

The Contextual and Household Contribution to Individual Health Status in Germany: What Is the Role of Gender and Migration Background?

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Introduction

As early as 1997 George Engel postulated the need to consider the multidimensionality of health in the contextual perspective on health, illness, and health care (Engel 1977), yet the meso-structural level of health is often neglected in research. The meso-level is located between state and individual actors and it describes influences of the direct environment, such as families and households. Theoretical approaches and empirical findings highlight that these characteristics are also important determinants of individual health.

It is well known that different types of households result in different morbidity and mortality risks (for a detailed overview, see Hank and Steinbach in this volume). Although, across the studies various indicators are used to reflect the household structure (usually marital status is taken into account, together with the life form, e.g. family structure, parenthood, presence and number of children, partnership status, cohabitation), this finding applies largely independent (Schneider et al. 2014). Our approach is to map this multidimensionality of living arrangements by examining several indicators together.

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Today private households and families are experiencing a differentiation and pluralisation, wherein the non-family sector (childless couples, living alone, living apart together) is growing and the family sector (couples with children, single parents) is shrinking (Meyer 2006). Meanwhile, in Germany less than half the population lives in a family, that is, with children. The proportion of households with at least three members has been declining for many years (1991: 35.6%, 2014: 24.8%), while 1-person and 2-person households are increasing. As a result, the average household size shrank from 2.27 in 1991 to 2.01 in 2014 (Statistisches Bundesamt 2015a). Life forms such as cohabitation, single parents, living alone, or childless couples do not completely repress the traditional family (married couples with children), but they are becoming increasingly common. We will analyze whether this development is accompanied by increasing health inequalities.

Gender is still a central determinant of health and health inequalities (Oksuzyan et al. 2014; Verbrugge 1989; see Oksuzyan et al. in this volume). Men and women show—at least partly—different mechanisms of health and illness, and they are vulnerable to different diseases (Denton et al. 2004). These differences are also apparent in the context of households and may even be exacerbated by household effects. Within households, social roles and gender norms are produced and reproduced, and usually the set of roles is different for men and women. To what extent this attribution of roles really has an effect on health and well-being, though, depends on the specific composition of the household, the type, strength and direction of relations, and other factors (McIlvane et al. 2007; Lowenstein et al. 2007), and is subject of our investigation.

Against the background of increasing global migration flows (Willekens 2015), the importance of the migration background as a determinant of (health) inequalities is increasing. Today, more than 200 million persons are living outside their country of birth, i.e. they migrated to another country (Willekens 2015). This raises a new cultural diversity within populations, which affects the health situation and demographic characteristics in the countries involved (both in the country of origin as well as in the host country) (Kohls 2012).

Germany has been an immigration country since World War II and is characterized by a large number of people with a migration background: About 20% (16.4 million) of the population in Germany has a migration background (Statistisches Bundesamt 2015a).¹ The largest groups among them are the Turks, who were recruited in the 1960s and 1970s as guest workers, and their descendants, and the Aussiedler,² who immigrated after the collapse of the Soviet Union (Statistisches Bundesamt 2015a). These two groups not only differ (more or less; see Section “Why Investigate the Health of Migrants and Distinguish Between

¹“Migration background” includes all people who immigrated to Germany themselves or are descendants of persons who immigrated to Germany (Statistisches Bundesamt 2015b).

²This term refers to foreign-born persons who hold German citizenship which was not acquired by an act of naturalization, who moved to Germany after 1949 [definition based on Statistisches Bundesamt (2011)].

Different Migration Backgrounds?") from the German host society, but also among themselves. In a health context it can be shown that Turks have increased risks of infectious diseases (Neuhauser and Razum 2008) and lower mental health (Milewski and Doblhammer 2015). By implication, Turkish migrants have disadvantages in healthy life expectancy relative to the German population; especially Turkish women show great disadvantages in life expectancy and healthy life expectancy compared to German women (Carnein et al. 2015). Aussiedler have higher rates of non-natural deaths but lower overall mortality than native Germans (Becher et al. 2007). While it is less common for Aussiedler to have severe diseases, they do suffer more frequently from mental disorders (Becher et al. 2007; Knipper and Bilgin 2009). At the household level, we find that the size and structure of a household depends on the migration background, where households of migrants are more frequently familial, larger, and have more children (Friedrich 2008; Worbs et al. 2013; Wittig et al. 2004; Woellert and Klingholz 2014). Both the household structure and health are therefore subject to a cultural imprint. Against the backdrop that once young migrants also age and are currently reaching ages associated with increasing health risks, the necessity to scrutinize integration and health inequalities in the context of migration background arises.

The direction and intensity of these connections have yet not been examined for Germany. We try to close this gap by analyzing the effects of household structure, namely the generational structure, on individual health. Due to the expected differences between men and women and between different migration backgrounds mentioned, we contextualize this by gender and migration background. Our main research questions are therefore: What is the influence of the household on health? What are the differences between men and women and which of these depend on the migration background? In addition, we conduct a mediator and moderator analysis to answer these questions: What is the impact of economic resources on the household effects? What influence do different characteristics of the household structure have on health in the context of migration background? The results can contribute to a better understanding of meso-level influences on health. They allow us to estimate the impact of changes in the family sector and contribute to a better understanding of health inequalities among migrants. Additionally, they can help identify vulnerable groups and exploit intervention as well as prevention measures in the German case.

Theoretical Perspectives and Findings

Health as an Outcome of Household Production

As George Engel's biopsychosocial model illustrates, illness and health cannot be understood as only individual characteristics, but rather they must be explored in a multilevel context (Engel 1977). This is why it is not effective to consider only

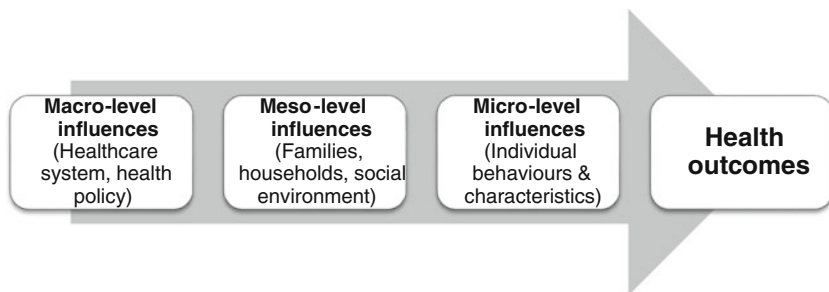


Fig. 1 Multidimensionality of health factors and health outcomes

effects on the individual level; a consideration of other contexts is also required when investigating determinants of health. In addition to individual characteristics, it is necessary to include families and other social organisations as well as healthcare facilities and health policy in order to gain a holistic understanding of health and disease (Holmes et al. 2008). Health outcomes are the result of factors at different levels, as we illustrate in Fig. 1.

Because they yield daily influences, households represent a crucial determinant of health. They set resources and demands and represent a special form of social networks, which are characterised by emotional ties, a specific role allocation, and permanent exchange relations. As a result, household members have similar resources and needs, and thus they show similar health outcomes (Hughes and Waite 2002; Berman et al. 1994). Currently, investigating the household as a determinant of health disparities appears to be particularly exciting, because households, household types, and household structures are becoming increasingly diverse. With increasing life expectancy, intergenerational relationships can last much longer, resulting in new (generational and familial) relationship potentials, e.g. long-term relations between grandparents and their grandchildren and multigenerational households³ (Arránz Becker and Steinbach 2012). These supposedly positive developments might even so be problematic: particularly the middle ages are in a “sandwich position” between their children and their parents, and are therefore faced with both a double burden as well as competing social role attributions (McIlvane et al. 2007).

In addition to this (partially) unequal distribution of roles, households fulfil the function as an instance of socialisation. They impart values, norms, duties and behaviour patterns, which are also reflected in health aspects. Within households and families, all members are producers of their own and the other members’ health (Jacobson 2000), and as a result of exchange relationships, health knowledge is shared, health behaviours are adopted, and a similar perception of health is configured (Jacobson 2000; Settertobulte and Palentien 1996).

³Despite the new potential, multigenerational households are rather atypical and tend to be less important; e.g. in Germany the proportion of all households with three or more generations declined from 1.2% in 1991 to 0.4% in 2012 (Hammes 2013).

One of the first conceptual frameworks, developed for the connection between households and health outcomes, is the Household Production of Health (HHPH) approach. The HHPH implies that households are the locus of health production, as they strive to maintain or restore their members' health. In a dynamic process, within households, internal resources (e.g. knowledge about health, health-related behaviours) are linked to external resources (e.g. information, resources, health services), so there is an allocation and adaption of health care strategies. This combination makes households more efficient than individuals and allows short-term responses and interventions, which have a quicker impact than contextual effects. Because health behaviour within a household is thus influenced by both the household itself and external factors, it can be assumed that different households and different types of households react differently given identical conditions, and that they would thus show different health outcomes (Berman et al. 1994). Economic theories, such as the approach of the New Household economics (NHE), expand the HHPH approach through economic aspects. This approach posits that the objectives of households are utility maximization and satisfaction, whereby health outcomes represent one possible source of satisfaction, which competes with other outcomes. Households are assumed to know how to produce health and strive to achieve a maximum of outcomes using available resources. The consideration, which and how many resources are used for which outcome, is a dynamic process. On the one hand, different combinations can result in the same outcomes, and on the other hand, similarly available resources do not necessarily result in equal outcomes (Berman et al. 1994). According to the NHE, health is subject to a large variance and depends heavily on intra-household choices. Statistical multilevel models are suitable and necessary to regard this variance when one investigates the effects of household and individual characteristics (DiPrete and Forristal 1994).

Findings consequently indicate that different types of households and living arrangements are linked to differences in health. In research, the aspect of the household is usually displayed by family demographic parameters, such as marital status (Hughes and Waite 2009). Being married is positively associated with good health outcomes (Joung et al. 1994; Schneider et al. 2014; Williams and Umberson 2004). This protective effect of marriage is largely explained by a better economic position and higher social support, but may as well—at least partially—be driven by differences in living arrangements. It has to be assumed that the living arrangements have an additional, but separate effect on health outcomes (Joung et al. 1994). While living alone is associated with health risks (Manderbacka et al. 2014; Cramer 1993), both partnership and parenthood are protective factors for health (Helbig et al. 2006; Koskinen et al. 2007; Zunzunegui et al. 2001; Kravdal et al. 2012).

