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Biases in Assertions of Self-Rated Health*

Exploring the Role of the Respondent, Country of Residence, and Interviewer

Patrick Lazarevič

Abstract: Comparative analyses frequently examine respondents' self-rated health (SRH), assuming that it is a valid and comparable measure of generic health. However, given SRH's vagueness, this assumption is questionable due to (1) manifold non-health influences, such as personal characteristics including optimism, interviewer effects on the rating, and cultural contexts, as well as (2) potential gender, age- or country-specific expectations for one's health or frames of reference. Conceptually, two major components of SRH can be distinguished: latent health and reporting behavior. While latent health exclusively refers to objective health status, reporting behavior collectively refers to non-health characteristics (NH) affecting SRH. The present paper is primarily concerned with the latter and aims to identify whether and how NH bias SRH, including possible differences by gender, age, and country of residence.

The presented analyses are based on data from 16,183 participants in five countries drawn from the fifth wave of the Survey of Health, Ageing and Retirement in Europe (SHARE). Latent health is controlled via a wide array of health indicators and the residuals are examined with a model covering NH from three different sources: the interviewer, the respondent, and the country of residence. To identify subgroup-specific response behaviors, all analyses are carried out separately by gender, three age groups (50-64, 65-79, and 80+ years), and country of residence.

The analyses uncovered influences of – among others–the interviewer's SRH, the respondent's life satisfaction, and the country of residence on SRH, while other factors differed by subgroup. The amount of explained variance due to such reporting behavior (with a mean of seven percent) can be deemed meaningful, considering that controlling for latent health already explains around half of SRH's variance. The greatest source of non-health influences was respondent characteristics, with the interviewer and country having smaller effects.

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These results illustrate the importance of taking NH into account when using SRH measures. Future research on complementing SRH with factual questions in survey design is advisable.

Keywords: Response Bias · Cross-National Comparison · Europe · Reporting Behavior · Self-Rated Health · Survey of Health · Ageing and Retirement in Europe (SHARE)

> The greatest compliment you can get from a German is "I can't complain", because you know they tried.
>
> (Anonymous)

1 Introduction

Health is relevant across all social sciences. Given ongoing demographic aging in many societies, the reasons and consequences of health inequality as well as maintaining good and improving bad health are increasingly important strands of research for individual and societal welfare. Results from such inquiries are crucial for developing evidence-based policies for improving the lives of vulnerable groups such as the elderly (*Brandt et al.* 2016).

How to measure the rather abstract concept of "health", however, is comparably seldom the focus of rigorous scientific analyses. In this context, self-rated health (SRH) is the most widely-used single-indicator of health in many scientific disciplines, which simply asks respondents to rate their overall health on a fully labeled five-point scale, e.g., "excellent, very good, good, fair, poor" (*Jylhä* 2009). Apart from its simplicity, brevity, and the comparability implied in its widespread use, the most important reasons for using SRH to measure health are its well-established predictive validity regarding morbidity (*Idler/Kasl* 1995) and mortality (*Idler/Benyamini* 1997) and its inclusive, dynamic, and resource-reflecting measurement of health (*Benyamini* 2011). More comprehensive approaches to health measurement (e.g., extensive questionnaires, physical examinations, performance tests, biomarkers etc.) on the other hand, while being more precise and straightforward in what is actually measured, are disadvantageous because of increasing respondent burden (*Bradburn* 1979; *Sharp/Frankel* 1983) and being generally more time- and cost-intensive, making them especially impractical for use in multi-thematic surveys.

While SRH is often taken at face value in applied research, researchers increasingly raise the question whether simply asking "Would you say your health is...?" alone might leave too much room for interpretation to respondents to provide comparable measurements due to potential biases from non-health influences. This makes it difficult to know what exactly is measured by SRH and how to interpret SRH scores, group differences, and coefficients in multivariate analyses. Conceptually, SRH can be assumed to comprise two components: latent or "true" health and reporting behavior, also known as reporting heterogeneity (*Shmueli* 2003; *Layes et al.* 2012). *Latent health* in this context can be thought of as the theoretically "objective" generic health status of a person covering aspects such as functional limitations or diseases.

Reporting behavior, on the other hand, is a collective term for any kind of systematic variation of SRH caused by non-health characteristics (NH) such as optimism or age, i.e., features that systematically affect health perceptions. However, this does not mean that NH are completely unrelated to health but rather that, for a given objective health status, for instance, people who are more optimistic will likely rate their health more positively than comparably pessimistic respondents. Similarly, older respondents might rate their health generally more positively because of changing frames of reference and health aspirations or due to having had more time to get used to functional limitations or health conditions (*Heyink* 1993; *Groot* 2000; *Melzer et al.* 2004).

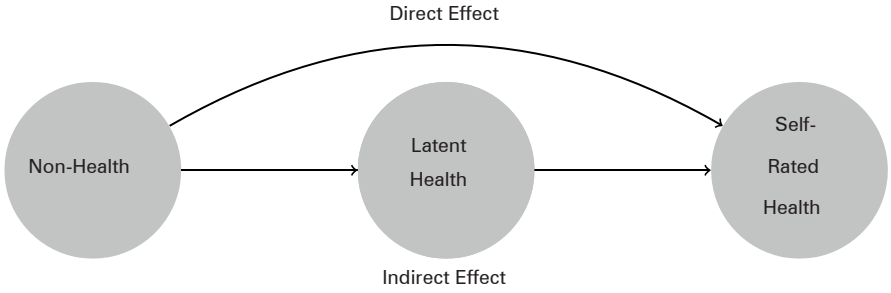
The goal of this paper is to explore the influence and variability of reporting behavior by using cross-sectional data from the fifth wave of the Survey of Health, Ageing and Retirement in Europe (SHARE). To this end, I first present the analytical model employed in the subsequent analysis and discuss the results of studies pertinent to this research. Subsequently, I describe the data and methods used for the analysis. Finally, I present the results that will then be discussed with possible directions for future research.

2 Theoretical Model: Health Ratings and Non-Health Characteristics

At its core, the idea of measuring generic health via SRH is based on the notion of latent health being reflected in SRH. However, as described above, reporting behavior likely plays an important and biasing role in how respondents translate their latent health into a health rating. One way to illustrate this idea is shown in Figure 1. Latent health as a major determinant of SRH is represented by the arrow from latent health to self-rated health. However, Figure 1 also acknowledges the NH of respondents, i.e., any respondent traits that do not belong to the concept of latent health. The role of NH is twofold: First, they can influence the latent health of the respondent, like higher education and its consequences benefiting health (*Jasilionis/Shkolnikov* 2016; *Lynch/von Hippel* 2016), which is represented by the arrow from NH to latent health in Figure 1. Second, however, NH may also directly affect SRH in a way that is not mediated by latent health and represented by the direct, bent arrow from NH to self-rated health. This direct effect of NH on SRH corresponds to the previously described concept of reporting behavior. One example for this might be if more educated respondents have a comparably positive outlook on their health and therefore tend to rate a similar objective health state more positively than less educated respondents do.

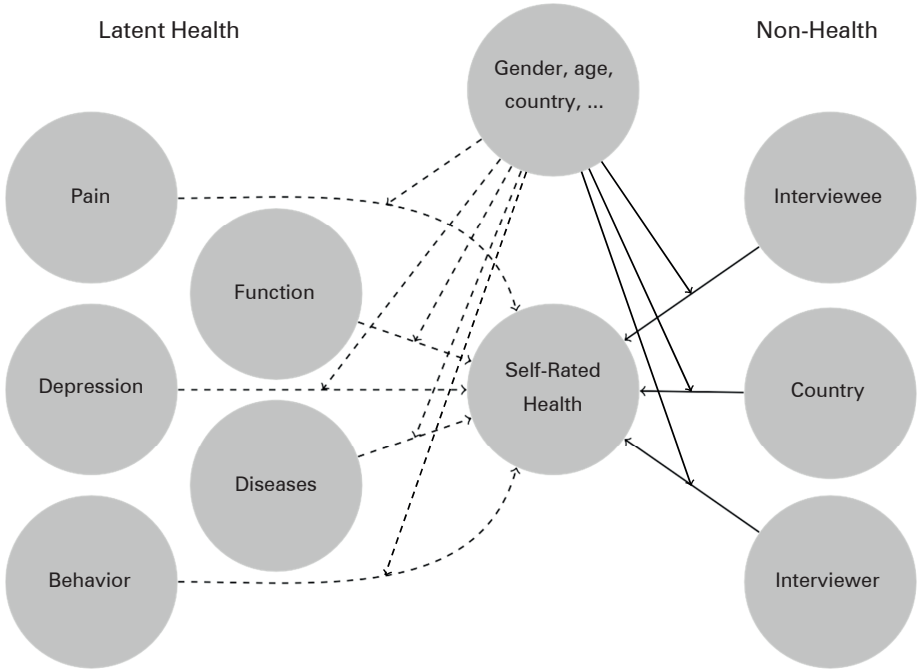
In order to isolate these direct effects of NH on SRH, i.e., NH net of its effects that are mediated by latent health, one possible approach is to control for any influences of latent health on SRH. When controlling for as much health information as possible, the remaining variance of SRH (i.e., the residuals) can, assuming a comprehensive latent health model, be attributed to either random deviations, i.e., idiosyncrasies of rating health, or to direct effects of NH on SRH. This means that the approach chosen for this study assumes that all information (i.e., SRH's variance) that cannot

