Development of gender inequality in self-rated health in the life-phase of raising children in Germany from 1994 to 2018 – A decomposition analysis of socioeconomic, psychosocial and family-related influencing factors

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ABSTRACT

Extensive research has documented gender inequalities in self-rated health (SRH) to the disadvantage of women. However, little research has been done on how this gender gap has changed against the backdrop of social change. Using data from the German Socio-Economic Panel Study (GSOEP), this study addressed this issue and examined time-trends in SRH between 1994 and 2018 in women (n = 117,608) and men (n = 101,404) aged 30–49 years. In addition, we analyzed the role of socioeconomic, psychosocial and family-related factors as possible mediators influencing these trends. We performed logistic regression analyses for analyzing the time-trends and applied the Karlson-Holm-Breen (KHB) method for decomposing the time effect into direct and indirect parts via mediators.

Over time, the chance of reporting good as well as poor SRH remained largely stable in both genders while the majority of socioeconomic and psychosocial factors pointed towards improvement. The decomposition analysis revealed a positive effect of most of these mediators on the time trend in SRH. After controlling for the mediators, the health trend became negative, leading to a decline in the proportion of good health over time by 5.4%-point and 4.3%-point in women and men, respectively. The same pattern was observed with respect to poor SRH. For both genders, the decline of economic worries and the rise in school education contributed most to the indirect time effect.

Our findings indicate a positive development of key socioeconomic and psychosocial health determinants particularly for women, but no corresponding increase in SRH. Thus, gender inequality in SRH remained largely unchanged. However, our results suggest that SRH would have developed much worse if there had been no improvements in the health determinants considered. Further studies are needed to determine what other factors may have counteracted a positive health trend and stood in the way of narrowing the gender health gap.

1. Introduction

While men suffer earlier and more frequently life-threatening diseases such as ischaemic heart disease and lung cancer (Allel et al., 2021; Lampert et al., 2018), women are more affected by health impairments and disabilities (Cabezas-Rodriguez et al., 2021; King et al., 2018; Sperlich et al., 2019). In order to explain these health disparities between women and men, it has become established to distinguish between the biological category ‘sex’ and the socio-cultural dimension of ‘gender’ (Mauvais-Jarvis et al., 2020; Regitz-Zagrosek, 2018). While ‘sex’ refers to all genetic, anatomical, physiological, and hormonal characteristics, the term ‘gender’ describes socio-cultural differences between men and women based on different gender roles and social living conditions. The influences of sex and gender on health interact throughout the life course (Kautzky-Willer, 2014). From a gender-point of view, women compared to men report poorer health as they are structurally disadvantaged and more affected by psychosocial stress due to gender-specific role requirements (Geißler, 2014; Hapke et al., 2013).

The lives of women have changed dramatically in the last decades, which becomes particularly evident in the life-phase of child-raising. Today, young women in Germany are more likely to achieve high school-leaving qualifications as compared to their male counterparts,
whereas the reverse was true in the past (AutorgruppeBildungsberichterstattung, 2020). Many studies have demonstrated the positive associations between educational attainment and self-rated health (SRH) (Barley et al., 2000; Valverde et al., 2021; Vandenheede et al., 2015). Given these health-promoting effects, gains in educational attainment over time might have altered gender health inequalities in favor of women. The rise in female educational qualifications has been accompanied by an increase in female employment (Geijler, 2014). The once-dominant role of women as homemakers has changed in favor of a dual earner while they still predominantly bear the main responsibility for the household and family care (McDonough et al., 2013). According to the ‘multiple role attachment hypothesis’, multiple roles enable attachment to broader networks, which provide social support and resources that enhance health (Barnett & Hyde, 2001). In accordance with this assumption, studies suggest that employed women, regardless of being mothers or childless, reported better SRH as compared to their non-employed counterparts (Fokkema, 2002; McMunn et al., 2006; von der Lippe & Rattay, 2016). Therefore, it can be assumed that also the increase in female employment rates had a positive effect on women’s health.

