Andreas Klärner · Markus Gamper ·
Sylvia Keim-Klärner · Irene Moor ·
Holger von der Lippe ·
Nico Vonneilich *Editors*

Social Networks and Health Inequalities

A New Perspective for Research

OPEN ACCESS

Springer

Social Networks and Health Inequalities

Andreas Klärner • Markus Gamper •
Sylvia Keim-Klärner • Irene Moor •
Holger von der Lippe • Nico Vonneilich
Editors

Social Networks and Health Inequalities

A New Perspective for Research

Springer

Editors
Andreas Klärner
Thünen Institute of Rural Studies
Braunschweig, Germany

Markus Gamper
Department of Cultural and Educational Sociology at the Department of Education and Social Sciences of the Faculty of Human Sciences
University of Cologne, Cologne, Germany

Sylvia Keim-Klärner
Thünen Institute of Rural Studies
Braunschweig, Germany

Irene Moor
Institute of Medical Sociology (IMS), Medical Faculty
Martin-Luther University Halle-Wittenberg
Halle, Germany

Holger von der Lippe
Department of Psychology
Medical School Berlin – School of Health & Medicine, Berlin, Germany

Nico Vonneilich
Institute of Medical Sociology, Medical Center Hamburg-Eppendorf
University of Hamburg, Hamburg, Germany

ISBN 978-3-030-97721-4 ISBN 978-3-030-97722-1 (eBook)
https://doi.org/10.1007/978-3-030-97722-1

Funding Information: Deutsche Forschungsgemeinschaft
This publication is funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) – Project number 280679966, Scientific Research Network "Social Networks and Health Inequalities".

Revised and updated translation from the German language edition: Soziale Netzwerke und gesundheitliche Ungleichheiten by Klärner et al., © Der/Die Herausgeber und der/die Autor(en) 2020. Published by Springer. All Rights Reserved.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Desiderata: Social Networks and Health Inequalities: Which Questions Remain Open?

Olaf Reis, Philip Adebahr, Stefan Brandt, Lea Ellwardt, Markus Gamper, Laura Hoffmann, Sylvia Keim-Klärner, Andreas Klärner, André Knabe, Gerhard Krug, Annett Kupfer, Daniel Lois, Martin Mlinarić, Irene Moor, Britta Müller, Mathilde Niehaus, Nancy Reims, Matthias Richter, Julia Seidel, Holger von der Lippe, Nico Vonneilich, and Stefan Zapfel

1 Introduction

"Tell me how much your friends earn, and I'll tell you if you smoke, what diseases you have and how long your life will be!" With this somewhat pointed statement, we wanted to shed light on the empirically well-confirmed connection between social

O. Reis (✉)
Department of Child and Adolescent Psychiatry and Neurology, University Medical Center Rostock, Rostock, Germany
e-mail: olaf.reis@med.uni-rostock.de

P. Adebahr
University of Technology, Chemnitz, Chemnitz, Germany
e-mail: philip.adebahr@soziologie.tu-chemnitz.de

S. Brandt
Landesfrauenrat Mecklenburg-Vorpommern e.V., Rostock, Germany
e-mail: brandt@landesfrauenrat-mv.de

L. Ellwardt
Institute of Sociology and Social Psychology, University of Cologne, Cologne, Germany
e-mail: ellwardt@wiso.uni-koeln.de

M. Gamper
University of Cologne, Köln, Germany
e-mail: m.gamper@uni-koeln.de

L. Hoffmann · I. Moor
Medizinische Fakultät, Institut für Medizinische Soziologie, Martin-Luther-Universität Halle-Wittenberg, Halle (Saale), Germany
e-mail: irene.moor@medizin.uni-halle.de

S. Keim-Klärner · A. Klärner
Thünen Institute of Rural Studies, Braunschweig, Germany
e-mail: sylvia.keim-klaerner@thuenen.de; andreas.klaerner@thuenen.de

A. Klärner et al. (eds.), *Social Networks and Health Inequalities*,
https://doi.org/10.1007/978-3-030-97722-1_17

and health inequalities from the perspective of network research at the beginning of this book (see chapter "Social Networks and Health Inequalities: A New Perspective for Research"). Social networks are understood here as mediating entities at an

A. Knabe
Rostock Institute for Social Research and Practice (ROSIS), Rostock, Germany
e-mail: andre.knabe@rostocker-institut.org

G. Krug
Fürth, Germany
e-mail: gerhard.krug@fau.de

A. Kupfer · J. Seidel
University of Dresden, Dresden, Germany
e-mail: annett.Kupfer@tu-dresden.de; julia.seidel4@tu-dresden.de

D. Lois
Faculty of Human Sciences, Universität der Bundeswehr München, Neubiberg, Germany
e-mail: daniel.lois@unibw.de

M. Mlinarić
Robert Koch-Institute, FG Health Monitoring, Berlin, Germany

B. Müller
Institute of Medical Psychology and Medical Sociology, University Medicine Rostock, Rostock, Germany
e-mail: britta.mueller@med.uni-rostock.de

M. Niehaus
Lehrstuhl für Arbeit und berufliche Rehabilitation, Universität zu Köln, Köln, Germany
e-mail: Mathilde.Niehaus@uni-koeln.de

N. Reims
Institut für Arbeitsmarkt und Berufsforschung, Nürnberg, Germany
e-mail: nancy.reims@iab.de

M. Richter
Martin-Luther-Universität Halle-Wittenberg, Medizinische Fakultät, Institut für Medizinische Soziologie, Halle (Saale), Germany

Department of Sport and Health Sciences, Technical University of Munich, Munich, Germany
e-mail: m.richter@medizin.uni-halle.de

H. von der Lippe
MSB Medical School Berlin, Berlin, Germany
e-mail: Holger.vonderLippe@medicalschool-berlin.de

N. Vonneilich
Institute of Medical Sociology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany
e-mail: n.vonneilich@uke.de

S. Zapfel
Institut für empirische Soziologie, Friedrich-Alexander-Universität Erlangen-Nürnberg, Nürnberg, Germany

Department of Sport and Health Sciences, Technical University of Munich, Munich, Germany
e-mail: stefan.zapfel@ifes.uni-erlangen.de

intermediate or meso-level, whose structure and function mediate between vertical (income, education, occupational status, etc.) as well as horizontal (e.g., age, gender, ethnic origin) inequalities and health inequalities (e.g., life expectancy, morbidity rates). Besides this mediating influence a moderating relationship wherein social networks amplify or diminish vertical and horizontal inequalities seems to be reasonable.

