals perceive themselves as excluded in several dimensions in society, e.g., by channeling resources at improving the economic conditions under which people live and encouraging social connectedness and social cohesion, are desirable.

Keywords: socioeconomic determinants, social capital, economic hardships, health, Sweden

LIST OF PUBLICATIONS

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- II. Ahnquist J, Wamala SP: Economic hardships and mental health problems in Sweden. The Swedish National Public Health Survey 2009. *BMC Public Health* 2011, **11**:788.
- III. Ahnquist J, Lindstrom M, Wamala SP. Institutional trust and alcohol consumption in Sweden: the Swedish National Public Health Survey 2006. *BMC Public Health* 2008, **8**:283.
- IV. Ahnquist J, Lindstrom M, Wamala SP. Social determinants of health –a matter of social or economic capital? Interaction effects of socioeconomic factors and social capital on mental health disorders. (*Submitted*)

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LIST OF ABBREVIATIONS

AUDIT	The Alcohol Use Disorders Identification Test
CI	Confidence interval
CHD	Coronary heart disease
DALYs	Disability adjusted life years
EU	European Union
GHQ-12	General Health Questionnaire, 12-item question
OR	Odds ratio
SCB	Statistics Sweden
SEK	Swedish crowns (currency)
SES	Socioeconomic status
SRH	Self-rated health
ULF	Swedish Survey of Living Conditions
UN	United Nations
WHO	World Health Organization
YLDs	Years lived with disability

1 INTRODUCTION

Health is determined to a great extent by social structures and social conditions [1-3]. Today, there is growing interest in the role of social structures, social conditions and social relationships in explaining patterns of health, as well as the need to connect individual health outcomes to their socioeconomic context. This thesis contributes to this young, but fast growing field by looking at the role of social and economic conditions in determining health by focusing on the relevance of economic and social capital as health determinants.

1.1 BACKGROUND

1.1.1 An overview of the social determinants of health

The social determinants of health refers to both specific features of and pathways by which social conditions affect health and which may be altered by informed action [4]. The main determinants of health include the social and economic environment, the physical environment, and the person's individual characteristics and behaviors [3]. Macinko et al. [5] have constructed a comprehensive conceptual framework for ordering and understanding the relationships among social determinants for health (see figure 1).

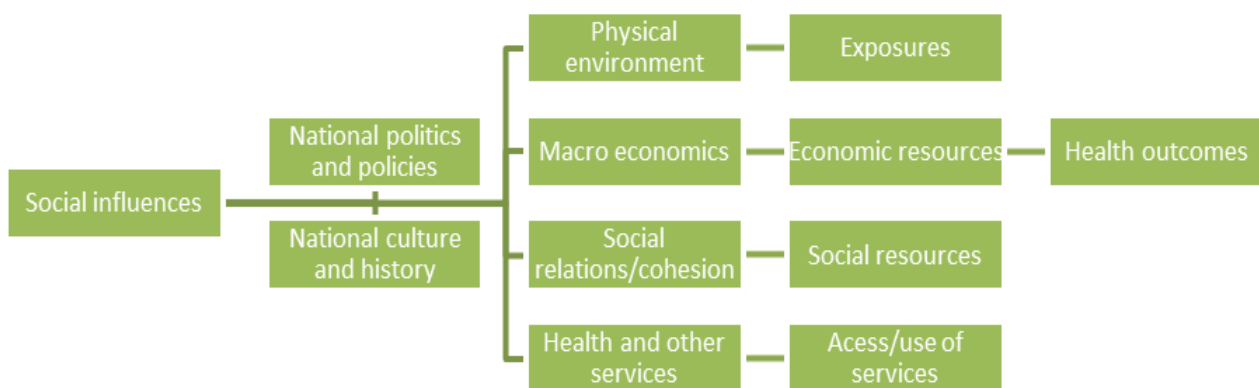


Figure 1. Model for ordering and understanding the relationships among social determinants for health (modified version from Macinko et al. [5])

Figure 1 describes distal and proximal determinants of health at the macro and micro levels. It organizes these determinants into five main columns. Beginning at the left, the first column describes the collective forces acting at the global level which have an impact on all other determinants of health. Examples include global governance structures, global markets, global communication and the diffusion of information, global mobility and cross-cultural interaction. The second column represents national political, cultural, and historical factors influencing other health determinants. Examples include systems of governance, legal and institutional factors governing union formation and health financing, cultural attitudes toward welfare and charity, and historical patterns of social relationships. The third column shows macro level determinants of health, which include the physical environment, macroeconomic environment, social relations and cohesion, and health and welfare services.

The fourth column describes micro level health determinants which include exposures and risk factors, economic resources, social resources, and access and use of services. Finally, the fifth column represents health outcomes. These include life expectancy, mortality, self-rated health, morbidity, mental health, and others. It should also be noted that there is a constant exchange between the levels.

Thus, characteristics of social structures and socioeconomic patterns at micro, meso, and macro levels form the social determinants affecting health throughout life. These are also strongly connected to health inequalities, where individuals further down the social ladder run a higher risk of serious illness and premature death [3]. Furthermore, it has also been suggested that social and economic disadvantages seem to concentrate among the same people, with effects that accumulate over time. Briefly, the field of social determinants is complex and challenging. To understand health inequalities and recommend strategies for reducing them, we need a better understanding of how both the ‘economic’ and the ‘social’ determinants are independently associated with health and also investigate the interplay between them. This thesis represents a step in that direction.

1.2 ECONOMIC RESOURCES –ECONOMIC CAPITAL, ECONOMIC HARDSHIPS AND HEALTH

In “The Forms of Capital”, Bourdieu [6] differentiates between three types of capital, where the possession of financial/economic capital (command over economic resources like cash or other assets) is described as one, along with social and cultural capital. According to Bourdieu “economic is at the root of all other types of capital” [6] (p. 252). A person’s command over economic resources, or economic capital, is thus of importance as it reflects the individual’s opportunities of influencing the conditions under which he or she lives, including those of significance to health. This thesis focuses on low economic capital, i.e., a lack of economic capital or economic resources at the individual level, as a health determinant. A lack of economic capital is labeled and presented as economic hardships.

1.2.1 Economic hardships and health – empirical studies

There are many parallel definitions to define and investigate poverty and economic hardships in relation to health. Most of the definitions focus on poverty as a concept. One definition provided by Mowafi & Khawaja [7] states that “*economic poverty refers to a deficiency in the amount of financial resources a household has to meet its basic needs, which can be defined in either absolute or relative terms*” (p.1). The definitions of poverty provided by for instance the United Nations includes, besides a lack of financial resources, a lack of basic capacity to participate effectively in society and thus considers poverty a “violation” of human dignity [8].

As income from gainful employment accounts for the lion’s share of an individual’s and families’ economic resources, it has so far been the measure most frequently used in studies on poverty and economic hardships to determine whether an individual does not have sufficient financial resources in relation to basic needs (defined in relative or absolute terms).

Most studies have shown a correlation between income (mostly measured by relative income poverty measures, e.g., income below a certain poverty line) and poor health and mortality [9-15]. Furthermore, several studies have indicated that a low income impacts negatively on health, especially when it is sustained over a long period of time [9, 12, 16-18]. However, the results are not consistent as some studies have failed to show an association with certain health outcomes such as mental health [19-21]. The contradictory results may be explained by different samples and methods used (e.g., which poverty line used), national and cultural contexts and variation in adjustments for potential confounders between studies among other things [22, 23]. Thus, who counts as having a low income changes over time and varies across countries. It has, for instance, been suggested that the Swedish welfare state, along with the Nordic welfare states characterized by a well-developed general social safety net, might have an impact on the relation between income and health through distribution of income. Thus, the Nordic welfare model might have a reducing effect on the impact of low income on health [24, 25].

In contrast, the relation between other “non-income-related” dimensions of economic hardships, like self-reported material deprivation or economic difficulties/financial stress and health outcomes, has not been as well scrutinized. These measures can be considered as important complements to income in measuring poverty and economic hardships, particularly considering that empirical studies have shown that the income poor and the consumption poor are not necessarily the same in some countries [26-29]. Thus, individuals with low income do not automatically need to show any signs of living in poverty while other people with high incomes may show obvious “poverty symptoms” due to circumstances like a difficult family situation or having excessively high expenses for rent and/or mortgages in relation to the actual income [27, 29, 30]. Error in the measurement of income has been suggested as one explanation for this, e.g., costs differ among individuals in a household as does the ability to make ends meet with a given sum of money. People can also have access to a wide range of non-monetary economic resources [26]. Some researchers, such as Ringen [28], have thus advocated the use of both income and deprivation criteria in identifying those who are excluded from society due to a lack of economic resources. Therefore, according to Ringen, a household should only be classified as deprived if it has both a low income and other symptoms of deprivation (e.g., if it is characterized by low consumption, does not have sufficient clothing or acceptable housing situation).

Following Peter Townsend [31], alternative proxy measures have been developed reflecting the material resource dimension of economic hardships, as measured by indicators of low consumption or “material deprivation”, and containing lists of consumption items regarded (by the public) as essential to a normal lifestyle in a particular society at a particular time. These “neo-material” indicators of deprivation (possession of consumption goods, like owning a car or a house) have been shown to be related with health outcomes in previous studies [19, 32-37].

A similar approach underlies the measurement of self-reported financial stress. It has been suggested that subjective measures like self-reported financial stress or current economic difficulties, indicating that a person’s economic resources are at least temporarily exhausted, may be equally important to health outcomes as objective measures of income and wealth [35, 38]. Questions relating to financial stress are survey questions where respondents are asked

whether they had difficulties to pay ordinary bills or rent, lacked a cash reserve or had to seek financial help from relatives or friends. Households which report one or two problems in surveys of this kind are then classified as “financially stressed” or as suffering from “economic difficulties”. A number of recent studies have investigated, and found, associations between these self-reported indicators of financial stress (e.g., difficulties to pay ordinary bills or rent or having to seek financial help from relatives, friends etc.) with health outcomes such as depression [15, 20, 21, 39-41], poor self-rated health [42, 43], poor physical functioning [42, 44-46] and coronary events [47, 48]. It is interesting to note that, as noted earlier by Ringen [28], quite a large number of families with high incomes are classified as having “financial stress” in these studies. Consequently, because self-reported financial stress represents aspects of economic hardships not solely related to income, it is also important to investigate this aspect in relation to health.

It should also be mentioned that the length of exposure is of importance to the magnitude of the effects of economic hardships on health. The length of economic hardships may vary from a temporary (acute) state to a sustained (chronic) state. Most previous studies are based on cross-sectional data, which makes it impossible to account for transitions into and out of economic hardships, and to capture the health effects of sustained exposure to economic hardships [16]. The longitudinal research conducted so far has found that effects of economic hardships are cumulative over time. Previous longitudinal studies have, for example, found an association between cumulative economic hardships (including indicators of low income and financial stress) over time and various health outcomes ranging from poor self-rated health [49, 50], long-term illness [49, 50], poor psychological health or functioning [11, 16, 50, 51], poor physical health or functioning [16, 50] to more severe health outcomes such as CHD-risk in women [51] and mortality risk [14, 52, 53]. Consequently, long-term economic hardships seem to be more hazardous to health than occasional episodes.

Some gender differences in the results have also been noticed in previous studies investigating associations between various indicators of economic hardships and health outcomes. Some previous studies have indicated small or even insignificant gender differences [19, 34, 44, 54, 55], while some other studies show differential associations for women and men, generally with higher risks for women [35, 41, 56, 57]. The higher risks for women concerning e.g. mental health outcomes have been explained by their lower socioeconomic status and higher exposure to stressors from the double burden of home and work stress [58, 59].

A further risk posed by economic hardships is cumulative disadvantages (i.e., multiple welfare problems). Hence, problems tend to accumulate among those who already have one or more problems, both material ones and problems affected by lifestyle [60-62]. Even though most previous research has been limited to studying only one economic hardships indicator at a time, mostly income, some research has studied several economic hardships indicators together with wide range of other “welfare problems” combined into deprivation or socioeconomic disadvantage indices. In the Swedish context, a previous study by Ringbäck-Weitofte found clear statistical associations between accumulated material problems (using a complex index including low income, current economic difficulties, housing and employment conditions) and perceived health state [63]. A study by Zimmerman and Katon [20] also found a complex index of “financial strain” (including several indicators of household financial status) to be casually related to depression. Finally, a study by Laaksonen et al [45] found a combined measure of

material circumstances (including household income, two indicators of economic difficulties and economic satisfaction) to be associated with mental functioning in middle-aged women and men in the city of Helsinki, Finland, using structural equation modeling.

1.2.2 Economic hardships – mechanisms and causality

Our knowledge of the mechanisms explaining the pathways between economic hardships and health is incomplete thus far. Several potential pathways linking economic hardships to poor health outcomes have, however, been suggested. It has been proposed that a lack of economic capital (financial resources) may affect health directly due to a pure material factor, where a low income for instance implies fewer financial resources to afford necessities like food and housing, and fewer financial resources to afford medical care or to get access to prevention and treatment of conditions of poor health. Potential pathways besides material deprivation also concern perceived deprivation, economic uncertainty, and impaired social relationships, which can act as acute or chronic exposures and stressors [19, 64]. Economic hardship has also been regarded as a psychosocial stressor, affecting health directly via psychobiological pathways or indirectly via coping processes involving health-related behaviors [65]. As indicated earlier, the effects of economic hardships on health can be either strengthened or weakened by other simultaneous problems, which may further increase the overall stressfulness of a problematic situation.

However, the relationship between economic hardships and health is complicated and it is difficult to differentiate the effects of economic hardships on health from the underlying mechanisms. It has been suggested that the relationship between economic hardships and health also encompasses a two-way effect where economic hardships contributes to poor health. Poor health in turn may lead to a diminished capacity to work and a reduction in income from work. Consequently, it is also possible to see that health problems can cause poverty by preventing people from earning a living. Thus, the issue of causality is not yet elucidated. Nevertheless, a number of studies have indicated that the main direction of causation runs from income and economic difficulties to poor health outcomes [21, 39, 40, 66].

There is currently an on-going international debate, following the Whitehall study, between the “neo-materialists” and the advocates of psychosocial mechanisms about whether or not psychosocial explanations are applicable in addition to the material explanations [67-71]. The neo-materialists mainly suggest that inequalities in health are determined by inequalities in access to material resources (e.g., money, food, housing conditions, etc.). Thus most neo-materialists propose that, even in the rich and healthy societies, the poor may suffer from major deprivations directly connected to health. The advocates of psychosocial mechanisms suggest on the other hand, according to Wilkinson’s theories on income inequalities, that it is not only income that matters to people’s health. Potential links suggested here are income in relation to that of others (income inequalities measured at the individual level and individual health) and inequalities in society as a whole (income inequalities measured at an ecological level e.g., the Gini coefficient and aggregate health). Thus, according to the theories of Wilkinson, living in an unequal society could be so corrosive of social relationships that it can have negative effects on the health of a population [69, 72]. Some empirical support has also been found for income inequalities on the individual level even though the effect on the ecological level has been

disputed [73, 74]. Furthermore, there have been criticisms of explanations implying a significance of psychosocial mechanisms, and specifically those implying a significance of concepts, such as social capital and social cohesion as mediators of the association between income inequality and health [67, 70]. Still, it has also been claimed that material and psychosocial interpretations should not be considered as mutually exclusive [68, 75].