The majority of previous studies indicate a positive temporal trend for self-reported health measures in terms of SRH, functional health and health-related quality of life (Ellert & Kurth, 2013; Gheorghe et al., 2016; Pöld et al., 2016; Sperlich et al., 2019; Sundberg et al., 2016; Trachte et al., 2015). The few studies employing a gender-sensitive approach yielded ambiguous findings. While some suggest a decrease in gender differences in SRH in favor of women (Aguilar-Palacio et al., 2018), Cummings & Braboy Jackson, 2008; Pöld et al., 2016; Sperlich et al., 2019; Volken et al., 2017), others found no evidence for a narrowing of the gender gap (Galenkamp et al., 2013; Johansson et al., 2015; Pinillos-Franco & García-Prieto, 2017). In addition, recent findings suggest that health improvements are more visible among older individuals whereas hardly any change could be found for younger ages (Clause-Verdreau et al., 2019; Greaney et al., 2019; Sperlich et al., 2019; Wolff et al., 2017). These findings point to the importance of an age-differentiated consideration of health trends. From a gender perspective, the middle age with the focus on raising children is of special importance as differences in role requirements between women and men become particularly visible in this life phase.

So far, studies on the health consequences of social change and their impact on the gender health gap are rare. The study by Hill and Needham (Hill & Needham, 2006) established that women’s health status has more steadily improved as compared to that of men. They attributed this trend primarily to women’s rise of high educational qualifications. With respect to changes in the working life, Corin et al. found only small, mainly positive changes in job demands over time (Corin et al., 2021). By contrast, the studies by Rigó et al. (Rigo et al., 2021) and Wolff et al. (Wolff et al., 2017) pointed to increasing work-related stress. However, as these studies are mostly lacking of a gender-sensitive approach, they do not allow any conclusions to be drawn about the impact of changing working conditions on gender inequalities in health. Given the research focus on paid work (Ophir & Polos, 2021), particularly little is known about how the distress related to unpaid household and family work has changed over time and impacted the health of women and men. We are not aware of any studies that have analyzed temporal trends in gender health inequality in Germany in the life-phase of child-raising.

To address this gap, we first analyzed the development of gender differences in SRH between 1994 and 2018 among individuals aged 30–49 years. To do this, we compared this age group over five time-periods using a population-based approach. In a second step, we examined, separately for women and men, changes over time in socioeconomic, psychosocial and family-related factors as possible mediators of the observed health trends. In a final step, we decomposed the total time effect on SRH into a direct and an indirect effect (via the mediators) and disentangled the contribution of each mediator.

2. Methods

2.1. Data source

The analyses are based on data from the German Socio-Economic Panel (GSOEP V.31), conducted by the German Institute for Economic Research. The GSOEP is a representative annual survey of German individuals aged 18 and older in private households that started in 1984 (Goebel et al., 2019). Data were collected by face-to-face interviews using different questionnaires for individuals, households or specific subgroups. The GSOEP population is updated regularly with new survey samples to reflect changes in the German population and in order to compensate for dropouts occurring over time. The central survey instrument for this study is an individual questionnaire on the personal social, family and health situation, which each adult household member is supposed to answer. Further information on GSOEP can be obtained from Goebel et al. (Goebel et al., 2019).

We included participants between 30 and 49 years of age as our focus was on the life-phase of raising children. Our analyses are based on a pooled dataset including the waves from 1994 to 2018, allowing for trend analysis on population level by means of cross-sectional comparisons. Although the GSOEP allows for individual-level observations, we did not examine them with respect to intra-individual changes over time. Rather, we examined SRH in the age cohort of 30- to 49-year-old men and women at the population level over different time-periods to determine whether the health status in this age cohort has changed over time. We used cross-sectional weights that are assumed to produce a nationally representative sample. Respondents with missing information were excluded. We used the STROBE cross sectional reporting guidelines (Elm et al., 2007).

2.2. Measures

2.2.1. Self-rated health (SRH)

SRH as the dependent variable was measured by asking the participants to assess their health with the following question: ‘In general, how would you rate your current health status?’. The five original response categories (‘very good’, ‘good’, ‘satisfactory’, ‘poor’ and ‘bad’ health status) were transformed into two binary variables indicating ‘good’ health status (‘very good’ and ‘good’ compared with ‘satisfactory’, ‘poor’ and ‘bad’) and ‘poor’ health status (‘poor’ and ‘bad’ health compared with ‘very good’, ‘good’ and ‘satisfactory’). SRH has proven to be a reliable and valid health indicator that predicts health-care utilization, future health problems, and mortality (DeSalvo et al., 2005; Idler et al., 2000; Kananen et al., 2021).