Fig. 1: Direct and Indirect Effects of Non-Health Characteristics on SRH



Source: own design based on *Lazarevic* 2019

Fig. 2: Theoretical Model of SRH



Source: own design based on *Lazarevic* 2019

be explained or predicted by health indicators is caused by reasons beyond health itself (i.e., NH). Any significant effect on the residuals of a comprehensive regression model of latent health on SRH that cannot be attributed to omitted health indicators can thus be interpreted as bias (i.e., systematic variation in error terms). In other words, any effects of NH after a control of latent health would describe the extent to which the same health status (based on the available latent health indicators) is rated differently by the respondents.

The analytical model used for the analyses of this paper is depicted in Figure 2. This model was developed by *Lazarevič* (2019)[1] from general models of the cognitive process underlying answering survey questions (*Tourangeau* 1984; *Strack/Martin* 1987) and rating one's health (*Knäuper/Turner* 2003; *Jylhä* 2009). In short, it asserts that SRH is based both on different domains of latent health (on the left side of the model) as well as NH, such as influences of the interviewer (in personal interviews), personal characteristics, and the country of residence (on the right side). As this paper is focused on direct influences of NH on SRH and, as stated above, the approach to isolate direct effects of NH on SRH is to control for latent health before the main analyses shown in this paper, the influences of latent health on SRH are depicted with dashed arrows while the arrows representing effects of NH on SRH are solid. Additionally, this model posits that basic sociodemographic characteristics of the respondent, such as gender, age, or country, can also potentially moderate any influence on SRH (top of Figure 2). This moderating effect can be captured analytically, e.g., as interaction effects of specific NH with sociodemographic traits or, as done in this paper, by estimating separate models by gender and age or country.

In the framework of this model, *function*(ing) represents how well an individual is able to function health-wise and is measured via aspects such as the ability to deal with (instrumental) activities of daily living, general health-related restrictions of activities, and physical performance tests. The aspect of *diseases* covers the influences of being afflicted by diagnosed (chronic) diseases or (adverse) health conditions, the presence of multimorbidity, and the overall number of diseases. *Pain* stands for the (chronic) experience and intensity of pain. *Depression* generally covers aspects of mental health, such as being affected by or diagnosed with mental health conditions such as depression or anxiety disorders, the number of such symptoms, and taking mental health medications. Lastly, *behavior* represents risk-related behaviors or their outcomes, such as being a smoker or having a non-normal body-mass-index (BMI), since these aspects might also influence one's evaluation of health even if they might not (yet) clinically affect health status.

As for NH, *interviewee* characteristics represent, in this paper, the direct influences of respondent characteristics, such as socially desirable responding, satisfaction with life as a proxy for optimism, and social participation and trust in others as a proxy for the influences of social networks (*Shmueli* 2003; *Layes et al.* 2012; *Warner et al.* 2012; *Latkin et al.* 2017). Further, this also includes situational characteristics of the interview situation, such as the presence of other persons during the interview or whether (health) information was provided by someone else, i.e., proxy interviews (*de Luca/Lipp*s 2005). These situational characteristics might also be seen as a source of bias in their own right (i.e., survey characteristics or method effects), but were included in the interviewee category since the respondent can often at least in part be deemed responsible for their occurrence. The *Country* of birth or residence plays a double role in this analysis since it first might influence

[1] A description of this model in English is provided by *Lazarevič* and *Brandt* (2020).

SRH directly, e.g., through cultural aspects such as norms regarding communication about health or problems in general, or simply variation in the translation of standardized survey instruments. Second, the country of residence might also, together with general respondent characteristics such as gender and age, have a moderating effect on how NH influence health ratings due to disparate expectations and frames of references or cultural aspects that affect rating behavior (e.g., *Jürges* 2007). Lastly, *interviewer* effects refer to direct effects of interviewer characteristics on health reporting, such as the interviewer's age, experience, education, or their own SRH (*Singer et al.* 1983; *Groves et al.* 2009). Additionally, this also includes potential biases due to interactions between the respondent and interviewer, e.g., their age difference or gender composition (*Lipps/Lutz* 2017).

3 Previous Studies on Reporting Behavior

Seminal research on the role of NH in SRH goes back to the 1950s and 1960s when researchers such as *Suchman et al*. (1958) and *Maddox* (1962) demonstrated a divergence between physician- and respondent-rated health, concluding: "It appears that a person's perceived state of health – whether it is healthy or ill – relates to one's attitudes, regardless of the objective health condition as judged by a physician." (*Suchman et al.* 1958: 228). While *Maddox* (1962) found a greater congruence of health ratings by physicians and respondents in his study, his analysis was only based on the distinction of good vs. poor health, making a congruent rating more likely. Nevertheless, he also noted that: "despite the marked influence of objective health on self-assessments of health, social factors do seem to have a consistent effect on this relationship" (*Maddox* 1962: 182). This divergence suggests that SRH is not completely based on objective indicators of health that a physician might measure, meaning that NH likely play into respondents' health ratings. Accordingly, some studies on the health determinants of SRH that utilize extensive health information provided by gerontological and epidemiological surveys find that while a lot of SRH's variance can be explained by health indicators (i.e., latent health), at least half of its variance cannot (*Singh-Manoux et al*. 2006; *Lazarevič/Brandt* 2020).

Building on both the mentioned divergence and the unexplained variance of SRH by health variables, different studies have examined *interviewee*-related characteristics, especially sociodemographic ones, that may be responsible for this unexplained variance. One study on this issue was conducted by *Shmueli* (2003) with Israeli data and found influences such as age, gender, and religiosity for the SF-36 which also comprises SRH. In this study, for example, men, older respondents, and individuals with a higher economic status rated similar health states more positively than women, younger respondents, and people with a lower economic status did. Another study by *Layes et al*. (2012) controlled for latent health using the HUI-3 in Canadians and found that females, older respondents (80+), and people who have less income and education rate their health relatively more positively. Consequently, results from these studies were rather inconsistent, complicating specific expectations regarding future results except for older respondents rating

similar health states relatively more optimistic than younger respondents in both studies.

However, certain respondent attitudes proved more consistent regarding their role in over- or underestimating one's health, such as positive social relations and trust (especially towards peers), both of which were found to be positively related with SRH (*Cotter/Lachman* 2010; *Glanville/Story* 2018). The same is true for positive and negative affect: both show direct effects on SRH when controlling for objective health, meaning that respondents with a more positive disposition tend to report better SRH (*Whitehead/Bergeman* 2016). In summary, this can be interpreted as evidence for the notion that more optimistic or positive respondents rate their health more favorably, which had already been shown for optimism in general (e.g., *Hooker et al.* 1992; *Ruthig/Chipperfield* 2006; *Rasmussen et al.* 2009; *Warner et al.* 2012; *Lazarevič et al.* 2018). In some cases, such effects are thought to result from positive influences of optimism on latent health without considering the possibility of optimism itself affecting response behavior, even though this influence is considerably weaker for more objective health indicators such as mortality (*Rasmussen et al*. 2009), highlighting the necessity of a prior control for latent health.

Lastly, methodological aspects such as the presence of another person during the interview or proxy interviews might also affect how respondents evaluate a certain health state. The presence of others might, for example, lead to more socially desirable response behaviors regarding sensitive questions (*Mneimneh et al*. 2015), even though this effect is typically considered to be rather small (*Bradburn/Sudman* 1979; *Silver et al.* 1986; *Mensch/Kandel* 1988; *Smith* 1995; *Ensminger et al*. 2007). This might be explained, at least in personal interviews, by the fact that the presence of an interviewer who is typically a stranger elicits more social desirability than one might expect towards a family member (*Duffy/Waterton* 1984: 304). As for proxy interviews, i.e., the responses about a person's health being provided by another person, results from previous studies are mixed with their congruence ranging from low (*Vuorisalmi et al*. 2012) to medium (*Ayalon/Covinsky* 2009) to high (*Magaziner et al.* 1996; *Sneeuw et al.* 2002).