1.2.3 Economic hardships – a multifaceted problem

One can consequently conclude that economic hardships is a multifaceted problem, not necessarily captured by a sole indicator. According to Mowafi and Khawaja a multidimensional view of poverty considers poverty not only as a lack of material goods, but also as “*a deficiency in other important areas such as social capital, human capital, power and voice*” [7] (p.262). One other example is Sen [76, 77], who wants to move away from the traditional concept of poverty as low income and/or low consumption, in order to focus on multiple dimensions of capability and functioning. Sen’s central tenet is that, to *function* effectively in a modernizing or modern country, people require a fairly wide range of *capabilities*, and not just an adequate income. If they lack or rate low on several capabilities, then their life choices will be severely constrained. Hence, according to Sen, poverty is a complex, multifaceted concept dependent on each person’s own personal characteristics and social circumstances. To be poor is to lack freedom, to have impoverished choice in the context of the society in which you live [76]. As such, Sen’s “capabilities approach” extends the concept of poverty by highlighting the associations between development, freedom, and deprivation of human capabilities (rather than income deprivation). As mentioned earlier the UN, in line with Sen, consider poverty as lack of basic capacity to participate effectively in society, thus recognizing the multidimensionality of the concept.

In conclusion, most of the previous studies associating economic hardships with health are limited to analyzing one single economic hardships indicator at a time, most often income. Health effects of cumulative exposure to several dimensions of economic hardships, including both income and non-income related aspects and thereby capturing the multidimensionality of the concept, need further scrutiny. More knowledge on possible cumulative effects of economic hardships over time is also warranted.

1.3 SOCIAL RESOURCES, SOCIAL CAPITAL AND HEALTH OUTCOMES

Besides economic capital, several researchers have in recent years stressed the theory of social capital in determining health and well-being [78]. Even though the concept is not new, with a history in sociology, social capital has recently received considerable attention as one of the key determinants of health [79]. Durkheim was one of the first to suggest a link between social cohesion and individual health in his studies of social cohesion and suicide [80]. In recent years, sociologists like Bourdieu [6] and Coleman [81] and economists like Fukuyama [82] have also recognized the value of social capital. Economic organizations and policy makers such as the World Bank and the OECD have also showed interest in the concept. Social capital is perhaps most commonly linked with the political scientist Putnam and his research on associational life and democracy in Italy and the United States [83]. It has been suggested that social capital

offers a new perspective to health research as it moves the emphasis from the behavior of individuals to the patterns for relationships between agents, social units and institutions [84]. However, it should be noted that the concept is heavily contested and there is an on-going discussion regarding what actually constitutes social capital and where it originates from as well as its actual impact on health. Studies on social capital and health have for instance been criticized as being limited in theoretical conceptualization and also weak on evidence [70, 85-87]. The following chapter provides a broad introduction to the concept and its suggested links to health.

1.3.1 Social capital – an introduction to the concept

There are many words used to denote the term social capital, e.g., social resources, community life, social bonds, social glue, social networks, extended friendships, good neighborliness and trustful social relations. Many different ways of conceptualizing the concept exist within these, depending on theoretical background. This has contributed to confusions about what actually constitutes “social capital”.

According to Lin [88], social capital captures the essence of concepts such as social support, solidarity, social cohesion and community. Lin [88] also suggests that the reason for the interest in social capital may be explained by the fact that social capital as a concept shares commonalities with other forms of capital in its focus on a payoff.

Social capital has thus been suggested to be analogous to other forms of capital like human/economic capital and cultural capital [6, 81], as well as a substitute or complement for other resources invested in with an expectation of a future return [89]. Portes [85] stated that; *“whereas economic capital is in people’s bank accounts and human capital is inside their heads, social capital inheres in the structure of their relationships. To possess social capital, a person must be related to others, and it is these others, not himself, who are the actual source of his or her advantage”* (p.7). Thus, it has been suggested that what actually separates social capital from other forms of capital is that it cannot be traded by individuals on an open market like other forms of capital, but is instead dependent on social relationships and therefore exists only when its shared [85, 90].

Sociologist Bourdieu was one of the first to introduce social capital as a concept in the 1970s, described alongside (and later differentiated from) cultural, economic, and symbolic capital. According to Bourdieu, social capital is *“the aggregate of the actual or potential resources which are linked to possessions of durable network of more or less institutionalized relationships of mutual acquaintance and recognition – or in other words membership in a group – which provides each of its members with backing of the collectively-owned capital, a ‘credential’ which entitles them to credit, in various senses of the word”* [6] (p.248-249). According to Bourdieu, social capital is hence a means by which individuals via social connections can acquire access to economic and cultural resources. It is the relationship in itself that allows individuals to claim access to resources possessed by other members of the network. Even though Bourdieu examines the individual’s social capital, he flows between the individual and the contextual levels and considers social capital as a collective asset possessed by the members of a network. Bourdieu also stresses the amount and quality of the relationships of the

networks and how successfully the individuals are in using these. Thus, Bourdieu's definition also includes an important power perspective, explaining the creation and preservation of the social order and especially economic inequalities: as one class has more economic capital, they also have higher social capital.

James Coleman [81] is another prominent sociologist who considers social capital as an individual resource, where investments are made in the individual's trust in people, confidence in the legal system or membership in organizations. However, like Bourdieu, Coleman also flows between the levels and suggests that social capital exists in the structure of the relationships, rather than within the actors. The main focus of Coleman's research concerns the relationship between social capital and education (human capital). Yet another definition is provided by Lin who claims that "*social capital is defined as resources embedded in one's social networks, resources that can be accessed or mobilized through ties and networks*" [88] (p. 73) and Portes who defines social capital as "*...the ability of actors to secure benefits through membership in networks and other social structures*" [85] (p.6).

One of the most influential social capital researchers, the political scientist Putnam, has widened the concept to a community level. Putnam defines social capital as the "*features of social life — networks, norms, and trust— that enable participants to act together more effectively to pursue shared objectives*" [91] (p.56). Putnam identifies three key aspects of social capital: networks, norms, and trust, which exist in a mutually reinforcing system. Putnam also specifies their role in social relationships: enabling individuals to co-operate to reach common goals (sometimes even unconsciously and/or unintentionally) [83]. Furthermore, according to Putnam, social networks have a value in themselves since they can enable individuals to achieve what they cannot achieve in their absence. According to Putnam, a society with high social capital is characterized by high civic engagement and social participation among the citizens, high generalized (horizontal) trust in other people, high levels of institutional (vertical) trust in the institutions of society and generalized reciprocity. Thus, Putnam looks upon social capital as a collective attribute, a property of groups of people and a public good measured at the community/neighborhood, state, or national level [83].

Like Putnam, economist Fukuyama [82] investigates social capital on a macro level, stressing trust as the core component of social capital, and defines social capital as "*an instantiated informal norm that promotes cooperation between two or more individuals*" [82] (p.1). According to Fukuyama, a nation's well-being, as well as its ability to compete, is dependent on the level of trust inherent in society [82]. Hence, both Putnam and Fukuyama consider trust as a part of social capital, even though Fukuyama considers trust as the core component. There is also an on-going debate as to whether values, such as trust, should be part of the definition of social capital or not. Some researchers have argued that definitions of social capital should focus mainly on its sources rather than its consequences. Woolcock [92], for instance, considers trust as important in its own right, but considers it to be an outcome of social capital and therefore suggests that the cognitive or value aspects, such as trust, should be excluded from the definition. According to Woolcock, social capital should then be defined by what it is rather than what it does.

There is also a current discussion regarding whether social networks should be included in the definition or not. While some theories excludes social support from social capital [93], others include or consider social capital to be the same concept as social support albeit under a different name [94]. Social contacts and social networks are important ingredients in social capital according to a recent definition provided by Rostila [95], separating preconditions for social capital (accessible social networks and social structures characterized by mutual trust) from the core of the concept (social resources). Rostila defines social capital as “*comprising social resources that evolve in accessible social networks and social structures characterized by mutual trust*” [95]. According to Rostila, these resources do not reside within the individual (i.e., intrapersonal resources), but in the structure of his/her social networks and, to gain access to social capital, an individual must be related to others. Thus, without a social network an individual cannot possess social capital and it is interaction among members who make its maintenance possible through their relationships with one another. Consequently, according to Rostila, social capital is always relational and inherent in the social structure [95].

In summary, although social capital is viewed and defined differently by different social capital researchers, social capital is generally looked upon as a resource arising through social relationships and considered to be an investment in social relations with expectations of future returns.

1.3.2 Social capital – an ecological or social construct?

In the field of health research, two streams of research have emerged, one treating social capital as an ecological and the other as an individual construct. Researchers following the tradition of e.g. sociologists Bourdieu and Coleman belong to the stream of researchers who, although recognizing the contextual level of investigating social capital, mainly investigate the relationship between social capital and health from a micro-level perspective and suggest that social capital is largely an individual resource [85, 96, 97]. The other stream of research treats it as an ecological construct, thus viewing social capital as contextual characteristics of society [71, 82, 91]. This ecological stream is inspired by Putnam and his communitarian or contextual approach to social capital [83].

There is a continuing discussion about which approach is more appropriate [98]. However, as recognized by Lin [88], social relations can be beneficial (or harmful) both for the individual and the collective. Rostila [95] has recently also argued that both individual and contextual approaches seem reasonable and should not necessarily exclude one another. According to Rostila, the multi-level nature of social capital implies that the same dimensions of social capital may be active on different levels of aggregation (i.e., individual and collective).

McOrmond and Babb have also suggested that social capital has no meaning without a specific collective, e.g., “*social capital cannot be accumulated by an individual in a community which does not recognise reciprocity or does not have norms to encourage the mutual exchange of favours; there would be no benefit of helping others because they would be unlikely to return the action*” [94] (p. 7-8). One study by Poortinga [96] also found that, when applying a multi-level framework to 22 European countries, while individual-level social trust and civic participation were positively associated with self-rated health, no relationship on the national

level was found. The researchers found no evidence of interaction effects between the two levels though [96]. It has thus been suggested that the two levels can be regarded as complementary to each other and that social capital should hence be considered as a phenomenon that can affect health simultaneously at both micro and macro levels [99-101].

1.3.3 Social capital and health – empirical studies

Even though social capital has gained recognition as a multidimensional concept, researchers still argue about its exact components, making measurement of social capital a challenging task. To distinguish dimensions of social capital, e.g., Harpman et al. [102] have suggested that social capital has a cognitive and structural component. The structural component denotes what people “do”, e.g., the objective quantity (extent and intensity) of social relationships, participation and memberships in associational activities [103]. The cognitive component denotes what people “feel”, e.g., subjective perceptions of the quality of those relationships such as trust, support, norms and reciprocity. Structural social capital and cognitive social capital have also been suggested to interact, e.g., social trust (generalized trust in other people) may facilitate the formation of organizations and networks, and networking may contribute to the building of mutual trust in the community [104]. It has also been suggested that social capital functions both horizontally, i.e. between individuals, groups, and other social agents with equal power, and vertically, i.e. between individuals and institutions across a power gradient [102, 105, 106].

Even if social capital is most commonly measured by its suggested dimensions, the structural and cognitive, a variety of proxy indicators have been used to measure the level of social participation and/or trust. According to Kawachi [99], the heterogeneity of indicators used to measure social capital reflects both the novelty of the concept and the fact that the researchers have to rely on secondary data sources originally collected for purposes other than assessing social capital.

Hence, when empirically investigating the association between social capital and health outcomes, membership in organizations (i.e., membership density) and general trust in people (i.e., social trust) are two indicators commonly used to relate structural and cognitive social capital, respectively, to a variety of health and other outcomes.

Recently, some critical voices have been raised towards using only the single question measuring interpersonal (social trust) as the sole indicator of trust. This is because trust can be considered a multidimensional concept. It has been suggested that interpersonal trust should be separated from institutional trust (trust in institutions and organizations). The Swedish political scientist Bo Rothstein [107] has, for instance, highlighted the importance of institutional trust as a trust in public institutions as a prerequisite for trusting people in general. The economist Fukuyama [82] has also stressed institutional trust as the core component of social capital and crucial for modern societies.

While institutional trust is related to formal networks concerned with trust in the formal system, e.g. the political, tax or judicial system, generalized trust can be characterized as trust in other people and is related to informal participation [108]. Hence, interpersonal (horizontal) trust flows across and among ordinary people while institutional (vertical) trust flows upward from

people to public institutions in a society. It should, however, be recognized that the two components of trust are not always strongly correlated. Results from recent studies have, for instance, shown that a society with high social participation, but low social trust is associated with high-risk adverse behaviors to health [109-111]. It could also be noted that the institutional aspect of trust in relation to health has largely been ignored in social capital research.

A vast number of empirical studies have also associated civic engagement, e.g., membership and social participation in civic, political, cultural or religious activities, with diverse health behaviors and health outcomes [112-116]. Generalized trust in other individuals, a widely used proxy measure of the horizontal aspect of trust, has also been associated with health outcomes in a number of studies conducted in different parts of the world [71, 96, 116-120]. The few studies conducted to-date investigating the relationship between institutional trust and health have indicated an association between different proxy measures of institutional trust (e.g., political trust, institutional trust in the health care system) and external locus of control [121], poor self-rated health and poor mental health [122-124] and more adverse health behaviors, such as smoking [125].

It should also be mentioned that not all studies have shown an association between indicators of social capital and health. This is true of studies conducted on both the individual and ecological level. Kennelly et al. [126] have for instance analyzed the relationship between social capital (trust and membership in voluntary associations) and population health in 19 different countries. The researchers found hardly any evidence of an association between population health and social capital indicators. Phongsavan et al [127] found an inverse association between trust and safety, neighborhood connections, reciprocity and psychological distress in a study of Australian adults. However, they did not find any associations between community participation and psychological distress. In a study of European countries by Poortinga [128], neither aggregated trust nor participation showed a relationship with self-rated health.

Furthermore, Veenstra et. al [129] investigated the association between three indicators of social capital (trust and social and civic participation) and found only social participation to be weakly associated with health at the individual level.

Moreover, it is important to note that the benefits of social capital depend on the characteristics of social capital in different settings. It has, for example, been suggested that strong associations among individuals where relationships bond members of existing groups and cause separations from others may not be healthy and may both increase and decrease the risk of certain health outcomes [78, 130]. Hence, not all forms of social capital are necessarily “good” for people.

Putnam has, for instance, emphasized that excessively strong bonding social capital may lead to social exclusion of some parts of the population. This form of exclusion has been labeled “the dark side of social capital” [83]. For instance, results from recent studies have shown that a society with high social participation, but low social trust is associated with high-risk adverse behaviors to health [109-111, 119, 125]. It has also been recognized that the distribution of social capital varies by, for instance, age, race/ethnicity, gender, socioeconomic status and neighborhood [131-133]. Thus, the same amount of social capital might not produce the same returns for individuals belonging to different genders, social classes or ethnic groups. With

regard to gender differences, some previous studies have found the association between individual-level social capital and self-rated health [134] and self-reported psychological health [124] to be of the same magnitude for both genders. However, other previous studies have indicated that effects of social capital at the area level may differ by gender [135-137].

1.3.4 Social capital -mechanisms and causality

Even though a few studies have suggested a path from social capital to mortality [112, 138-140], it should be mentioned that most studies of social capital face problems with causality [141]. Social capital and enhanced health may also be mutually reinforcing. The research on the associated influences and potential channels through which social capital affects health is increasing, but the understanding of its mechanisms is still in its beginning [142]. Research conducted so far has suggested that social capital promotes health through a variety of mechanisms influencing health-related behaviors, like social control over deviant behavior and violence. It has for instance been suggested that social capital may influence health behaviors by more rapid diffusion of health behavior or increasing the adoption of healthy norms of behavior and also exerting social control over deviant health-related behavior. Social capital has also been suggested to influence access to services and amenities and to affect psychosocial processes by providing affective support and acting as a source of self-esteem and mutual respect [119, 143]. It is also suggested that these mechanisms most probably interact with each other to produce a synergistic effect on health. Giordano and Lindstrom [33] have also suggested that aspects of social capital such as low trust and social participation may act upon different causal pathways in relation to health outcomes. Giordano's and Lindstrom's theory suggests that social participation could mainly affect health outcomes via social support mechanisms, whereas trust could influence health outcomes mostly via psychosocial pathways.