2.2.2. Time trend

The time trend as the independent variable was assessed by a categorical variable covering five time-periods (1994–1998, 1999–2003, 2004–2008, 2009–2013 and 2014–2018), using the first time-period as reference category. In addition, the time-trend was assessed using a continuous trend variable, coded 0 for 1994 and 1 for 2018, with the years in between getting fractional values, for example 0.042 for 1995, 0.084 for 1996 and so forth. The value determined with this variable gives the average change over the entire time-period.

2.2.3. Mediators

Socioeconomic, psychosocial and family-related factors that have been shown to impact health as well as health inequalities (Moor et al., 2017) were used as potential mediators of the health trends. Socioeconomic factors include educational level, occupational status, and household net adjusted disposable income according to the modified equivalence scale (Eurostat, 1995). Each of these indicators was classified into three categories, representing low, intermediate and high social status (see Appendix Table A). In addition, employment status was assessed using four categories: 1.) ‘unemployed and looking for work’,...
2. 'not employed (e.g. parental leave), 3. 'employed part-time' and 4. 'employed full-time'.

Psychosocial factors include economic worries, worries about job security, satisfaction with work, satisfaction with own household activities, and satisfaction with child-care options. All variables were assessed since 1994 with the exception of satisfaction with own household activities and child-care options that were first surveyed in 1997. Economic worries were assessed by asking the participants “Are you worried about your own economic situation?” offering the following answer options: 1.) major worries, 2.) some worries and 3.) no worries. Job security was surveyed with the question: “If you are gainfully employed: Are you concerned about the security of your job?” Answer options were again 1.) major worries, 2.) some worries and 3.) no worries. Satisfaction with work, with activities in the household and with the possibilities of childcare was each measured on a scale from 0 (completely dissatisfied) to 10 (completely satisfied). Participants that were not engaged in household activities by themselves or those for whom childcare facilities were not relevant due to childlessness, indicated ‘not rated health by means of logistic regression analyses using cluster-robust applicable

addition to odds ratios (OR), we reported predicted probabilities.

with first time of observation. For the categorical variable, this was the interaction term was the temporal development of SRH in men, starting

categorical and continuous time-trend variable. Reference category for the
determined to be the family status most conducive to SRH. In addition,

For assessing family-related factors we used a variable that contains

four categories: 1.) partnered parents (married or cohabitating), 2.) single parents, 3.) married/cohabitating individuals being childless, and 4.) singles being childless.

2.3. Statistical analyses

First, we analyzed the temporal development of good and poor self-rated health by means of logistic regression analyses using cluster-robust standard errors to adjust for the panel structure of the data. We calculated interaction terms between the time-trend and gender in order to determine changes in gender inequality in SRH, using both the categorical and continuous time-trend variable. Reference category for the interaction term was the temporal development of SRH in men, starting with first time of observation. For the categorical variable, this was the first period (1994–1998) and for the continuous variable the first year (1994). In addition, we investigated the temporal development of the mediators (socioeconomic, psychosocial and family-related factors). In addition to odds ratios (OR), we reported predicted probabilities.

Based on logistic regression analysis, the Karlson-Holm-Breen method (KHB-method) (Kohler et al., 2011) was applied to examine how much of the total time effect on SRH is mediated by changes in socioeconomic, psychosocial and family-related factors over time. The KHB method extends the decomposition properties of linear models to logistic regression models by decomposing the total effect of time on SRH into a direct and indirect effect. This method ensures that the crude and adjusted coefficients are measured on the same scale and thus, are unaffected by the rescaling bias that arise in cross-model comparisons of non-linear models.