In this way, an attempt is made to place a "meso-founded" approach between macro- and micro-founded levels of health science, which necessarily combines the macro- and micro-perspectives. With this claim, network research locates itself between classical macro-sociological approaches, which refer to large groups (e.g., social classes, gender), and micro-founded approaches, which emphasize individual health conditions, preferences, and behavior. It also takes up the criticism of Emirbayer (1997), who, on the one hand, criticizes overly simple models of rational and self-interest-oriented actors but, on the other hand, also criticizes approaches that assert the strict primacy of norms or social structures that "guide" the actions of subjects. Within the social network, individual preconditions, such as genetic make-up, personality, preferences, and so forth, encounter each other and the social "structuration" (Giddens, 1984) through vertical and horizontal inequalities. On the one hand, social networks are influenced by the individual, while on the other hand, network changes affect the individual.

In order to clarify the links between individual health, networks, and social inequality, a number of prerequisites are needed, to which the first part of this volume is devoted. Within the scientific discourse of social relationships, social capital, and social networks, various terms are not clearly distinguished from one another and are sometimes used synonymously. As a result, those terms often remain unclear, which makes a unified definition and understanding of social relations and social networks difficult. In order to contribute to a clearer understanding, Nico Vonneilich presents a classification of terms and concepts (see chapter "Social Relations, Social Capital, and Social Networks: A Conceptual Classification"). In his contribution to network theory, Markus Gamper (see chapter "Social Network Theories: An Overview") suggests to understand "networks" primarily in structural terms, as a set of nodes (actors at different levels of aggregation) connected by edges (relationships of various kinds), through which an exchange (of information, emotions, goods, etc.) takes place. Social capital can thus be understood as the presence of nodes and edges that are beneficial to health, while social support can be understood as its effect. The probability of the occurrence of productive nodes and edges would be moderated by vertical and horizontal inequalities. At the micro-level of individuals those inequalities manifest themselves in advantageous or disadvantageous health effects (with regard to morbidity and mortality as well as subjective health perception). At the macro-level that moderation should be reflected in socially unequally distributed mental and physical health states, that is, health inequalities.

In their chapter, Andreas Klärner and Holger von der Lippe discuss further possible causal mechanisms in social networks: social integration, social influence, and (social) contagion (see chapter "Social Network Mechanisms"). As their contribution shows, these concepts are heuristically useful as collective terms. A

general, parsimonious, and selectively working theoretical model, however, in which the possible connections can be precisely defined and differentiated, is still lacking. According to the authors, future research will have to take into account the distinctions between (1) direct and indirect and (2) positive and negative health effects caused by (3) different actors or sectors of networks. Future research should address these aspects in various ways for different risks of disease.

As the authors of all contributions to this work make clear, the concept of network is still too often used merely as a metaphor in the literature; for example, it stands for "frequency of contact with parents and friends" or for "social support," but is not operationalized in a structural way. Network studies using the abovementioned structural approach are still relatively rare in the field of health inequality research. The authors of this work also point out that there is still a considerable need for theoretical and methodological development in the area of social networks and health inequalities. In order to provide the required "meso-foundation" of network-driven health sciences between macro- and micro-processes, it is necessary to further develop the existing theoretical models (see chapter "Social Networks and Health Inequalities: A New Perspective for Research") and to apply the methods of network analysis (see chapter "Network Analysis and Health Inequalities: A Methodological Introduction") in a consistent way. For example, health risks and resources in the network should be modeled as parts of the living environment while being relatively independent of the individual. For example, the exposure to smoking classmates is greater for young people from lower income groups, regardless of whether they themselves smoke or not. This extension of the model is achieved by the overall network analysis, which includes all nodes and edges within a defined space. The actors (as nodes) have relationships even without the agency or knowledge of the individual (alter-alter relationships). These (sometimes perhaps unconscious) relationships in turn have an effect on nodes and edges within the ego-centered network, which can then affect individual health. Furthermore, qualitative and ego-centered network procedures also enable researchers to expand the space of possible influences of the social network on health by adding previously unknown actors (nodes) as so-called actor generators. However, all authors of this volume agree that the field of network research in medical and health sociology as well as in social epidemiology has large gaps with regard to the consideration of alter-alter relations and with regard to the inclusion of additional actors.

A considerable structural expansion of network research is demanded by Philip Adebahr (see chapter "Negative Ties and Inequalities in Health")—the inclusion of so-called *negative relationships* or, more precisely, *negative ties*. Quarrels, conflicts, psychological stress, physical injuries, or other negative aspects of relationships should not solely be understood as health risks. Rather, their effect depends on the context of other relationships—the entire network. Nor should the concept of negative relationships be limited to ego networks. It may be that moderating or mediating functions of the network, as formulated above, can be better understood and explained only by including negative relationships in alter-alter relationships. For example, limitations of the network due to lower income might be better described by the presence of negative relationships than by the absence of positive

relationships. There is a gap in research here, because so far not enough is known about the negative aspects of relationships. One under-researched aspect is the extent to which negative ties organize networks. Other aspects are the extent to which they are socially unequally distributed or the extent of contagion mechanisms depending on vertical dimensions of inequality. Social advancement, for example, could be presented not only as a gain from positive relationships, but also as a detachment from negative relationships. The inclusion of negative aspects of social relationships is similar to other concepts from relationship research, for example, the concept of "intergenerational ambivalence" (Lüscher & Pillemer, 1998).