In summary, the findings from studies investigating associations between social capital and health vary in strength depending on the conceptualization and indicators of social capital, the level of analysis and the social context and demographics that set the frames of the study. The question regarding mechanisms linking social capital with poor health outcomes is also not yet answered. Further research investigating associations including indicators capturing the multidimensionality of the concept in relation to health would be of value.

1.4 A MATTER OF SOCIAL OR ECONOMIC CAPITAL FOR HEALTH?

Following for instance Bourdieu [6], Coleman [81] and Portes [85], social and economic capital can be seen as two kinds of capital, each dependent on the other. As mentioned in previous sections, various forms of capital share commonalities in their focus on payoff of a future return [88]. According to Portes [85], economic capital is related to people's bank accounts while social capital is inherent in the structure of their relationships.

As discussed earlier, there is also a current international debate, following the Whitehall study, regarding the importance of social capital vs. economic capital in relation to health and health inequalities. It is moreover very possible that social capital generates and is influenced by

material outcomes and vice versa and that a combination contributes to a double burden on health.

One can assume several mechanisms that link a lack of economic and social capital to poor health outcomes. Firstly, a lack of economic resources may result in lower social capital, e.g., by restraining the person's participation in social activities and society in general. Lower social capital was, for instance, reported by unemployed individuals in a previous study by Lindström [115]. Secondly, low social capital may result in economic hardships, e.g., poorer social networks and lower trust may contribute to fewer economic resources as result of minimized job opportunities [144]. Thirdly, both a lack of economic and social capital may also influence health via psychobiological pathways, e.g., by contributing to high stress levels due to financial difficulties and low trust in society. Fourthly, both a lack of economic and social capital may well affect health indirectly through social support mechanisms, e.g., by making people less motivated to take part in and to profit from the social support systems provided by society. An individual suffering from a lack of both social and economic capital may be considered to be impoverished in several important areas which restrain the daily life of the individual and contribute to poor health outcomes [76, 77].

However, previous research investigating possible interaction effects of a lack of economic capital (i.e., economic hardships) and social capital on health outcomes is scarce. A few previous studies have, however, included both indicators in the same study. Carlson [117] and Rose [145] have for instance found both economic and social indicators to be important in relation to health in Eastern Europe and Russia. In a study by Sun et al. [146], associations were found between a lack of economic capital, i.e., poverty (living on minimum living allowance) and low individual level social capital (captured by a five dimensional measure) in rural China. In this study, possible interaction effects of a lack of social capital (neighborhood social cohesion) and low economic capital were also investigated. The researchers found a synergy effect indicating an aggravating effect on health (self-rated health) of the two. Hence, even though the evidence is still very limited, positive interactions between economic and social capital with health outcomes may also be hypothesized in addition to associations between economic capital and aspects of social capital, respectively, and poor health outcomes. Further research on this issue is thus motivated.

1.5 KNOWLEDGE GAPS

When summarizing the current knowledge on social and economic capital in relation to health outcomes, several important issues arise that needs further research. One such issue concerns health effects of cumulative exposure to economic hardships, including both income and non-income related aspects. Another issue is the need for further research investigating associations of social capital with health outcomes, including indicators capturing the multidimensionality of the concept. A third issue is interactions between economic hardships and social capital with health outcomes, which have not received attention in previous research. Further studies on these issues may yield important insights as to how the socioeconomic determinants, as measured by social and economic capital, affect health and consequently what can be done.

1.6 A FRAMEWORK FOR ANALYZING THE SOCIOECONOMIC DETERMINANTS OF HEALTH

Previous research has highlighted the importance of both the “social” and the “economic” determinants of people’s health. This thesis focuses on the relevance of economic and social capital as determinants of health. The previous theoretical and empirical literature presented earlier has, however, included many aspects of both economic and social capital. This section will outline the framework for the economic and social capital indicators, as well as a framework for the health outcomes, selected in this thesis.

1.6.1 Economic capital/Economic hardships

Throughout the studies included in the thesis, economic capital, or rather a “lack thereof”, is conceptualized according to Sen [76, 77] who considers poverty as a multifaceted concept and Ringen [28] who proposed that a household should only be classified as deprived if it has both a low income and other symptoms of poverty. Low economic capital is labeled “economic hardships” throughout the studies and is measured by several indicators of economic hardships, capturing different dimensions of economic vulnerability (both income and non-income related).

1.6.2 Social capital

Social capital can be viewed upon as both an individual and a contextual construct. In this thesis, social capital is examined at the individual level although recognizing that social capital is multidimensional and always relational and inherent in the social structure [95]. In addition, social capital is conceptualized in agreement with the reasoning of e.g. Harpham [102] in view of the cognitive and structural dimensions which set up the preconditions for social capital. The structural dimension highlights the “social” side of the concept and the behavioral manifestation of social networks, e.g., level of social participation. The cognitive dimension highlights the qualitative preconditions for social capital which relates to the amount of social trust, e.g., perceptions of reciprocity, sharing and trust. The cognitive dimension is included throughout the studies and measured by horizontal (interpersonal) and vertical (political/institutional) aspects of trust and the structural dimension by social participation.

1.6.3 Health outcomes

Measuring health is not an easy task. One could question what is health? The most common definition is stated by the WHO “*Health is a state of complete physical, mental and social well-being and not merely the absence of disease*” [2]. This definition, even though criticized for being unrealistic and unattainable, does not focus on a medical diagnosis, but rather takes the person’s own perception of health into consideration.

In this thesis, a wide range of health outcomes were selected in order to get deeper understandings of the associations between socioeconomic determinants and broad measures of health, taking the respondent’s own perceptions of health into consideration. Health is

measured primarily as self-rated health, psychological health (mild psychiatric disorders), physical health (musculoskeletal disorders) and health behaviors (alcohol consumption).

Self-rated health is a measure of health that takes the physical, emotional and personal components of health at the specific point in time of the interview into consideration. The measure has been argued to depict health in line with the definition given by the WHO [147]. Hence, self-rated health measures a combination of different aspects of health and has been proven to be a robust and reliable measure of a person's overall health status and a strong predictor of mortality [148-151].

Poor mental health is an important health problem. Among mental health disorders, depressive disorders are the most common and are a leading cause of disability as measured by years lived with disability (YLDs) and were the fourth leading contributor to the global burden of disease (in terms of disability adjusted life years, DALYs) in 2000. By 2020, depression is anticipated to reach second place in the ranking of DALYs [152]. Depressive disorders seriously reduce quality of life for individuals and their families, are a risk factor for suicide, and often worsen the outcome of other physical health problems. A vast amount of literature has shown e.g. an association between psychological distress (negative emotions such as worries, anxiety, and depressive symptoms) and adverse health outcomes such as coronary heart disease (CHD) [153-158] as well as subsequent risks of attempted suicide, psychiatric disorders, hospital care and all-cause mortality [56, 159-162].

Musculoskeletal disorders are a common health problem. Health complaints relating to musculoskeletal pain and discomfort are the most common occupationally related illnesses in Sweden [163] and about 40% of all sick leave in Sweden is due to musculoskeletal problems [164]. Thus, in addition to the suffering of the individual, musculoskeletal problems incur large societal costs as they cause long periods of sick leave, involving treatment and rehabilitation. In addition, some musculoskeletal disorders have been associated with inflammatory processes that increase the risk of CHD [165, 166] and contribute substantially to the burden of disease (DALY) [167].

The hazardous and harmful use of alcohol is also a major global contributing factor to death, disease and injury and can also be very costly to communities and societies. Alcohol consumption is ranked as the world's third largest risk factor for disease and disability [168]. According to the WHO, alcohol is a causal factor in 60 types of disease and injury and a component cause in 200 others. Furthermore, almost 4% of all deaths worldwide are attributed to alcohol, which is greater than deaths caused by HIV/AIDS, violence or tuberculosis [169]. Alcohol consumption in Sweden has increased since the mid-1990s and was approximated at 9.3 liters per person in 2009 [170], and has been anticipated to lead to and increase alcohol-related problems [171].

1.6.4 Gender differences

As it has been suggested that socioeconomic determinants may not be equally beneficial for men and women [172], we specifically aimed to examine gender-specific patterns of associations of economic and social capital with health outcomes in all studies. The well-known paradox that men have higher mortality, but a lower prevalence of both mental and somatic

chronic health problems is an additional reason for examining gender specific patterns in associations. For instance, Swedish women report higher levels of poor self-reported health and mental health than men [173]. Trust of women also differs from that of men [174] and Swedish women generally report a higher prevalence of economic hardships [173].

2 GENERAL AIM AND RESEARCH QUESTIONS

The general aim of this thesis is to study the socioeconomic determinants of health by focusing on the relevance of economic and social capital.

The following questions are addressed:

- Does cumulative exposure to low economic capital (i.e., economic hardships) predict poor health outcomes over a 16-year period? (Study I)
- Is low economic capital (i.e., economic hardships) associated with mental health problems? Is the level of economic capital associated with the magnitude of mental health problems? (Study II)
- Is low social capital (low institutional trust) associated with harmful health behavior (harmful alcohol consumption)? (Study III)
- Do economic capital and social capital act independently or interact to influence health outcomes? (Study IV)

3 METHODOLOGY

3.1 OVERVIEW

This thesis is based on four studies focusing on the relevance of economic and social capital in relation to various health outcomes. The thesis is mainly based on quantitative methods. In Studies I and II, we examine associations between measures of economic capital and health outcomes. In Study III, we analyze associations between measures of social capital and health outcomes. Lastly, independent associations, and interactions, of a lack of economic capital and social capital on health outcomes are examined (Study IV). The research questions and the material chosen for analysis of each question are described in figure 2 below.

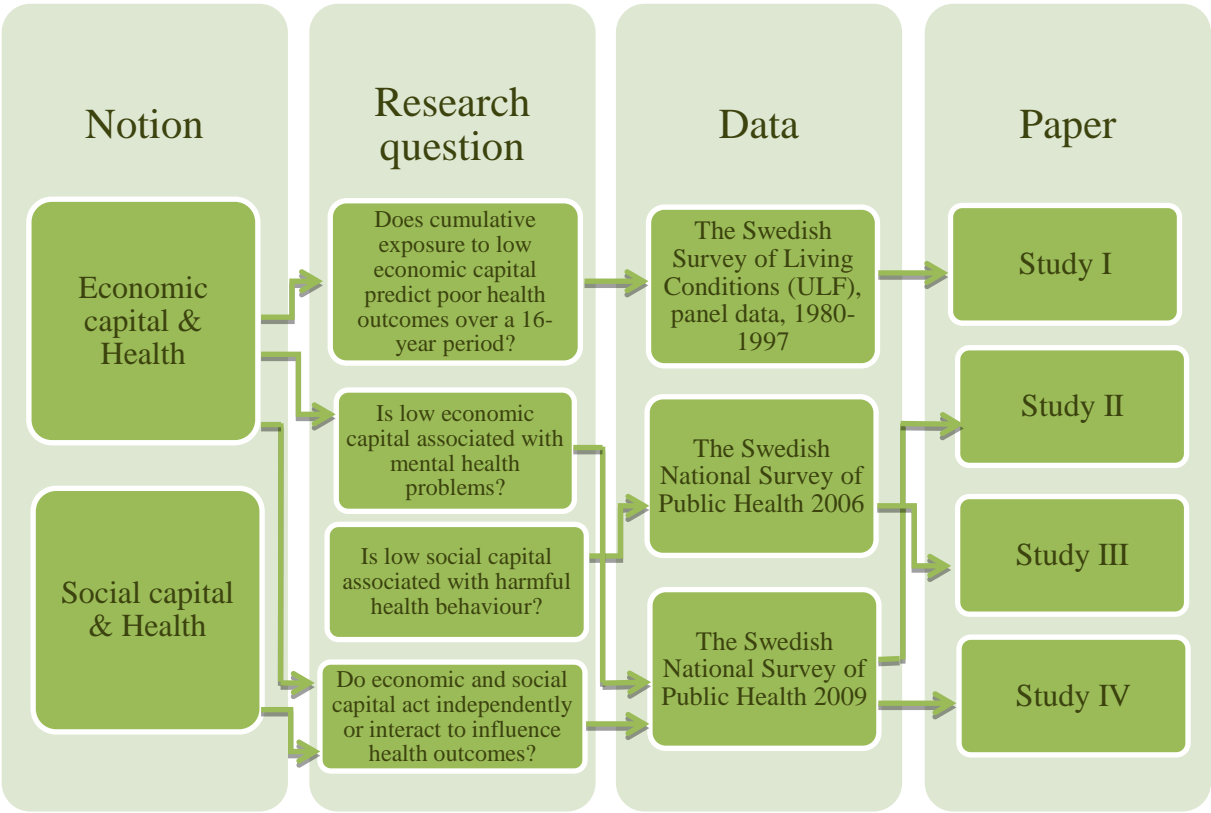


Figure 2. Overview of the research framework.

3.2 DATA SOURCES

The thesis includes four studies of which the first is based on longitudinal data from the Swedish Survey of Living Conditions (ULF) panel study from the years 1981–1997. Study III is based on cross-sectional data from the National Public Health Survey 2006 and Study II and IV on cross-sectional data from the National Public Health Survey 2009.

3.2.1 Swedish Survey of Living Conditions (ULF) (Study I)

Statistics Sweden's Survey of Living Conditions, ULF, was used for analysis in Study I. The survey has been conducted annually in Sweden since 1975. The ULF is a continuous series of annual surveys, administered by face-to-face interviews, which draws a random sample of approximately 7,500 people from all permanent residents in Sweden, between 16 and 84 years of age. A national sample of 8,000-12,000 persons have been interviewed each year [175]. Altogether, the survey comprises about 500 indicators. Each individual participates in a one-hour face-to-face interview. In case a sampled person is not available, close relatives (spouse, parent or children) were interviewed instead. However, so far this has occurred in an insignificant number of sampled persons. The interview data is supplemented by data on income, money transfers, taxes, etc. from various registers.

Each year, half of the participants are selected for a panel investigation with eight years interval. Four major themes are recurrently repeated: social relations, working life, physical environment and health. In each wave, two years of ULF are combined in order to obtain sufficiently large sample sizes to analyze. In Study I, we used panel data from panel number II, the "Health Panel" consisting of panel data from three waves; 1980/81 (expressed as T_1), 1988/89 (expressed as T_2) and 1996/97 (expressed as T_3). The study sample in Study I comprised a total of 3,780 individuals (1,799 men and 1,981 women), between the ages of 16 and 68 years old (at T_1) who participated in all three panel waves. This covers a population between 16 and 68 years old during the first interviews in T_1 , and hence between 32 and 84 years old in T_3 . Since personal interviews were used to collect data, the internal non-response rate for specific questions was very low, particularly for questions concerning health status.

3.2.2 The Swedish National Survey of Public Health (Studies II-IV)

The primary data set used in this thesis is the Swedish National Public Health Survey. In 2003, the Swedish government endorsed the national public health policy. As a consequence, the Swedish National Survey of Public Health started in 2004, with a repeated survey every year since. This survey is carried out by Statistics Sweden in collaboration with various county councils and municipalities in Sweden, and is coordinated by the Swedish National Institute of Public Health. Each year a random sample of approximately 20,000 people from the adult population (16-84 years of age) in Sweden is selected and combined with a randomly selected sample from the collaborating county councils and municipalities. The total number of collaborating partners has varied from year to year.