In our case, the total effect is the effect of time on SRH without the mediators, only controlled for age and the residual variance. The direct effect of time corresponds to the effect that remained after controlling for the mediators. Accordingly, the indirect effect is the part of the time-effect on SRH that is explained by the mediators. In addition to odds ratios (OR), we reported average partial effects (APE) giving the decomposition a more substantial interpretation. APE are measured on the probability scale and estimate the average marginal effect of each mediator as expressed in percentage points (Kohler et al., 2011).

With respect to OR, the indirect effect is calculated as the total effect divided by the direct effect. Regarding APE, it is calculated by the total effect minus the direct effect. All regression analyses were performed separately for men and women. We controlled for age by including a continuous age-variable as a covariate, taking possible shifts in age composition into account. Population weights were employed to match the official population statistics. All analyses were performed with

Table 1

| Category                        | Women (n = 117,608) | Men (n = 101,404) |
|---------------------------------|---------------------|-------------------|
| **Age groups in yrs.**          |                     |                   |
| 30–34                           | 23.6                | 23.6              |
| 35–39                           | 24.8                | 24.8              |
| 40–44                           | 25.9                | 26.0              |
| 45–49                           | 25.8                | 25.6              |
| missing                         | 0                   | 0                 |
| **Parental Status**             |                     |                   |
| partnered parent                | 50.5                | 50.1              |
| partnered/childless             | 25.2                | 23.2              |
| single parent                   | 9.4                 | 1.1               |
| single/childless                | 14.9                | 25.6              |
| missing                         | 0                   | 0                 |
| **School education**            |                     |                   |
| low                             | 29.3                | 34.8              |
| intermediate                    | 40.7                | 32.5              |
| high                            | 29.9                | 32.7              |
| other qualification             | 8.8                 | 8.0               |
| missing                         | 1.7                 | 1.6               |
| **Employment status**           |                     |                   |
| unemployed                      | 6.1                 | 6.2               |
| not employed                    | 22.0                | 4.4               |
| part-time                       | 34.9                | 4.2               |
| full-time                       | 37.0                | 85.2              |
| missing                         | 0                   | 0                 |
| **Occupational position**       |                     |                   |
| low                             | 15.7                | 13.7              |
| intermediate                    | 42.2                | 46.3              |
| high                            | 14.7                | 29.5              |
| not working                     | 27.4                | 10.5              |
| missing                         | 0.3                 | 0.2               |
| **Household income**            |                     |                   |
| low                             | 9.7                 | 7.6               |
| intermediate                    | 69.7                | 68.7              |
| high                            | 20.7                | 23.7              |
| missing                         | 2.1                 | 2.0               |

Notes: n = number of observations. 1 categories low, intermediate and high are explained in Table A (Appendix).
3.1. Temporal development of SRH

Between 1994 and 2018, the predicted probabilities of good SRH increased in women and men aged 30–49 years from 53.7% to 57.0% and 58.2%–61.4%, respectively (Fig. 1). The corresponding odds ratios are OR = 1.15 (CI: 1.03–1.27) and OR = 1.13 (CI: 1.00–1.28), respectively (Table 2). At the same time, predicted probabilities of poor SRH rose slightly from 13.6% to 14.2% in women and from 10.3% to 11.3% in men. At all time-points, women showed poorer health relative to men. As indicated by the non-significant interaction term between gender and time, there has been no change in this gender relationship over time (see Appendix Table D). However, gender differences in good and poor SRH tended to widen after the time-period 2009–2013, while before that they have narrowed somewhat.

3.2. Temporal development of the mediators

Over time, the chance of getting a tertiary education increased approximately threefold for women (OR: 2.97, CI: 2.50–3.53) and nearly twofold for men (OR: 1.97, CI: 1.65–2.34) (Table 3). Expressed in predicted probabilities, the proportion of tertiary education rose in women from 18.4% to 36.4% (Appendix Table E) and in men from 24.1% to 36.4% (Appendix Table F). Similarly, the chance for a high occupational position increased by 129% in women (OR: 2.29, CI: 1.88–2.78) and by 36.4% (OR: 1.29, CI: 1.00–1.28) as compared to men (Appendix Table E). With regard to family status, it revealed that the proportion of partnered parents significantly decreased in both genders while particularly childless singles were on the rise. All psychosocial factors showed a positive trend towards improved conditions for health. Among women, men (OR: 2.60, CI: 2.12–3.19). As the interaction-terms of time and gender indicate, gender differences with respect to tertiary education, employment status and occupational position have narrowed over time to the advantage of women (Table 3). However, in 2014–2018 women were still disadvantaged in terms of employment status, occupational position and income (Appendix Table E) as compared to men (Appendix Table F). Among partnered parents, the gender gap in this respect. Men showed a greater reduction of economic worries and concerns about job security as compared with women. In addition, the increase of satisfaction with the household activities was more pronounced in males (Table 3).