A second major aspect of potential NH is the *country*. Some European studies examined country-specific reporting behavior and found evidence that, for instance, Swedish and Danish people reported their general health more positively than respondents from other countries such as Germany, even when controlling for objective health, pointing to a more positive view of similar underlying latent health states (*Jürges* 2007; *Pfarr et al.* 2012). Furthermore, different translations of the same questionnaire might also play a role in reporting behavior. For instance, studies from the US have repeatedly shown that respondents who were interviewed in Spanish rather than English tended to rate equivalent health states more pessimistically (*Bzostek et al.* 2007; *Viruell-Fuentes et al.* 2011), which also points to the necessity of including the country as NH.

Studies investigating the *interviewer* as a source of reporting behavior are relatively rare since comprehensive interviewer data beyond basic information such as gender or age are rarely collected. However, there is some evidence that

the mere presence of an interviewer might introduce systematic bias into SRH, since respondents generally appear to show signs of social desirability in personal interviews (*Groves/Mathiowetz* 1984; *Livert et al.* 1998; *Latkin et al.* 2017; *Lipps/Lutz* 2017). While social desirability is typically not directly measured in major surveys, a few studies have examined the interaction of interviewer and respondent characteristics (e.g., gender composition or age difference), assuming that they might affect reporting behavior. In this line of research, some researchers have found that female interviewers showed signs of lower social desirability, as worse health states were reported – or admitted – to them, possibly due to greater trust of the respondents (*Lipps/Lutz* 2017). Furthermore, there are indications that a greater age difference might have the same effect, possibly for the same reason (*Okamoto et al.* 2002). Strikingly, the role of the interviewer's health in the respondents' health reports has not yet been investigated, probably due to a lack of suitable data. Accordingly, it is unclear whether a healthier interviewer could have an influence on the respondent's SRH. Effects in both directions are conceivable: On the one hand, better health on the side of the interviewer might be used as a reference frame by the interviewees, thus decreasing their subjective health ratings and leading to a negative correlation, while on the other hand it is also possible that respondents would only "admit" worse health states to less healthy interviewers, resulting in a positive correlation between the two ratings, in line with the previously mentioned findings regarding social desirability.

Even though there are some studies investigating NH, overall, the state of research is quite fragmented. Most studies are only concerned with the influence of individual sources of bias or specific characteristics on SRH. However, multiple sources of bias should be considered simultaneously. This would also enable an evaluation of their relative importance. Additionally, most studies only insufficiently control for latent health, if at all. This is problematic for the evaluation of reporting behavior, since there might be both direct and indirect effects of NH on the respondents' health perceptions and corresponding ratings.

4 Data and Method

4.1 Data

For the following analyses, I used data from the fifth wave of the Survey of Health, Ageing and Retirement in Europe (SHARE) from 2015, comprising a wide array of data for more than 60,000 respondents from fifteen European countries aged 50 years or older. Specifically, in the multivariate analyses, I drew on data from 16,183 respondents (8,676 women and 7,534 men) from all five countries (Austria, Belgium, Germany, Spain, Sweden) which participated in an interviewer survey (*Blom/Korbmacher* 2013; *Korbmacher et al.* 2015). These data are exceptionally well suited for the present research questions because of SHARE's comprehensive (non-) health information, its data collection in multiple countries, and the interviewer survey which was first conducted in multiple countries in this wave. These three aspects

offer the opportunity for a comparably comprehensive control for latent health, cross-country comparisons, and for including interviewer characteristics as well as the combination of interviewer and respondent characteristics in the analyses.

4.2 Analysis and Measurement

To conduct the analysis according to the previously described analytical model, it is necessary to remove or control for all health-related variance of SRH, or at least as much of this variance as possible given the available data, in order to isolate the effect of NH characteristics. After this, a broad model of NH can be applied to the remaining variance to investigate their isolated relationship with SRH. OLS-regression models are particularly appropriate to implement this approach. OLS examines the non-health-related variance of SRH by first modeling the influence of latent health on SRH with as many health indicators as possible and then further analyzing the influence of NH on the first model's residuals. Accordingly, I first ran a linear regression with extensive health information provided by SHARE as the independent variables and SRH as the dependent variable, separately by gender, age, and country.

In this model, five *domains of latent health* were controlled for to obtain the residual variance of SRH. In short, these were *functional health* (e.g., grip strength, chair stand, number of restrictions of (I)ADL and mobility), chronic *diseases* and health conditions, the presence of chronic *pain* and its intensity, symptoms of and medication against *mental health*, and *health behavior* and its consequences (i.e., smoking behavior and BMI). The overall explained variance is comparably high ($R^2_{♀} = 0.51$; $R^2_{♂} = 0.48$, see Table A1 in the Appendix for the full results by gender), suggesting a relatively comprehensive control of latent health, given the lower or comparable amounts of explained variance regarding SRH in similar studies, e.g., 46 percent for *Tornstam* (1975), 35 percent for *Quinn et al*. (1999), and 35-41 percent for *Singh-Manoux et al.* (2006), with the latter two additionally controlling for sociodemographic information. A full description and discussion of the latent health model used for the analyses of this paper can be found elsewhere (*Lazarevič* 2019; *Lazarevič/Brandt* 2020), while the results specific to the present analyses, i.e., restricted to the sample used here, are shown by gender in the supplementary material in Table A1 in the Appendix.

To analyze the influence of NH on SRH net of health influences in this paper, I used the residuals from these regression models as the dependent variable and non-health indicators as independent variables. These NH were, in line with the theoretical model, categorized according to the three proposed sources of non-health-related indicators: interviewee and situational characteristics, the country of residence, and interviewer characteristics:

Respondent and Interview Situation

The first potential source of bias consisted of two types of information: respondent characteristics and situational effects. The first type represented in the model of bias were characteristics or opinions directly linked to or provided by the respondent,

i.e., (1) life satisfaction (11-point Likert scale), (2) generalized trust in others (11-point Likert scale), (3) formal education (high (ISCED 5 and 6), medium (ISCED 3 and 4), and low (ISCED 0-3)), (4) age groups (only in analyses by gender and country), (5) marital status (married and living together vs. all others), and (6) number of types of activities participated in last year (count variable of seven types of activities, such as doing voluntary or charity work, or playing cards or chess).[2] To account for a likely non-linear relationship of this last variable with SRH, it was transformed with an inverse hyperbolic sine transformation ($log(x_i + (x_i^2 + 1)^{\cdot 5})$). This transformation generally functions similarly to logarithmic transformations but also allows for the transformation of zero values (*Burbidge et al.* 1988; *Zhang et al.* 2000), which were common in this variable. Situational effects were operationalized with dummy variables for (1) having at least one other person present during the interview apart from the interviewer and respondent and (2) whether somebody else provided health information for the survey in lieu of the respondent (i.e., whether it was a proxy interview).

Country

The five countries included in this study are Austria, Belgium, Germany, Spain, and Sweden, all of which participated in SHARE's interviewer survey. They are used in the analyses of this paper both as directly influencing the residuals (via country dummies with German residents as the reference group) as well as potentially moderating all effects of the two other sources of bias on residuals. The second aspect was implemented by separate analyses of the influence of the other variables by country so that potentially differential effects could be identified.

Interviewer

Two types of NH related to the interviewers were included in the overall model: interviewer characteristics and interviewer–respondent interactions. The first type of these indicators was only based on the interviewers themselves and comprised their experience as an interviewer (none vs. at least one year), their age (ten-year intervals), their own SRH, and their education (university vs. lower). The second type of the indicators of this source of bias stemmed from the combination of characteristics of interviewers and respondents, represented here by their age difference (in years) and their genders (interviewer gender in separate analyses by respondent gender).

To examine the importance of these three potential sources of bias, I conducted dominance analyses with the Stata module domin (*Luchman* 2013). This approach compares R^2 for all possible subsets of variables or, as in this case, sets of variables to determine their individual or combined contribution to the overall R^2 (*Budescu*

[2] Furthermore, income and/ the ability to make ends meet as additional measures of socioeconomic status as well as the existence of or contact with one's children as another type of social contact and/ support were considered. However, the inclusion of these variables would have greatly reduced the number of available cases due to high numbers of item nonresponse, with none of these variables being significantly related to the residuals.