Regardless of the theoretical and methodological challenges to network research just described, the following section lists gaps in *content* as described in different chapters. The contributions collected in this volume present the state of research and were clustered into different fields. One of these fields is the life course perspective, and chapters were ordered according to age, from childhood to seniority. A second field of research entails vertical and horizontal inequalities—from socioeconomic status to nation-ethno-cultural affiliation. In the next section, we will identify open questions from the perspectives of life course research and inequality research. By doing so, we hope to show the direction for future research efforts. To anticipate one major result: studies that merge health, network, and social inequality into a unified model are not available. Given that limitation, the reader may be disappointed by the fact that this volume does not present comprehensive results on these interactions.

2 Open Questions from the Perspective of Life Course Research

Before summing up the open questions from this book, we have to admit that the research we found contains several blind spots. First of all, most studies reviewed here stem from the up the war in Ukraine mostly peaceful Global North and industrialized countries, including China. Those studies, however, mostly point to the healing and compensating effect networks can have for marginalized social groups. At the same time, exclusion from health care provided by the society had a strong effect on individual health. These results gained for the industrialized part of the world certainly extend to other parts where usually less institutional health care is provided and more people live in highly segregated societies. However, not only factors of global distribution of wealth and welfare were left aside to some extent in this book, but also factors of cultural diversity. Here, a field of future research on social networks is opening—studying the interplay of social networks, SES, and cultural factors influencing individual health outcomes on a global scale. A very recent study on female sex workers in China for instance (Yuruo et al., 2021) found associations between individual values of collectivism, network parameters, and stigmatization. Smaller and more homogenous networks were associated with lesser stigmatization for sex workers, but more so for older sex workers who shared the

traditional collectivistic values. Another culture-sensitive concept influencing network structure and processes may be the so-called familism, meaning the directing role the family has for social relations and individual development in certain cultures. In a study comparing the mental health of ethnic minority and majority students during the transition to college in California, family support played a bigger role for ethnic minority students, but only if support from friends and teachers was lacking (Reis et al., 2009). With regard to the life course perspective, various authors point out in the second part of this volume that almost all known studies exclude biological factors from the models (see chapters "Social Networks, Family Social Capital, and Child Health" and "Social Networks and Health Inequalities in Young and Middle Adulthood"). This applies in particular to genetic factors, which have an effect not only in childhood but throughout life and often interact with environmental events. Such events can be directly related to networks, such as loss of central relationships or changes in network positions. This topic is largely uncharted scientific territory and requires large studies with multidimensional data. In other words, it requires complete bio-psycho-social surveys (see Sect. 5).

Furthermore, different mechanisms of social networks (see chapter "Social Network Mechanisms") seem to be effective in different phases of life. For example, social influence in the form of direct social control (exercised by the parents) may be more significant at the beginning of one's life compared to social contagion. Social contagion is likely to increase with the growing autonomy of the individual over the course of his or her life and possibly lose importance toward the end of life compared to social control (e.g., exercised by helpers). In order to investigate this time perspective on the dynamics of social networks, conceptual mergers of sociological network and psychological development research are needed. Within those models, phase-specific regulatory mechanisms may be assumed.

With regard to children's networks, Daniel Lois (see chapter "Social Networks, Family Social Capital, and Child Health") notes that in empirical research family networks are often too narrowly defined. Siblings, grandparents, distant relatives, or adopted family members are rarely included. Moreover, as family networks diversify during the course of modernization, they would benefit from the inclusion of the alter-alter edges and their formalization as negative relationships. For example, one may imagine networks of children from patchwork families that include four or more pairs of grandparents whose alter-alter relationships may be influenced by conflict-driven relationships between the respective parents, for example after divorce (see chapter "Social Networks and Health Inequalities in Young and Middle Adulthood"). Patterns of positive and negative relationships of distant relatives are relevant to the child's health in many ways, for example, when certain grandparents (e.g., parents of the divorced partner) are excluded from the network (by the mother) because of their risky health-related behavior, but are still needed in order to provide financial or practical support. They may also be needed due to the negative relationship with the subsequent partner.

From a network perspective, the youth period of the life span is the best studied so far (see chapter "Social Networks, Health, and Health Inequalities in Youth"). Here, Irene Moor and co-authors present the largest methodologically advanced studies,

which nevertheless have some gaps in content. Most of the studies cited for adolescence are aiming at school contexts. Too often important network shares of families and extracurricular contacts (e.g., in clubs) are omitted from the studies in favor of surveying the overall network (a school has clearly defined boundaries). Since most studies have a cross-sectional design, causal statements are rarely possible. Nevertheless, relative to studies from other stages of life the studies on adolescence come closest to the goal of conceptualizing network and health inequalities together. Most studies focus on risky health-related behavior, especially nicotine use. Studies on mental health are harder to find, but are alarming and promising at the same time. Social networks, especially groups of peers, mediate between the socioeconomic status of young people and their risky behavior. However, little research has been conducted to date that examines the significance of social networks for health inequalities (aside from tobacco consumption).

The association of network and health in adulthood seems to be influenced by two factors: lifelong stabilities (such as extended networks of friends or the personality of the adult) and biographical transitions that are associated with changes in the network. Only a few of the reviewed studies analyze these relationships within the context of vertical inequalities. Some events, such as divorce, reveal the connection of transition, network, and health equality. Holger von der Lippe and Olaf Reis (see chapter "Social Networks and Health Inequalities in Young and Middle Adulthood") list some requirements for network research. In their view, event structures (e.g., their sequence) and timing should be considered in network research, since similar events interacting at different times with other events have various effects on networks and can therefore have different effects on health. Moreover, the authors emphasize effects of secular change, which can have lasting impact patterns in adulthood with vertical inequalities playing a significant role.