Table 2

| Model 1: Good SRH | 95% CI | Model 2: Good SRH | 95% CI |
|-------------------|-------|-------------------|-------|
| 1994–1998         | 1.00  | 1.15*              | 1.03  |
| 1999–2003         | 1.07  | 1.17**             | 1.10  |
| 2004–2008         | 1.08  | 1.17***            | 1.11  |
| 2009–2013         | 1.10  | 1.17***            | 1.12  |
| 2014–2018         | 1.12  | 1.17***            | 1.13  |

Table 3

| Time (cat.) | Good SRH | 95% CI | Poor SRH | 95% CI |
|-------------|----------|-------|----------|-------|
| 1994–1998   | 1.00     | 1.00  | 1.00     | 1.00  |
| 1999–2003   | 1.10*    | 1.10  | 1.10*    | 1.10  |
| 2004–2008   | 1.03    | 1.03  | 1.03     | 1.03  |
| 2009–2013   | 1.07    | 1.07  | 1.07     | 1.07  |
| 2014–2018   | 1.10*   | 1.10  | 1.10*    | 1.10  |

Notes: Logistic regression analyses of good/poor SRH on time, adjusted for age. The continuous time variable ‘Time (cont.)’ in model 2 is coded 0 for 1994 and 1 for 2018. Reference group in model 1: first time period (1994–1998) and in model 2: first year of observation (1994). 95%CI = 95% confidence interval, *p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001.
Temporal development of the mediators (socioeconomic, psychosocial and family-related factors) in women and men aged 30–49 years, Germany, 1994–2018

| Women | Men | Interaction Time*Gender |
|-------|-----|-------------------------|
|       | OR  | 95% CI                  | OR  | 95% CI                  | OR  | 95% CI                  |
| Temporal development: | | | | | | |
| School education primary | 0.24*** | 0.20; | 0.35*** | 0.29; | 0.88 | 0.63; |
| secondary | 0.84* | 0.73; | 0.96 | 0.82; | 0.87 | 0.71; |
| tertiary | 2.97*** | 2.50; | 1.97*** | 1.65; | 1.48*** | 1.17; |
| Employment Status | | | | | | |
| unemployed | 0.80* | 0.67; | 1.18 | 0.94; | 0.68** | 0.51; |
| not employed | 0.54*** | 0.47; | 1.62** | 1.24; | 0.32*** | 0.24; |
| part-time | 1.60*** | 1.41; | 3.04*** | 2.23; | 0.57*** | 0.41; |
| full-time | 1.06 | 0.92; | 0.55*** | 0.46; | 1.86*** | 1.50; |
| Occupational position | | | | | | |
| low | 0.80* | 0.69; | 0.88 | 0.74; | 0.97 | 0.77; |
| intermediate | 1.19** | 1.05; | 0.76*** | 0.67; | 1.59*** | 1.34; |
| high | 2.29*** | 1.88; | 1.29*** | 1.10; | 1.75*** | 1.35; |
| Income | | | | | | |
| <60% median | 2.31*** | 1.99; | 2.60*** | 2.12; | 0.90 | 0.70; |
| >60% - <150% | 0.64*** | 0.56; | 0.62*** | 0.54; | 1.03 | 0.85; |
| ≥150% | 1.14 | 0.97; | 1.22* | 1.03; | 0.94 | 0.74; |
| Parental Status | | | | | | |
| single | 1.20 | 0.97; | 1.60 | 0.82; | 0.72 | 0.36; |
| partnered | 0.72*** | 0.63; | 0.53*** | 0.46; | 1.25* | 1.03; |
| parent | 0.93 | 0.79; | 1.30*** | 1.10; | 0.77* | 0.61; |
| single/childless | 1.85*** | 1.50; | 1.75*** | 1.46; | 1.12 | 0.85; |
| Economic worries | | | | | | |
| no | 1.53*** | 1.33; | 1.89*** | 1.64; | 0.82* | 0.67; |
| some | 0.84** | 0.76; | 0.79*** | 0.72; | 1.04 | 0.71; |
| considerable | 0.84** | 0.75; | 0.69*** | 0.61; | 1.22* | 1.03; |
| Worries about job security | | | | | | |
| no | 2.09*** | 1.85; | 1.93*** | 1.70; | 1.10 | 0.93; |
| some | 0.91 | 0.82; | 0.61*** | 0.55; | 1.51*** | 1.30; |
| considerable | 0.74*** | 0.64; | 0.58*** | 0.50; | 1.29* | 1.05; |
| Satisfaction with job | | | | | | |
| less satisfied | 0.90 | 0.76; | 0.73*** | 0.63; | 1.22 | 0.97; |
| intermediate | 1.28*** | 1.16; | 0.97 | 0.88; | 1.34*** | 1.17; |
| (very) satisfied | 1.49*** | 1.34; | 1.12* | 1.00; | 1.36*** | 1.17; |
| Satisfaction with household | | | | | | |
| less satisfied | 0.67*** | 0.58; | 0.58*** | 0.48; | 1.18 | 0.93; |
| intermediate | 0.83*** | 0.76; | 1.41*** | 1.26; | 0.60*** | 0.52; |
| (very) satisfied | 1.10 | 0.99; | 2.81*** | 2.48; | 0.40*** | 0.34; |
| Satisfaction with child-care | 0.27*** | 0.24** | 1.09 | |