1993; *Luchman* 2014, 2015). The possible moderating influence of gender, age, and country was implemented by conducting separate analyses for the corresponding groups. In the context of the analyses of this paper, a moderating effect of each of the three characteristics on the extent of bias due to one source of bias would be evident if estimations of its relative importance were to significantly differ between groups. Furthermore, I used bootstrapping (10,000 samples for each model) to estimate confidence intervals for these contributions to R^2 in order to better evaluate the size of group differences in the amount of bias due to different sources as well as to test the statistical significance of potential differences in the explained variance between groups or sources of bias (10,000 samples for each difference).

5 Results

The detailed regression results are shown in Table 1 separately by gender. Considering that around half of SRH's variance was already explained by the indicators of latent health ($R^2_{\text{♀}} = 0.51$; $R^2_{\text{♂}} = 0.48$, see Table A1 in the Appendix), the model's R^2 of .07 suggest a substantial bias of SRH due to NH. The available *interviewee* characteristics accounted for around 5 percent of the overall variance of SRH that was not explained via health indicators. As for the interpretation of the coefficients, each can be interpreted as indicating the bias in rating one's health corresponding to the coefficient's sign. For instance, the statistically significant positive effect of life satisfaction for both genders can be interpreted as more satisfied respondents rating the same latent health (as measured via health indicators), on average, more positively than less satisfied respondents. Furthermore, the same was true for men with an ISCED score of five or higher, who rated similar health states more favorably than their counterparts with less formal education (ISCED ≤ 4). This suggests that a general satisfaction with life and, by extension, general optimism as well as advanced education (at least for men) positively bias health ratings. Apart from this, there was a tendency in the oldest age group (80+) to rate their health more optimistically, although this relationship was not statistically significant for either gender. Being married and living with one's spouse, as another indicator of social control or loneliness, turned out to be negative in the case of women, i.e., married women who lived with their spouse rated similar health states more negatively than women with a different marital status. In any case, a more diverse social participation turned out to bias health reporting upwards. Generalized trust in others, as an additional proxy for positivity bias, was not significantly correlated to the SRH after controlling for health indicators, which might be due to the fact that generalized trust appears to be less relevant to SRH than particularized trust, i.e., trust in family, friends, and acquaintances (*Glanville/Story* 2018; *Kim* 2018). Additionally, it seems to be warranted to emphasize that neither the presence of other persons during the interview nor proxy interviews seemed to generate significant bias in SRH.

Furthermore, the *country* dummies showed country-specific reporting behavior, in line with earlier research (e.g., *Jürges* 2007). Respondents from Austria, Belgium, and Sweden all rated their health more positively than Germans did, given the

Tab. 1: Results from OLS Regression Explaining Residuals (b-Coefficients and Explained Variance for Each Source of Bias)

	Women	Men
Interviewee (explained variance)	*4.89%*	*4.55%*
Satisfaction with life	0.05***	0.06***
Trust in others	0.01	-0.01
Education (RC: high (ISCED 5-6))		
Medium (ISCED 4-5)	-0.02	-0.11***
Low (ISCED 0-3)	-0.08	-0.17***
Age (RC: 50-64 years)		
65-79 years	-0.02	0.00
80+ years	0.15	0.06
Married, cohabitating (RC: other marital status)	-0.08**	0.01
Number of activities (last year)[a]	0.14***	0.07**
Not alone during interview (RC: alone)	0.03	0.03
Proxy interview (RC: no proxy)	-0.02	0.04
Country (RC: Germany) (explained variance)	*1.21%*	*1.76%*
Spain	-0.01	0.08
Austria	0.05	0.17***
Belgium	0.19***	0.25***
Sweden	0.30***	0.42***
Interviewer (explained variance)	*1.12%*	*0.93%*
No experience (RC: one year or more)	-0.03	-0.02
Interviewer's age (cat. 10 years)	-0.06*	-0.05
Interviewer's Self-Rated Health	0.05**	0.04*
Age-difference (in years)	-0.00	-0.00
Female interviewer (RC: male)	0.04	-0.01
Education (RC: university)		
Upper	0.08*	-0.00
Medium	0.05	-0.02
Lower	0.12**	0.03
$R^2_{Adj.}$ (Health)	0.51	0.48
$R^2_{Adj.}$ (Non-Health)	0.07	0.07
n	8,677	7,532

[a] Inverse hyperbolic sine transformation to account for nonlinear relationship.

$+ p \leq 0.1$; * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.

Source: Survey of Health, Ageing and Retirement, release 7.1.0, own calculations

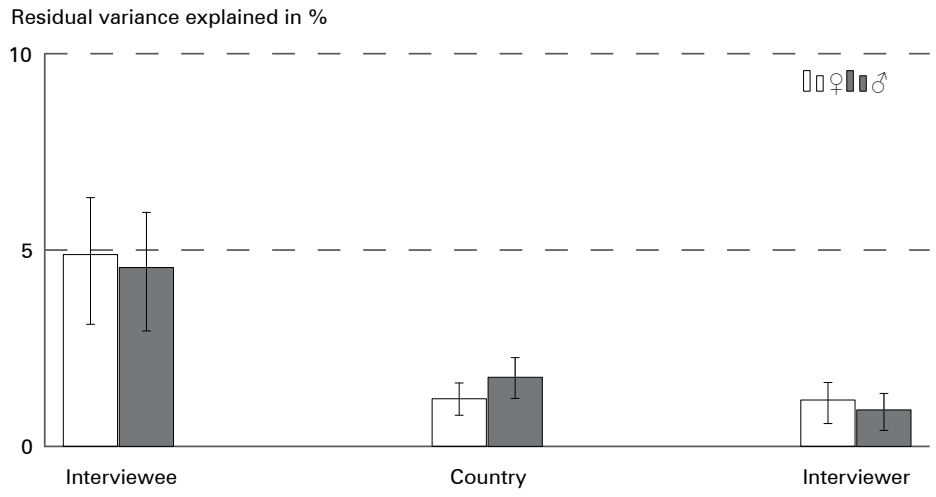
same latent health. In the case of Austria, however, this effect was only significant for men. Additionally, the country effects were significantly more pronounced for men than for women in the case of Austrians and Swedes. This impression is also

corroborated by the fact that, overall, the country of residence explained around 1.2 percent of SRH's residual variance in women and 1.8 percent in men, even though this difference was not statistically significant.

As for *interviewer* characteristics, the negative sign for the interviewer's age means that respondents with older interviewers rated their health more negatively than other respondents with the same latent health (according to the collected health indicators) and younger interviewers, though this was only statistically significant for women. The opposite was true for the interviewer's self-rated health: respondents of both genders with (subjectively) healthier interviewers tended to rate their own health more positively than respondents with interviewers in worse health did. Both coefficients suggest that interviewees slightly "adjust" their health rating according to their interviewers' (supposed or apparent) health status, which could be interpreted as social desirability bias. The experience of the interviewer, the age difference between respondent and interviewer, as well as their genders did not show a significant relationship with their health reporting. As for the interviewer's education, only women exhibited a significant influence in that they generally rated their health more positively when the interviewer's education was lower than university, although this was only statistically significant in the case of interviewers who graduated from a lower and higher-level secondary school. In sum, the available interviewer characteristics explained around 1 percent of SRH's residual variance after controlling for health, with no significant difference between genders.

Each of the three potential sources' contribution to the overall R^2 can be seen in Figure 3, separated by gender. In these analyses, interviewees were (in this model) by far the most relevant source of bias, explaining around 5 percent of the residual

Fig. 3: Amount of Explained Variance Accounted for by Source by Gender (95%-Confidence Intervals)