According to Ferrer et al. (2005), the magnitude of household influences on health differences itself is dependent on the household composition. For married people without children, this effect of household and family is very pronounced; in this group, 22% of health differences are explained by the family-level effect (Ferrer et al. 2005). Soons and Kalmijn (2009) examined health differences between marriage and cohabitation and found that this effect is explained by the level of

institutionalization of cohabitation: In countries where the proportion of cohabitants is higher, the difference is smaller than in countries with a low proportion (Soons and Kalmijn 2009). With regard to the household composition, in Finland it was found that for those living alone, lone parents and cohabitants have a higher amenable mortality, which is attributed to economic disadvantages (Manderbacka et al. 2014). McIlvane et al. (2007) performed an analysis of the impact of the generational composition on self-rated health and found that single parents show low self-rated health. In contrast, living with parents has positive effects and may compensate for other, otherwise unfavourable characteristics, such as a low level of education or being unmarried (McIlvane et al. 2007). A longitudinal analysis of the relationship between living arrangement and different health outcomes was carried out by Hughes and Waite (2002). They state health variances across different living arrangements, where members of married couples living alone or with children show the best health and single mothers have the greatest health disadvantages (Hughes and Waite 2002).

To summarize, the household has a double significance in the production of health. On the one hand, different arrangements are associated with different health risks and health outcomes. On the other hand, further outcomes (e.g. gender roles, distribution of responsibilities, perception of health) are determined within households, which are associated with health differences. However, households are not independent, but are embedded in social conditions, so it should be considered that both the welfare state configuration and cultural norms influence this nexus.

Migration Background and Health in a Household Context

Migrants are people who change their main place of residence for a longer time or permanently to another country in the course of a migration process. They have in common that they have gone through this migration process, which is a phase of disruption and reorientation associated with stress and integration challenges (Neuhauser and Razum 2008). This process characterizes both their own situation and the family development over several generations (Neuhauser and Razum 2008). Due to often precarious employment and income situations as well as lower levels of non-transferable economic and educational assets, migrants more frequently belong to socially disadvantaged classes in the host country. This social deprivation is associated with additional health risks and often also has negative effects on the educational success of children with migration background (Schenk 2007). In addition to socio-economic disadvantages and downward social mobility (Constant and Massey 2005; Schenk 2007), problems such as language barriers, processes of integration, and cultural adaptation can affect migrants negatively, e.g. in terms of health (Neuhauser and Razum 2008). Language barriers, differences in health perception, and a lack of knowledge about the health care system in the host society often results in a limited access of migrants to the formal health care system and a

lower utilization of health services⁴ (Dias et al. 2008; Helman 2007). The stressful experiences associated with immigration and integration as well as social stigmatization and marginalization enhance this effect (Derose, Escarce and Lurie 2007; Neuhauser and Razum 2008). The health of migrants is thus determined by three aspects: the conditions in the country of origin, the conditions of the migration process, and the conditions in the host country (Spallek and Razum 2007).

However, migrants represent a heterogeneous group and differ in their origin, their cultural backgrounds, their motives to migrate, their duration of stay in the host country, their legal status, their degree of integration, their demographic behaviour, and many other characteristics (Lindert et al. 2008; Norredam 2011; Neuhauser and Razum 2008). They differ both among themselves as well as from the society of origin and the host society. Their decision to migrate is subject to a selection process, and in most cases driven by a positive selection mechanism: compared to non-migrants of the country of origin, migrants are mostly young, educated, and relatively healthy⁵ (Ghatak et al. 1996; Razum and Rohrmann 2002). Due to this combination of characteristics, migrants also differ positively from the host society, particularly in their work performance (Ghatak et al. 1996).

Migrants with their own migration experiences (i.e. first generation migrants) underwent their socialisation in their country of origin, which often differs from the host society, and therefore have incorporated different cultural ideas, behaviours, norms, and values. Because migrants often maintain ties with their countries of origin (Haas 2010), these patterns usually persist for a longer time after immigration. Gender norms, family ideals, health related behaviours, and health perception therefore are supposedly strongly influenced by the culture of origin and social policies in the home country. Consequently, it can be assumed, that migrants differ in their health outcomes and in household patterns from the host society, whereby the extent of these differences depends on the magnitude of cultural differences as well as the individual degree of integration.

Although social networks (in the potential host society and the society of origin) are an important aspect in the decision to migrate, migrants often experience a temporary loss of social ties and social capital (Haug 2007). The social capital affects the social embedding and the integration. As a source of control (Coleman 1990), social capital enables access to the labour market and thus affects economic and social outcomes. Using the example of Turks in Germany, Lancee and Hartung (2012) demonstrate that, among migrants, being embedded in inter-ethnic contacts results in advantages in the labour market (Lancee and Hartung 2012). The high importance of social networks among migrants can be inferred from the so-called "Latino Health Paradox". Despite a worse socio-economic profile, Latinos in the US have better health outcomes and lower mortality rates than do Whites, which is

⁴Studies have found that the differences in health risks and health care utilization between immigrants and non-immigrants are equalized with increasing duration of stay (Leclere et al. 1994; Kreft and Doblhammer 2012).

⁵This selection is called the "Healthy-Migrant-Effect" (Kohls 2008).

due to social factors, such as social networks and emotional ties (Viruell-Fuentes and Schulz 2009; Abraído-Lanza et al. 1999). Although this effect of social ties probably has a cultural component and depends on the legal status of migrants in the host country, we suspect transferability to other contexts, for example to the German case. Other studies also show that the family situation and the household structure might have a substituting function for external social ties: If the external social capital is low, the household and family act as a central compensating resource (Haug 2007). Burt's "Closure-Argument" highlights the importance of social networks in the creation of social capital (Burt 2001), whereby a dense family network also increases social capital (Haug 2007).

Thus, there are strong ties between the household context and the migration status. Both are strongly embedded in the cultural context and contribute to the formation of social norms (e.g. gender roles, family ideals, health perception). We therefore follow the assumption that the impact of the household on health is different between migrants and non-migrants.

Gender Differences in Health and Household Context

"The embeddedness of gender in all social relationships may make it impossible to separate gender from the very life circumstances that we examine in order to understand gender patterns in health. (Walters et al. 2002)"

Gender inequalities in health are reported frequently. Men and women not only differ in general in their morbidity and mortality, but also have different determinants for health and illness. For a detailed overview, see Oksuzyan et al. in this volume. This diversity is also reflected in the household context.

In the household context additional gender differences become apparent. The previously presented studies consistently illustrate—as far as they performed gender-specific analyses—a difference of determinants and effect sizes between men and women (Manderbacka et al. 2014; Williams and Umberson 2004; Soons and Kalmijn 2009; Hughes and Waite 2002). The underlying mechanism is that men's health shows a higher dependency on behavioural determinants, while for women social structural and psychosocial determinants are more important. It has to be assumed that household factors have a stronger impact on women's health than on men's health. Gender-based health inequalities thus reflect (among other things) social factors and an unequal distribution of family demands (Denton et al. 2004; Artazcoz 2001), which goes together with the social roles and role allocation within households already described (see Section "Health as an Outcome of Household Production"). Gender or gender-specific role assignments are crucial determinants of health, as they have an influence on how people behave and how they access health services (UN 2010; World Health Organization 2010).

Household and care work are still rather female domains (Oláh et al. 2014). Together with the increasing involvement of women in the labour market, additional burdens arise for women (Geulen 2004). The understanding of gender roles

and division of tasks is strongly influenced by social-political standards and cultural norms. Especially in conservative welfare states, the value of the family is quite high and there is a traditional division of tasks, due to which men and women are attributed different roles. Conservative welfare states have low levels of egalitarian participation on the labour market and shared household tasks (Hook 2006; Huschek et al. 2011; Batalova and Cohen 2002). This ideal of the traditional family image is maintained by social policies and thus can promote gender differences in the context of households and health (Esping-Andersen 1990).

Why Investigate the Health of Migrants and Distinguish Between Different Migration Backgrounds?

The need for migration background-specific analyses of health in Germany arises from the special composition of the German population. In 2014, one of every five people in Germany (16.4 million) had a migration background, i.e. they immigrated themselves or are descendants of migrants (Statistisches Bundesamt 2015a). Thus, the number of migrants in Germany is currently at a record high and a growing ethnic and cultural diversity is emerging. Against this backdrop, and due to the close ties between health and migration background, migrants must be considered as a group that is exposed to additional health risks. We carry out an internal differentiation of the migrant population in Germany and consider the two largest groups of migrants—Turkish migrants and Aussiedler—separately, because they differ in many characteristics and health outcomes. In the following analysis, we measure the migration background according to the definition of the German Federal Statistical Office (Statistisches Bundesamt) and consider both the (current and former) nationality and/or country of birth as well as the parents' ancestry. People with a migration background thus are all those who migrated to Germany themselves (first generation migrants), who were born as a foreigner in Germany, or who have at least one parent who immigrated or was born as a foreigner in Germany (second generation migrants) (Statistisches Bundesamt 2011).

Turkish migrants and Aussiedler are the two largest groups of people with a migration background in Germany. In 2014, approximately 3 million Turks lived in Germany, of which about 1.4 million were first generation migrants (Statistisches Bundesamt 2015b). The high number of Turks in Germany is explained by the recruitment of guest workers between the 1950s and the 1970s and subsequent family reunification. Aussiedler are the second large migrant group in Germany, comprising approximately 3 million people. Aussiedler, sometimes called "In-Migrating Ethnic Germans", are descendants of emigrants who moved from Germany to Eastern Europe before the 20th century or persons of German origin who stayed in the former German regions after the 2nd World War (Kreft and Doblhammer 2012). Aussiedler differ from other migrant groups especially in their cultural background and motives to migrate. In their home countries, Aussiedler

were a minority and they emigrated to live as Germans among Germans. For Aussiedler, Germany is their cultural home (Janikowski 1999). Due to this German origin, Aussiedler are in the unique situation that they are legally recognized as “Germans by status” and can directly acquire citizenship, which entitles them to participate in the health and welfare system. Aussiedler immigrated from different countries, the majority come from the former Soviet Union (1.4 million), Poland (570,000), Kazakhstan (568,000), and the Russian Federation (555,000) (Statistisches Bundesamt 2015b).