The questionnaire consists of information on different health outcomes, health habits and socioeconomic conditions, as well as factors related to work and family. The self-administered questionnaire is sent to the respondent's home address. Two different questionnaire forms are sent, one to the national sample processed by the County of Gotland and the other to the supplementary sample from the participating county councils and municipalities. The latter contain the same questions as the national sample, but with some supplementary questions and separate cover letters accompanying the questionnaire. Respondents are assured confidentiality and informed about data linkage with registry data (on income, educational level, marital status and family characteristics) from Statistics Sweden. People are reminded three times if they do

not return the questionnaire in the given time. Data from the completed questionnaire is further de-identified and controlled for errors, inconsistencies and internally missing data and tested against official registry data [176]. Partially missing data in the questionnaires is reduced by imputing average numbers based on related answers from other completed questions and by the use of weighting procedures based on a calibration method developed by Statistics Sweden.

In Studies II and III, the 2006 Swedish National Public Health Survey was used for analysis, while the Swedish National Public Health Survey from 2009 was used in Studies IV and V. Data for the 2006 Swedish National Public Health Survey was sent out to a total of 90,000 randomly selected individuals during a three-month period between April to June 2006. The total study population comprised 5,995 individuals from the national sample, combined with a randomly selected supplementary sample from four county councils and health care regions (the region Västra Götaland and county councils of Östergötland, Jämtland, Västernorrland, Västerbotten and Norrbotten) and one county (Gotland) consisting of a total of 56,889 individuals (26,305 men and 30,584 women) aged 16-84 years. The non-response rate was 37%.

Data for the 2009 Swedish National Public Health Survey was collected within a four-month period during spring (March-June) 2009. In the 2009 version, the respondents could either complete the postal questionnaire or complete a web-based questionnaire (approximately 10% responded to the web-based version). The total study population comprised a randomly selected national sample of 10,373 individuals combined with a randomly selected supplementary sample from four county councils (Halland, Jönköping, Östergötland and Kronoberg) and three municipalities (Gotland, Göteborg and Jönköping) consisting of a total of 51,414 individuals (23,153 men and 28,261 women) aged 16-84 years. The non-response rate was 46.2%.

3.3 DEPENDENT VARIABLES (OUTCOME VARIABLES)

Measures of health in this thesis are limited to: self-rated health, psychological health (mild psychiatric disorders), physical health (musculoskeletal disorders) and health behavior (harmful alcohol consumption).

3.3.1 Psychological well-being

In Study I, poor mental health (psychological distress) was measured based on the question from the Swedish Survey of Living Conditions: “Do you suffer from nervousness, uneasiness or anxiety?” (during the last 14 days). Three alternative answers included: “No”, “Yes, mild” and “Yes, severe”. The two latter categories were categorized as psychological distress. This single item question has been used in previous studies where it has been associated with subsequent risks of attempted suicide and psychiatric disease as well as associated risks of all-cause mortality, inpatient care and ischemic heart disease in the Swedish population [56].

In Study II, mental health problems included three measures from the 2009 Swedish National Public Health Survey: (i) psychological distress (GHQ-12), (ii) severe anxiety and (iii) use of

antidepressant medication. Psychological distress, as measured by the GHQ-12, was also used as an outcome measure in Study IV.

Psychological distress was measured by the 12-item version of the General Health Questionnaire (GHQ-12) [177]. This instrument for the measurement of psychological health is the shortest (other GHQ measures contain, for instance, 28 or 60 items). High psychological distress measured by the GHQ-12 has been associated with all-cause mortality [178]. The 12-item version is a well validated indicator of psychological distress [179-185] based in the respondent assessment of their present relative state to their usual, or normal, state [177]. The questionnaire comprises questions about general level of happiness, experience of depressive and anxiety symptoms, and sleep disturbance over the last four weeks. The items included in the GHQ-12 are: “*Have you been able to concentrate on what you have been doing during the past weeks?*”, “*Have you had problems with your sleep during the past weeks?*”, “*Do you feel that you have been useful during the past weeks?*”, “*Have you been able to make decisions in different areas during the past weeks?*”, “*Have you felt tense during the past weeks?*”, “*Have you during the past weeks been able to appreciate what you have been doing during the days?*”, “*Have you been able to deal with your problems during the past weeks?*”. “*Generally speaking have you felt happy during the past weeks?*” These eight items had four alternative answers: “*More/better than usually*”, “*As usual*”, “*Less than usual*” and “*Much less than usual*”. These items were dichotomized into two alternatives denoting “good” psychological health and two alternatives denoting “bad” psychological health. Four other items had somewhat different alternative answers: “*Have you felt unable to deal with your own personal problems during the past weeks?*”, “*Have you felt unhappy and depressed during the past weeks?*”, “*Have you lost faith in yourself during the past weeks?*”, and “*Have you felt worthless during the past weeks?*”. The four alternative answers to these four items were: “*Not at all*”, “*Not more than usually*”, “*More than usually*”, and “*Much more than usually*”. The first two answers were categorized as psychological distress and the second as no psychological distress. The GHQ-12 gives a total score ranging from 0 to 12. In Studies II and IV, the commonly used cut-off point of three or more symptoms was used to denote psychological distress [186, 187].

(ii) *Severe anxiety* was based on the same question as in Study I (ULF data), although somewhat rephrased in this survey. The question reads; “*Do you have any symptoms of these; nervousness, uneasiness and anxiety?*” with three response options; “*No*”, “*Yes, mild symptoms*”, or “*Yes, severe symptoms*”. Severe anxiety was recorded as present if respondents reported having severe symptoms of anxiety or worries. As mentioned before, this single item question has been used in previous studies where it has been associated with psychiatric disease, ischemic disease and mortality among other things [56].

(iii) *Use of antidepressant medication* was measured by the “Yes” or “No” answer question “*Have you during the past three months used antidepressant medications?*” and recorded as present with a “Yes” answer. This question has been shown to be a valid measure of self-reported mental health problems [188].

3.3.2 Self-rated health

The question in the Swedish Survey of Living Conditions used in Study I read as follows: “*How do you assess your general health?*” In 1998/89, there were three response alternatives (good, bad or something in between) and the cut-off point was set between good and less than good health. In 1996/1997, there were five corresponding response alternatives, very good, good, fair, poor and very poor, and the cut-off point was set between the top two and the bottom three alternatives.

In the Swedish National Public Health Survey 2009 used in Study IV, the question reads the same as in the Swedish Survey of Living Conditions with the same five corresponding response alternatives (very good, good, fair, poor and very poor) and the cut-off point was correspondingly set between the top two and the bottom three alternatives.

3.3.3 Physical health – musculoskeletal disorders

Musculoskeletal disorders were measured based on a combination of three questions measuring different symptoms of musculoskeletal disorders derived from the Swedish Survey of Living Conditions (Study I) and the Swedish National Public Health Survey 2009 (Study IV) with an identical question in both surveys. The questions reads; (i) “*Do you suffer from pain in the shoulders or neck?*” (ii) “*Do you suffer from back pain, backache, hip pains or ischias?*” (iii) “*Do you suffer from aches or pains in hands, elbows, legs or knees?*” with three corresponding response options: “*No*”, “*Yes, mild*” and “*Yes, severe*”. The two latter categories were categorized as musculoskeletal disorders in both studies.

3.3.4 Health behaviors – Harmful alcohol consumption

In Study II, harmful alcohol consumption was used as an outcome measure based on data from the Swedish National Public Health Survey 2006. Harmful alcohol consumption was measured by the Alcohol Use Disorders Identification Test (AUDIT). AUDIT contains ten items, which have been used to identify people with alcohol consumption that is hazardous to their health. AUDIT was developed, and now recommended, by the World Health Organization [189]. AUDIT’s 10 items cover the three conceptual domains of consumption, dependence symptoms, and alcohol-related consequences and are intended to correspond to the World Health Organization concepts of hazardous drinking, alcohol dependence, and alcohol-related harm [189]. It has been suggested that AUDIT is particularly apt for use in the general population where the prevalence of alcohol problems is lower than that in clinical samples as AUDIT is sensitive, not only to severe alcohol problems, but also to hazardous drinking [190].

In Study III, harmful alcohol consumption was based on “AUDIT-C”, consisting of three AUDIT items, which has been suggested to be equivalent in accuracy to the full AUDIT and to be used as a stand-alone screening measure when time or other resources do not permit administration of the full AUDIT [191-195]. Study III was based on the Swedish version of AUDIT-C [190]. The Swedish version of AUDIT has been shown to have satisfactory internal and test-retest reliability [190]. The three AUDIT questions read: i) “*How often have you drunk alcohol in the past 12 months?*” with response options: never (0 points), monthly or less (1

point), 2 to 4 times a month (2 points), 2 to 3 times a week (3 points), 4 times a week or more (4 points); (ii) “*How many glasses containing alcohol do you have on a typical day when you are drinking?*” (One drink is equivalent to 5-8 cl of wine or 4 cl of alcoholic liquor, e.g., whisky), with response options: 1 to 2 drinks (0 points), 3 to 4 drinks (1 point), 5 to 6 drinks (2 points), 7 to 9 drinks (3 points), or 10 or more drinks (4 points); (iii) “*How often do you have six drinks or more at one occasion?*” with response options: never (0 points), less than monthly (1 point), monthly (2 points), weekly (3 points), or daily or almost daily (4 points). Each item is scored from 0 to 4 points with a maximum score of 12. In Study III, we used a previously recommended gender specific cut-off score [196]. The reasons for using gender specific cut-off concerns women’s metabolic system which breaks down alcohol slower than men’s and as a result often shows a higher blood-alcohol level than men’s after consuming the same amount of alcohol in terms of consumption per kg body weight. The risks of medical alcohol-related harm, e.g. liver cirrhosis and cognitive disorders, are higher for women than for men as well [197]. Therefore, the cut-off for harmful alcohol consumption was set at 5 points for men and at 4 points for women [193].

3.4 EXPOSURE VARIABLES (MAIN DETERMINANTS)

The studies included in this thesis focus on the relevance of economic and social capital as health determinants. A wide range of health outcomes were selected in order to get deeper understandings of the associations between socioeconomic determinants and broad measures of health.

3.4.1 Economic determinants (economic capital variables)

In Studies I, II and IV, three variables from the Swedish Survey of Living Conditions (Study I) and the Swedish National Public Health Survey 2006 (Study II) and 2009 (Study III and IV) were used to define economic hardships: (i) low income, (ii) inability to meet expenses and (iii) lack of cash reserves. The two latter variables were adopted to gauge the respondents’ perceptions of their financial situation, besides their actual income from earnings, and labeled financial stress/current economic difficulties.

In Study I, low income was measured based on the conventional EU measurement of relative poverty, i.e., those who live in a household with an equivalent disposable income that is below 60 percent of the median household income are defined as poor. Due to lack of data, we could not use household income. Thus, in this study we used records of the individual’s disposable annual income from work in the tax office register being less than 60% of the median income which corresponded to SEK 53,700 at T₁, SEK 109,800 at T₂ and SEK 136,400 at T₃. Financial stress was measured on the basis of two self-reported variables: (i) inability to meet expenses (difficulties to pay for household expenses such as mortgage or rent payments or utility bills for the past 12 months) and a lack of cash reserves/cash margin (difficulty to obtain a certain amount of money within a week if anything unpredictable occurs). The sum of Swedish kronor included in the question about cash margins is calculated by Statistics Sweden and should correspond to a regular worker’s salary. The sum is adjusted from time to time to approximately adjust for changes in consumer price levels. The sum was thus estimated at SEK 8,000 at T₁,

SEK 9,000 at T₂ and SEK 14,000 at T₃. In Study I, economic hardships was dichotomized and summed up at T₁ and T₂ (separately for financial stress and for low income). The sums for financial stress and for low income were 0, 1 and 2. A cumulative score was constructed and categorized as: 0=not exposed at any time (reference category), 1=being exposed at one instance or 2=two instances.

In Studies II and IV, three similar variables from the Swedish National Survey of Public Health were used to define economic hardships. The first variable, low household income, was based on information on disposable annual household income (equivalized on number of adults and children in the household) in the tax register office the year prior to the study. Household income was categorized as low based on the lowest 25% of the total distribution of household income of study participants (less or equal to SEK 172,556/year) or not low if income was greater than SEK 172,556/year. Levels of financial stress (here labeled as current economic difficulties) were measured by two, almost identical self-reported questions as used in the ULF study, assessing: (i) inability to meet expenses (difficulties to pay for household expenses such as mortgage or rent payments or utility bills for the past 12 months) and (ii) lacking cash reserves (difficulty to get hands on SEK 15,000 within a week if needed). Thus, in 2006 and 2009, the sum for an ordinary worker's salary had been raised from SEK 10,000 in the 1990s to SEK 15,000.

In Study II, we attempted to develop a combined economic hardships measure to be able to judge the accumulation of economic hardships. The combined economic hardships measure was constructed as follows; the three economic hardships factors were binarily recorded and summed up, resulting in sums of zero to three. Economic hardships were categorized as "none" (if the sum was equal to zero), "mild" (if the sum was equal to one), "severe" (if the sum was equal to two) and "very severe" (if the sum was equal to three).

In Study IV, the three economic hardships variables were combined into one single economic hardships measure. We used the same procedure as above for dichotomizing and summing up the variables as in Study II, but categorized economic hardships as present if the sum was equal to zero or one and not present if the sum was equal to two or three.

The average inter-item correlation between the three economic hardships measures was low, with a standardized Chronbach's alpha coefficient of 0.48, suggesting that we should not construct an index based on these three variables. Nevertheless, as we were not primarily interested in the combined economic hardships measure as an index in statistical terms, but as a combination of three separate economic hardships indicators, each capturing separate dimensions of the multifaceted construct of economic hardships. Thus, in Study II and IV, we constructed an index that captures the vulnerabilities from these economic factors, given the social context of Sweden as a welfare state.

3.4.2 Social determinants (social capital variables)

The social capital variables investigated in this thesis, social participation and interpersonal and institutional aspects of trust, are all self-reported variables and both interpersonal trust and social participation are commonly used as empirical indicators of social capital [100]. As

mentioned in the framework section, social capital is in this thesis examined at the individual level although recognizing that social capital is multidimensional and always relational and inherent in the social structure.

In Study IV, social capital was measured by social participation (structural dimension) and two measures of trust (cognitive dimension). *Social participation* describes how actively the person takes part in the activities of formal and informal groups as well as other activities in society. In Study IV, social participation was measured by the following question derived from the Swedish National Survey of Public Health from 2009: “*Have you taken part in any of the following activities during the past 12 months?*” (study circle/course at your workplace, study circle/course in free time, trade/professional union meeting, other association meeting, theatre/cinema, art exhibition, religious meeting, sports event, writing letters to the press, demonstration of any kind, public place of entertainment, e.g. night club, dance or similar, largish family meeting, private party in somebody’s home). Those who answered positively to any one of these 14 activities were judged to participate and those who did not participate at all were judged as not. This question has been used in previous studies in Sweden [198]. The cut-off less than two activities was categorized as low participation in Study IV as this cut-off resulted in a prevalence of low participation at 20%, which seemed reasonable for a population-based national survey.

Interpersonal (horizontal) trust, used in Study IV, measures the horizontal dimension of trust and reflects the person’s perception of trust in other people, and has been used in previous studies, e.g. in the United States [119] and Sweden [111]. Low interpersonal trust was recorded as present if the respondents gave a “No” answer to the question “*Do you think that other people can be trusted in general?*” which was derived from the 2009 Swedish National Survey of Public Health.