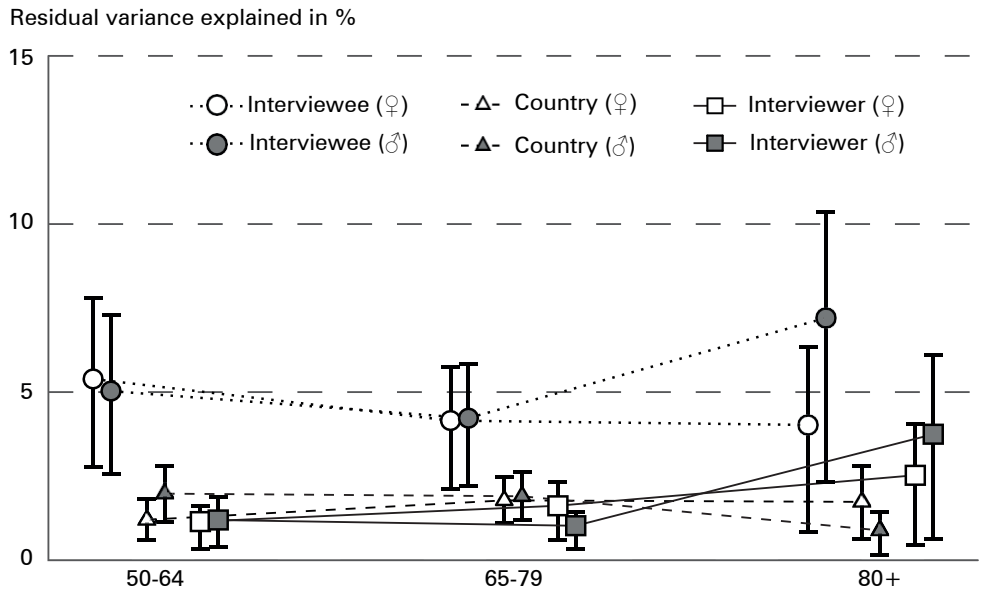


Source: Survey of Health, Ageing and Retirement, release 7.1.0, own calculations

variance for both genders. It appears that interviewers and the country of residence or language of the interview are, at least in comparison, less important as sources of bias. Lastly, even though there appeared to be some minor gender differences regarding the country of residence in particular, the confidence intervals for all three groups' contribution to R^2 strongly overlapped, indicating great similarity in their relevance by gender. These impressions were confirmed by the fact that only the differences between interviewee characteristics and the other sources of bias are significantly different from each other between genders, while there was no significant difference between the contribution of interviewer characteristics and country dummies to the explained variance. For all three sources of bias, no significant gender differences in these contributions were found, which is also true for the overall explained variance by gender.

Figure 4 shows the same analyses separated by age group. These results corroborate the impression that there appear to be no meaningful differences by gender, as all confidence intervals heavily overlap for all three sources of bias in every age group, which is confirmed as none of the gender comparisons yielded significant differences. However, the figure also shows only very slight signs of differences between the age groups. The only apparent age discrepancies were that respondent characteristics were slightly more relevant for men aged 80+ and slightly less relevant for women of this age group and interviewer effects were generally (nominally) a little more relevant for the oldest respondents of both

Fig. 4: Amount of Explained Variance Accounted for by Type of Variable Separated by Gender and Age-Group (95%-Confidence Intervals)



Source: Survey of Health, Ageing and Retirement, release 7.1.0, own calculations

genders. However, the confidence intervals demonstrate that all these supposed age differences were far too small to be meaningfully interpreted, as none of these differences turned out to be statistically significant.

The only significant differences in these analyses were, once again, between interviewee characteristics and the two other sources of bias, albeit not for the oldest age group in the case of the interviewee characteristics for both genders and country dummies in the case of women. This is likely due to the lower number of cases as well as the overall higher contributions of interviewer effects in this age group, and the comparably high contributions of country effects for the oldest women.

The overall adjusted R^2 by gender and age group, as documented in Table 2, showed no systematic differences, except for a relatively low amount of explained variance for the oldest women in comparison to men, in line with the impression of a lower relevance of respondent characteristics in this group, although no comparison

Tab. 2: Adjusted R^2 and Number of Cases for Separate Models by Gender and Age

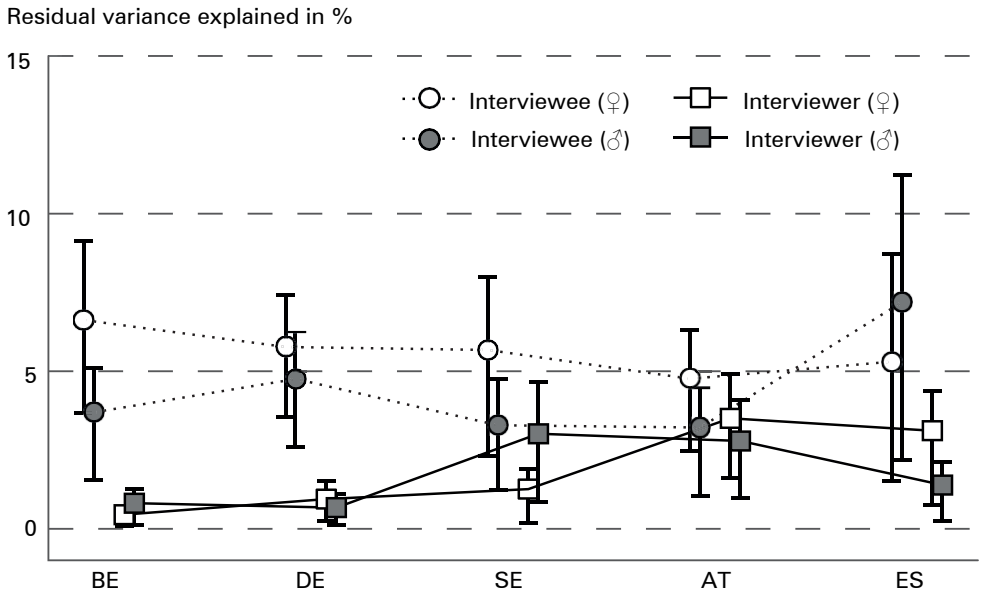
	Women			Men		
	50-64	65-79	80+	50-64	65-79	80+
$R^2_{Adj.}$ (Health)	0.48	0.50	0.48	0.48	0.45	0.44
$R^2_{Adj.}$ (Non-Health)	0.07	0.07	0.06	0.08	0.07	0.10
n	4,312	3,408	957	3,563	3,183	786

Source: Survey of Health, Ageing and Retirement, release 7.1.0, own calculations

of any of these statistics yielded a significant difference between the models.

As the last step of this paper's analyses, Figure 5 shows the extent to which the explained variance by NH was attributable to interviewer and respondent characteristics in country-specific models. As can be seen from the figure, there were, once again, no marked differences by gender, as the confidence intervals for each gender (strongly) overlap in every country for both sources of bias. This was backed by further significance testing, and within countries, once again, no gender differences turned out to be statistically significant. Still, there were some possible differences by country in that Germans and Belgians of both genders appeared to be considerably less influenced in their reporting behavior by interviewer characteristics than people from Spain, Austria, and Sweden. This notion is also substantiated by the fact that Germany and Belgium were the only countries where the confidence intervals of both sources of bias did not overlap for both genders. This was further supported by Austria and Spain being the only two countries where there were no significant differences between the explained variance by source of bias for both genders. However, while the contribution of interviewee and interviewer characteristics to the R^2 differed in a statistically significant way for both men and women in Germany, this was only true for women in Sweden and Belgium. Lastly, as depicted in Table 3, there did not seem to be much variance in adjusted R^2

Fig. 5: Amount of Explained Variance Accounted for by Type of Variable Separated by Country and Gender (95%-Confidence Intervals)



Source: Survey of Health, Ageing and Retirement, release 7.1.0, own calculations

Tab. 3: Adjusted R^2 and Number of Cases for Separate Models by Gender and Country

	Women					Men				
	BE	DE	SE	AT	ES	BE	DE	SE	AT	ES
$R^2_{Adj.}$ (Health)	0.47	0.52	0.51	0.55	0.54	0.41	0.48	0.50	0.53	0.47
$R^2_{Adj.}$ (Non-Health)	0.06	0.06	0.05	0.07	0.08	0.03	0.05	0.04	0.05	0.08
n	1,826	2,288	971	1,729	1,863	1,545	2,155	881	1,236	1,715

Source: Survey of Health, Ageing and Retirement, release 7.1.0, own calculations

between countries, perhaps with the exception of Swedish and Belgian men, whose overall $R^2_{Adj.}$ was lower than .05, although neither of these groups significantly differed from any other subsample regarding overall explained variance.

6 Conclusion and Discussion

The focus of this paper was to explore the effects of non-health characteristics (NH) on self-rated health (SRH), also known as "reporting behavior" in the pertinent literature, and how they might differ by gender, age group, and (European) country and language of the interview. To this end, I first controlled for latent health

indicators as comprehensively as possible with a model comprising a wide array of health indicators that explained about half of SRH's variance (for the full results, see *Lazarevič/Brandt* 2020). In a second step, I then applied a NH model to the residuals from the first regression, encompassing three potentially important sources of bias unrelated to health in the context of survey research: the respondent, country (of residence), and interviewer.

Separate detailed analyses by gender showed consistent effects of the respondents' life satisfaction and social participation, living in Belgium or Sweden, and the interviewer's SRH. All these aspects appear to bias SRH, regardless of gender. This suggests a substantial bias of SRH due to non-health characteristics, potentially threatening the validity of research based on this widely-used indicator alone. However, especially in the case of life satisfaction and social participation, reverse causality cannot be ruled out, since healthier respondents might be more satisfied with life and good health can be seen as a prerequisite for greater social participation.