Studies demonstrate significant differences between the host population, Turks, Aussiedler, and other migrant groups in Germany. Regarding health, non-Germans generally are exposed to other and higher health risks; while chronic diseases and cancers are less common among migrants compared to Germans without migration background, they have higher risks of suffering from musculoskeletal disorders, cardiovascular diseases, diabetes, respiratory diseases, and infectious diseases (Neuhauser and Razum 2008). These differences are at least partly explained by poor working and living conditions of non-Germans, and also reflect the relatively high medical standard in Germany⁶ (Neuhauser and Razum 2008). More detailed analyses reveal that Turks in Germany have increased morbidity, and especially higher risks for cardiovascular diseases, diabetes, and viral hepatitis (Knipper and Bilgin 2009). This is particularly attributed to an inactive lifestyle and other eating habits (Knipper and Bilgin 2009). Among Turks, eating has a high priority (Rehaag et al. 2012); a bountiful table is a sign of hospitality and although traditional Turkish cuisine is based primarily on vegetables, they are often prepared with copious amounts of oil (Zwick 2007). Aussiedler, on the other hand, exhibit increased risk factors for cardiovascular diseases (e.g. alcohol consumption, obesity, drugs), but seldom have severe diseases. Despite the pooling of risk factors, Aussiedler have surprisingly low rates of mortality (Becher et al. 2007; Wittig et al. 2004; Knipper and Bilgin 2009). Generally, these differences (between the groups of migrants and non-migrants) are more pronounced in women than in men (Worbs et al. 2013). The causes are mainly due to socioeconomic differences, but also cultural differences contribute to this (Neuhauser and Razum 2008).

Turkish migrants in Germany have a low social status on average, e.g. low levels of education and a poor economic situation (Statistisches Bundesamt 2015a; Woellert and Klingholz 2014), and thus bundle characteristics that are associated with health disadvantages (Mielck 2008). On the contrary, the Aussiedler have an advantageous structure in their educational and professional qualification, are usually employed, and thus have a high similarity to the German middle class (Worbs et al. 2013). The proportion of people with a higher education entrance qualification is 43% among Germans,⁷ 31% among Aussiedler, and 20% among

⁶E.g., infectious diseases have become very rare in Germany due to medical processes and are now rather diseases of less developed countries (Omran 2005).

⁷In the following descriptions, “Germans” means the German population without a migration background in first or second generation.

Turks; the unemployment rate is 6% among Germans, 9% among Aussiedler, and 16% among Turks (Woellert and Klingholz 2014). The deviating proportions of the Turks are particularly due to the low integration of Turkish women in the education system and the labour market (Woellert and Klingholz 2014; Neuhauser and Razum 2008). Consequently, the housewife ratio, which reflects the proportion of women who stay at home, is markedly higher—49% of Turkish women stay at home but only 17% of Germans and 20% of Aussiedler (Woellert and Klingholz 2014). This demonstrates a still persisting classic distribution of tasks and traditional gender roles among Turks.

The majority of Turks in Germany are very religious, whereas the religious faith is rather understood as a norm than as an individual decision (Wetzels and Brettfeld 2007). Turks are usually Muslims (Haug et al. 2009), and in Islam roles tend to be non-interchangeable and the traditional family ideal is of great importance (Predelli 2004). Aussiedler are usually Christian (83%), and thus have the same confession as the majority of the German population without migration background (Worbs et al. 2013).

Marriage and family life forms have a higher importance among Turks (Sachverständigenkommission 6. Familienbericht 2000), and Turkish migrants show different patterns in their family-formation processes, e.g. marry at an earlier age and have more children (Milewski 2011). Aussiedler, as well, are more likely to be married and to share a household with children than Germans (Worbs et al. 2013). Again, this might be an indicator of the gender roles and family norms of their countries of origin, which are more conservative and traditional than in Germany, especially among Turkish migrants (Huschek et al. 2011; Diehl et al. 2009; de Valk 2008). As a result, the average household size and structure differs between Germans, Turks, and Aussiedler. While Germans live in rather small households (Ø 2.0 persons per household), the household size is larger among Aussiedler (2.3) and especially among Turks (3.1) (Woellert and Klingholz 2014). Familial forms of life, households with many children, and multi-generational households are more common among Turks and Aussiedler (Woellert and Klingholz 2014).

To summarize, there are several differences in many aspects of life between Turks, Aussiedler, and Germans. While Turks differ strongly from Germans—mainly due to their traditional norms—Aussiedler are quite similar to the German population. Aussiedler show—in comparison with Turks—a high degree of integration, which can be attributed to their legal status and their cultural similarity (Woellert and Klingholz 2014). We assume that the decision for or against a specific arrangement is culturally influenced and driven by deviating motivations and thus results in different health-outcomes.

Summary and Hypotheses

The descriptions above illustrate the importance of the household as a determinant of health, whereas the underlying mechanisms are not clear, but embedded in a strong network of individual values, cultural background, and socio-political

frameworks. What becomes clear is that the impact of household structures differs across the contexts, for example with regard to gender and migration background. We aim to discover and explain these various mechanisms.

Our analysis is designed to test four hypotheses deduced from the conceptual framework discussed above. First, we test the *family segregation-hypothesis*. There are different patterns in the household formation and different types of households are associated with disparate tasks and resources and finally result in different health risks. Because living in a one generation household, i.e. living alone or living without children, is accompanied by lower levels of family ties, we assume that people in one generation households show health disadvantages. These disadvantages are based particularly on the lack of social support when living alone, the lack of integration into a dense family network, and the positive selection mechanisms into parenthood. We expect, however, a variance according to migration background, resulting from different cultural backgrounds. Because traditional family households are more common among migrants and one generation households tend to contradict the cultural norm, we suspect that living without children is the result of disadvantageous selection among migrants and thus acts more detrimentally among migrants than among non-migrant Germans. Our second hypothesis—the *gender hypothesis*—states that the effect of the household structure is strongly gendered. Due to an allocation of multiple social roles and a high embedding in the household, women's health is stronger and affected by the household composition in a different way than men's health. Due to more traditional gender roles in migrant households we expect this effect to be amplified among migrants. Based on the *mediator hypothesis*, we test whether and how additional characteristics, especially the economic situation, explain health differences by household composition, gender, and migration background. Finally, the *partner hypothesis* hypothesises a positive effect of a partner in the household on health, which is driven by positive health selection into partnership. Due to a higher importance of the traditional family ideal among migrants, we assume that the absence of a partner is more disadvantageous for migrants than for Germans without a migration background. In addition, health related selection forces into partnership may also differ by migration background.

Data and Methods

Data and Variables

Dataset and Analytical Basis: The German Microcensuses 2005 and 2009

We used data from the German Microcensuses 2005 and 2009 (hereafter referred to as Microcensus 2005/2009) which is an annual multi-purpose household survey with a representative sample of one percent of the German population (about 830,000 persons per year). Due to the obligation to provide information to the

majority of questions and the presence of information for each member of the household, the Microcensus is highly representative of the German population. The data provide detailed information on the German demographic and labour market structure, including socio-demographic, economic, and household aspects (Statistisches Bundesamt 2015c).

Because the Microcensus is designed as a rotating panel, in which each selected household is annually interviewed over a period of four years, we used two survey years with a distance of four years to ensure that each person is included in the dataset only once. We used the survey years 2005 and 2009 because these combine information about individuals' health status, household context, and migratory background. Pooling the data of the two years increases the number of individuals with a migration background.

Variables

Health Outcomes

The Microcensuses 2005 and 2009 include a health module in addition to the standard programme with a limited set of indicators. In the following analysis, the general health status is measured by the following question: "Have you been ill or had an accidental injury within the last four weeks (before the interview)?" and "How long does/did your illness or your injury last?". In this study all persons with an illness that lasts (lasted) at least four weeks are defined as unhealthy. The time frame of four weeks was chosen in order to exclude persons with short-term illnesses (e.g., the flu or other infections). Because answering the question is optional, the number of cases with missing information is higher than for most of the other variables. Due to missing information in the health variable 69,144 cases [57,053 native Germans (12.64% of the total sample) and 12,091 persons with migration background (2.68%)] have to be excluded from the analysis. In total, 382,113 persons [323,577 native Germans (84.68% of the final sample) and 58,536 migrants (15.32%)] remain in the sample under study.

Variables at the Individual Level

When analysing contextual effects on individual health outcomes, the effects of personal characteristics are controlled for. These individual level variables are sex, age (4 age groups: 30 to <40, 40 to <50, 50 to <60 and 60 to <65 years), family status (single, married, divorced, widowed), presence of a partner in the household, education (low degree = graduation after a maximum of nine classes, medium = ten-class general educational school, high = university entrance qualification), and occupational status [self-employed without employees; self-employed with employees; unpaid family worker; official or judge; employed or soldier; full- and

part-time worker (skilled, semi-skilled, and unskilled); non-active population]. One of the key characteristics is the migration background, which includes migration history and ethnic background for first and second generation and thus follows the definition of the Federal Statistical Office (Statistisches Bundesamt 2011). Based on this information, we distinguish between native born Germans, Turks, Aussiedler, and people with a migration background from other countries (“other”). As “native born Germans”, we mean all who have no migration background in the first or second generation, i.e. persons who have neither migrated themselves nor have parents who are immigrants in Germany. Turks are identified by current and former nationality: all who have themselves or whose parent(s) had or have Turkish nationality belong to this group. Aussiedler are measured by legal status and represent the group of those whose parent(s) or who themselves is/are registered as Aussiedler. The identification of Aussiedler in the data of the Microcensus is possible on the basis of officially generated information. “Other” includes all persons who have a migration background but are not Turkish or Aussiedler.⁸

Because behavioural factors are strongly linked to health (see e.g. Sturm 2002; World Health Organization 2002), BMI [classified into underweight (BMI < 18.5), normal weight ($18.5 \leq \text{BMI} \leq 25$), overweight ($25 < \text{BMI} \leq 30$), obese (BMI > 30), missing information], and smoking habits (never smoked, ex-smoker, smoker, missing) will be controlled for. Additionally, the year of the interview (2005 or 2009) will be included in the models to control for period effects.

Household and Contextual Variables

At the second level, we focus on the household structure and take the number and composition of generations into account: One generation households (1G-HH) comprise persons living alone or as a couple (without children or with children who do not/no longer live in the same household). Two generation households combine a parent and a child generation; we make distinctions for two generations (2G-HH) with one or two children, 2G-HH with three or more children, 2G-HH with (grand)parents. We also created a category for households with three or more generations (3+G-HH). Additionally, we control for the net equivalent income [less than 930 € per month (lowest 20% in the sample); 930 to less than 1400 € (20–50%); 1400 to less than 2110 € (50–80%); more than 2110 € (top 20%)], and analyze the migration background of the household. In contrast to the individual migration background, the migration background of the household provides information about the presence of persons without a migration background. We define three types of households: no migration background (i.e. all persons are non-migrants), mixed households (i.e. households with migrants and non-migrant Germans), and migrant households (all persons with migration background).

⁸A detailed differentiation is not possible and useful due to statistical and definitional problems.