Notes: **Regression models are adjusted for age. For layout reasons, the continuous predictor employment status is listed in columns while the mediators (dependent variables) are listed in rows. A regression model was calculated for each mediator, separated for men, women and for interaction time*gender. Reference category for men and women: first year of observation (1994), reference category for time*gender: temporal development in men, starting in 1994 (main effects of gender and time not displayed). 95% CI = 95% confidence interval, *p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001.

4. Discussion

We analyzed temporal changes in SRH between 1994 and 2018 among women and men aged 30–49 years and investigated the role of socioeconomic, psychosocial and family-related factors as possible drivers behind these trends. Our main result was that despite positive developments in socioeconomic and psychosocial factors, particularly for women, proportions of good and poor SRH for both genders have not changed markedly. This corresponds to previous work that indicated that SRH did no substantial change in younger ages (Claude-Verdreaux et al., 2019; Greaney et al., 2019; Sperlich et al., 2019; Wolfl et al., 2017). Accordingly, we found that gender inequalities in SRH to the disadvantage of women did not substantially change over time.

4.1. Temporal changes in socioeconomic, psychosocial and family-related mediators by gender

Between 1994 and 2018, social inequalities between genders reduced significantly. This applies particularly to the chance of a high school education that increased approximately threefold for women but only twofold among men. In addition, the chance for a high occupational position increased by 129% in women but only by 29% in men (Table 3). The rise of women’s number in a high occupational position went hand in hand with the overall increase in women’s participation in the labor market.
force. However, gender inequalities to the disadvantage of women still persist, indicating that in 2014–2018 one in three men (Appendix Table F) but only one in five women (Appendix Table E) held a high occupational position. The continuing disadvantage of women in high occupational positions might point to structural barriers that stand in the way of the corresponding translation of a high educational qualification into a high occupational status.

4.2. Gender-specific trends in SRH

In line with previous work (Lampert et al., 2018; Oksuzyan et al., 2008; Regitz-Zagrosek, 2018), we found that women reported poorer SRH compared to men, which applies to all time-points considered.