For studies on older age, Britta Müller and Lea Ellwardt (see chapter "Social Networks and Health Inequalities in Old Age") point out gaps in content and methodology. Available studies concentrate mainly on persons living in their own homes. To date, it is unclear to what extent these findings are transferable to residents of nursing homes. The effect of individual transitions on networks during the late phases of life is also an open question. Influences of health deterioration and functional losses are to be expected for that period. Previous studies have analyzed the connection between socioeconomic status (SES), health, and social network with depression or functional and subjective health. However, the question of whether interactions with SES and social network also occur in dementia and pain-associated diseases has yet to be clarified. The authors emphasize that complex research designs including social networks in old age should be preferred to investigate the relationship between SES, health, and social network. Purely quantitative or qualitative instruments are less suitable. Up to now, network characteristics in gerontological research have usually only been measured indirectly via a proxy. Established methods of network analysis provide a potential option that should be used much more for future research on the elderly.

3 Open Questions from the Perspective of Inequality Research

In the third part of the volume, the authors approach network research from the perspective of inequality research. For studies on social status, Nico Vonneilich (see chapter "Social Status, Social Relations, and Health") states that there are hardly any studies that link macro-social, micro-social, and individual processes together in multi-level models. Within a few studies only these levels are connected with each other, and socio-structural factors for the creation of stable social networks are taken into account and related to health. Since there are hardly any relevant studies with comprehensive sets of indicators on social networks, the author recommends the re-analysis of existing data sets, such as the SHIP study. However, secondary data are often afflicted with measurement problems either at the health or network level. Gerhard Krug et al. also deplore the lack of studies showing networks in their impact on health inequalities for the relatively well-studied inequality after the transition to unemployment (see chapter "Unemployment, Social Networks, and Health Inequalities"). This lack is all the more regrettable as good evidence of network-based mediator and moderator effects has been produced for this event. For this topic, processes related to time and timing can hardly be described due to the extensive lack of longitudinal studies.

With regard to mental health, in particular, it is difficult to differentiate between cause and effect, since most studies rely on selected samples. Such "downward spirals," in which smaller networks and poorer health conditions follow each other, have so far only been shown to a limited extent, for example with single parents (see chapter "Social Networks and the Health of Single Parents"). As for unemployment, evidence for single parents points to the buffering effects of functional networks; however, differentiated analyses are lacking. Sylvia Keim-Klärner lists various approaches that could fill this gap. She differentiates between longitudinal, cross-sectional, and qualitative analyses. She considers the inclusion of negative relationships and relationship content as promising to increase knowledge and to do justice to the complexity and ambivalence of relationship configurations and interactions.

On the subject of gender (see chapter "Gender and Health Inequalities: Social Networks in the Context of Health and Health Behaviour"), a central dimension of inequality in the current social science discussion, Markus Gamper and co-authors state that research focuses almost exclusively on the two gender identities: "man" and "woman." In the course of the social debate on gender identities and the decision of the German Federal Constitutional Court in 2017, which obliges legislators to provide a third option ("diverse") for inter-gender persons in birth and population registers, more attention could be paid to the health situation of persons with other gender identities (McDermott et al., 2021). Relatively little is known about their health situation to date, partly because of the difficulty of recording this group in representative surveys (Reisner et al., 2016). While research on gender effects focuses particularly on the youth and elderly, the other phases of life tend to remain underrepresented. Methodologically, research in this area is relatively well

developed, and there are a large number of quantitative network studies, including longitudinal studies, using SIENA models. Yet, qualitative network research or visual network methods that would be particularly suitable for uncovering the mode of action of social networks (see chapter "Social Network Mechanisms") can hardly be found. Further development in this area would be worthwhile.

Compared with the unemployed or single parents, people with disabilities are a group that is largely neglected by network research (see chapter "Social Networks and Disability: Access to and Stabilization of Integration into the Primary Labor Market"), although for instance in Germany they represent one-tenth of the total population. This gap is all the more important because people with disabilities influence the maintenance and formation of networks and employment relationships. In addition to institutional actors, many other factors play a role in keeping this group healthy. These factors, however, were rarely linked to network parameters (such as regional accessibility). Furthermore, Stefan Zapfel and co-authors also point to the changing importance of different institutions.

Health risks regarding migration and (multiple)nation-ethno-cultural affiliation and associated network mechanisms are explained via different models, such as the "Healthy-migrant" hypothesis (see chapter "Migration as a Health Inequality Dimension? Natio-Ethno-Cultural Affiliation, Health, and Social Networks"). Those hypotheses, however, are hardly pursued in research methodology. Moreover, other dimensions of inequality, such as economic status or cultural capital of migrants, are rarely modeled. Migration, however, sets up a most interesting field wherein the interplay of inequalities, cultural factors, and social networks should be investigated on a global scale, not only for the industrialized countries or welfare states. According to Annett Kupfer and Markus Gamper, there are considerable methodological gaps in the recording of migrant networks when it comes to women. Furthermore, there are almost no longitudinal studies or studies with comparison groups. Negative relationships (edges), which are marked by hostility, discrimination, or racism, for example, are not surveyed as part of migrant networks, nor are welfare state or other institutional nodes. Finally, there are hardly any studies that link health, networks, and migration.