Table 1 Variance inflation factors of the sample, men and women

| | Sample | Men | Women |
|---------------------------------------|---------|---------|---------|
| Generation composition | 1.18 | 1.19 | 1.19 |
| Year of interview | 1.01 | 1.02 | 1.01 |
| Sex | 1.06 | | |
| Age group | 1.24 | 1.21 | 1.32 |
| Family status | 1.09 | 1.07 | 1.14 |
| Presence of a partner in the same HH | 1.13 | 1.16 | 1.19 |
| Migration background | 2.61 | 2.60 | 2.63 |
| Education | 1.16 | 1.15 | 1.19 |
| Occupational status | 1.20 | 1.22 | 1.18 |
| BMI | 1.03 | 1.03 | 1.03 |
| Smoking habits | 1.07 | 1.06 | 1.05 |
| Equivalent income group | 1.24 | 1.26 | 1.25 |
| Migration background of the household | 2.73 | 2.72 | 2.75 |
| Place of residence | 1.06 | 1.06 | 1.06 |
| Mean VIF | 1.34 | 1.34 | 1.36 |
| n | 382,113 | 188,108 | 194,005 |

Source German Microcensus 2005/2009

Finally, we control for the size of the place of residence (rural with fewer than 20,000 inhabitants; urban with 20,000 inhabitants or more) as an indicator of the contextual embedding and access to health care (Hartley et al. 1994; Bennett et al. 2008).

Pre-regression Diagnostics

The bivariate analysis shows significant statistical correlations between all characteristics and longstanding illness. Covariates are generally not correlated, with the exception of the individual migration background and the household's migration background (Table 1).

Statistical Methods

We modelled the association between health and the observed characteristics by applying multilevel regression models for both sexes combined to account for the dependency of observations on the household-level. Logistic regression models were used to calculate sex specific models. The estimations were performed using the “xtlogit” and “logit” routine in Stata version 14.1.

Sample Under Study

The analyses were restricted to 451,257 individuals between the ages of 30 and 64 living in private households. This specific age groups was chosen because people in this range display a diversity in living arrangements and are typically of an age in which (own) children already or still live at home. Of these, 69,144 individuals were excluded due to missing information about their health status. The two-level regression analysis for both sexes combined were therefore conducted based on 382,113 people at level 1 (individual level), nested within 247,360 households at level 2 (household level). Of these, 323,577 were native born Germans (84.68%), 10,043 were Turkish (2.63%), 13,147 were Aussiedler (3.44%), and 35,346 had a different migration background (9.25%).

The sex specific models included 194,005 women and 188,108 men. The proportion of the migrant groups is similar for both sexes.

Results

Descriptive Statistics

A detailed overview of the sample's composition is given in Table 2.

Longstanding illness is a rather rare phenomenon in our study population. Only 5.47% of the sample have a longstanding illness, where the proportion among women (5.60%) is slightly higher than men (5.34%). People who live in a one generation household (1G-HH) or in a two generation household (2G-HH) with their (grand)parents have worse health than those in other household structures; the proportion of ill persons is 7.30% for both groups. The quota is 3.79% in 2G-HH with one or two children, 3.23% in 2G-HH with three or more children, and 5.28% in households with 3 or more generations (3+G-HH). Turkish people have worst health of all migration backgrounds (8.01% vs. 5.40–5.49%).

In terms of household structure there are differences by migration background and sex. While the majority of native Germans live in 1G-HH (50.08%) followed by 42.68% in 2G-HH with one or two children, 2G-HH with one or two children are the most common composition among the other migrant groups. It is also striking that Turks live in different household structures than Germans, i.e. with three or more children (24.76%) or in 3+G-HH (2.41%). Furthermore, the absence of a partner in the same household is more common among native Germans (26.16%) and least common among Turks (16.17%); the share of persons without a partner among Aussiedler is located between these two groups (20.44%).

We find gender differences to the extent that men live in an 1G-HH (49.22% vs. 46.80%) slightly more frequently than women and slightly less frequently with

Table 2 Characteristics of the sample, men and women

| | Sample | | Men | | Women | |
|---|---------|-------|---------|-------|---------|-------|
| | n | % | n | % | n | % |
| <i>Longstanding illness</i> | | | | | | |
| No | 361,199 | 94.53 | 178,057 | 94.66 | 183,142 | 94.40 |
| Yes | 20,914 | 5.47 | 10,051 | 5.34 | 10,863 | 5.60 |
| <i>Generation composition</i> | | | | | | |
| 1G-HH | 183,382 | 47.99 | 92,594 | 49.22 | 90,788 | 46.80 |
| 2G-HH with one or two children | 166,224 | 43.50 | 79,792 | 42.42 | 86,432 | 44.55 |
| 2G-HH with three or more children | 24,914 | 6.52 | 12,057 | 6.41 | 12,857 | 6.63 |
| 2G-HH with (grand)parents | 3524 | 0.92 | 1819 | 0.97 | 1705 | 0.88 |
| 3+G-HH | 4069 | 1.06 | 1846 | 0.98 | 2223 | 1.15 |
| <i>Year of interview</i> | | | | | | |
| 2005 | 195,681 | 51.21 | 96,671 | 51.39 | 99,010 | 51.03 |
| 2009 | 186,432 | 48.79 | 91,437 | 48.61 | 94,995 | 48.97 |
| <i>Sex</i> | | | | | | |
| Females | 194,005 | 50.77 | | | | |
| Males | 188,108 | 49.23 | | | | |
| <i>Age group</i> | | | | | | |
| 30 to <40 years | 97,679 | 25.56 | 48,164 | 25.60 | 49,515 | 25.52 |
| 40 to <50 years | 127,163 | 33.28 | 63,311 | 33.66 | 63,852 | 32.91 |
| 50 to <60 years | 108,437 | 28.38 | 52,925 | 28.14 | 55,512 | 28.61 |
| 60 to <65 years | 48,834 | 12.78 | 23,708 | 12.60 | 25,126 | 12.95 |
| <i>Family status</i> | | | | | | |
| Single | 68,609 | 17.96 | 41,452 | 22.04 | 27,157 | 14.00 |
| Married | 264,441 | 69.20 | 128,375 | 68.25 | 136,066 | 70.14 |
| Widowed | 10,422 | 2.73 | 1969 | 1.05 | 8453 | 4.36 |
| Divorced | 38,641 | 10.11 | 16,312 | 8.67 | 22,329 | 11.51 |
| <i>Presence of a partner in the same HH</i> | | | | | | |
| Yes | 285,178 | 74.63 | 140,130 | 74.49 | 145,048 | 74.77 |
| No | 96,935 | 25.37 | 47,978 | 25.51 | 48,957 | 25.23 |
| <i>Migration background</i> | | | | | | |
| Native Germans | 323,577 | 84.68 | 159,525 | 84.81 | 164,052 | 84.56 |
| Turkish | 10,043 | 2.63 | 5172 | 2.75 | 4871 | 2.51 |
| Aussiedler | 13,147 | 3.44 | 6402 | 3.40 | 6745 | 3.48 |
| Other | 35,346 | 9.25 | 17,009 | 9.04 | 18,337 | 9.45 |
| <i>Education</i> | | | | | | |
| Low | 150,914 | 39.49 | 77,036 | 40.95 | 73,878 | 38.08 |
| Medium | 129,477 | 33.88 | 55,996 | 29.77 | 73,481 | 37.88 |
| High | 100,718 | 26.36 | 54,558 | 29.00 | 46,160 | 23.79 |

(continued)

Table 2 (continued)

| | Sample | | Men | | Women | |
|--|---------|-------|---------|-------|---------|-------|
| | n | % | n | % | n | % |
| Missing information | 1004 | 0.26 | 518 | 0.28 | 486 | 0.25 |
| <i>Occupational status</i> | | | | | | |
| Self-employed without employees | 17,528 | 4.59 | 11,161 | 5.93 | 6367 | 3.28 |
| Self-employed with employees | 14,927 | 3.91 | 11,259 | 5.99 | 3668 | 1.89 |
| Unpaid family worker | 1330 | 0.35 | 154 | 0.08 | 1176 | 0.61 |
| Official or judge | 15,773 | 4.13 | 9270 | 4.93 | 6503 | 3.35 |
| Employed or soldier | 139,659 | 36.55 | 62,187 | 33.06 | 77,472 | 39.93 |
| Full- or part-time worker | 69,372 | 18.15 | 46,928 | 24.95 | 22,444 | 11.57 |
| Non-active population | 123,524 | 32.33 | 47,149 | 25.06 | 76,375 | 39.37 |
| <i>BMI</i> | | | | | | |
| Underweight (BMI < 18.5) | 5585 | 1.46 | 686 | 0.36 | 4899 | 2.53 |
| Normal weight (18.5 ≤ BMI ≤ 25) | 160,046 | 41.88 | 63,410 | 33.71 | 96,636 | 49.81 |
| Overweight (25 < BMI ≤ 30) | 125,677 | 32.89 | 79,641 | 42.34 | 46,036 | 23.73 |
| Obese (BMI > 30) | 49,465 | 12.95 | 27,673 | 14.71 | 21,792 | 11.23 |
| Missing information | 41,340 | 10.82 | 16,698 | 8.88 | 24,642 | 12.70 |
| <i>Smoking habits</i> | | | | | | |
| Never | 173,768 | 45.48 | 70,836 | 37.66 | 102,932 | 53.06 |
| Ex-smoker | 78,825 | 20.63 | 45,359 | 24.11 | 33,466 | 17.25 |
| Smoker | 116,285 | 30.43 | 65,335 | 34.73 | 50,950 | 26.26 |
| Missing information | 13,235 | 3.46 | 6578 | 3.50 | 6657 | 3.43 |
| <i>Equivalent income group</i> | | | | | | |
| <930 € (lowest 20%) | 68,371 | 17.89 | 32,019 | 17.02 | 36,352 | 18.74 |
| 930 to <1400 € (20–50%) | 109,822 | 28.74 | 52,511 | 27.92 | 57,311 | 29.54 |
| 1400 to <2110 € (50–80%) | 107,153 | 28.04 | 53,413 | 28.39 | 53,740 | 27.70 |
| >2110 € (top 20%) | 71,760 | 18.78 | 37,655 | 20.02 | 34,105 | 17.58 |
| Missing information | 25,007 | 6.54 | 12,510 | 6.65 | 12,497 | 6.44 |
| <i>Migration background of the household</i> | | | | | | |
| No migration background | 310,811 | 81.34 | 152,745 | 81.20 | 158,066 | 81.48 |
| Mixed household | 24,534 | 6.42 | 12,153 | 6.46 | 12,381 | 6.38 |
| All persons with migration background | 46,768 | 12.24 | 23,210 | 12.34 | 23,558 | 12.14 |

(continued)

Table 2 (continued)

| | Sample | | Men | | Women | |
|---------------------------------------|---------|--------|---------|--------|---------|--------|
| | n | % | n | % | n | % |
| <i>Place of residence</i> | | | | | | |
| Rural (fewer than 20,000 inhabitants) | 166,103 | 43.47 | 82,457 | 43.83 | 83,646 | 43.12 |
| Urban (20,000 inhabitants and more) | 216,010 | 56.53 | 105,651 | 56.17 | 110,359 | 56.88 |
| Total | 382,113 | 100.00 | 188,108 | 100.00 | 194,005 | 100.00 |

Source German Microcensus 2005/2009

children (49.81% vs. 52.33%⁹). Regarding the absence or presence of a partner, there are no striking gender differences.