Overall, we found that SRH has not significantly changed in both genders, despite positive trends in socioeconomic and psychosocial factors that were particularly evident for women. Our results suggest that SRH would have worsened significantly for both genders if there had been no improvements in the socioeconomic and psychosocial factors considered. However, this general positive trend of influencing factors might mask different developments for different socioeconomic groups. This could also explain why the model fit of the decomposition analysis in terms of pseudo-$R^2$ is not excellent. Consistent with this assumption, McDonough et al. suggested that the overall health trend may mask a growing gap among women (McDonough et al., 2013). They postulate that the social change in terms of increasing female labor participation may not be beneficial for all women. They argued that the employment trends, together with rising divorce rates might leave social disadvantaged women more vulnerable. This assumption is supported by a recent study showing that socioeconomic conditions as well as SRH among single mothers has deteriorated sharply over the past two decades (Sperlich et al., 2022).

### Table 4

Decomposition of the total time effect on good and poor self-rated health (SRH) into direct and indirect effects via mediators (socioeconomic, psychosocial and family-related factors) in women and men aged 30–49 years, Germany 1994–2018

|                      | Women |                      | Men |                      |
|----------------------|-------|----------------------|-----|----------------------|
|                      | OR    | 95% CI               | OR  | 95% CI               |
| Total time effect    | 1.01  | (0.96; 1.14)         | 1.08| (0.94; 1.24)         |
| Direct time effect   | 0.78***| (0.69; 0.89)         | 0.82***| (0.71; 0.94)         |
| Indirect time effect | 1.29***| (1.23; 1.36)         | 1.32***| (1.24; 1.41)         |
| APE (%)              | 95% CI| APE (%)              | 95% CI| APE (%)              |
| Total time effect    | 0.3   | (−2.36; 2.96)        | 1.6 | (−1.31; 4.56)        |
| Direct time effect   | −5.4***| (−8.29; −2.81)       | −4.3**| (−7.35; −1.32)       |
| Indirect time effect | 5.7   | (6.0)                | −3   | −2.6                |
| Direct time effect   | Coef  | P_diff               | Coef | P_diff               |
| Economic worries     | 1.6   | 29.1                 | 2.0 | 33.0                 |
| Primary education    | 1.0   | 17.6                 | 1.0 | 16.8                 |
| Tertiary education   | 0.6   | 11.4                 | 0.6 | 9.8                  |
| High satisfaction household | 0.3 | 4.6              | 1.3 | 22.4                 |
| High job satisfaction | 1.6  | 27.7                 | 0.7 | 11.2                 |
| No worries job security | 0.8 | 13.3                 | 0.3 | 5.2                  |
| Low income           | −0.3  | 5.7                  | <0.1| −0.7                 |
| High income          | 0.2   | 3.2                  | 0.1 | 2.4                  |
| Low occupational position | 0.1 | 2.5                  | <0.1| −0.4                 |
| High occupational position | 0.3 | 5.4                  | 0.2 | 3.7                  |
| Not employed         | −0.2  | 3.0                  | 0.1 | 0.2                  |
| Partnered parent     | −0.4  | 6.7                  | −0.2| −3.6                 |
| High satisfaction child-caring | <0.1 | 0.7              | <0.1| 0.4                  |
| Pseudo R² (McFadden) | 0.08  | 0.09                 | 0.07| 0.10                 |

Notes: Based on KHB-method for logistic regression, adjusted for age. OR = Odds ratio, APE = average partial effects (change in average probability of SRH over time in percentage points), 1−95% confidence interval cannot be calculated since standard errors of indirect effects are not known for APE method, Coef: indirect effect due to each of the mediators, $P_{\text{diff}}$: contribution of each mediator to the indirect effect in percentages (the sum of all $P_{\text{diff}}$ values adds up to 100 percent), $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$. 95%CI = 95% confidence interval.
Germany underwent major labour market policies changes in the 1990s and 2000s, which transformed the German economy from a conservative to a more liberal labour market. As a consequence, precarious employment has increased in Germany by means of labour market flexibilisation (Pfortner & Elgar, 2016). At the same time, Germany experienced also a rise in income inequality and income-related health inequalities (Siegel et al., 2014). Moreover, increased differences in poor SRH by working poverty and low wage were found during the economic crisis in 2008/09 and the post-recession periods (Pfortner et al., 2019). These findings suggest that the development of SRH during the child-rearing life stage may have varied by socioeconomic status. Therefore, further studies are needed for both genders, examining health trends and their potential determinants separately for different socioeconomic groups. Such analyses will provide information about vulnerable groups for whom strengthening preventive measures seem to be especially necessary.