Further, there was also a positive effect of higher education on reporting behavior in the case of men. This can be interpreted in two different ways: The effect might be attributable to omitted variables in the latent health model or might reflect the greater resources more educated respondents have to cope with objective health problems (*Idler/Benyamini* 1997; *Benyamini* 2011). In the first case, this effect would mean that more educated respondents are actually more healthy resulting in no actual bias, while the second case would suggest that the perception of a given latent health status is indeed dependent on education. As such, whether this would mean biased empirical research depends, as with all effects of personal characteristics in this paper, on the rationale of SRH's use. If SRH is used to reflect the respondent's health perception or satisfaction with their health status, this would not necessarily mean biased results or interpretations. However, when using SRH as a proxy for latent health (i.e., generic health status) – as is often the case in applied research – the results would be biased. Nonetheless, the influence of interviewer characteristics on SRH is undesirable in any case and respondents' latent health or day-to-day health perceptions should not be related to them. Thus, these effects, i.e., the interviewer's SRH for both genders and interviewer age and education for women, can be attributed to the interview situation itself, and therefore mean biased results, possibly due to social desirability. This is sometimes explained by the respondent's willingness to "admit" worse health states to more trustworthy or relatable interviewers (e.g., *Lipps/Lutz* 2017).

There were no marked differences regarding the relative importance of the three sources by gender, with the respondent being by far the largest source of bias while the interviewer and country of residence only explained small shares of the residual variance. Furthermore, there were some gender-specific biases such as interviewer age and education for women and education and living in Austria and Sweden for men, although the corresponding coefficients were only significantly different by gender in the case of the two countries. Overall, this does seem to substantiate the impression that women and men are relatively similar when rating their health (e.g., *Jylhä et al.* 1998; *Zajacova et al.* 2017; *Lazarevič/Brandt* 2020). Subsequent analyses

by age group revealed that there are only very minor differences by age group and gender in the relative importance of the three sources, the most notable being a nominally higher R^2 from interviewer characteristics for the oldest respondents in the sample, which was, however, not significantly different between any age group. Finally, separate analyses by country also uncovered only slight differences, except for relatively high relevance of interviewer effects in Austria and Spain, as highlighted by non-significant differences between both sources of bias for both genders in these countries as well as for Swedish men.

Overall, these results demonstrate that while SRH is indeed largely based on latent health, biases due to non-health influences are evident. Even with the comparably limited attitudinal and psychological measurements on the respondent level available in SHARE, around 7 percent of the residual variance of SRH could be explained, with little overall variability across gender, age, and country of residence. Furthermore, these biases are mainly driven by respondent characteristics, demonstrating that biases due to interviewer effects (e.g., *Lipps/Lutz* 2017) and the country of residence (e.g., *Jürges* 2007), although non-negligible, are apparently far lower than those deriving from idiosyncrasies in the rating behavior of respondents.

Some limitations in this study should be addressed in subsequent work on NH-related biases in SRH. First, as with all secondary analyses, this study was restricted to the indicators available in the dataset. Albeit rich in health information, the current data were relatively limited regarding NH that have been proven to influence SRH, such as the respondent's personality traits (e.g., *Jerram/Coleman* 1999; *Goodwin/Engstrom* 2002), hypochondriasis (e.g., *Barsky et al.* 1992), or social desirability (e.g., *Latkin et al.* 2017). A general measurement of these aspects as well as a more direct measurement of traits such as a generally optimistic or positive disposition would be highly desirable for future studies of biases in the general appraisal of one's health.

Lastly, studies that aim to not only investigate but to also alleviate the problem of biases in SRH are advisable. One way to achieve this could be priming the meaning of health by asking other questions on health information prior to SRH (*Garbarski et al.* 2015; *Garbarski* 2016). Furthermore, complementing SRH with factual questions reflecting important aspects of subjective health such as functioning and diseases (*Lazarevič/Brandt* 2020) might be helpful in providing a quick and simple measurement of generic health status for multi-thematic surveys. Measuring health in this way could be promising since it has the potential of capturing an overall inclusive, dynamic, resource-reflecting appraisal of health (*Idler/Benyamini* 1997; *Benyamini* 2011) while also gathering information on known key aspects of health (*Lazarevič/Brandt* 2020). Still, considering both financial as well as temporal restrictions and the need for comparability, a standardized, short, and easily understandable measurement is central for achieving this. The Minimum European Health Module (*Robine/Jagger* 2003) seems to be very promising in this regard, since it comprises a question about chronic diseases and the Global Activity Limitation Indicator (GALI), which captures overall activity limitations, i.e., functioning and disabilities (*Jagger et al.* 2010). Both aspects appear to be integral facets of SRH. This approach of measuring health

would also have the additional benefit of enabling the aforementioned priming of a meaning of health by asking about diseases and activity limitations first.

References

Ayalon, Liat; Covinsky, Kenneth E. 2009: Spouse-Rated Versus Self-Rated Health as Predictors of Mortality. In: Archives of Internal Medicine 169,22: 2156-2161. https://doi.org/10.1001/archinternmed.2009.386

Barsky, Arthur J.; Cleary, Paul D.; Klerman, Gerald L. 1992: Determinants of Perceived Health Status of Medical Outpatients. In: Social Science & Medicine 34,10: 1147-1154. https://doi.org/10.1016/0277-9536(92)90288-2

Benyamini, Yael 2011: Why Does Self-Rated Health Predict Mortality? An Update on Current Knowledge and a Research Agenda for Psychologists. In: Psychology & Health 26,11: 1407-1413. https://doi.org/10.1080/08870446.2011.621703

Blom, Annelies G.; Korbmacher, Julie M. 2013: Measuring Interviewer Characteristics Pertinent to Social Surveys: A Conceptual Framework. In: Survey Methods: Insights from the Field. https://doi.org/10.13094/SMIF-2013-00001

Bradburn, Norman M. 1979: Respondent Burden. In: *Reeder, Leo G.* (Ed.): Health Survey Research Methods: Second Biennial Conference. U.S. Department of Health, Education, Welfare: 49-53.

Bradburn, Norman M.; Sudman, Seymour 1979: Improving Interview Method and Questionnaire Design. Jossey-Bass Publishers.

Brandt, Martina; Kaschowitz, Judith; Lazarevič, Patrick 2016: Gesundheit im Alter: Ein Überblick über den Stand der sozialwissenschaftlichen Forschung. In: *Jungbauer-Gans, Monika; Kriwy, Peter* (Eds.): Handbuch Gesundheitssoziologie. Wiesbaden: Springer: 419-436. https://doi.org/10.1007/978-3-658-06392-4_23

Budescu, David V. 1993: Dominance Analysis: A New Approach to the Problem of Relative Importance of Predictors in Multiple Regression. In: Psychological Bulletin 114,3: 542-551. https://doi.org/10.1037/0033-2909.114.3.542

Burbidge, John B.; Magee, Lonnie; Robb, A. Leslie 1988: Alternative Transformations to Handle Extreme Values of the Dependent Variable. In: Journal of the American Statistical Association 83,401: 123-127. https://doi.org/10.1080/01621459.1988.10478575

Bzostek, Sharon; Goldmana, Noreen; Pebley, Anne 2007: Why Do Hispanics in the USA Report Poor Health? In: Social Science & Medicine 65,5: 990-1003. https://doi.org/10.1016/j.socscimed.2007.04.028

Cotter, Kelly A.; Lachman, Margie E. 2010: Psychosocial and Behavioural Contributors to Health: Age-Related Increases in Physical Disability Are Reduced by Physical Fitness. In: Psychology & Health 25,7: 805-820. https://doi.org/10.1080/08870440902883212

de Luca, Guiseppe; Lipps, Oliver 2005: Fieldwork and Survey Management in SHARE. In: *Börsch-Supan, Axel; Jürges, Hendrik* (Eds.): The Survey of Health, Aging, and Retirement in Europe: Methodology. Mannheim Research Institute for the Economics of Aging (MEA): 75-81.