There are sufficient numbers of cases for all characteristics and the main combinations of characteristics to perform a multilevel regression model and sex-specific logistic regression models.

Gender Differences in Health— Results of Logistic Regression

The results of the logistic regression models are shown in Table 3.

Living in a 1G-HH is accompanied by health disadvantages. This effect applies to both men and women, but is more pronounced for women. Women in 2G-HH with one or two children respectively three or more children and women in 3 +G-HH have significantly lower health risks than women in 1G-HH. These group differences exist almost independently of other characteristics, but are reinforced after control for socio-economic characteristics. Women in 2G-HH with three or more children have the best health (OR = 0.45–0.61; $p < 0.001$), followed by women in 3+G-HH (OR = 0.60–0.74; $p = 0.000$ –0.002) and women in 2G-HH with one or two children (OR = 0.68–0.71; $p < 0.001$) (Table 3). Among men, health advantages by generation composition appear for those in 2G-HH with children. Those with three or more children have the best health with a reduced risk of illness by 17% ($p = 0.001$), followed by men with one or two children, who have a 13% lower risk ($p < 0.001$). 2G-HH with (grand)parents and 3G-HH do not differ from 1G-HH (Table 3).

When controlling for other characteristics, it became clear that health differences according to migration background exist for women but not for men. Female Aussiedler and women with other migration backgrounds reveal better health than German women: Their risk of poor health is 24% ($p = 0.012$) resp. 20%

⁹The remaining ~1% of men and women live in 2G-HH with (grand)parents.

Table 3 Odds of longstanding illness for men and women: odds ratio and *p*-values from logistic regression

| Covariates | Men | | Women | |
|--|------|----------|-------|----------|
| | OR | <i>p</i> | OR | <i>p</i> |
| <i>Generation composition (ref. 1G-HH)</i> | | | | |
| 2G-HH with one or two children | 0.87 | 0.000 | 0.69 | 0.000 |
| 2G-HH with three or more children | 0.82 | 0.001 | 0.45 | 0.000 |
| 2G-HH with (grand)parents | 0.95 | 0.609 | 0.88 | 0.188 |
| 3+G-HH | 1.04 | 0.741 | 0.62 | 0.000 |
| <i>Year of interview (ref. 2005)</i> | | | | |
| 2009 | 1.11 | 0.000 | 1.15 | 0.000 |
| <i>Age group (ref. 30 to <40 years)</i> | | | | |
| 40 to <50 years | 1.62 | 0.000 | 1.72 | 0.000 |
| 50 to <60 years | 2.53 | 0.000 | 2.39 | 0.000 |
| 60 to <65 years | 1.78 | 0.000 | 1.77 | 0.000 |
| <i>Family status (ref. single)</i> | | | | |
| Married | 1.07 | 0.109 | 0.84 | 0.000 |
| Widowed | 0.96 | 0.658 | 0.81 | 0.000 |
| Divorced | 1.03 | 0.449 | 1.11 | 0.009 |
| <i>Presence of a partner in the same HH (ref. yes)</i> | | | | |
| No | 1.31 | 0.000 | 1.42 | 0.000 |
| <i>Migration background (ref. native Germans)</i> | | | | |
| Turkish | 1.19 | 0.124 | 1.01 | 0.938 |
| Aussiedler | 0.93 | 0.481 | 0.76 | 0.012 |
| Other | 0.96 | 0.690 | 0.80 | 0.020 |
| <i>Education (ref. low)</i> | | | | |
| Medium | 0.76 | 0.000 | 0.87 | 0.000 |
| High | 0.67 | 0.000 | 0.73 | 0.000 |
| Missing information | 0.95 | 0.799 | 0.90 | 0.624 |
| <i>Occupational status (ref. employed or soldier)</i> | | | | |
| Self-employed without employees | 1.03 | 0.686 | 1.11 | 0.239 |
| Self-employed with employees | 1.01 | 0.938 | 1.00 | 0.970 |
| Unpaid family worker | 1.55 | 0.337 | 1.89 | 0.000 |
| Official or judge | 1.53 | 0.000 | 1.25 | 0.020 |
| Full- or part-time worker | 1.08 | 0.094 | 1.21 | 0.000 |
| Non-active population | 6.68 | 0.000 | 4.73 | 0.000 |
| <i>BMI (ref. normal weight; 18.5 ≤ BMI ≤ 25)</i> | | | | |
| Underweight (BMI < 18.5) | 2.59 | 0.000 | 1.70 | 0.000 |
| Overweight (25 < BMI ≤ 30) | 0.97 | 0.178 | 1.21 | 0.000 |
| Obese (BMI > 30) | 1.29 | 0.000 | 1.76 | 0.000 |
| Missing information | 0.79 | 0.000 | 0.94 | 0.147 |
| <i>Smoking habits (ref. never)</i> | | | | |
| Ex-smoker | 1.47 | 0.000 | 1.39 | 0.000 |

(continued)

Table 3 (continued)

| Covariates | Men | | Women | |
|---|---------|----------|---------|----------|
| | OR | <i>p</i> | OR | <i>p</i> |
| Smoker | 1.15 | 0.000 | 1.28 | 0.000 |
| Missing information | 0.70 | 0.000 | 0.60 | 0.000 |
| <i>Equivalent income group (ref. < 930 €; lowest 20%)</i> | | | | |
| 930 to < 1400 € (20–50%) | 0.92 | 0.003 | 0.84 | 0.000 |
| 1400 to < 2110 € (50–80%) | 0.78 | 0.000 | 0.78 | 0.000 |
| >2110 € (top 20%) | 0.63 | 0.000 | 0.68 | 0.000 |
| Missing information | 0.88 | 0.008 | 0.83 | 0.000 |
| <i>Migration background household (ref. no m.b.)</i> | | | | |
| Mixed household | 1.02 | 0.799 | 0.98 | 0.794 |
| All persons with migration background | 1.02 | 0.851 | 1.38 | 0.001 |
| <i>Place of residence (ref. rural; fewer than 20,000 inhabitants)</i> | | | | |
| Urban (20,000 inhabitants and more) | 0.95 | 0.019 | 0.99 | 0.743 |
| Constant | 0.01 | 0.000 | 0.02 | 0.000 |
| R ² | 0.16 | | 0.12 | |
| Log likelihood | –33,074 | | –36,731 | |
| n | 188,108 | | 194,005 | |

Source German Microcensus 2005/2009

($p = 0.020$) lower (Table 3). The opposite is true for Turkish women: Health disadvantages of Turkish women compared to German women are driven mainly by social status and do remain after controlling for these characteristics (OR = 1.01; $p = 0.938$). Among men, without controlling for individual socio-economic status, lifestyle factors and contextual/household factors, both migrant groups considered have worse health than do German men. In the model without controlling for these factors, the risk of longstanding illness is 114% higher among Turks ($p < 0.001$) and 14% higher among Aussiedler ($p = 0.022$). These health differences are fully explained by compositional and structural factors and are attenuated, once controlled for other characteristics (Table 3).

The legal status of a partnership (family status) affects health, but only among women. Living as a female divorcee increases the risk of longstanding illness by 11% ($p = 0.009$) whereas the health advantage of married women is 16% ($p = 0.001$) and those of the widowed 19% ($p < 0.001$) (Table 3). The effect of a partner in the household is stronger and more consistent than the effect of family status: the absence of a partner increases the risk of poor health both among women (by 42%; $p < 0.001$) and men (by 30%; $p < 0.001$) (Table 3). This partner effect is partly explained by individual socioeconomic differences among men and by contextual characteristics among women, as our stepwise models (results not shown) illustrate.

Finally, we find that women who live in a household consisting of only migrants have worse health. Their risk of illness is increased by 38% ($p = 0.001$) compared to households with no migration background. For men, this relationship cannot be found.

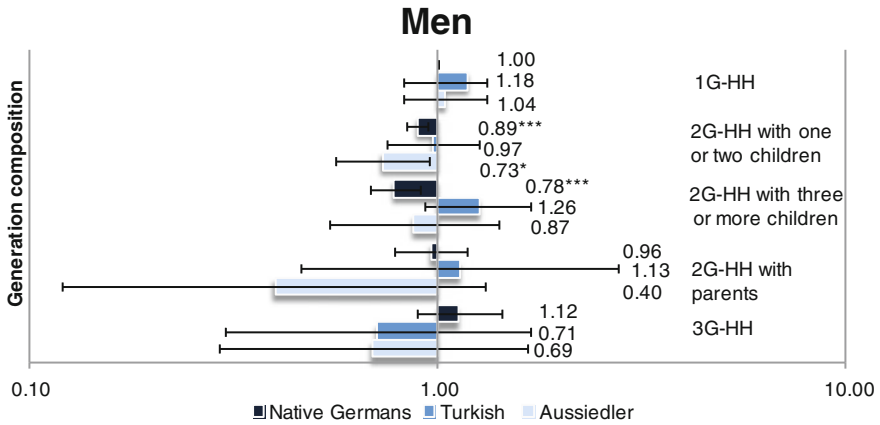


Fig. 2 Household effect according to migration background: odds and 95% confidence intervals of longstanding illness for men.

Note Reference = Native Germans in 1G-HH; logarithmic scale; controlled for all covariates.