The authors of the third part of the volume agree that the *mechanisms of* network influence are rather presupposed than investigated. Various hypotheses are possible, such as the loss of *integration* into the group of colleagues after the transition to unemployment or the connection between support, negative relationships, and homogeneity in the network among single parents. For all inequalities, it is true that in modern welfare societies, institutions play a decisive role in the success of networking—for example, job centers in the case of unemployment, family helpers for single parents, integration helpers for disabled people, and migration services for migrants. Private and institutional relationships are intertwined here, but their interaction has hardly been investigated so far (see Kupfer, 2015). Interesting hypotheses can also be formed regarding this interaction. In essence, studies of this kind address modes of action of the modern welfare state. For example, institutional and private support could be mutually supportive or could compete (similar to the thesis on interrupted dyads in the development of friendships after

transition to partnership; see chapter "Social Networks and Health Inequalities in Young and Middle Adulthood"). The different interactions could possibly be explained by the strength of the respective relationships. When state and private support are intertwined, it remains questionable whether such networks actually connect to each other or whether defined boundaries (e.g., between state and private relationships) remain within *hybrid network constructions.* Such hybrid constructions, in which private and institutional network parts are intertwined but are kept separate, would benefit greatly from the introduction of edge-specific mechanisms (e.g., support in weak institutional relationships, infection in strong proximal relationships) as well as from the inclusion of negative relationships (e.g., the mistrust of single parents toward the youth welfare office with simultaneous dependence on institutional support). If the idea of extensive network research and its extension to social institutions is pursued further, it is unclear whether network hierarchies and structures can be represented, for example as "networks within networks." A proposal for such structures was presented by Reis (2017) when he described families in the German Democratic Republic (1949–1989) as "niches" within the communist totalitarian state.

4 Life Course, Inequality, Network, and Health: Some Hypotheses

It must be said that the integration of the life course perspective and inequality research for social networks and health is lacking for the most part. It is necessary to understand network changes across life phases as health risks and resources that are either consequences (mediation) of social inequalities or influence their impact (moderation)—here a new research area awaits development. With the expanded network perspective, as presented throughout this book, many previously hypothesized connections could be examined, for example:

- Success makes one lonely and then sick, but only if one comes from a socially lower class and starts to progress into adulthood.
- Keeping young people healthy is largely due to the relationship work of their parents, for example, by parents interrupting negative relationships (e.g., by moving away from a high-risk neighborhood), but only those who have sufficient resources can do this.
- Alter-alter ties, i.e., relations between others in one own's network, are more important for giving access to better quality healthcare resources in networks of more affluent classes compared to networks of poorer ones. This mechanism works already early in life, that is, for the children of more affluent parents.
- The lack of willingness to provide care to the elderly is often the result of negative past relationships, with "poorer old people" being more severely affected than more affluent ones.

- Risk behavior is suitable for improving the position within the network (e.g., centrality), but only if the whole network contains no other chance for comparison, for example, if other network participants (nodes) are better equipped financially. Such network mechanisms are limited to the youth, because for older age groups social networks become more homogenous.

5 Outlook: Requirements for Future Research

For the formulation of desiderata for future research, we return to the model presented at the beginning of this book (see chapter "Social Networks and Health Inequalities: A New Perspective for Research") and assign our conclusions to the levels of analysis described there.

For the *top model level* in Fig. 1, the demand that social inequalities should be a *conditio sine qua non* of health research still applies. The increasing average prosperity of Western industrialized countries is currently associated with increasing social inequality (Alvaredo et al., 2018), with both increases having an impact on health. The social change toward a digital knowledge society and economy (Reckwitz, 2017) as part of the "runaway world" (Giddens, 1999) includes considerable risks for inequality, detachment, and flexibilization. The transformation of these risks into chances requires high individual investments, including investments into functional networks. Categories of inequality, both horizontal and vertical, perhaps become more dynamic in digital economies. Mobility, both social and spatial, requires social capital, the inclusion of which in health prediction models should become a standard.

The objectification of social capital requires the most accurate measurement of social networks (*model level 2* in Fig. 1). The inconsistent and, in some cases, inappropriate measurement of social networks was a point of criticism expressed in all contributions in this volume. Some demands on network research compiled from the individual chapters that could improve the meso-foundation of health include the following:

- The network analysis should go beyond the recording of the type and number of contacts and should allow statements about the structural level that include parameters such as density, homogeneity, centrality, cliques, or structural holes.
- The network should contain more detailed information about the alters and their properties, both as newly generated nodes (by actor generators) and through their relationships (alter-alter edges).
- Basically, relationships (edges) should not only have health-promoting aspects (in the sense of support or social capital), but also negative, health-damaging aspects. Negative relationships are likely to reduce health-related capital. They may occur both close to the individual and far from it. Negative ties can have a direct effect on the ego or affect alter-alter relationships. Finally, relationships can