4.4. Limitations

Finally, some important limitations of this study need to be addressed. It may be possible that the time-trends are biased by the exclusion of the institutionalized population and persons who could not participate in the survey for health reasons. In addition, due to the panel structure of the data, there could be some attrition in some cases because the health status of participants could deteriorate over time. Hence, we cannot fully rule out that the trends in SRH and in the mediators are overestimated in our study. However, there is no reason to assume that the proportion of persons not accessible with the survey increased over time and, therefore, the time-trends should not be majorly biased thereby.

Furthermore, a shift in the perception of health may also have contributed to changes in proportions of good and poor SRH over time. The changes observed may therefore also be due to changes in norms and values regarding health.

Another limitation of our study is that the predictive validity of SRH may differ according to gender. For instance, it was found that poor SRH is a more powerful predictor of short-time mortality for men as compared to women (Assari, 2016). One reason for this could be the different meaning of ‘good’ and ‘poor’ SRH for men and women, which may have contributed to the gender differences found in our study. However, Zajacova et al. (Zajacova et al., 2017) find little systematic gender difference in the structure of SRH and concluded that the meaning of SRH is similar for women and men.

Psychosocial and material factors have been identified as key pathways in the explanation of socioeconomic inequalities in health (Moor et al., 2017). Therefore, we analyzed changes in these factors over time as possible factors influencing the temporal development of SRH. However, because we used cross-sectional data, no firm conclusions can be drawn about the direction of the relationship. Moreover, it should be considered that the variables used as mediators may have their origins prior to the study period. For example, economic worries may have their origin in the socioeconomic status of the parents. Therefore, possible selection effects in the life course should be considered when interpreting the findings.

In addition, it should be noted that we considered all women and men between the ages of 30 and 49, both those with and without underaged children. Because of this approach, we focused on family-related factors that apply to all individuals. This means that, with the exception of satisfaction with child-care options, we excluded all variables that relate only to parents, such as the number and age of children. However, given the great importance of these factors for health (Mistry et al., 2007; Sperlich et al., 2011), they should be considered in further subgroup-specific analyses on parents.

Finally, our grouping of the temporal evolution in five-year periods may be too broad to capture significant turning points. Therefore, sensitivity analyses were performed using Joinpoint Regression software, which is provided free of charge by the US National Cancer Institute. The results based on annual SHR data indicated significant turning points in women toward a decrease in good SRH after 2012 and an increase of poor SRH after 2009. By contrast, in men a significant increase in good SRH could be established after 2005 while no significant turning point could be found for poor SRH. These results confirmed our finding that after the period 2009–2013, gender inequalities in SRH have increased again to the disadvantage of women.

4.5. Conclusions

Our findings suggest a positive development of key structural and psychosocial health determinants among individuals aged 30–49 years that applied particularly to women. However, we found no corresponding increase in SRH and no evidence that gender inequalities in SRH have changed substantially between 1994 and 2018. We may assume that SRH would have deteriorated significantly in both genders if there had been no improvements in the socioeconomic and psychosocial determinants considered. Further gender sensitive studies are warranted in order to determine what other determinants might have opposed to a positive health trend.

Ethical statement

Ethical approval from the ethics committee is not required as this study using pre-existing and de-identified survey data.

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CRediT author statement

Frauke-Marie Tübbecke: Conceptualization, Formal analysis, Visualization, Validation, Writing - Original Draft, Jelena Epping: Writing - Review & Editing, Batoul Safieddine: Writing - Review & Editing, Stefanie Sperlich: Writing - Original Draft, English editing, Formal analysis, Supervision.

Data availability statement

The raw data were drawn from the German Socio-Economic Panel Study (GSOEP 21 V.31). The datasets used are available from the corresponding author on reasonable request. German data privacy laws necessitate that all users sign a data user contract with DIW Berlin.

Declaration of competing interest

All authors declared that they have no conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.saphm.2022.101183.

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