Source German Microcensus 2005/2009; n = 188,108; ***p < 0.001, **p < 0.01, *p < 0.05

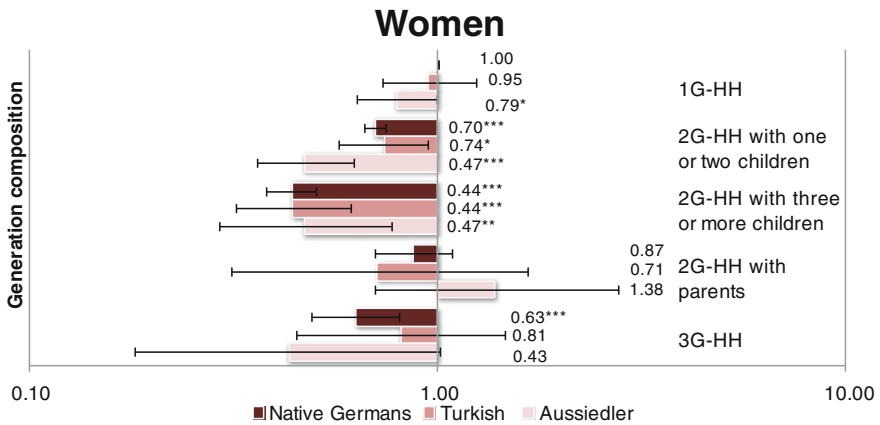


Fig. 3 Household effect according to migration background: odds and 95% confidence intervals of longstanding illness for women.

Note Reference = Native Germans in 1G-HH; logarithmic scale; controlled for all covariates.

Source German Microcensus 2005/2009; n = 194,005; ***p < 0.001, **p < 0.01, *p < 0.05

Our hypotheses suggest that most mechanisms act differently upon migrants and non-migrants. To test this assumption, interaction effects were estimated. Interaction effects indicate an estimation of non-additive effects of (at least) two independent variables on the outcome, assuming that the effect of one variable is influenced by the other variable. We examine the effect of the generation composition and the partner effect and assume that these effects vary among native Germans, Turks, and Aussiedler. Our results do not support this assumption. Among men and women, the effect of the

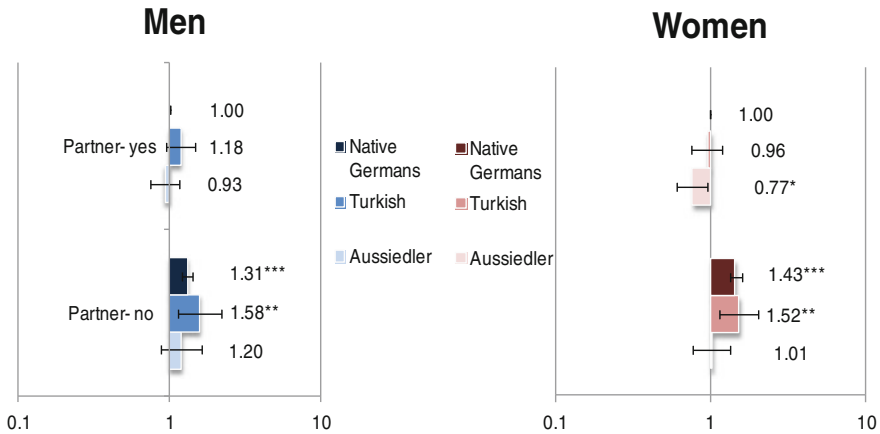


Fig. 4 Partner effect according to migration background: odds and 95% confidence intervals of longstanding illness for men and women.

Note Reference = Native Germans with partner; logarithmic scale; controlled for all covariates. *Source* German Microcensus 2005/2009; men: n = 188,108; women: n = 194,005; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

generation composition within the household on longstanding illness is the same for all subgroups considered. The generation composition generally causes a shift in health risks and follows—in particular among women—largely the same tendency for Germans, Turks, and Aussiedler (Figs. 2 and 3). However, two exceptions can be found: female Aussiedler in 1G-HH have lower risks of illness compared to German women in 1G-HH (OR = 0.79; $p = 0.043$). Thus, the absence of children or other persons of other generation are less disadvantageous for female Aussiedler than for female Germans (Fig. 3). Turkish men in 2G-HH with three or more children have higher risks of illness (OR = 1.26; 95% CI: 0.93; 1.69) than their German counterparts (OR = 0.78; 95% CI: 0.68; 0.90). Concerning the partner effect, again the same trend applies for all migrant-groups: the absence of a partner results in increased risks of illness. Among women, however, we find that the strength of this negative effect differs between the migrant groups, whereas especially female Aussiedler show a different pattern. Female Aussiedler with a partner have significantly lower risks of illness than German women with a partner (OR = 0.77; $p = 0.019$), and the absence of a partner is not associated with health disadvantages (OR = 1.01; $p = 0.917$) (Fig. 4).

Effects of Household Structure, Migration Background, and Individual Characteristics on Health—Results of Multilevel Regression

The results presented so far are based on gendered logistic regression models. To highlight and understand the variance across households, multilevel regression

Table 4 Odds of longstanding illness: odds ratio and *p*-values from multilevel regression

| Covariates | Model 1 | | Model 2 | | Model 3 | | Model 4 | | Model 5 | |
|--|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|
| | OR | <i>p</i> | OR | <i>p</i> | OR | <i>p</i> | OR | <i>p</i> | OR | <i>p</i> |
| <i>Generation composition (ref. IG-HH)</i> | | | | | | | | | | |
| 2G-HH with one or two children | 0.63 | 0.000 | 0.72 | 0.000 | 0.77 | 0.000 | 0.78 | 0.000 | 0.75 | 0.000 |
| 2G-HH with three or more children | 0.59 | 0.000 | 0.67 | 0.000 | 0.58 | 0.000 | 0.60 | 0.000 | 0.55 | 0.000 |
| 2G-HH with (grand)parents | 0.95 | 0.535 | 0.92 | 0.342 | 0.86 | 0.082 | 0.87 | 0.106 | 0.89 | 0.198 |
| 3+G-HH | 0.79 | 0.010 | 0.83 | 0.033 | 0.76 | 0.003 | 0.78 | 0.008 | 0.77 | 0.004 |
| <i>Year of interview (ref. 2005)</i> | | | | | | | | | | |
| 2009 | 1.14 | 0.000 | 1.12 | 0.000 | 1.14 | 0.000 | 1.12 | 0.000 | 1.16 | 0.000 |
| <i>Sex (ref. Females)</i> | | | | | | | | | | |
| Males | 0.96 | 0.009 | 0.97 | 0.037 | 1.25 | 0.000 | 1.13 | 0.000 | 1.12 | 0.000 |
| <i>Age group (ref. 30 to <40 years)</i> | | | | | | | | | | |
| 40 to <50 years | 1.78 | 0.000 | 1.85 | 0.000 | 1.86 | 0.000 | 1.82 | 0.000 | 1.84 | 0.000 |
| 50 to <60 years | 3.48 | 0.000 | 3.87 | 0.000 | 3.05 | 0.000 | 2.93 | 0.000 | 3.01 | 0.000 |
| 60 to <65 years | 4.58 | 0.000 | 5.33 | 0.000 | 2.08 | 0.000 | 2.03 | 0.000 | 2.13 | 0.000 |
| <i>Family status (ref. single)</i> | | | | | | | | | | |
| Married | | | 1.02 | 0.608 | 0.98 | 0.582 | 0.96 | 0.233 | 0.95 | 0.142 |
| Widowed | | | 0.98 | 0.734 | 0.91 | 0.057 | 0.86 | 0.003 | 0.89 | 0.021 |
| Divorced | | | 1.22 | 0.000 | 1.23 | 0.000 | 1.16 | 0.000 | 1.14 | 0.000 |
| <i>Presence of a partner in the same HH (ref. yes)</i> | | | | | | | | | | |
| No | | | 1.75 | 0.000 | 1.60 | 0.000 | 1.60 | 0.000 | 1.44 | 0.000 |
| <i>Migration background (ref. native Germans)</i> | | | | | | | | | | |
| Turkish | | | 2.57 | 0.000 | 1.46 | 0.000 | 1.48 | 0.000 | 1.12 | 0.232 |
| Aussiedler | | | 1.11 | 0.039 | 1.02 | 0.658 | 1.03 | 0.497 | 0.83 | 0.028 |
| Other | | | 1.23 | 0.000 | 1.02 | 0.464 | 1.05 | 0.117 | 0.84 | 0.024 |

(continued)

Table 4 (continued)

| Covariates | Model 1 | | Model 2 | | Model 3 | | Model 4 | | Model 5 | |
|--|---------|---|---------|---|---------|-------|---------|-------|---------|-------|
| | OR | p | OR | p | OR | p | OR | p | OR | p |
| <i>Education (ref. low)</i> | | | | | | | | | | |
| Medium | | | | | 0.76 | 0.000 | 0.77 | 0.000 | 0.79 | 0.000 |
| High | | | | | 0.56 | 0.000 | 0.60 | 0.000 | 0.67 | 0.000 |
| Missing information | | | | | 0.76 | 0.117 | 0.90 | 0.539 | 0.92 | 0.639 |
| <i>Occupational status (ref. employed or soldier)</i> | | | | | | | | | | |
| Self-employed without employees | | | | | 1.01 | 0.901 | 1.01 | 0.856 | 0.98 | 0.750 |
| Self-employed with employees | | | | | 0.89 | 0.100 | 0.90 | 0.139 | 0.93 | 0.293 |
| Unpaid family worker | | | | | 1.89 | 0.000 | 1.99 | 0.000 | 1.88 | 0.000 |
| Official or judge | | | | | 1.32 | 0.000 | 1.32 | 0.000 | 1.44 | 0.000 |
| Full- or part-time worker | | | | | 1.12 | 0.001 | 1.09 | 0.011 | 1.02 | 0.495 |
| Non-active population | | | | | 7.96 | 0.000 | 7.67 | 0.000 | 6.78 | 0.000 |
| <i>BMI (ref. normal weight; 18.5 ≤ BMI < 25)</i> | | | | | | | | | | |
| Underweight (BMI < 18.5) | | | | | | | 2.05 | 0.000 | 2.04 | 0.000 |
| Overweight (25 < BMI < 30) | | | | | | | 1.13 | 0.000 | 1.11 | 0.000 |
| Obese (BMI > 30) | | | | | | | 1.73 | 0.000 | 1.67 | 0.000 |
| Missing information | | | | | | | 0.87 | 0.000 | 0.86 | 0.000 |
| <i>Smoking habits (ref. never)</i> | | | | | | | | | | |
| Ex-smoker | | | | | | | 1.55 | 0.000 | 1.58 | 0.000 |
| Smoker | | | | | | | 1.29 | 0.000 | 1.27 | 0.000 |
| Missing information | | | | | | | 0.60 | 0.000 | 0.59 | 0.000 |
| <i>Equivalent income group (ref. < 930 €; lowest 20%)</i> | | | | | | | | | | |
| 930 to <1400 € (20–50%) | | | | | | | | | 0.82 | 0.000 |
| 1400 to <2110 € (50–80%) | | | | | | | | | 0.70 | 0.000 |