Institutional trust was analyzed as a single independent social capital variable in Study III, and as one of three social capital variables in Study IV denoting institutional/political trust in the Swedish National Parliament (Riksdag). Institutional trust measures the vertical dimension of trust. It is not a commonly used indicator in the social capital-health literature, but have previously been used to measure institutional and political trust in Sweden [107], and other countries [199].

In Study III, *institutional trust* was measured based on a question from the Swedish National Public Health Survey 2006 reflecting the person’s perception of trust in welfare-state institutions, based on the ten most common welfare institutions in Sweden. The question reads: “*How much trust do you have in the following institutions in society?*”; a) health care, b) school system, c) social welfare services, d) labor office, e) social insurance office, f) police, g) court of law, h) parliament, i) politicians at county council level and j) politicians at municipal level. Response options were; “*Very high*”, “*Fairly high*”, “*Low*”, “*No trust at all*” and “*No opinion*”. Because the internal consistency reliability was high (0.84), an index of institutional trust was constructed by summing up trust from all these ten institutions. Institutional trust was categorized as: (i) “*Very high*” (very high or fairly high trust in all ten institutions), (ii) “*Moderately high*” (low or no trust in 1-2 institutions), (iii) “*Moderately low*” (low or no trust in

3-5 institutions), (iiii) “Very low” (low or no trust in 6-10 institutions). The response “No opinion” was recorded as missing.

In Study IV, *institutional trust* was measured based on a question reflecting the person’s perception of trust in the Swedish national parliament (Riksdag), which relates to the political authority level responsible for the functioning of both the economic system and the general welfare system in Sweden. The question, which was derived from the Swedish National Public Health Survey 2009, reads: “How much trust do you have in the Riksdag?” Response options were: “Very high”, “Fairly high”, “Low”, “No trust at all” and “No opinion”. It was dichotomized with the two first alternatives recorded as high political trust, and the two latter as low political trust. As more than 20% of the women and more than 10% of the men answered “No opinion,” the results for this answer were presented separately in the analysis.

3.4.3 Confounding variables

A number of potential confounders known to influence both economic hardships and health outcomes were adjusted for the analysis.

Age was included as a continuous variable in Study I and categorized into 4 age groups: 16-29, 30-44, 45-64 and 65-84 years in Studies II-IV.

Country of birth was categorized as (i) Sweden, (ii) other OECD countries (other Nordic countries, Europe, North America) and (iii) other countries (Africa, Asia, Latin America, Middle East) in Study II-IV and in Study I as: (i) Sweden or (ii) outside Sweden.

Educational level/attainment categorized into three levels (based on the highest level achieved): (i) low (nine-year compulsory school or less), (ii) intermediate (upper secondary school or less), and (iii) high (university/college level) in Studies I-IV.

Occupational status was categorized as: (i) manual workers, (ii) lower non-manual workers, (iii) intermediate and high-position non-manual workers, (iv) farmers and self-employed and (v) unclassified occupational status (e.g., students) in Studies II-IV. In Study I, occupational status was categorized as low if manual worker, intermediate if lower non-manual worker or high if intermediate or high non manual worker.

Employment status was used as a confounder in Studies II-IV and was categorized as: (i) employed, (ii) other economically inactive (e.g., students, sick-leave absence or maternity leave), and (iii) unemployed.

Family status/characteristics was based on four categories in Study I: living alone without children, living alone with children, cohabiting without children or cohabiting with children in a household. Living alone was categorized as being a lone adult if respondents reported the first two alternatives. In Studies II-IV, family characteristics were based on three categories: (i) married/ cohabiting, (ii) living alone with children or (iii) living alone without children where living alone was categorized as being a lone adult if respondents reported the two latter alternatives.

Long-term illness was based on the “Yes” or “No” answer question measuring if the respondents had any long-term illness, problems following an accident, any disability or other long-term health problems. Respondents who answered “Yes” were regarded as suffering from long-term illness in Studies I-IV.

Interpersonal trust was included as a confounder in Study III. Low interpersonal trust was recorded as present if the respondents gave a “No” answer to the question “*Do you think that other people can be trusted in general?*”

Living in a metropolitan area (if respondents are living in a densely populated area) was included as a confounder in Study I.

3.5 STATISTICAL ANALYSIS

Due to a mix of longitudinal and cross-sectional data, different statistical methods were used in this thesis. However, as our health outcomes were binary, logistic regression analysis was the most frequent measure of association used.

In Studies II-IV, multiple logistic regression analyses were applied to assess associations of the selected determinants and health outcomes. The choice of logistic regression was made as this is a straightforward and common method enabling comparisons with other studies. By using multiple regression analysis, several potential confounding factors were added stepwise to the statistical model. This allowed us to control for possible explanatory variables for likelihood of poor health outcomes.

In Study I, a modified Poisson regression approach was used to estimate the effects of cumulative economic hardships at T_1 and T_2 on health outcomes at T_3 . This method, unlike the ordinary logistic regression analysis for example, directly estimates the prevalence (risk) ratios of poor health in relation to economic hardships by using a robust error variance procedure known as a sandwich estimation [200]. To establish if there was a temporal relationship between economic hardships and health outcomes, economic hardships at T_1 and T_2 were regressed on health outcomes at T_3 . Possible confounders known to influence both economic hardships and health outcomes were accounted for in all regression models.

In Study IV, possible interaction effects between each of the social capital variables and economic hardships on health problems were estimated by calculating the Synergy Index (SI) using a SAS program developed by Lundberg, Fredlund, Hallquist and Diderichsen [201]. Calculation of SI has been recommended while studying interactions in social epidemiology [202, 203]. The use of SI allowed studying interaction based on odds ratios from logistic models. Interactions were assessed on the basis of departures from additive rates or risks. If the value for synergy exceeded 1.0, this indicates synergy and the existence of a cooperative effect.

All analyses included in this thesis were conducted separately for men and women using SAS, version 9.1.3.

3.6 ETHICAL CONSIDERATIONS

All studies received approval by the Regional Ethics Committee in Stockholm (DNR 2005/1146-3 and 2010/1576-32).

Table 1. Summary of data material and methods for Studies I-IV

STUDY	DATA MATERIAL	STATISTICAL ANALYSIS	SOCIO-ECONOMIC DETERMINANTS	MAIN HEALTH OUTCOMES
I. Cumulative exposure to low economic capital (i.e., economic hardships) and health outcomes	Swedish Survey of Living Conditions, ULF panel, 1980-1997, (N=3780) Longitudinal data.	Prevalences, multiple adjusted Poisson regression analyses.	<i>Economic hardships;</i> (i) low household income, (ii) inability to meet expenses and/or lack of cash reserves.	<i>Health outcomes;</i> (i) self-rated health, (ii) psychological distress (anxiety and worries), (iii) musculoskeletal disorders.
II. Low economic capital (i.e., economic hardships) and mental health outcomes	Swedish National Survey of Public Health, 2009 (N=51,414) Cross-sectional data.	Prevalences, multiple adjusted logistic regression analyses.	<i>Economic hardships;</i> (i) low household income, (ii) inability to meet expenses, (iii) lack of cash reserves.	<i>Mental health outcomes;</i> (i) psychological distress (GHQ-12), (ii) severe anxiety (anxiety and worries), (iii) use of anti-depressant medications.
III. Low social capital (institutional trust) and harmful alcohol consumption	Swedish National Survey of Public Health, 2006 (N=56,889) Cross-sectional data.	Prevalences, multiple adjusted logistic regression analyses.	<i>Social capital;</i> Institutional trust (trust in ten main welfare institutions).	<i>Harmful alcohol consumption (AUDIT).</i>
IV. Interaction effects of low economic capital (i.e., economic hardships) and social capital on health outcomes	Swedish National Survey of Public Health, 2009 (N=51,414) Cross-sectional data.	Prevalences, multiple adjusted logistic regression analyses, interaction effects calculating Synergy Index (SI).	<i>Economic hardships;</i> (i) low household income, (ii) inability to meet expenses, (iii) lack of cash reserves. <i>Social capital;</i> (i) social participation, (ii) institutional trust, (iii) interpersonal trust.	<i>Health outcomes;</i> (i) self-rated health, (ii) psychological distress (GHQ-12) , (iii) musculoskeletal disorders.

4 RESULTS

4.1 STUDY I

This study contributes to knowledge of how low individual economic capital (i.e., economic hardships) affects the health of the adult Swedish population by analyzing: (i) temporal associations between cumulative exposure to economic hardships and poor health outcomes over a 16-year period, and (ii) gender differences in relation to the temporal association between economic hardships and health. For women, we found that cumulative exposure to economic hardships over a 16-year period as measured by financial stress showed persistent and statistically significant effects on all health outcomes among women. Furthermore, a dose-response effect on women's health was observed with an increasing score of cumulative exposure to financial stress. Women exposed to financial stress at both T1 and T2 had an increased risk of 1.4 to 1.6 for all health measures compared to those who were not exposed. Cumulative exposure to low income, however, did not show statistically significant effects on women's health. The results for men were more inconclusive. We did not find the same consistent or clear dose-response effect among men as we did among women. Cumulative exposure to financial stress seemed to affect men's self-rated health, exposure to low income seemed to affect men's psychological distress. Neither exposure to low income nor financial stress seemed to affect men's musculoskeletal disorders (Table 2).

Table 2. Cumulative exposure to economic hardships in relation to various health outcomes. Risk rate ratios (95 % CI), men and women, the ULF panel.

Instances of cumulative exposure to economic hardships	Women (N=1981)			Men (N=1799)		
	Poor self-rated health T ₃	Psychological distress T ₃	Musculoskeletal disorders T ₃	Poor self-rated health T ₃	Psychological distress T ₃	Musculoskeletal disorders T ₃
Financial stress T₁ and T₂^{a*}						
0 (none)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
1 (once)	1.22 (1.04-1.42)	1.23 (0.96-1.57)	1.38 (1.23-1.56)	1.18 (0.93-1.51)	1.26 (0.84-1.90)	1.20 (1.00-1.44)
2 (twice)	1.36 (1.11-1.68)	1.57 (1.15-2.15)	1.57 (1.36-1.81)	1.74 (1.32-2.31)	1.66 (0.95-2.88)	0.97 (0.69-1.37)
P for trend	<0.0001	<0.0001	<0.0001	<0.0001	0.0009	<0.0001
Low income T₁ and T₂^{b*}						
0 (none)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
1 (once)	1.27 (1.06-1.52)	1.20 (0.94-1.52)	1.109 (0.97-1.24)	1.05 (0.83-1.32)	1.06 (0.71-1.58)	0.82 (0.66-1.01)
2 (twice)	1.23 (1.01-1.50)	1.21 (0.92-1.60)	1.11 (0.96-1.29)	1.21 (0.93-1.60)	2.00 (1.22-3.27)	1.03 (0.77-1.36)
P for trend	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001

T₁=1980/81

T₂=1988/89

T₃=1996/97

^a inability to pay ordinary bills or lack of cash reserves.

^b income below 60 % of median income.

*Adjusted for age, long term illness, living alone with or without children, foreign born, living in metropolitan area, low educational level and low occupational status.

4.2 STUDY II

This study contributes to knowledge of associations between low individual economic capital (i.e., economic hardships) and the health of the adult Swedish population by analyzing: (i) independent associations between multiple measures of economic hardships and mental health problems, and (ii) associations between a combined economic hardships measure and mental health problems.

First, the results from multiple-adjusted logistic regression analysis indicate that self-reported financial stress (inability to pay for ordinary bills and lack of cash reserves, labeled as current economic difficulties) was significantly associated with both women's and men's mental health problems. Conversely, we did **not** find any statistically significant association between low income and mental health, neither for women nor men (with the exception of a 50% higher risk of the use of anti-depressive medications among men with a low income compared to men with a high income). These results also remained valid after adjustments for age, country of birth, other socioeconomic circumstances and long term illness (Table 3).

Second, we found significant associations between the combined economic hardships measure and mental health problems. Very severe economic hardships were associated with a two to four fold increased risk of mental health problems among men and women after controlling for potential confounders (age, country of birth, educational level, occupational status, employment status, family status and long term illness). Furthermore, the likelihood of mental health problems differed significantly in a graded fashion in relation to levels of economic hardships (Table 4).

Third, the patterns were observed for both men and women with only very small gender differences and no signs of interaction, but rather indications of independence of effects between genders.

Table 3. Age-adjusted and multiple-adjusted odds ratios (OR) and 95% confidence intervals (CI) of mental health problems (GHQ-12, severe anxiety & use of antidepressant medication) in relation to economic hardships (inability to pay ordinary bills, lack of cash reserves, low household income), men and women, the Swedish National Public Health Survey 2009.

	Psychological distress (GHQ-12)		Severe anxiety		Use of antidepressant medications	
	OR (95 % CI)		OR (95 % CI)		OR (95 % CI)	
Men (N=23,153)	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Inability to pay for ordinary bills						
No (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	3.34 (3.06-3.65)	2.05 (1.76-2.38)	4.92 (4.24-5.72)	2.76 (2.10-3.63)	3.07 (2.80-3.63)	1.90 (1.48-2.43)
Lack of cash reserves						
No (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	2.52 (2.31-2.75)	1.38 (1.17-1.62)	4.27 (3.69-4.95)	1.67 (1.26-2.21)	2.85 (2.42-3.34)	1.34 (1.03-1.73)
Low household income						
No (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.82 (1.67-2.00)	1.14 (0.98-1.33)	2.70 (2.32-3.15)	1.09 (0.83-1.42)	2.64 (2.25-3.09)	1.51 (1.20-1.91)
Women (N=28,261)	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Inability to pay for ordinary bills						
No (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	2.56 (2.38-2.74)	1.81 (1.61-2.04)	3.56 (3.19-3.97)	1.85 (1.52-2.24)	2.67 (2.39-2.99)	1.55 (1.30-1.84)
Lack of cash reserves						
No (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	2.01 (1.88-2.15)	1.34 (1.20-1.51)	2.94 (2.65-3.27)	1.63 (1.34-1.98)	2.01 (1.88-2.32)	1.21 (1.02-1.43)
Low household income						
No (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.44 (1.34-1.55)	1.14 (0.99-1.28)	1.89 (1.69-2.12)	1.09 (0.91-1.31)	1.81 (1.62-2.03)	1.18 (0.99-1.39)

Model 1 adjusted for age

Model 2 adjusted for age, country of birth, educational level, occupational status, employment status, family status and long term illness and all three economic hardships variables included in the model simultaneously

Table 4. Age-adjusted and multiple-adjusted odds ratios (OR) and 95% confidence intervals (CI) of mental health problems (GHQ-12, severe anxiety & use of antidepressant medication) in relation to the level of economic hardships, men and women, the Swedish National Public Health Survey 2009.