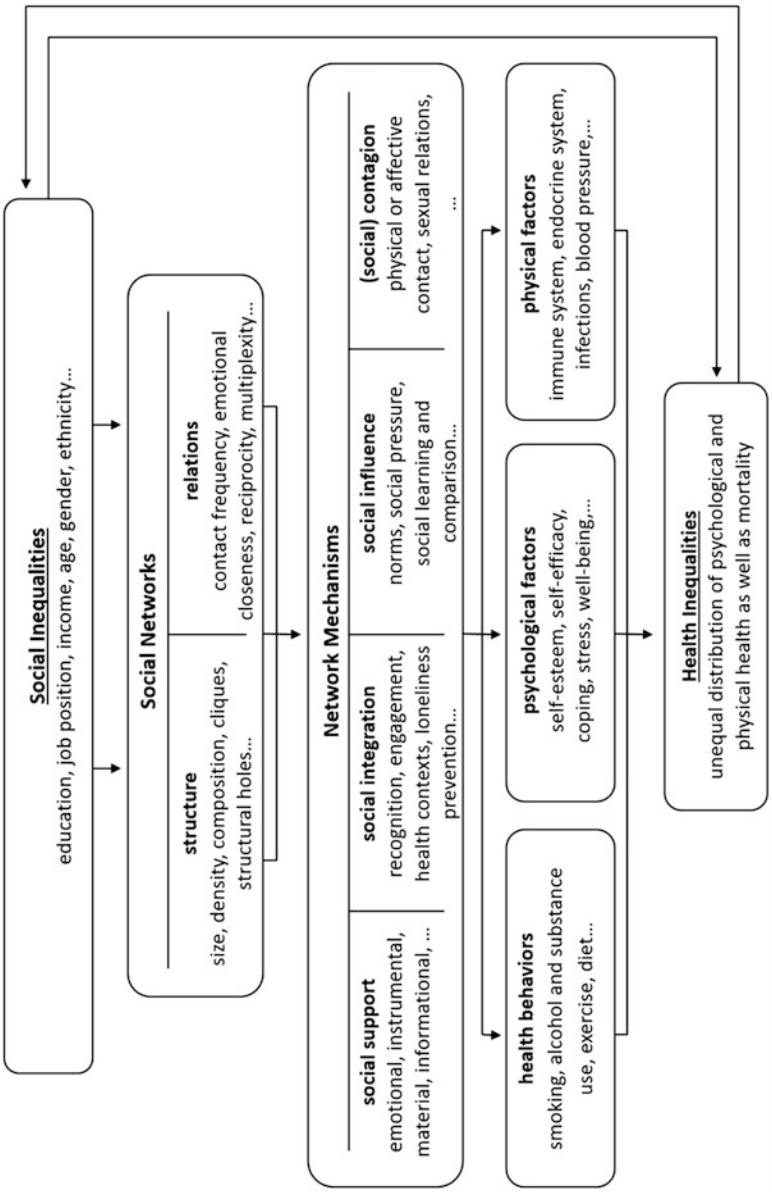

Fig. 1 Repetition of the summarizing theory model on social inequalities, social networks, and health inequalities (see chapter "Social Networks and Health Inequalities: A New Perspective for Research"). Source: Own representation, based on: Berkman and Glass (2000), Elkeles and Mielck (1997), and Dahlgren and Whitehead (1991)

be simultaneously supportive and burdensome and should not be reduced to a (single) function.

- The measurement of social networks should be as similar as possible for different contexts, with regard to space and time. By (social) space we mean dimensions like urban-rural, work–leisure, offline–online, or migration events. Framing concepts, such as "family" and "health," depend on cultural definitions and belong here. Spatial dimensions also describe event-related changes in social space, for example after unemployment or changes in the life of someone with a disability. Different time contexts refer primarily to age- and life course-related network changes. In the chapters of the second part of this volume, it was shown that different ages are not only associated with different event structures, but also with different individual preconditions for the shaping of networks. Roughly speaking, the individual construction of the network over the life course has the shape of an inverted U, whereby both expansion and activity parameters change over the life course. Spatial and temporal contexts of network acquisition are mutually interrelated. For example, "untimely" transitions, that is, transitions that are not adapted to the social norms of time, such as premature parenthood, make it less likely that certain social spaces, such as the university, will be entered. Similarly, the lifelong risks of transitioning into unemployment vary depending on when and how often this transition takes place and within what length of time. Late transitions into unemployment seem to be more problematic than transitions early in life.
- If the concept of reciprocity gets used consequently for social relationships, it is also possible to relate network changes that occur far apart during the life course. For example, late unemployment among parents leads to the end of their lives at work and also to increased investment in their own children and grandchildren, which in turn possibly make health-promoting effects of the family network or support in old age more likely.
- It cannot be assumed that networks only affect passive individuals in top-down mechanisms. Individuals change networks as soon as they encounter them, whether consciously, strategically, or unconsciously. That means networks are also subject to bottom-up "couplings" and selection effects. The active contribution of the individual (e.g., through individual sociability or individual networks) is an important additional variable that needs to be controlled for.
- An ideal network measurement should take into account that networks probably operate through different mechanisms (model level 3 in Fig. 1). Even if all of the mechanisms discussed by Klärner and von der Lippe (see chapter "Social Network Mechanisms") will be difficult to map in a single study, a distinction should nevertheless be made between social support, inclusion, influence, or contagion effects. For this purpose, short scales, such as the Oslo Social Support Scale (OSSS) (Dalgard et al., 2006) or the F-SozU K-14 and F-SozU K-6 (Kliem et al., 2015), are available in validated form. While the OSSS records social support with three items, in the F-SozU K-14 three items also describe the social integration of a person.

- In the future, offline mechanisms should be examined in their interrelation with online mechanisms. Mechanisms vary from pure macro strategies, such as the notorious Facebook experiment that attempted to reveal whether the emotional state of users can be manipulated by selecting the news reports displayed in the news feed (Kramer et al., 2014; Kleinsman & Buckley, 2015), to micro-systemic on/offline-switching behavior, such as the transition from (cross-class) multiplayer game networks to offline friendships. The biggest industries of modern times have emerged in the meso-systemic area of social networks. The business concepts of those industries are closely linked to network mechanisms, such as inclusion, social influence, or contagion. Machine intelligences or algorithms that do not always reveal themselves as such constitute important nodes in these networks. Thus, future network studies should also benefit from research on human–human–machine interactions (e.g., in the case of health apps shared by partners) or from research on deceptive communication.

Here, various hypotheses can be built about the mechanisms by which social networks "couple" to proximal, that is, micro-founded, factors of health. As far as the measurement on this *fourth model level* from Fig. 1 is concerned, a revolution is currently taking place here, and future network research will have to be oriented toward it. Without elaborating further on this idea, it should be pointed out that, for example, health-related behavior can be highly objectified via so-called EMAs (ecological momentary assessments) of, for example, psychophysiological parameters (Raugh et al., 2019). Mental and physical markers, from skin conduction resistance, blood pressure, and brain activity to the current gene expression for the formation of the sleep-controlling hormone melatonin, are becoming more and more accessible in the course of increasingly complex analyses in the health sciences and can be recorded in dynamic ways (changing in time and place). The patients of the future must be understood in many ways as "connected," meaning that offline and online relationships are among the "driving forces" in "digital psychiatry" or "e-health" (Bughra et al., 2017, p. 799).