(continued)

Table 4 (continued)

| Covariates | Model 1 | | Model 2 | | Model 3 | | Model 4 | | Model 5 | |
|---|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|
| | OR | p | OR | p | OR | p | OR | p | OR | p |
| >2110 € (top 20%) | | | | | | | | | 0.56 | 0.000 |
| Missing information | | | | | | | | | 0.78 | 0.000 |
| <i>Migration background household (ref. no m.b.)</i> | | | | | | | | | | |
| Mixed household | | | | | | | | | 1.00 | 0.959 |
| All persons with migration background | | | | | | | | | 1.24 | 0.008 |
| <i>Place of residence (ref. rural; fewer than 20,000 inhabitants)</i> | | | | | | | | | | |
| Urban (20,000 inhabitants and more) | | | | | | | | | 0.97 | 0.125 |
| Constant | 0.01 | 0.000 | 0.01 | 0.000 | 0.00 | 0.000 | 0.00 | 0.000 | 0.01 | 0.000 |
| lnsig2u | 0.88 | | 0.81 | | 0.79 | | 0.76 | | 0.76 | |
| sigma_u | 1.55 | | 1.50 | | 1.48 | | 1.46 | | 1.46 | |
| Rho | 0.422 | | 0.406 | | 0.400 | | 0.394 | | 0.395 | |
| Log likelihood | -77,299 | | -76,629 | | -70,243 | | -69,612 | | -69,453 | |
| n | 382,113 | | 382,113 | | 382,113 | | 382,113 | | 382,113 | |

Source German Microcensus 2005/2009

models using pooled data (men and women together) were calculated. Interestingly, the results of the sample reflect mainly the effects among women. We use the results to reveal model changes when stepwise including the covariates and thus to explore possible underlying mechanisms, where the analysis consists of five nested models. The detailed results are shown in Table 4.

The gross effect of the migration background is partly explained and superimposed by other characteristics. Without consideration of socioeconomic characteristics, lifestyle, and contextual factors, native Germans have (only slightly but significantly) better health than Aussiedler (OR = 1.11; $p = 0.039$). The poor health of the Turkish subgroup is particularly striking, as they show a more than 2.5-fold increased risk of illness (OR = 2.57; $p < 0.001$) (Model 2, Table 4). Our full models reveal that the health disadvantage among Turks is primarily explained by worse socioeconomic status and contextual embedding. Considering the socioeconomic status, the risk of illness among Turks is reduced to 1.5-fold of the risk of native Germans (OR = 1.48; $p < 0.001$; Model 4, Table 4), and considering the contextual embedding, there remain no significant health differences between these two groups (OR = 1.12, $p = 0.232$; Model 5, Table 4). Controlling for contextual factors, Aussiedler (OR = 0.83; $p = 0.028$) even have health advantages over native Germans (Model 5, Table 4). The effect of the migration background does not superimpose the effect of the generation composition and is thus an additional risk factor for health outcomes. It also applies to the pooled multilevel model that the effect of the generation structure does not vary according to migration background.

The generation composition of the household is an independent determinant of health outcomes, which is remarkably stable in the model comparison. Persons living in a 1G-HH have worse health compared to the other subgroups. The risk is almost halved among 2G-HH with three or more children (OR = 0.55; $p < 0.001$) and about a quarter lower for 2G-HH with one or two children (OR = 0.75; $p < 0.001$) and for 3+G-HH (OR = 0.77; $p = 0.004$).

Gender effects in terms of long-standing illness vary. As shown in the previous section, men's and women's health is affected by different protective and pathogenic mechanisms. In our baseline model men show slightly better health than women (OR = 0.96; $p = 0.009$; Model 1, Table 4) This health advantage is mainly driven by a conducive socio-economic status; after controlling for this the gender effect is reversed and women show better health (OR = 1.25, $p < 0.001$; Model 3, Table 4). Differences in lifestyle explain some of the gender differences. Taking the lifestyle factors in account, women have a 12–13% lower risk of longstanding illness ($p < 0.001$; Models 4 and 5, Table 4).

The absence of a partner in the same household is a strong and largely independent pathogenic factor associated with an increased risk of illness. Those without a partner in the same household have from a 44% up to a 75% higher risk of longstanding illness ($p < 0.001$; Table 4). This effect is the same across all migrant groups. The risk of divorced people compared to singles is increased by 14% ($p < 0.001$) and that of the widowed is decreased by 11% ($p = 0.021$).

Finally, it is detrimental if all persons in the household have a migration background. This situation results in a 24% increased risk of longstanding illness ($p = 0.008$; Model 5, Table 4).

Discussion

To our knowledge, our study is one of the first to investigate the influence of the generational composition—a measure of the household structure—on health and to integrate the results in the context of gender and migration background. Not only family characteristics such as marital status and partnership status, which are frequently considered in research, but also the household structure is associated with health. This finding is particularly consistent and robust among women. For women, it applies to all migration backgrounds that living in a one generation household (1G-HH) results in exposure to greater health risks. Living in a two generation household (2G-HH) with three or more children is constantly beneficial and associated with lowest risks of illness. As well, living in a 2G-HH with one or two children is more advantageous than living in a 1G-HH. Our results suggest that this generational structure even results in additional health benefits among female Aussiedler (compared to German women). This link between household structure and health is not explained or offset by other factors and it applies to men as well. However, because men's health is generally less dependent on household characteristics and economic resources than women's health, less robust correlations arise among men. Without controlling for further health related characteristics, health inequalities by migration background are immense, but our analyses indicate that they are mainly driven by socio-economic differences.

Interpretation

Our *family segregation-hypothesis* states that living in a 1G-HH is accompanied by situations of relatively weak family ties—at least within the household—and thus results in health disadvantages. This hypothesis can largely be confirmed, but our assumption, that native Germans and migrants differ in this effect, is not conferred. Our models showed health disadvantages among persons in 1G-HH. Compared to all the other considered subgroups, they constantly have the highest risk of longstanding illness. Among men, the extent of differences between the groups decreases slightly when controlling for other characteristics, among women it even increases. The result, that persons in households with many children (2G-HH with three or more children) have the best health, illustrates the importance of emotional ties and social support within households. This conclusion is consistent with other findings (Zunzunegui et al. 2001; Kravdal et al. 2012), but contradicts those approaches which consider child care a burden and focus the multiple burdens of middle-aged persons (McIlvane et al. 2007; Oláh et al. 2014). Our findings instead indicate that

children are a helpful resource. This parenthood-health-interaction, as well as the decision for a specific household type, might be driven by selection effects: in particular, when healthy adults decide to have (many) children and consciously take care of children or other relatives. A detailed analysis of the quality of relationships could be included in subsequent studies. Furthermore, it is conceivable that the effect of the parenthood depends on the age of the children in the household and is different between those with younger and those with older children. As Kravdal et al. (2012) stated, it is likely that parenting and the responsibility for a large household have a positive impact on individual lifestyle and thus result in better health outcomes. However, it should be noted that the group of persons in 1G-HH is composed of three subgroups: those living alone, couples without children, and couples with children that have already moved out of the parental household. 64% of the persons in 1G-HH in our sample live together with a partner. As we controlled for partnership status, we determine the net effect for this group. Our model reference category includes persons in a 1G-HH without a partner in the household. Thus, our findings are consistent with other studies that find that living alone is associated with additional health risks, e.g. due to a higher consumption of alcohol in this group (Cramer 1993) or to differences in access to healthcare providers (Manderbacka et al. 2014). Health disadvantages of couples without children can also be inferred from other studies (e.g. Hughes and Gove 1981). Johnson and Catalano (1981) note that childless married are partly socially isolated and therefore vulnerable to illness; van Balen and Trimbos-Kemper (1993) observe lower levels of well-being among infertile adults. Parents, especially mothers, whose children leave the parental home, sometimes experience a phase of reorientation which is accompanied by feelings of loneliness (Liu and Guo 2007) and negatively affects mental health (Radloff 1980). Persons in 1G-HH thus group unfavourable circumstances and characteristics that may adversely affect health. Considering that persons in 1G-HH partly even have economic benefits (e.g. no costs for child maintenance, couples with “double income and no kids”), our results illustrate the importance of social components and affirm the Social Support Theory (Lakey and Cohen 2000). Furthermore, our results may demonstrate reverse causality, i.e. health selection into childlessness (Gibney 2012).

The *gender hypothesis* states a gendered effect of the household structure, which is greater among people with migration backgrounds. A gender-gradient is evident in the strength of the influence of different household compositions. Among women, the effect is greater and more stable, which was also shown in other studies (Manderbacka et al. 2014; Williams and Umberson 2004; Soons and Kalmijn 2009; Hughes and Waite 2002; Denton et al. 2004; Artazcoz 2001). A higher dependence of women on household characteristics can thus be detected. The result, that living in solely migrant households is disadvantageous only among women, illustrates this effect additionally and is in line with earlier studies (e.g. Haug 2004, 2007). That this effect cannot be proven for men might also represent their greater integration into the labour market, due to which the household is only one of several resources of social capital. The gender hypothesis can be accepted, but there are no differences in the context of migration background. Among migrants the effect of the household structure on health is not any more gendered than among non-migrants.

According to our *mediator hypothesis* additional characteristics, especially the economic situation, are expected to explain health differences by household composition, gender, and migration background. This hypothesis must be rejected in large parts. Our results demonstrate that the socio-economic status is of high importance in the perspective of the migration background; here it explains many of the differences between the groups. However, differences by household composition are generally not explained by structural differences. The socio-economic status itself determines health inequalities, but does not mediate the effect of the generation composition. Of particular importance is how someone positions himself in society, i.e. with regard to education and occupational status. The household's economic situation acts as an additional compensation effect.

Our *partner hypothesis* states a positive effect of a partner in the household, which differs according to migration background. In all considerations the presence of a partner is associated with health benefits and leads to a general shift in health risks, which is in line with existing research (e.g. Koskinen et al. 2007; Joung et al. 1994; Manderbacka et al. 2014). This result may also demonstrate the health-related selection into partnership (Hughes and Gove 1981).