	OR (95 % CI)		OR (95 % CI)		OR (95 % CI)	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Men (N=23,153)						
Combined economic hardship measure						
None (reference)	1.00	1.00	1.00	1.00	1.00	1.00
Mild	1.73 (1.58-1.91)	1.52 (1.32-1.76)	2.45 (2.03-2.96)	1.53 (1.12-2.08)	1.91 (1.59-2.29)	1.55 (1.21-1.97)
Severe	3.52 (3.15-3.93)	2.55 (2.14-3.05)	6.40 (5.30-7.73)	3.87 (2.85-5.25)	3.67 (2.99-4.52)	2.74 (2.09-3.61)
Very severe	5.40 (4.59-4.34)	3.07 (2.35-4.01)	10.9 (8.63-13.77)	4.83 (3.25-7.16)	6.94 (5.36-8.99)	3.58 (2.47-5.20)
Women (N=28,261)						
Combined economic hardship measure						
None (reference)	1.00	1.00	1.00	1.00	1.00	
Mild	1.50 (1.40-1.62)	1.49 (1.33-1.66)	1.83 (1.60-2.10)	1.53 (1.24-1.88)	1.50 (1.33-1.70)	1.00
Severe	2.57 (2.36-2.79)	2.21 (1.94-2.53)	3.89 (3.39-4.45)	2.67 (2.15-3.32)	2.78 (2.43-3.19)	1.28 (1.09-1.50)
Very severe	3.72 (3.28-4.23)	2.63 (2.16-3.21)	6.82 (5.74-8.11)	3.01 (2.27-4.04)	4.22 (3.50-4.09)	1.78 (1.47-2.15)

Model 1 adjusted for age

Model 2 adjusted for age, country of birth, educational level, occupational status, employment status, family status and long term illness

4.3 STUDY III

This study contributes to knowledge of associations between individual social capital, as measured by institutional trust in ten main welfare institutions, and poor health behavior, as measured by harmful alcohol consumption, in the adult Swedish population. The results show that, independent of age, country of birth, socioeconomic circumstances and interpersonal trust, low institutional trust was associated with a 50 percent increased risk of harmful alcohol consumption for men and a 48 percent increase for women. Furthermore, a statistically significant graded association was found between harmful alcohol consumption and levels of institutional trust. In addition, stratified analyses showed that all levels of low institutional trust were associated with harmful alcohol consumption even in the presence of high interpersonal trust. All results were true for both men and women with only very small gender differences (Table 5).

Table 5. Age-adjusted and multiple-adjusted odds ratios (OR) and 95 % confidence intervals (CI) of hazardous alcohol consumption in relation to institutional and interpersonal trust, men and women, the Swedish National Public Health Survey 2006.

Institutional trust	Model 1	Model 2	Model 3
	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)
Men (N=18,558)			
Institutional trust			
Very high (high trust in all institutions)	1.00	1.00	1.00
Moderately high (lack of trust in 1-2 institutions)	1.29 (1.15-1.44)	1.18 (1.04-1.33)	1.18 (1.04-1.33)
Moderately low (lack of trust in 3-5 institutions)	1.58 (1.42-1.75)	1.40 (1.25-1.56)	1.39 (1.24-1.55)
Very low (lack of trust in 6-10 institutions)	1.76 (1.58-1.95)	1.52 (1.36-1.70)	1.50 (1.34-1.68)
Interpersonal Trust			
High (reference category)	1.00	1.00	1.00
Low	1.07 (1.01-1.40)	1.11 (1.04-1.19)	1.06 (0.98-1.13)
Women (N=21,444)			
Institutional trust			
Very high (high trust in all institutions)	1.00	1.00	1.00
Moderately high (lack of trust in 1-2 institutions)	1.35 (1.22-1.49)	1.27 (1.14-1.41)	1.27 (1.14-1.42)
Moderately low (lack of trust in 3-5 institutions)	1.58 (1.44-1.74)	1.43 (1.30-1.58)	1.43 (1.34-1.58)
Very low (lack of trust in 6-10 institutions)	1.64 (1.49-1.81)	1.50 (1.35-1.66)	1.48 (1.34-1.65)
Interpersonal Trust			
High (reference category)	1.00	1.00	1.00
Low	1.04 (0.98-1.11)	1.09 (1.02-1.17)	1.05 (0.98-1.13)

Model 1. Adjusted for age

Model 2. Simultaneously adjusted for age, country of birth, educational level, financial stress and employment status

Model 3. Simultaneously adjusted for age, country of birth, educational level, financial stress and employment status, institutional and interpersonal trust

4.4 STUDY IV

This study contributes to knowledge of associations between social and economic capital and the health of the adult Swedish population by analyzing: (i) independent associations, and (ii) interactions, of a lack of economic capital (economic hardships) and social capital (social participation, interpersonal and political/institutional trust at individual level) on various health outcomes.

Results from multiple logistic regression show that both measures of economic capital (i.e., economic hardships) and low social capital (i.e., low interpersonal and institutional/political trust and low social participation) were significantly associated with poor health status, with only a few exceptions. Furthermore, we found a clear interaction effect between indicators of economic hardships and low social capital on women's and men's health. Statistically significant interactive effects measured as a synergy index were observed between economic hardships and all different types of social capital included in this study. The synergy indices ranged from 1.4 to 2.3. In addition, the results of the multiple regression analyses and interaction analyses revealed very small gender differences, where the associations between social capital and health, and economic hardships and health all seemed to be of almost the same magnitude between genders (Table 6 a & b).

Table 6a. Interaction effects (SI, age-adjusted odds ratios) between economic hardships and social capital variables on health problem, men, the Swedish National Public Health Survey 2009.

	SRH (self-rated health)		Psychological distress (GHQ-12)		Musculoskeletal disorders		
	OR (95 % CI)		OR (95 % CI)		OR (95 % CI)		
Men (N=23,153)	Presence of Economic hardships		Presence of Economic hardships		Presence of Economic hardships		
	Yes	No	Yes	No	Yes	No	
Social capital –low social participation	Yes	5.04 (4.36-5.81)	1.94 (1.79-2.09)	4.54 (3.92-5.26)	1.46 (1.31-1.62)	2.39 (2.09-2.74)	1.48 (1.38-1.60)
	No	2.78 (2.49-3.10)	1.00 (reference)	3.07 (2.74-3.45)	1.00 (reference)	2.08 (1.87-2.31)	1.00 (reference)
S (Synergy index) (95% CI)	1.49 (1.21-1.83)		1.39 (1.12-1.75)		0.89 (0.68-1.17)		
	Presence of Economic hardships		Presence of Economic hardships		Presence of Economic hardships		
Social capital –low interpersonal trust	Yes	No	Yes	No	Yes	No	
	Yes	5.41 (4.74-6.17)	1.95 (1.81-2.12)	5.81 (5.10-6.63)	1.92 (1.74-2.11)	3.10 (2.73-3.52)	1.61 (1.50-1.74)
	No	2.64 (2.35-2.97)	1.00 (reference)	2.84 (2.50-3.24)	1.00 (reference)	1.81 (1.62-2.02)	1.00 (reference)
S (Synergy index) (95% CI)	1.70 (1.39-2.06)		1.74 (1.43-2.13)		1.47 (1.16-1.87)		
	Presence of Economic hardships		Presence of Economic hardships		Presence of Economic hardships		
Social capital –low political/inst. trust	Yes	No	Yes	No	Yes	No	
	Yes	3.97 (3.54-4.46)	1.25 (1.17-1.33)	3.30 (2.92-3.73)	1.04 (0.95-1.13)	2.81 (2.52-3.15)	1.40 (1.32-1.48)
	No	2.05 (1.71-2.47)	1.00 (reference)	2.48 (2.04-3.01)	1.00 (reference)	1.57 (1.32-1.87)	1.00 (reference)
S (Synergy index) (95% CI)	2.29 (1.68-3.16)		1.51 (1.07-2.14)		1.88 (1.35-2.62)		

Table 6b. Interaction effects (SI, age adjusted odds ratios) between economic hardships and social capital variables on health problem, women, the Swedish National Public Health Survey 2009.

	SRH (self-rated health)		Psychological distress (GHQ-12)		Musculoskeletal disorders		
	OR (95 % CI)		OR (95 % CI)		OR (95 % CI)		
Women (N=28,261)	Presence of Economic hardships		Presence of Economic hardships		Presence of Economic hardships		
	Yes	No	Yes	No	Yes	No	
Social capital –low social participation	Yes	5.09 (4.51-5.74)	2.34 (2.16-2.52)	3.31 (2.94-3.73)	1.60 (1.48-1.72)	2.53 (2.24-2.86)	1.35 (1.25-1.45)
	No	2.68 (2.47-2.91)	1.00 (reference)	2.23 (2.04-2.42)	1.00 (reference)	1.91 (1.77-2.07)	1.00 (reference)
S (Synergy index) (95% CI)	1.36 (1.15-1.60)		1.43 (1.17-1.76)		1.22 (0.96-1.55)		
	Presence of Economic hardships		Presence of Economic hardships		Presence of Economic hardships		
Social capital –low interpersonal trust	Yes	No	Yes	No	Yes	No	
	Yes	5.72 (5.15-6.35)	2.13 (1.98-2.29)	4.44 (4.01-4.91)	1.98 (1.84-2.15)	3.07 (2.77-3.41)	1.70 (1.59-1.82)
	No	2.46 (2.25-2.68)	1.00 (reference)	2.07 (1.89-2.28)	1.00 (reference)	1.80 (1.66-1.96)	1.00 (reference)
S (Synergy index) (95% CI)	1.85 (1.57-2.12)		1.67 (1.42-1.96)		1.38 (1.14-1.66)		
	Presence of Economic hardships		Presence of Economic hardships		Presence of Economic hardships		
Social capital –low political/inst. trust	Yes	No	Yes	No	Yes	No	
	Yes	3.08 (2.79-3.39)	1.08 (1.02-1.14)	2.41 (2.18-2.66)	1.13 (1.06-1.21)	2.42 (2.20-2.67)	1.31 (1.24-1.38)
	No	1.95 (1.70-2.24)	1.00 (reference)	1.94 (1.69-2.26)	1.00 (reference)	1.43 (1.26-1.63)	1.00 (reference)
S (Synergy index) (95% CI)	2.01 (1.51-2.69)		1.32 (1.00-1.78)		1.91 (1.41-2.59)		

5 DISCUSSION

5.1 MAIN FINDINGS

Characteristics of social structures and socioeconomic patterns at micro, meso, and macro levels form the social determinants affecting health throughout life [5]. The general aim of this thesis is to study the socioeconomic determinants of health by focusing on the relevance of economic and social capital at the individual level. The thesis contributes to this field of research in the following ways;

1. Self-perceived financial stress, but not low income per se, was independently associated with poor mental health outcomes for men and women.
2. Higher levels of economic hardships (a combination of low income and financial stress) were associated with poorer health outcomes in a graded fashion among both men and women.
3. Repeated exposure to self-perceived financial stress over time was statistically significantly associated with health status, as measured by various indicators, among women, but not men.
4. Low social capital, as measured by social participation and institutional and interpersonal trust at the individual level, was independent of socioeconomic factors associated with poor health outcomes.
5. Low levels of trust in institutions were associated with increased magnitude of harmful alcohol consumption in a graded fashion.
6. A combined exposure to low economic capital and low social capital was associated with increased magnitude of poorer health outcomes for both men and women, than when considered alone.

Thus, the results indicate that the socioeconomic determinants, as measured by economic hardships and low social capital at the individual level, independently contribute to poor health outcomes. Furthermore, when combined, the “economic” and the “social” determinants of health are associated with a further increased magnitude for poorer health.

5.1.1 Economic capital and health

First, the findings from Studies I and II demonstrate a new finding that economic hardships and not low income per se was significantly associated with poor health outcomes in the adult Swedish population. In the cross-sectional study, Study II, significant associations were found between self-reported financial stress and both women’s and men’s poor mental health outcomes. Such associations were not found for low income. In the longitudinal study, Study I, women’s exposure to financial stress was cumulatively hazardous to their overall health (SRH, psychological distress and musculoskeletal disorders) over a 16-year period. A similar, consistent dose-response effect was not observed among men in this longitudinal study.

The results from Studies I and II thus stress the importance of self-reported financial stress to poor health outcomes, especially among women. Self-reported financial stress might represent a domain of economic hardships, which is not fully captured by the conventional income measures [204]. Perhaps it is not low income in itself, but the feeling of not managing financially in daily life (as indicated by the association between measures of self-reported financial stress and health outcomes observed in Studies I and II) that seems most important to health (both physical and mental). In previous studies, self-reported measures of financial stress have been suggested to possibly be even stronger predictors of poor health outcomes than low income as they represent more immediate and accumulated influences, which may be more closely related to health than more distal ones [54].

Previous studies in this field of research have, however, arrived at different conclusions. While a vast number of previous studies have found evident associations between low income (subjects living below a subsistence level or a poverty level) and poor health outcomes, other studies have not. For example, a previous cross-sectional study comparing cohorts of middle-aged Finnish and British employees' economic difficulties (i.e., difficulties in paying bills and affording food and clothes that the family needs) found associations with common mental disorders (GHQ-12). Such associations were not found for other socioeconomic circumstances, e.g., income (belonging to the lowest income quartile) [34]. In addition, while a longitudinal study of the Canadian National Population Health Survey found financial strain (not enough money to buy necessities) and low educational level to be associated with an increased risk of major depression among the working sample population, no such association was found for low household income [66]. Nevertheless, a vast number of previous studies have found evident associations between measures of low income and mental health outcomes [16, 41, 50]. Then again, other studies have concluded that income, *per se*, is a rather weak predictor of psychological distress and depression [19-21].

The conflicting results have been attributed to the use of different samples and methods (e.g., adjustments for confounders, samples used or poverty threshold level, which we will elaborate more on in the discussion section), as well as the national and cultural context [22, 23]. One reasonable explanation for the lack of observed associations between low income and poor health outcomes observed in the studies included in this thesis relates to the latter, the national and cultural context. In international comparisons, the Swedish egalitarian welfare society is characterized by e.g., generous benefit levels, comparatively high workforce participation for women, low poverty rates and relatively small inequalities both between classes and between genders society. It is thus very possible that egalitarian socioeconomic policies may reduce the effect of low income on health [24, 25]. Nevertheless, regardless of income level, people may suffer from financial problems because of strenuous life situations, financial habits or accumulation of debt that is too high in relation to income. Consequently, self-reported financial stress might still be valid as a health determinant in the context of a high income welfare society like Sweden.

Second, in Study II, we found graded associations between a combined economic hardships measure, including both low income and financial stress, and all mental health outcomes (psychological distress (GHQ-12), severe anxiety and use of anti-

depressant medication), even after adjustments for potential confounders, including education and occupation. So this finding indicates accumulative effects of economic hardships on mental health outcomes. In Study IV, we also found significant associations between the combined economic hardships measure, even though dichotomized, and other health outcomes, such as poor self-rated health (SRH) and musculoskeletal disorders. Associations of a combined economic hardships measure and poor health outcomes have not been widely examined. Most of the previous studies have either analyzed economic hardships variables separately (as presented earlier) or combined them into deprivation or socioeconomic disadvantage indices together with a wide range of other “welfare problems” [20, 45, 63]. Thus, the association between a combined economic hardships measure observed in Studies II and IV indicates that both “being poor” and “feeling poor” together are factors that, combined, have a negative effect on mental health outcomes. It is thus possible that both low income and financial hardship capture separate dimensions of the multifaceted construct of economic hardships (which is supported by the low intra-correlation observed). But when combined, they enhance each other and all capture different “pieces of the puzzle”. Thus, poverty and economic hardships are indeed multifaceted concepts with complex relations to health; *“Far from simple, poverty is multidimensional in its symptoms, multiple in its causes, dynamic in its trajectory, and quite complex in its relation to health”* [7] (p.1).

5.1.2 Social capital and health

First, results from Study IV suggest that measures of social capital, capturing both cognitive and structural dimensions (low interpersonal (horizontal) trust and low political/institutional (vertical) trust in parliament), are associated with poor mental and physical health outcomes for both men and women in the adult Swedish population. The results reconfirm the results from some previous studies, which have found associations between trust (both interpersonal and institutional) and measures of mental and physical health, and also between social participation and health at the individual level [33, 96, 129, 205]. However, the results for the structural indicator of social capital, i.e., social participation, were more inconclusive and only significantly associated with poor self-rated health for women and for men. It has, however, been suggested that the cognitive aspects have a closer association with e.g. poor mental health than the structural aspects [98].