A substantial change is ongoing on the fifth level of our proposed theoretical model, called inequality in mental and physical morbidity and mortality. This change regards measurement processes and more. For example, definitions of "diseases" are changing with the introduction of new coding systems, such as the expected replacement of the ICD-10 with ICD-11. Increases or decreases in the prevalence of diseases may also be due to macro-systemic changes in attribution. Healthcare costs, such as those provided by the European Brain Council for brain-associated disorders (https://www.braincouncil.eu/), and their distribution should be included in the modeling of social and health inequalities. Thus, whether and how the functions of networks differ within healthcare systems financed by insurance companies, tax revenues, or private capital or combinations of these is a question for research.

6 Network and Health Inequalities: Hot Topics

Here, we would like to list a few topics that we would have liked to discuss in this volume, but for which there was no time, no space, or no author to be found. Like Christakis and Fowler (2011), we believe that networks are a *universal* agent of human development and thus of health. The following list therefore does not follow a systematic approach, but only describes some wishes and ideas of the researchers involved in the volume.

6.1 Commuting, Online and Offline Networks, and Social Class

The considerable flexibilization of the labor market in all sectors, the increasing proportion of temporary employment, and the expansion of the low-income sector are associated with increasing intra- and international labor migration, which exceeds the mobility of families and *convoys of life* (Ceccagno & Sacchetto, 2020; Wrzus et al., 2013). A growing number of work commuters increasingly spend time far away from offline networks. The duration of work stays is often too short to build up offline networks at remote places. Here, for example, one could ask to what extent the health risks associated with commuting or short-termed migration are moderated by online networks, how spatial and social mobility are linked, or how timing effects, network, and social status are related. The balance of online–offline contacts may vary depending on social status, for example, if manual seasonal workers (e.g., harvesters) have fewer resources to see their families regularly compared to better-off temporary employees from the IT industry.

6.2 Mental Illness, Online and Offline Networks, and Social Class

In principle, mental illnesses are highly associated with dysfunctional social relationships, whereby various directions of association could be adopted for development, chronification, or therapy of disorders. Moreover, the long-known associations between social class and psychiatric diagnosis (Hollingshead & Redlich, 1958) have rarely been the subject of scientific research in recent years and deserve to be revived in the context of network analysis. A practical example from therapy will illustrate this demand.

Usually, mental illness is only treated with the consent of the patient. The relative isolation (from risky social contexts) is an essential component of many inpatient therapies. However, the general electronically mediated networking across space and time boundaries has become so much a part of everyday life that many patients agree

to inpatient therapy only if they must not refrain from networking. Therefore, many clinics allow communication with the "outside world" (mobile phone time), at least temporarily, which might pose a risk to the success of therapy. For example, the therapy of non-suicidal self-injurious behavior is sometimes thwarted when patients are confronted with the narratives of non-patients and images of slashed forearms via WhatsApp. Thus, several questions can be asked here, for example: how can psychotherapy succeed under conditions without interrupted dyads, how can the effects of negative relationships be minimized, or how can therapy be improved by including disease-relevant platforms? Similar to the findings for adolescent smoking behavior, it could be assumed that adolescents with lower social status are more often confronted with risky behavior in their networks because their networks are less homogenous. For example, it should be investigated as to whether so-called Werther or Papageno effects (social infection of suicidal behavior or suicide preventive behavior) have different effects in different social strata. It was shown, for example, that media role models, mediated via offline networks, have an effect on suicidal behavior of adolescents (Abrutyn & Mueller, 2014), without health inequalities having been investigated so far. In the sense of the classic study by Hollingshead and Redlich (1958), the question as to whether status-dependent access to the psychiatric help system is moderated or mediated by network functions remains open.

6.3 Poverty, Health, and Institutional Network Relations

Institutions and professional helpers can be important actors or nodes in a network, especially for people at risk of poverty (Klärner & Knabe, 2019). Within those networks, they cannot only improve well-being, but may also have a stronger health-relevant effect, for example, by bringing preventive or curative measures to the person. The socially unequal distribution of access to support systems may reinforce (or mitigate) health-related inequalities depending on the place of residence and local opportunities. Institutional helpers are actors of the welfare state fighting poverty (Paugam, 1998), and they may or may not be accessible. The question to be asked here is in what ways these actors work within a social network, for example, whether they influence relationships with other actors. Another research question might be which network structures support the receivers' autonomy, or if they, in contrast, tend to create dependencies and thus have a more detrimental effect. For the latter case, the hypothesis would be that detrimental professional support sparks investments into more informal networks.

6.4 *The Spatial Dimension of Social Networks: Health and Social Networks in Rural Areas*

Social networks also have a spatial dimension: in order to establish direct interpersonal contacts and interactions with friends, acquaintances, institutional helpers, doctors, and so forth, or to make use of certain health-related services in clinics, pharmacies, or emergency facilities, a spatial distance usually has to be covered. Accessibilities to healthcare institutions and service providers are spatially and socially distributed unequally (Neumeier, 2016). The question arises what kind of effects is produced by the absence or poor accessibility to these institutionalized nodes in the network. Another question is whether other areas of the network can compensate this inaccessibility. It might well be that the absence of face-to-face services can be replaced and supplemented by new digitalized services. The consequences of the unequally distributed *health literacy* in this context must also be considered. Approaches to capitalize on network analytical methods in this context and to reconstruct a form of *spatial capital* were presented at a session organized by SoNegU at the Sunbelt Social Network Conference (Galaskiewicz et al., 2016).

References

Abrutyn, S., & Mueller, A. S. (2014). Are suicidal behaviors contagious in adolescence? Using longitudinal data to examine suicide suggestion. *American Sociological Review, 79*, 211–227.

Alvaredo, F., Chancel, L., Piketty, T., Saez, E., & Zucman, G. (Eds.). (2018). *World inequality report 2018*. Harvard University Press.