Our hypotheses can largely be confirmed. However, the expected fundamental differences between native Germans and migrants cannot be found. An exception is found for female Aussiedler, for whom living in a 1G-HH as well as the absence of a partner are less disadvantageous than for German women. Supposedly adverse effects are less influential among female Aussiedler. This result especially reflects the generally lower risk of illness among female Aussiedler. Despite this, the basic mechanisms in the production of health, respectively the influence of the household structure on health, are the same for native Germans, Turks, and (male) Aussiedler. One reason for this might be the composition of our sample under study. The migrants in our sample generally have been in Germany for a long time already. Among the Turks, more than 90% have been in Germany for more than 10 years and 70% more than 30 years. Among the Aussiedler, 85% have a duration of stay of longer than 10 years and 25% of longer than 30 years. Our results show that—as explained in Section “[Why Investigate the Health of Migrants and Distinguish Between Different Migration Backgrounds?](#)”—Aussiedler have many similarities to the German majority population. Additionally, the results suggest that Aussiedler and Turkish migrants in Germany have strongly adopted values and behaviours of the majority population, which is consistent with Kreft and Doblhammer (2012). We have analyzed whether these findings are also driven by our wide definition of “migration background” (migrants in first and second generation); the differentiated regression models for migrants in first generation largely repeat the previously described findings and underline the robustness of our results.

Our results may reflect selection processes among migrants. The “healthy migrant effect” (Kohls 2008) assumes a positive selection effect, i.e. especially young and healthy persons are likely to migrate.¹⁰ Together with the

¹⁰However, it is assumed that the health benefits of migrants appear especially shortly after migration and decrease over time (Razum and Rohrmann 2002; Schenk 2007).

“unhealthy-remigration effect” (Razum et al. 1998)—unhealthy migrants are more likely to return to their home countries—the analysis of migrants is possibly biased. So it is conceivable that the migrants in our sample are subject to a positive selection mechanism and thus the effects are underestimated. It should also be kept in mind that Turkish migrants and Aussiedler in Germany are subject to an additional selection process. Due to their health checks in their recruitment as guest workers, at least the first generation of (male) Turkish migrants was selected by health, and Aussiedler are selected by their proximity to German culture. This may have direct and indirect impact on health factors and the integration into society.

Another explanation could be that migrants have greater social resources. In addition to stable family structures, they might be emotionally supported by extended families, social networks, and ethnic communities in times of shortage (Razum and Spallek 2012; Wilkinson and Marmot 2003). Networks across households and/or outside households were not investigated in our study, but could provide further explanations. As Haug (2007) describes, external resources might—along with the household—act as sources of social embeddedness and it seems that this resource is equally compensatory among migrants and non-migrants. The finding that women who live in households without any non-migrants have increased health risks suggests that networks, in particular social contacts with Germans, might counteract health risks and is in line with existing studies (Haug 2004; Lancee and Hartung 2012).

Finally, it should also be questioned whether in fact there are immense differences in value systems, family ideals, and the motivation for the formation of a specific household type between non-migrant Germans and migrants, particularly against the background of a long duration of stay. According to Haas (2010) and Haug (2004), migrants often maintain ties with their countries of origin, which exist and are formative long after migration. Among Turkish migrants, this social capital is rather family-based and kinship based (Haug 2005), which could be detrimental for the social integration and health care utilization and thus might establish an intra-ethnic segmentation (Lue Kessing et al. 2013; Esser 2001). Bearing in mind that Turks and Aussiedler often migrated to reunite their family or—in the case of Aussiedler—to live in their cultural home, this assumption must be questioned. It is conceivable—and supported by our results—that there is a gradual appropriation of cultural peculiarities, which goes together with an adaption of norms and values as well as health risks in the course of stay (Schenk 2007). As in other studies, we conclude that migrants who have been in Germany for a long time adapt behaviours (Milewski 2010, 2011; Berry 1992).

Our results also indicate that there are social structures which compensate for differences at the household level. There are differences in the health structure between Turkish migrants, Aussiedler, and Germans, but these generally do not explain health differences by migration background. One exception are (female) Aussiedler, where it remains partly unclear why they have better health and why their dependence on the household structure follows a different pattern.

Strengths and Restrictions

This study and our results have some restrictions. First of all, the health indicator used must be questioned. Illness is operationalized by longstanding illness. In the questionnaire of the Microcensus, neither a definition of illness is given nor is the severity of illness requested. The time frame of four weeks, which was set as the minimum duration of illness to define a person as ill, is intended to compensate for this weakness. The relatively high item non-response in the health variable might be problematic, as it has to be assumed that non-respondents are in poor health (Goldberg et al. 2001). The consideration of persons living in private households only might lead to an underestimation of ill people, as especially serious illness is often associated with a stay in a health institution and these people are not included in our study.

It should also be questioned whether our indicator reflects the health status for all persons equally or is more relevant to those who are active in the labour market. Because employment rates differ partially between Germans and migrants in Germany, this could cause a bias. Additionally, it should be kept in mind that migrants have fewer chronic diseases and more infectious diseases (see Section “[Why Investigate the Health of Migrants and Distinguish Between Different Migration Backgrounds?](#)”), thus this indicator may not completely cover the spectrum of diseases among migrants. Finally, the definitions of health and illness are culturally shaped (Helman 2007) so it is conceivable that Germans, Turkish migrants, and Aussiedler differ in their perception of health and illness and have different patterns in the utilization of health care services and consult physicians more or less frequently. Language barriers among migrants may reinforce this effect and might contribute to a lower awareness of health status among migrants. The fact that the proportion of nonresponse is slightly higher among the migrant groups (18.43% among Turks and 16.05% among Aussiedler) than among the German group (14.99%) indicates uncertainty in answering this question among migrants, but might also reflect a sponsorship-effect (the Microcensus is carried out on behalf of the Federal Statistic Office and this official character could help that respondents answer in the sense of the sponsor or to avoid undesirable answers). Misunderstandings and misinterpretation due to language problems in the interviews with migrants/non-German speakers could be an additional bias.

Second, there are further restrictions on the contextual level. A generalisation of our findings should be verified. Health outcomes, motives for a specific household type, levels of integration, family ideals, and norms are strongly shaped by cultural beliefs, social policies, and other macro structural influences, which means that a transmission of the results, e.g. to other countries, should be part of subsequent studies. Our results reflect the mechanisms in the conservative welfare state of Germany, as well as the cultural values and perceptions of the sub groups analyzed (native Germans, Turks, and Aussiedler in Germany).

Third, with our study design, causality cannot be found, as we carried out a cross-sectional study. We assume that household structures affect health outcomes. This assumption is in line with theoretical approaches (Berman et al. 1994) and

longitudinal analyses (Hughes and Waite 2002). However, reverse causality is also conceivable: specific households and generation compositions are formed due to health characteristics. Children and parents might act as a helpful resource, so that living together is chosen more or less deliberately. Likewise, living with parents and/or children might also be driven by economic or health needs and might go together with additional burdens (McIlvane et al. 2007). Overall, the motivations and reasons for a specific living arrangement are quite heterogeneous, so the arrangement-specific impact may be heterogeneous as well. An analysis of the structure of relationships, the quality of relationships, and the exchanges within households appears to be necessary and useful, but this was not initially targeted in our analysis. The necessity to capture the high complexity, multidimensionality, and heterogeneity of health, illness, households, family ties, etc. in a more detailed way is revealed by our gender-specific models and might yield further research suggestions.

Fourth, the classification of generation structures in our analyses is partly imprecise. In particular, the group of the one generation households is rather heterogeneous, as it includes singles and couples who either are childless or whose children have already left the parental home. When using the data of the German Microcensus there is no reliable way to differentiate between these groups, so this is a data problem.

The main strengths of our study are the consideration of different levels that affect health and the modelling of the effect of the generation composition within households on health. The multilevel approach allows us to consider a second level—the household level—and thus to meet the variance across households in health matters, which are postulated by the approaches of the Household Production of Health and the New Household Economics. Our results illustrate this variance and the need for multilevel models. By considering the generation composition, we focus a measurement of the household structure, which will probably gain ground in the future. Already today, we find numerous changes in family and household structures (e.g. the trend towards smaller households, the possibility of coexistence of several generations), which are associated with different health risks and opportunities. This differentiation will also continue in the coming decades, resulting in the need for household to be a level of consideration. By using several household-related characteristics, we can prove that many of these characteristics act independently. Some of the indicators measure similar issues, however, they are not perfectly multicollinear and have an additional effect on health inequalities (e.g. there is a significant correlation between partnership status and the family status ($p < 0.001$), but we find all combinations of characteristics; the proportion of partnerless is 3% among married, 85% among widowed, 76% among divorced, and 73% among singles). What is surprising is the effect of the generation composition, which is stronger and more robust than the effect of the family status, which traditionally is examined as the main indicator for household characteristics. The comparison of men and women as well of the migrant groups shows that this is a largely global effect.

Another major strength of our study lies in the use of a broad database. First, the German Microcensus enables us to identify the household level and to perform stratified analyses. Second, considering the heterogeneity of the migrant population points to an internal differentiation of this group. With our differentiation between the two groups (Turks and Aussiedler) we meet this requirement and thus can make differentiated conclusions for a larger portion of the population in Germany. Finally, due to the obligation to provide information and the sampling, the data of the Microcensus and our analyses are highly representative for the target population examined (the non-institutionalised population in Germany between ages 30 and 64) and provide high accuracy.

Conclusion and Implications

This study provides new insights into the household effect on health and helps to identify health inequalities by migration background and gender. Native Germans, Turks, and Aussiedler differ in their health status, however, these differences are for the most part not due to differences in household composition. Our results indicate that there are effects on the macro level and individual level, which can compensate or superimpose meso-structural disadvantages or differences. Also, we assume that the migrant groups considered, which generally have already been in Germany for a longer time, are well integrated into social structures and have adopted norms, ideals, and health behaviours.

The household structure is significantly associated with health outcomes, whereas persons in 1G-HH (singles, couples without children, those living apart from their families) show health disadvantages. Thus, this group can be identified as particularly vulnerable. Because the influence of the household structure is largely the same for men and women who are Germans, Turks, and Aussiedler, the implication of interventions at the household level appears to reduce health inequalities globally. However, interactions at the family level and household level (e.g. childbearing, health behaviours, allocation of roles, and division of tasks) are a private matter, so connecting factors are difficult to discern. Our analysis clearly shows that women in particular are the beneficiaries of such interventions, as they have a greater dependence on household characteristics and because the household is still a female domain. An establishment of modern role models, a social policy adjustment, and a relief of women in the household could weaken these mechanisms and dependence prospectively.

Additionally, our analysis emphasises the socio-economic situation as a crucial determinant of health, which becomes especially clear in the context of migration background. At first glance, Turks have great health disadvantages and Aussiedler slight disadvantages. These health inequalities among migrants in Germany are mainly driven by their worse economic status. Intervention measures should act on this level as well. The example of Aussiedler in Germany elucidates that a high

level of integration into society, the education system, and the labour market also leads to an approximation in individual health outcomes.

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