Second, social capital, as measured by institutional (vertical) trust, also seemed to be associated with poor health behaviors (harmful alcohol consumption) in the adult Swedish population (Study III). This was (to my knowledge) one of the first studies indicating independent associations between low institutional trust and harmful alcohol consumption, even after adjusting and stratifying for interpersonal trust. However, previous studies have found other proxy measures of institutional trust (e.g., political trust, institutional trust in the health care system) to be associated with psychological distress [206] and other adverse health behaviors such as smoking [125].

As mentioned in the introduction section, previous research has suggested several pathways from low social capital, both trust and social participation, to poor health

including influencing health-related behaviors, like social control over deviant behavior and violence, access to services and amenities, and psychosocial processes by providing affective support and acting as a source of self-esteem and mutual respect [119, 143]. According to Giordano and Lindstrom [33], social participation could mainly affect health outcomes via social support mechanisms, whereas trust could influence health outcomes most via psychosocial pathways. The suggested mechanisms most probably also interact with each other to produce a synergistic effect on health with an unknown direction of causality.

With regard to the observed associations between low institutional trust (trust in ten main welfare institutions) and poor health behaviors as measured by harmful alcohol consumption (Study III), it is possible that that low trust in institutions may contribute to a lack of cohesiveness in society and a lack of responsible actions, which may ultimately result in poor health behaviors such as alcohol consumption. Fukuyama has, for instance, stressed the importance of trust to societal well-being [82]. The Swedish welfare society has a long history of high trust levels in its institutions which is also of importance to the well-being of its inhabitants. Low political trust in the government, the Riksdag and its politicians may, for instance, lead to a lower inclination to comply with the rules and regulations decided by the authorities concerning alcohol policies. Low institutional trust in the health care system may also imply a lower propensity to follow advice and recommendations from physicians and nurses, or perhaps also that from the central health care system with regard to alcohol consumption [207].

5.1.3 A matter of social or economic capital for health?

In Study IV, we found an interaction effect of combining the exposures of presence of economic hardships and low social capital (all variables), causing a higher risk of poor health than would be expected from a simple addition of these exposures, both for women and for men. This issue has not been extensively scrutinized in preceding studies. Yet, even though the indicators of social capital and poverty/economic hardships differed, the results from Study IV are in line with the result from a previous study by Sun et al., who detected a synergy effect between individual level social capital (low neighborhood social cohesion) and poverty (subgroup living on minimum living allowance supplied by the local communities), in rural China [146].

The synergy effects indicate that the social capital and the economic determinants should not be seen as exclusive and separate in relation to health. Several potential pathways linking both social and economic capital to health outcomes are possible. As suggested in the introduction section, a lack of social and economic capital might both have direct effects on health, e.g., pure material factors and via psychosocial pathways, and indirect effects via social support mechanisms. The results from this study, where we have included several dimensions of social capital and economic hardships (including both income and other symptoms of financial stress in our combined measure), indicate that these causal mechanisms may interact with each other, thus creating the synergistic effects on health observed. Therefore, combined, a lack of economic capital and a lack of social capital may be considered as a lack of capabilities in several dimensions [76, 77], or as marginalization or discrimination factors [146,

208], creating a spiral of cumulative disadvantage which, over time, constrain the life of the individual. This may ultimately result in exclusion with consequences to health.

5.1.4 Gender differences

As the main focus of the thesis was to investigate socioeconomic determinants of health, and not gender differences, the theoretical background does not include specific gender theories. Furthermore, even though all analyses were stratified for gender, specific statistical analysis to determine significant differences between genders (p-values, interactions effects, etc.) were only performed in some of the studies.

Generally, the studies revealed only small differences in relation to gender.

In Studies I, II and IV, women generally reported somewhat higher levels of poor health and higher levels of economic hardships, although with only very small and mostly insignificant gender differences. When looking at odds ratios of health problems in relation to economic hardships (logistic regression analysis), financial stress was consistently statistically associated with poor health outcomes for women, but not for men in the longitudinal analysis (Study I). When looking at the odds ratios of health problems in relation to economic hardships (all measures) in the cross-sectional studies, the odds were quite similar and in some cases negligibly higher for men than for women (Study II and IV). In study II, we further complemented our analyses by quantifying a possible interaction effect between economic hardships and gender on mental health outcomes (GHQ-12, severe anxiety and use of antidepressant medication) by calculating a synergy index. However, we found no sign of interaction, but rather indications of independence of effects between genders.

Hence, the first longitudinal study (Study I) indicated that self-reported financial stress might be a stronger indicator of poor health outcomes among women than men while the cross-sectional analysis revealed no large gender differences. Previous studies have also arrived at different conclusions regarding gender differences in associations of economic hardships variables and poor health outcomes [19, 34, 44, 54, 55] [35, 41, 56, 57]. The conflicting results may be explained by different samples and methods used, e.g., the proxy measure of low income or financial stress, or may also be dependent on cultural context [22, 23].

Throughout the studies included in this thesis, the associations between social capital and health outcomes (also harmful alcohol consumption) seemed to be of almost the same magnitude between genders (Studies III and IV). Our findings concerning the association between the social capital attributes and health are also partly supported by previous studies, which have found that the association between individual level social capital and self-rated health [134] and self-reported psychological health [124] were of the same magnitude for both genders. However, other previous studies have indicated that effects of social capital at the area level may differ by gender [135-137]. Hence, one possible explanation may be due to the level of analyses, individual or contextual, in which individual social capital might be equally important for men and women. Contextual conditions between countries might also contribute to the explanation.

5.2 STRENGTHS AND LIMITATIONS

5.2.1 Study design (data collecting instrument)

The studies included in this thesis were based on two different data sets. The strength of Study I is that it was based on three-wave panel data from the ULF survey, comprising a systematic sample of the adult Swedish population. This longitudinal study design with repeated measurements over a 16-year period (eight-year interval between interviews) enabled us to study and draw conclusions on temporal relationships between economic hardships and health outcomes. ULF has the advantage of collecting data based on face-to-face interviews which generally provide more reliable information than that obtained from mailed questionnaires. Nevertheless, the ULF study has some limitations, e.g., even though systematically sampled, the ULF panel study is relatively small, the data contains no information on exposures during childhood and is limited to a few observations in time.

Studies II-IV were based on the Swedish National Surveys of Public Health. The major strength of this study is that it is a large study, representing a systematically selected sample from the general population in Sweden. However, it should be mentioned that it is not a representative selection of the Swedish population in a strict sense as the randomly selected sample from the adult population (16-84 years of age) in Sweden is combined with randomly selected samples from the collaborating county councils and municipalities (which have also varied from year to year).

However, the robustness of the findings is strengthened by the fact that both population surveys cover a wide range of health disorders and health behaviors, socioeconomic determinants and other variables. Nevertheless, they do not investigate any of them in depth. Furthermore, as the study samples were limited to the national context of Sweden, this limits the generalization of the study results to other populations outside Sweden.

In the following sections, the limitations of the studies will be further scrutinized.

5.2.2 Possible sources of bias

A study can be biased because of the way in which the subjects have been selected (selection bias), the way the study variables are measured (information bias), or some confounding factor that is not completely controlled for [209]. Other possible limitations that also need to be taken into account are e.g., time-lag, reversed causation and duration of illness.

5.2.2.1 Selection bias

Selection bias is a systematic error which arises from the procedure to select subjects, and factors that influence participation. The bias results if the association between the exposure and the outcome is different for participants and non-participants [209]. One potential selection bias is related to non-response. Non-response is present in almost all surveys. Non-response to population surveys has been reported to correlate with lower

socioeconomic status (both income and educational level), poor health status (including psychological disorders and seriously ill persons) and more harmful lifestyle behaviors [210-215]. However, several studies have indicated that even though the prevalence of poor health outcomes may be affected by the non-response rate, investigated associations are not [210, 216, 217].

The large non-response of the Swedish National Survey of Public Health (37% in 2006 and 46.2 % in 2009) seems to be the most problematic in this concern. The non-response rates in both studies were higher among men, young people, people with little education and those born outside Sweden. However, in both the ULF survey and the Swedish National Survey of Public Health, the risk of introducing a bias or non-response error is reduced by post-stratification, a compensatory method aimed at compensating for non-coverage and variations in response rate. After establishing the dataset, missing data is completed by the use of weighting procedures based on related answers from other completed questions, and by the use of weighting procedures based on calibration methods developed by Statistics Sweden [176, 218]. However, weighted data was not used in the analysis.

Furthermore, a study investigating non-response bias in previous years of the Swedish National Survey of Public Health did not indicate any statistically significant differences in response pattern (both dependent and independent variables) between the respondents and the non-respondents [219]. However, this study only reached a small number of non-responders and should not be considered as a follow up study.

In the case of selection bias, previous studies [220] indicate that the strength of associations is underestimated in our studies.

5.2.2.2 Information bias – misclassification of exposure

Information bias involves misclassification of the study participants with respect to disease or exposure status [209].

There are some concerns surrounding misclassification of low income that should be mentioned. A few individuals both in the ULF dataset and the datasets from the Swedish National Survey of Public Health had an annual income from work which was zero or very low. Some individuals might have been misclassified as having a low income due to incomplete data on transfers. In Study I, similar analyses were run on individuals with zero and missing income and somewhat elevated risks of poor health were found, although not statistically significant. In Studies II and IV, individuals with zero or missing income were excluded from the analysis to minimize these problems. It is, however, also possible that some individuals have received compensation from other monetary or non-monetary resources such as transfers (e.g., unemployment benefits, compensation from a spouse, etc.), not included in this income measure. Still, household income is a commonly used measure in poverty research showing clear associations with health outcomes [18]. Our results are thus possibly, at least to some extent, explained by measurement errors of income or misclassification of income contributing to either an over or underestimation of the true associations.

Our two complementary “non-income” based measures of economic hardships are self-reported variables based on questions on the existence of concrete financial difficulties (inability to meet expenses and lacking cash reserves). Hence, they do not suffer from the same methodological problems as the low income variable based on national register data. However, as they are self-reported, the possibility of reporting bias has to be considered [221]. Furthermore, as is the case with low income, we have no information on wealth, economic support from other family members (e.g., parents), or the degree of economic difficulties. Still, the variables indicate that the respondent’s resources have been at least temporarily exhausted. Nevertheless, both self-reported economic hardships variables are commonly used measures in poverty research which have shown clear associations with health outcomes in previous studies in the Swedish context [163, 222]. Still, over or underestimation of the true prevalence of these variables may still have biased our results in one direction or another.

When it comes to the social capital variables, generalized trust in other people, political/institutional trust and social participation are all self-reported items, which make them impossible to validate. Furthermore, in interpreting the results concerning social capital, one should keep in mind that the measures of social capital have varied from single questions to indexes and dimensions. Still, the items used in this thesis have been used in previous nationwide investigations in countries such as the United States [83], Sweden [107, 223], and other European countries [224] and have been shown to be good predictors of mortality [112, 138-140]. Both political trust and horizontal trust in other people are rather stable over time for individuals [83, 107].

In summary, even though most self-reported explanatory variables are well used internationally, showing clear associations with health outcomes in previous studies, they are all subject to reporting biases dependent on the respondent’s general well-being, which in turn is dependent on past experiences and the respondent’s attitude and state of mind when responding to the questionnaire. Therefore, the available measures reported by the respondent are likely to differ from the true level of social capital and economic hardships, with an uncertain direction of bias.

Furthermore, in interpreting the results, one should also keep in mind that both the measures of social capital and economic hardships have varied from single questions to indexes and vary in terms of content and quantity, making it challenging to compare the results.

5.2.2.3 Information bias – misclassification of outcome

The choice of health outcomes used in this thesis is selected due to their relevance to morbidity of major causes of death and longevity [148, 159, 161, 162, 166] and generally measured by established and validated measurements tools. However, some issues related to measurement need to be considered.

One example is the single item question measuring feelings of nervousness, uneasiness and anxiety used in the ULF study to indicate psychological distress, which may not be equated to that based on psychiatric screening instruments used in a clinical setting.

Previous studies have, for instance, shown that associations between economic hardships and common mental disorders are generally larger in studies using standardized clinical interviews than in studies based on self-reports [225]. This indicates that we might underestimate the true associations between the indicators of psychological distress and the explanatory variables in Studies I, II and IV.

A study by Ringbäck-Weitof et al. [56] has, however, shown that the single item question capturing “anxiety and worries” used in Studies I and IV is strongly related to subsequent risks of attempted suicide and psychiatric disease. It has also been associated with risks of all-cause mortality, inpatient care, and ischemic heart disease in the Swedish population [56]. The GHQ-12 questionnaire used in Studies II and IV has also been shown to be a good predictor of more severe mental disorders [186, 187] and has been validated in a variety of settings [179-185]. The validity is also unlikely to be affected by the language of the questionnaire [186].

Self-rated health, a subjective measure of how people perceive their overall health, was chosen as one of the outcome measures in Studies I, II and IV. It is a robust and reliable measure of an individual’s overall health status [149, 151] determined mainly by mental and physical health status and not by factors such as sociodemographic, early life or psychosocial factors [226]. It is also a reliable predictor of mortality [148, 150, 227]. In addition, musculoskeletal disorders have been associated with inflammatory processes that increase the risk of CHD [165, 166] and contributes substantially to the burden of disease (Disability Adjusted Life Years) [167].

Furthermore, self-reporting as a means of data collection when it comes to health behaviors, such as harmful alcohol consumption (used in Study III), may result in problems of under-reporting or over-reporting. The self-reported prevalence of harmful alcohol consumption in the present study might have been underestimated compared with data from sales statistics. Nevertheless, self-reported alcohol consumption is considered to be a valid measure of an underlying alcohol problem [228] and since the Alcohol Use Disorders Identification Test (AUDIT) used in Study II is sensitive, not only to severe alcohol problems, but also to hazardous drinking, it is suggested to be particularly suitable for studies in the general population where prevalence of alcohol problems is lower than in clinical samples [190].

5.2.3 Confounding

Confounding occurs when the exposed and unexposed differ in factors that predict the risk of poor health, and causes under or overestimation of the relative risk [209]. We have adjusted for several important potential confounders in our analyses.

In all studies, we have considered age as a potential confounder. Adjusting for age is essential e.g., when analyzing the health-economic hardships relationship, as younger people on average have a lower income, but better health status. We have also adjusted for unemployment in the analysis as unemployment is a strong risk factor for several of our health outcomes, e.g., common mental disorders [229]. In addition, long term illness can also be considered as a confounder, e.g., for mental illness [230].

Adjustments for long-term illness in the final models in Studies I, II and IV did not, however, affect the observed economic hardships-poor health and social capital-poor health relationships.

A specific confounding issue concerns education and occupation, commonly used indicators of socioeconomic position, and whether they should be included as confounders in the studies of economic hardships or not. However, although different indicators of socioeconomic position (income, education and occupation) are correlated, they do to some extent suggest different causal agents. Thus, any remaining association between income and health after adjusting for education and occupation is more likely to indicate effects of material or economic conditions [231]. Hence, we have adjusted for educational and occupational level in the studies including measures of economic hardships (Studies I, II and IV).

Nevertheless, the confounding control may have been limited due to unmeasured confounders as well as imprecise measurement of confounders, and residue confounding cannot be ruled out in the studies.

5.2.4 Other possible sources of bias

Other possible limitations that should be considered are reversed causation, time-lag, duration of illness and reporting bias.