Duffy, John C.; Waterton, Jennifer J. 1984: Under-Reporting of Alcohol Consumption in Sample Surveys: The Effect of Computer Interviewing in Fieldwork. In: British Journal of Addiction 79,3: 303-308. https://doi.org/10.1111/j.1360-0443.1984.tb00278.x

Ensminger, Margaret E.; Juon, Hee-Soon; Green, Kerry M. 2007: Consistency Between Adolescent Reports and Adult Retrospective Reports of Adolescent Marijuana Use: Explanations of Inconsistent Reporting among an African American Population. In: Drug and Alcohol Dependence 89,1: 13-23. https://doi.org/10.1016/j.drugalcdep.2006.11.011

Garbarski, Dana 2016: Research in and Prospects for the Measurement of Health Using Self-Rated Health. In: Public Opinion Quarterly 80,4: 977-997. https://doi.org/10.1093/poq/nfw033

Garbarski, Dana; Schaeffer, Nora Cate; Dykema, Jennifer 2015: The Effects of Response Option Order and Question Order on Self-Rated Health. In: Quality of Life Research 24,6: 1443-1453. https://doi.org/10.1007/s11136-014-0861-y

Glanville, Jennifer L.; Story, William T. 2018: Social Capital and Self-rated Health: Clarifying the Role of Trust. In: Social Science Research 71: 98-108. https://doi.org/10.1016/j.ssresearch.2018.01.002

Goodwin, Renee; Engstrom, Gunnar 2002: Personality and the Perception of Health in the General Population. In: Psychological Medicine 32,2: 325-332. https://doi.org/10.1017/S0033291701005104

Groot, Wim 2000: Adaptation and Scale of Reference Bias in Self-Assessments of Quality of Life. In: Journal of Health Economics 19,3: 403-420. https://doi.org/10.1016/s0167-6296(99)00037-5

Groves, Robert M. et al. 2009: Survey Methodology. Hoboken: John Wiley & Sons.

Groves, Robert M.; Mathiowetz, Nancy A. 1984: Computer Assisted Telephone Interviewing: Effects on Interviewers and Respondents. In: Public Opinion Quarterly 48,1: 356-369. https://doi.org/10.1093/poq/48.1b.356

Heyink, Joost 1993: Adaptation and Well-Being. In: Psychological Reports 73,3: 1331-1342. https://doi.org/10.2466/pr0.1993.73.3f.1331

Hooker, Karen et al. 1992: Mental and Physical Health of Spouse Caregivers: The Role of Personality. In: Psychology and Aging 7,3: 367-375. https://doi.org/10.1037/0882-7974.7.3.367

Idler, Ellen L.; Benyamini, Yael 1997: Self-Rated Health and Mortality: A Review of Twenty-Seven Community Studies. In: Journal of Health and Social Behavior 38,1: 21-37.

Idler, Ellen L.; Kasl, Stanislav V. 1995: Self-Ratings of Health: Do They Also Predict Change in Functional Ability? In: Journals of Gerontology Series B: Psychological Sciences and Social Sciences 50B,6: 344-353. https://doi.org/10.1093/geronb/50b.6.s344

Jagger, Carol et al. 2010: The Global Activity Limitation Index Measured Function and Disability Similarly Across European Countries. In: Journal of Clinical Epidemiology 63,8: 892-899. https://doi.org/10.1016/j.jclinepi.2009.11.002

Jasilionis, Domantas; Shkolnikov, Vladimir M. 2016: Longevity and Education: A Demographic Perspective. In: Gerontology 6,2: 253-262. https://doi.org/10.1159/000438901

Jerram, Kathryn L.; Coleman, Peter G. 1999: The Big Five Personality Traits and Reporting of Health Problems and Health Behaviour in Old Age. In: British Journal of Health Psychology 4,2: 181-192. https://doi.org/10.1348/135910799168560

Jürges, Hendrik 2007: True Health vs. Response Styles: Exploring Cross-Country Differences in Self-Reported Health. In: Health Economics 16,2: 163-178. https://doi.org/10.1002/hec.1134

Jylhä, Marja 2009: What Is Self-Rated Health and Why Does It Predict Mortality? Towards a Unified Conceptual Model. In: Social Science & Medicine 69,3: 307-316. https://doi.org/10.1016/j.socscimed.2009.05.013

Jylhä, Marja et al. 1998: Is Self-Rated Health Comparable Across Cultures and Genders? In: The Journals of Gerontology 53B,3: S144-S152. https://doi.org/10.1093/geronb/53B.3.S144

Kim, Harris Hyun-Soo 2018: Particularized Trust, Generalized Trust, and Immigrant Self-Rated Health: Cross-National Analysis of World Values Survey. In: American Journal of Pharmacy and the Sciences Supporting Public Health 158: 93-101. https://doi.org/10.1016/j.puhe.2018.01.039

Knäuper, Bärbel; Turner, Patricia A. 2003: Measuring Health: Improving the Validity of Health Assessments. In: Quality of Life Research 12,1: 81-89. https://doi.org/10.1023/A:1023589907955

Korbmacher, Julie M.; Friedel, Sabine; Wagner, Melanie 2015: Interviewing Interviewers: The SHARE Interviewer Survey. In: *Malter, Frederic; Börsch-Supan, Axel* (Eds.): SHARE Wave 5: Innovations & Methodology. Munich Center for the Economics of Ageing: 67-74.

Latkin, Carl A. et al. 2017: The Relationship Between Social Desirability Bias and Self-Reports of Health, Substance Use, and Social Network Factors Among Urban Substance Users in Baltimore, Maryland. In: Addictive Behaviors 73: 133-136. https://doi.org/10.1016/j.addbeh.2017.05.005

Layes, Audrey; Asada, Yukiko; Kephart, George 2012: Whiners and Deniers: What Does Self-Rated Health Measure. In: Social Science & Medicine 75,1: 1-9. https://doi.org/10.1016/j.socscimed.2011.10.030

Lazarevič, Patrick 2019: Was misst Self-Rated Health? Die Basis subjektiver Gesundheit und Unterschiede nach Geschlecht, Alter und Kohorte in Europa und Kanada. Springer. https://doi.org/10.1007/978-3-658-28026-0

Lazarevič, Patrick; Brandt, Martina 2020: Diverging Ideas of Health? Comparing the Basis of Health Ratings Across Gender, Age, and Country. In: Social Science & Medicine 267,112913. https://doi.org/10.1016/j.socscimed.2020.112913

Lazarevič, Patrick et al. 2018: Non-Health Influences on Generic Health Ratings: Comparing the Susceptibility of Self-Rated Health (SRH) and the Minimum European Health Module (MEHM) to Biases Due to Optimism, Hypochondriasis, and Social Desirability. In: *PUMA* (Ed.): PUMA Survey V.2: Ergebnisberichte der einzelnen PUMA-Befragungsmodule. Plattform für Umfragen, Methoden und empirische Analysen (PUMA): 5-8 [https:// www.puma-plattf orm.at/ f ileadmin/ user_upload/ p_puma/ Modulberichte_PUMA_Survey_V .2_01.pdf, 14.02.2023].

Lipps, Oliver; Lutz, Georg 2017: Gender of Interviewer Effects in a Multitopic Centralized CATI Panel Survey. In: Methods, Data, Analyses 11,1: 67-86. https://doi.org/10.12758/mda.2016.009

Livert, D. et al. 1998: Do Interviewer-Respondent Race Effects Impact the Measurement of Illicit Substance Use and Related Attitudes? Proceedings of the Survey Research Methods Section, American Statistical Association: 894-899.

Luchman, Joseph Nicholas 2013: DOMIN: Stata Module to Conduct Dominance Analysis [http://ideas.repec.org/c/boc/bocode/s457629.html, 31.08.2022].

Luchman, Joseph Nicholas 2014: Relative Importance Analysis With Multicategory Dependent Variables: An Extension and Review of Best Practices. In: Organizational Research Methods 17,4: 452-471. http://dx.doi.org/10.1177/1094428114544509

Luchman, Joseph Nicholas 2015: Determining Subgroup Difference Importance with Complex Survey Designs: An Application of Weighted Dominance Analysis. In: Survey Practice 8,5: 1-10. http://dx.doi.org/10.29115/SP-2015-0022

Lynch, Jamie L.; von Hippel, Paul T. 2016: An Education Gradient in Health, a Health Gradient in Education, or a Confounded Gradient in Both? In: Social Science & Medicine 154: 18-27. https://doi.org/10.1016/j.socscimed.2016.02.029

Maddox, George L. 1962: Some Correlates of Differences in Self-Assessment of Health Status Among the Elderly. In: Journal of Gerontology 17,2: 180-185. https://doi.org/10.1093/geronj/17.2.180

Magaziner, Jay et al. 1996: Use of Proxies to Measure Health and Functional Status in Epidemiologic Studies of Community-dwelling Women Aged 65 Years and Older. In: American Journal of Epidemiology 143,3: 283-292. https://doi.org/10.1093/oxfordjournals.aje.a008740