Berkman, L. F., & Glass, T. (2000). Social integration, social networks, social support, and health. In L. F. Berkman & I. Kawachi (Eds.), *Social epidemiology* (pp. 137–173). Oxford University Press.

Bughra, D., Tasman, A., Pathare, S., Priebe, S., Smith, S., Torous, J., Arbuckle, M. R., et al. (2017). The WPA-Lancet Psychiatry Commission on the future of psychiatry. *Lancet Psychiatry, 4*(10), 775–818.

Ceccagno, A., & Sacchetto, D. (2020). The mobility of workers living at work in Europe. *Current Sociology, 68(3)*, 299–315.

Christakis, N. A., & Fowler, J. H. (2011). *Connected: The surprising of our social networks and how they shape our lives, how your friends' friends' friends affect everything you feel, think, and do*. Back Bay Books.

Dahlgren, G., & Whitehead, M. (1991). *Policies and strategies to promote social equity in health: Background document to WHO—Strategy paper for Europe*. Retrieved November 9, 2020, from https://www.researchgate.net/publication/5095964_Policies_and_strategies_to_promote_social_equity_in_health_Background_document_to_WHO_-_Strategy_paper_for_Europe

Dalgard, O. S., Dowrick, C., Lehtinen, V., Vazquez-Barquero, J. L., Casey, P., Wilkinson, G., Ayuso-Mateos, J. L., Page, H., Dunn, G., & The ODIN Group. (2006). Negative life events, social support and gender difference in depression: A multinational community survey with data from the ODIN study. *Social Psychiatry and Psychiatric Epidemiology, 41*, 444–451.

Elkeles, T., & Mielck, A. (1997). Entwicklung eines Modells zur Erklärung gesundheitlicher Ungleichheit [=Development of a model to explain health inequalities]. *Gesundheitswesen, 59*, 137–143.

Emirbayer, M. (1997). Manifesto for a Relational Sociology. *American Journal of Sociology, 103*(2), 281–317.

Galaskiewicz, J., Freeman Anderson, K., & Thompson-Dyck, K. (2016). *SpatialCapital: Applications for the study of urban inequality.* In Paper presented in the session on Social Networks and Health Inequalities. International Sunbelt Social Network Conference, April 5–10, Newport Beach, CA.

Giddens, A. (1984). *The constitution of society. Outline of the theory of structuration*. Polity Press.

Giddens, A. (1999). *Runaway world*. Profile Books.

Hollingshead, A. B., & Redlich, F. C. (1958). *Social class & mental illness*. Wiley.

Klärner, A., & Knabe, A. (2019). Social networks and coping with poverty in rural areas. *Sociologia Ruralis, 59*(*3*), 447–473.

Kleinsman, J., & Buckley, S. (2015). Facebook study: A little bit unethical but worth it? *Bioethical Inquiry, 12*(2), 179–182.

Kliem, S., Mößle, T., Rehbein, F., Hellmann, D. F., Zenger, M., & Brähler, E. (2015). A brief form of the Perceived Social Support Questionnaire (F-SozU) was developed, validated, and standardized. *Journal of Clinical Epidemiology, 68*(*5*), 551–562.

Kramer, A. D. I., Guillory, J. E., & Hancock, J. T. (2014). Experimental evidence of massive-scale emotional contagion through social networks. *Proceedings of the National Academy of Sciences, 111*(24), 8788–8790.

Kupfer, A. (2015). *Wer hilft helfen? Einflüsse sozialer Netzwerke auf Beratung [=Who helps to help? Influences of social networks on counseling]*. dgvt.

Lüscher, K., & Pillemer, K. (1998). Intergenerational ambivalence: A new approach to the study of parent-child relations in later life. *Journal of Marriage and the Family, 60*, 413–425.

McDermott, E., Nelson, R., & Weeks, H. (2021). The politics of LGBT+ health inequality: Conclusions from a UK scoping review. *International Journal of Environmental Research and Public Health, 18*(2).

Neumeier, S. (2016). Regional distribution of ambulant nursing services in Germany. A GIS accessibility analysis. *Raumforschung und Raumordnung, 74*(*4*), 339–359.

Paugam, S. (1998). Poverty and social exclusion: A sociological view. In M. Rhodes & Y. Mény (Eds.), *The future of European welfare*. Palgrave Macmillan.

Raugh, I. M., Chapman, H. C., Bartolomeo, L. A., Gonzalez, C., & Strauss, G. P. (2019). A comprehensive review of psychophysiological applications for ecological momentary assessment in psychiatric populations. *Psychological Assessment, 31*(3), 304–317.

Reckwitz, A. (2017). *Die Gesellschaft der Singularitäten. Zum Strukturwandel der Moderne [=The society of singularities. On the structural change of modernity]*. Suhrkamp.

Reis, O. (2017). *Nischen im Wandel. Zur Transformation von Familien und Generationenbeziehungen in Ostdeutschland [=Niches in transition. On the transformation of families and generational relations in eastern Germany]*. Psychosozial.

Reis, O., Azmitia, M., Syed, M., Radmacher, K., & Gills, J. (2009). Patterns of social support and mental health among ethnically-diverse adolescents during school transitions. *European Journal of Developmental Science, 3*, 43–54.

Reisner, S. L., Poteat, T., Keatley, J., Cabral, M., Mothopeng, T., Dunham, E., Holland, C. E., Max, R., & Baral, S. D. (2016). Global health burden and needs of transgender populations: A review. *The Lancet, 388*(10042), 412–436.

Wrzus, C., Hänel, M., Wagner, J., & Neyer, F. J. (2013). Social network changes and life events across the life span: A meta-analysis. *Psychological Bulletin, 139*(*1*), 53–80.

Yuruo, L., Slopen, N., Sweet, T., Nguyen, Q., Beck, K., & Liu, H. (2021). Stigma in a collectivistic culture: Social network of female sex workers in China. *AIDS and Behavior*, *26*(2), 297–309.