As mentioned earlier the longitudinal study design used in Study I can be considered as a strength, making it possible to draw conclusions regarding temporal associations between economic hardships and health. Adjustments for health selection (i.e., control for long term illness at T_1) hopefully decrease the possibility of baseline poor health affecting subsequent economic hardships. Even so, it should be noted that there is still a possibility of reverse causality, e.g., healthier respondents are more likely to be able to work more and earn more money and probably also find it easier to participate in society. A sick respondent, in contrast, might have less financial resources due to a need to pay for medical care or might feel socially isolated because the disease constrains the individual from participation in societal activities. A number of previous longitudinal studies have, however, concluded that the main direction of causation runs from income and material standards or from economic difficulties/financial stress to health [21, 22, 39, 41, 66] .

The measure of cumulative exposure to socioeconomic hardships used in Study I is also limited to only three observation points in time. This implies that temporal fluctuations into and out of economic hardships in-between these three time periods were not analyzed. It also assumes that any particular instance of economic hardships has the same value regardless of when it occurs in time. The length of time between follow-ups in Study I was eight years and there might have been some important societal changes between the baseline and the two follow-up periods that might have influenced our results. The studied time periods correspond, for instance, to some changes in the Swedish society, including a recession in the early 1980s, an economic boom in the late 1980s, and a major economic crisis at the beginning of the 1990s, which might have

biased our results. This pattern is reflected by the fact that the observed proportions of individuals with economic hardships were larger at T₁ (1980-1981) than T₂ (1988-89). Nevertheless, we believe that the consistent temporal associations between financial stress and women's health observed in Study I cannot be ignored.

The cross-sectional design of Studies II-IV rules out the possibility of confirming a causal relationship between economic hardships and health. To study causal associations, longitudinal studies are needed. As mentioned earlier, a number of previous longitudinal studies have, however, concluded that the main direction of causation runs from income and material standards or from economic difficulties/financial stress to health [21, 22, 39, 41, 66].

In the cross-sectional studies (II-IV), we also have the issue of time lag. The induction time from economic hardships to health, or from social capital to health, is not possible to capture in a cross-sectional study, since the information on both exposures and outcomes are collected at the same time. Although the health of the individual might not be affected by experiencing economic hardships or low social capital for a month or a year, health may be affected after several years. As a result, cross-sectional studies might over-represent cases with a long duration and under-represent cases with a short duration. However, outcome measures such as self-rated health, summarizing a person's overall health, are not likely to have a duration in the traditional sense.

As we are dealing with self-reported questionnaires, we also have the problem with recall bias in all our studies [221]. In both the ULF study and the Swedish National Survey of Public Health, self-reports are used. Hence, the data is based on what respondents have knowledge of and remember about various health disorders, not on their medical records or standardized clinical interviews, which may result in either under or over-reporting. We would, however, suspect that this problem is not differential, but between the subjects, as no included question deals with recall for more than the past weeks (most questions ask about the present state).

5.2.5 Choice of statistical method for analyzing data

Several researchers have suggested that when the outcome is common (prevalence over 10%), it is more preferable to estimate the relative risk (using the prevalence ratio) than to estimate the odds ratio (OR) [232, 233]. In Study I, we therefore tested a SAS program designed to estimate the prevalence ratios of poor health in relation to economic hardships by using a robust error variance produced known as a sandwich estimation [200]. We also ran all analysis using binomial regression models, but ran into convergence problems, and ordinary logistic regression which, as expected, produced higher risks in terms of odds ratios.

In the remaining studies (II-IV), we used ordinary logistic regression models and calculated the regression association coefficients (standard errors) to obtain OR (95% CI). It should be remembered, though, that as the prevalence for almost all health outcomes was more than 10% in Studies II-IV, the odds ratios observed are most probably an overestimation of the true relative risk. In Study IV, we also quantified a

possible interaction of effects between each of the social capital variables and economic hardships on health problems by calculating the Synergy Index (SI), using a SAS program developed by Lundberg, Fredlund, Hallquist and Diderichsen [201]. Calculation of SI has been recommended while studying interactions in social epidemiology [202, 203]. There is, however, a debate in the literature regarding the value of biological interaction in different types of epidemiological studies (see e.g., a recent debate between Rajaleid et al. and Lawlor [234, 235]).

5.3 KNOWLEDGE GAPS AND RESEARCH NEEDS

The studies included in this thesis have made several contributions to the research on the socioeconomic determinants of health. However, several new research questions have also emerged from this work. Addressing more specific research issues on the basis of existing results from Studies I, II and IV indicates that research further clarifying which aspects of economic hardships are most important in driving mental health outcomes is desired. Such research would also contribute to our understanding of economic hardships as a concept. Including several different indicators of economic hardships, both income and non-income related, in relation to health might also contribute to a deeper understanding of the concept of economic hardships as a whole. It would also be of interest to also include the “material resources dimension” of economic hardships (e.g., neo-material indicators like owning a car or a house), which we were not able to investigate in this thesis due to lack of data.

The results from studies (III and IV) indicate that, besides economic capital, social capital is also important when analyzing the socioeconomic determinants of health. As the research on social capital in relation to health is still in its beginning, further research is needed. In the studies included in this thesis, we were limited to a few questions capturing indicators of social capital and also limited by a cross-sectional study design. As there is currently no generally accepted instrument for measuring social capital, further longitudinal studies capturing the multidimensionality and complexity of the concept would possibly be more effective in revealing the relationships between social capital and health. Qualitative studies further scrutinizing the concept would also be of importance.

The synergy effects observed in Study IV between economic hardships and all different types of social capital also indicate that social capital and economic determinants should not be considered as separate in relation to health. Given the limited results from previous studies scrutinizing this issue, this warrants attention in further research.

Due to a lack of data, the changing patterns of social capital, economic hardships and health from childhood into adulthood could not be captured. Further longitudinal studies are needed to consider the impact of social and financial circumstances throughout the entire life span. In depth longitudinal data could also shed some light on the complexity and processes upon which routinely collected data does not bear.

In addition, our studies were limited to study self-reported aspects of health. Even though we included several different variables to obtain a comprehensive view of

health as a psychophysical entity, we were limited to studying self-reported aspects of health. Including other data sources concerning more severe health outcomes, such as CHD, or even mortality data from registers would be of importance. Today, we have access to data which makes it possible to complement our longitudinal study of the cumulative effects of economic hardships with data on mortality covering a time period of 26 years.

Generally the gender differences found in the included studies were small. Further scrutiny into the subject in future studies, both in terms of analysis and theoretical foundations for explanations of the results in terms of gender differences, would be of interest.

Finally, I hope that the findings of the present thesis will inspire similar studies in other contexts, enabling cross-country comparisons and contributing to more knowledge on the socioeconomic determinants of health.

5.4 IMPLICATIONS TO HEALTH POLICY AND PREVENTION

First, results from the longitudinal study (Study I) indicate that policies aimed at reducing health inequalities should recognize that long-term exposure to economic hardships as measured by indicators of self-reported financial stress affects health, especially the health of women, and policies need to focus on strategies to counteract long-term exposure to economic hardships.

Second, the fact that low income in itself is not generally associated with poor mental health offers important suggestions for future preventive policies. Policies that target poverty reduction aimed at improving health need not only focus on the level of income, they should also focus on capabilities i.e., on how people in poverty can manage their daily basic needs in a way that can increase their capabilities in several dimensions, as suggested by Sen [76, 77].

Third, the results from Studies III and IV suggest that the concept of social capital also needs to be taken into consideration when adopting policies aimed at improving health. However, intervention strategies aimed at strengthening social capital need to focus on both a bottom-up and a top-down perspective, i.e., should not only focus on increasing social participation, but also on enhancing social cohesion by state action in order to improve public services and create safe living environments.

Fourth, Study III indicates that public health policies also need to consider the characteristics of relevant institutions and how these may influence lifestyle patterns of individuals, which includes levels of alcohol consumption.

Fifth, the interaction effects found between social capital and economic hardships in relation to health (Study IV) suggest that policy strategies are needed, which address both economic and social capital simultaneously at the structural level, e.g., by improving economic conditions to help people manage daily life and by encouraging social connectivity and social cohesion, and thus minimizing the extent to which

individuals perceive themselves as excluded in several dimensions of society. As Roberts suggests , “*the determinants of [child] health inequalities, in both developed and less developed countries, are social and economic, and so remedial action must also be social and economic.*” [236] (p. 371).

The recommendations for health policy and health prevention suggested above are thus in line with the fundamental recommendations for improving “*daily conditions in which people grow, live and work*” as laid out by the WHO Commission on Social Determinants of Health [237].

6 CONCLUSIONS

The general aim of this thesis is to study the socioeconomic determinants of health by focusing on the relevance of economic and social capital at the individual level. The studies in this thesis suggest that both economic hardships and social capital are multifaceted concepts, each independently contributing to a range of different health outcomes.

Regarding associations of economic capital on health outcomes, the studies reveal that self-perceived financial stress, but not low income per se, are independently associated with poor mental health outcomes for men and women. A combination of both low income and financial stress also seems to be associated with poor health outcomes, in a graded fashion. In addition, repeated exposure to self-perceived financial stress over time is significantly associated with health status, as measured by various indicators, among women. A similar, consistent association is not observed for men.

Regarding the low social capital-health associations, the studies indicate that social capital as measured by social participation and institutional and interpersonal trust at the individual level is independently associated with poor health outcomes. Low levels of trust in institutions are also associated with harmful alcohol consumption in a graded fashion.

Generally, no large gender differences are visible throughout the studies.

Furthermore, significant interaction effects measured as a synergy index are observed between economic hardships and all different types of social capital. Thus, when combined, the “economic” and the “social” determinants of health are associated with a higher risk of poor health outcomes than if considered alone. As the research on this issue is still limited, further research is necessary.

Policy proposals from these messages suggest that action must be both social and economic, improving economic conditions to help people manage daily life and encouraging social connectivity and social cohesion, counteracting feelings of exclusion in several dimensions of society.

7 SUMMARY IN SWEDISH

Titel; Socioekonomiska bestämningsfaktorer för hälsa – en fråga om socialt eller ekonomiskt kapital?

Bakgrund: I dag finns ett växande intresse för betydelsen av sociala strukturer, sociala förhållanden och sociala relationer när det gäller att förklara hur hälsan utvecklas på befolkningsnivå. Behovet av att knyta samman individuella hälsoutfall med den socioekonomiska kontexten är exempel på ytterligare ett sådant område. Denna avhandling bidrar till detta snabbt växande forskningsfält genom att analysera betydelsen av sociala och ekonomiska förhållanden för hälsa.

Syfte: Att studera socioekonomiska bestämningsfaktorer för hälsa genom att fokusera på betydelsen av ekonomiskt och social kapital.

Metoder: Avhandlingen består av fyra studier, varav tre är baserade på tvärsnittsdata från den nationella folkhälsoenkäten från år 2006 (N=56,889) och 2009 (N=51,414) (Studie II, III och IV) och en studie baserad på longitudinella data från ULF-panelen (Undersökningen om levnadsförhållanden) från 1981-1997 (N=3,780) (Studie I). Medan fokus i Studie I och II låg på analyser av samband mellan olika mått på ekonomiskt kapital och hälsa så låg fokus i Studie III på analys av samband mellan flera olika mått på socialt kapital på individnivå och hälsa. I Studie IV analyserades slutligen både oberoende samband, och interaktioner, mellan lågt ekonomiskt kapital och lågt socialt kapital i relation till hälsa. Indikatorer på lågt socialt kapital (definierat som ekonomiska svårigheter) var låg inkomst (hushållsinkomst) och självrapporterad ekonomisk stress (svårigheter att betala löpande räkningar och avsaknad av kontantmarginal). Socialt kapital mättes på individnivå med indikatorerna socialt deltagande, interpersonell (horisontell) tillit och politisk (vertikal/institutionell) tillit. Hälsoutfall inkluderade (i) självskattad hälsa, (ii) symtom på psykisk ohälsa (besvär med ångslan, oro och ångest, lågt GHQ-12, och intag av antidepressiva mediciner) (iii) fysisk ohälsa i form av besvär i rörelseorganen (iv) skadlig alkoholkonsumtion.

Resultat: I Studie I, baserat på longitudinella data, så fann vi en dos-respons effekt för kvinnor för alla ohälsomått med en kumulativ exponering för ekonomisk stress under en 16-årsperiod. Kvinnor exponerade för ekonomisk stress vid både T1 och T2 hade en ökad risk om 1.4 till 1.6 för alla hälsoutfall jämfört med kvinnor som inte var exponerade för ekonomisk stress efter justering för potentiella confounders. Vi fann inte några motsvarande effekter för exponering för låg inkomst hos kvinnor. Resultaten för män var mer inkonklusiva. Vi fann inte samma konsistenta dos-respons effekter för män som för kvinnor. Kumulativ exponering för ekonomisk stress påverkade mäns självskattade hälsa. Exponering för låg inkomst påverkade mäns psykiska hälsa (ångslan, oro och ångest). Å andra sidan påverkade varken exponering för låg inkomst eller ekonomisk stress mäns fysiska ohälsa (besvär i rörelseorganen).

Resultat från logistiska regressionsanalyser (Studie II) visade att självrapporterad ekonomisk stress var signifikant associerat med både kvinnors och mäns symtom på psykisk ohälsa (alla indikatorer) efter justering för tänkbara confounders. Vi fann inte

några motsvarande signifikanta samband för låg inkomst. Vi fann dessutom ett statistiskt signifikant graderat samband mellan psykisk ohälsa och nivån på ekonomiska svårigheter (mätt med ett kombinerat mått på ekonomiska svårigheter som inkluderade både låg inkomst och självrapporterad ekonomisk stress).

Resultaten från logistiska regressionsanalyser som genomfördes i Studie III visade att, oberoende av ålder, födelseland, socioekonomiska förhållanden och interpersonell tillit, så var låg institutionell tillit associerad med en riskökning på 50 % för riskfylld alkoholkonsumtion för män och en riskökning på 48 % för kvinnor. Vi fann även ett statistiskt signifikant graderat samband mellan riskfylld alkoholkonsumtion och nivån på institutionell tillit.

Resultaten från de logistiska regressionsanalyserna i Studie IV visade signifikanta samband mellan (i) indikatorer på ekonomiskt kapital (ekonomiska svårigheter) och ohälsa och (ii) lågt socialt kapital (låg interpersonell och institutionell/politisk tillit och socialt deltagande) och ohälsa, efter justering för confounders. Resultaten var likartade både för män och kvinnor. Vi fann dessutom en tydlig interaktionseffekt mellan indikatorer på ekonomiska svårigheter och lågt socialt kapital och kvinnors och mäns hälsa. Statistiskt signifikanta interaktionseffekter mätta som SI (Synergy Index) observerades mellan ekonomiska svårigheter och indikatorer på socialt kapital med SI som varierade mellan 1.4 och 2.3.

Könsskillnader i hälsoutfall i relation till lågt ekonomiskt och socialt kapital analyserades i samtliga artiklar. Vi fann dock genomgående endast små (och oftast signifikanta) könsskillnader med undantag för Studie I där självrapporterade ekonomiska svårigheter genomgående var associerade med ohälsa för kvinnor men inte för män.

Slutsatser: Denna avhandling bidrar med vetenskapliga belägg för att ekonomiskt kapital och socialt kapital på individnivå är mångfacetterade koncept som oberoende av varandra har samband med ohälsa, både psykisk och fysisk. I kombination förefaller de dessutom bidra till ytterligare ökad ohälsa. Därför bör de sociala och de ekonomiska determinanterna inte betraktas separat i förhållande till hälsa. Policyinitiativ som riktar sig mot att minimera att individer upplever sig som exkluderade i flera dimensioner av samhället samtidigt, och som både förbättrar de ekonomiska förhållanden som människor lever under och uppmuntrar social samhörighet och sammanhållning är önskvärda.

Nyckelord: socioekonomiska bestämningsfaktorer, socialt kapital, ekonomiska svårigheter, hälsa, Sverige

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