Melzer, David et al. 2004: Variation in Thresholds for Reporting Mobility Disability Between National Population Subgroups and Studies. In: Journal of Gerontology 59,12: 1295-1303. https://doi.org/10.1093/gerona/59.12.1295

Mensch, Barbara S.; Kandel, Denise B. 1988: Underreporting of Substance Use in a National Longitudinal Youth Cohort: Individual and Interviewer Effects. In: Public Opinion Quarterly 52,1: 100-124. https://doi.org/10.1086/269084

Mneimneh, Zeina M. et al. 2015: Cultural Variations in the Effect of Interview Privacy and the Need for Social Conformity on Reporting Sensitive Information. In: Journal of Official Statistics 31,4: 673-697. https://doi.org/10.1515/jos-2015-0040

Okamoto, Kazushi et al. 2002: Comparability of Epidemiological Information Between Self- and Interviewer-Administered Questionnaires. In: Journal of Clinical Epidemiology 55,5; 505-511. https://doi.org/10.1016/s0895-4356(01)00515-7

Pfarr, Christian; Schmid, Andreas; Schneider, Udo 2012: Reporting Heterogeneity in Self-Assessed Health among Elderly Europeans. In: Health Economics Review 2,21: 1-14. https://doi.org/10.1186/2191-1991-2-21

Quinn, Mary Ellen et al. 1999: Psychosocial Correlates of Subjective Health in Sexagenarians, Octogenarians, and Centenarians. In: Issues in Mental Health Nursing 20,2: 151-171. https://doi.org/10.1080/016128499248727

Rasmussen, Heather N.; Scheier, Michael F.; Greenhouse, Joel B. 2009: Optimism and Physical Health: A Meta-Analytic Review. In: Annals of Behavioral Medicine 37,3: 239-256. https://doi.org/10.1007/s12160-009-9111-x

Robine, Jean-Marie; Jagger, Carol 2003: Report to Eurostat on European Health Status Module. Montpellier: Euro-REVES.

Ruthig, Joelle C.; Chipperfield, Judith G. 2006: Health Incongruence in Later Life: Implications for Subsequent Well-Being and Health Care. In: Health Psychology 26,6: 753-761. https://doi.org/10.1037/0278-6133.26.6.753

Sharp, Laure M.; Frankel, Joanne 1983: Respondent Burden: A Test of Some Common Assumptions. In: Public Opinion Quarterly 47,1: 36-53. https://doi.org/10.1086/268765

Shmueli, Amir 2003: Socio-Economic and Demographic Variation in Health and in Its Measures: The Issue of Reporting Heterogeneity. In: Social Science & Medicine 57,1: 125-134. https://doi.org/10.1016/s0277-9536(02)00333-7

Silver, Brian D.; Abramson, Paul R.; Anderson, Barbara A. 1986: The Presence of Others and Overreporting of Voting in American National Elections. In: Public Opinion Quarterly 50,2: 228-239. https://doi.org/10.1086/268977

Singer, Eleanor; Frankel, Martin R.; Glassman, Marc B. 1983: The Effect of Interviewer Characteristics and Expectations on Response. In: Public Opinion Quarterly 47,1: 68-83. https://doi.org/10.1086/268767

Singh-Manoux, Archana et al. 2006: What Does Self Rated Health Measure? Results from the British Whitehall II and French. Gazel Cohort Studies. In: Journal of Epidemiology and Community Health 60,4: 364-372. https://doi.org/10.1136/jech.2005.039883

Smith, Tom W. 1995: The Impact of the Presence of Others on a Respondent's Answers to Questions. GSS Methodological Report 86. University of Chicago: Chicago.

Sneeuw, Kommer C.; Sprangers, Mirjam A; Aaronson, Neil K. 2002: The Role of Health Care Providers and Significant Others in Evaluating the Quality of Life of Patients with Chronic Disease. In: Journal of Clinical Epidemiology 55,11: 1130-1143. https://doi.org/10.1016/s0895-4356(02)00479-1

Strack, Fritz; Martin, Leonard L. 1987: Thinking, Judging, Communicating: A Process Account of Context Effects in Attitude Surveys. In: *Hippler, Hans-J.; Schwarz, Norbert; Sudman, Seymour* (Eds.): Social Information Processing and Survey Methodology. New York: Springer: 123-148. https://doi.org/10.1007/978-1-4612-4798-2_7

Suchman, Edward A.; Phillips, Bernard S.; Streib, Gordon F. 1958: An Analysis of the Validity of Health Questionnaires. In: Social Forces 36,3: 223-232. https://doi.org/10.2307/2573809

Tornstam, Lars 1975: Health and Self-Perception: A Systems Theoretical Approach. In: The Gerontologist 15,3: 264-270. https://doi.org/10.1093/geront/15.3.264

Tourangeau, Roger 1984: Cognitive Sciences and Survey Methods. In: *Jabine, Thomas B. et al.* (Eds.): Cognitive Aspects of Survey Methodology: Building a Bridge Between Disciplines. National Academy Press: 73-100.

Viruell-Fuentes, Edna A. et al. 2011: Language of Interview, Self-Rated Health, and the Other Latino Health Puzzle. In: American Journal of Public Health 101,7: 1306-1313. https://doi.org/10.2105/AJPH.2009.175455

Vuorisalmi, Merja et al. 2012: Among Nonagenarians, Congruence Between Self-Rated and Proxy-Rated Health Was Low but Both Predicted Mortality. In: Journal of Clinical Epidemiology 65,5: 553-559. https://doi.org/10.1016/j.jclinepi.2011.11.001

Warner, Lisa M.et al. 2012: Health-Specific Optimism Mediates Between Objective and Perceived Physical Functioning in Older Adults. In: Journal of Behavioral Medicine 35,4: 400-406. http://dx.doi.org/10.1007/s10865-011-9368-y

Whitehead, Brenda R.; Bergeman, Cindy S. 2016: Affective Health Bias in Older Adults: Considering Positive and Negative Affect in a General Health Context. In: Social Science & Medicine 165: 28-35. https://doi.org/10.1016/j.socscimed.2016.07.021

Zajacova, Anna; Huzurbazar, Snehalata; Todd, Megan 2017: Gender and the Structure of Self-Rated Health Across the Adult Life Span. In: Social Science & Medicine 187: 58-66. https://doi.org/10.1016/j.socscimed.2017.06.019

Zhang, Mingliang et al. 2000: An Application of the Inverse Hyperbolic Sine Transformation: A Note. In: Health Services and Outcomes Research Methodology 1,2: 165-171. https://doi.org/10.1023/A:1012593022758

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Appendix

Tab. A1: Results from OLS Regression Explaining SRH via Latent Health Indicators (b-Coefficients and Explained Variance for Each Health Domain)

	Women	Men
Functioning (explained variance)	*19.81%*	*18.27%*
Global activity limitation indicator	-0.33***	-0.33***
Number of restrictions in daily life[a]	-0.04	-0.04
Number of restrictions in mobility[a]	-0.12***	-0.12***
Grip strength (RC: middle 50%)		
No measurement	-0.06	-0.09
Strongest 25%	0.12***	0.10**
Weakest 25%	-0.05	-0.13***
Chair stand (RC: middle 50%)		
No measurement	−0.23***	-0.24***
Fastest 25%	0.14***	0.06
Slowest 25%	-0.17***	-0.11**
Diseases (explained variance)	*15.03%*	*14.32%*
Chronic diseases (RC: none)	-0.23***	-0.29***
Number of diseases[a]	-0.24***	-0.22***
Pain (RC: none)	*8.79%*	*7.47%*
Mild	0.02	0.03
Moderate	-0.16***	-0.21***
Severe	-0.33***	-0.33***
Mental Health (explained variance)	*5.63%*	*5.99%*
Medication for depression (RC: no)	-0.13**	-0.11
Number of depressive symptoms[a]	-0.12***	-0.14***
Behavior (explained variance)	*2.24%*	*1.76%*
BMI (RC: normal (18.5 ≤ BMI ≤ 25))		
Underweight (BMI < 18.5)	-0.18	-0.11
Overweight (25 ≤ BMI < 30)	-0.09**	-0.06
Adipose (BMI ≥ 30)	-0.19***	-0.19***
Current smoker (RC: no)	-0.10*	-0.16***
Adj. R^2	0.51	0.48
n	8,677	7,532

[a] Inverse hyperbolic sine transformation to account for nonlinear relationship.
$^{+}$p ≤ 0.1; *p ≤ 0.05; **p ≤ 0.01; ***p ≤ 0.001.
For details on the variables used for these models, see *Lazarevič/Brandt* (2020).

Source: Survey of Health, Ageing and Retirement, release 7.1.0, own calculations

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