The Necessity, Feasibility, and Utility of Using the Minimum European Health Module to Measure Generic Health

European Population Conference 2020 in Padova, Italy, 24th–27th June

Patrick Lazarevič (Vienna Institute of Demography), Marc Luy (Vienna Institute of Demography), Martina Brandt (TU Dortmund University)

Corresponding Author: Patrick Lazarevič

Email: Patrick.Lazarevic@oeaw.ac.at

Research Interest, Framework, and Objectives

Health is a fundamental aspect of many scientific disciplines and its definition and measurement is the analytical core of many empirical studies. However, financial and temporal restrictions typically preclude comprehensive health measurement via extensive scales, performance measures, or the collection of biomarkers. Accordingly, multi-thematic surveys often opt to (only) ask for the respondent's self-rated health (SRH) as this single indicator potentially provides a comprehensive and inclusive measurement of health. Yet, recent studies (e.g., Layes et al. 2012; Lazarevič 2019; Oksuzyan et al. 2019) have shown that SRH exhibits some properties that question its suitability to measure generic health, e.g., age-specific health determinants and standards (i.e., lack of measurement invariance) or systematic influences of non-health aspects even after controlling for comprehensive health information (i.e., non-health biases). Consequently, to efficiently utilize SRH's potential for comprehensive generic health measurement, these drawbacks need to be rectified.

The Minimum European Health Module (MEHM), as proposed by Robine & Jagger (2003), complements SRH with global questions on chronic health conditions and health-related activity limitations. Thus, the MEHM can be seen as a compromise between using SRH as a single-indicator and more comprehensive scales. In this paper, we investigate the feasibility to combine the MEHM into a generic health indicator and judge its utility in comparison to SRH as the current state of the art.

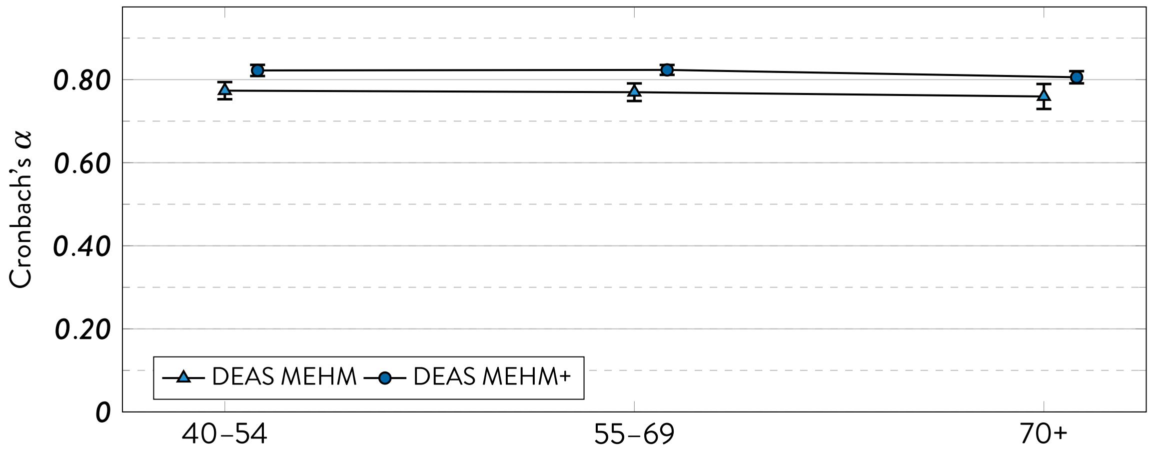
Data & Methods

For our analysis, we use cross-sectional data from the German Ageing Survey (2008 & 2014), which provides MEHM-data from 12,037 respondents. Further analyses were restricted to 7,089 respondents due to the use of data from an additional drop-off survey. To the end of judging the *feasibility* of using the MEHM to measure generic health, we firstly examined the internal consistency of both versions of the MEHM and utilize generalized structural equation modeling to estimate latent variables (i.e., generic health) from these data. Additionally, we explore the option of an extended version of the MEHM (MEHM+) by adding information on multimorbidity (i.e., 0/1/2+ chronic health conditions) and the presence and intensity of chronic pain. Secondly, in order to explore both new indicators' *utility*, we compared both measures regarding their susceptibility to age-specific reporting behavior and non-health influences using SRH as a benchmark.

Selected Results

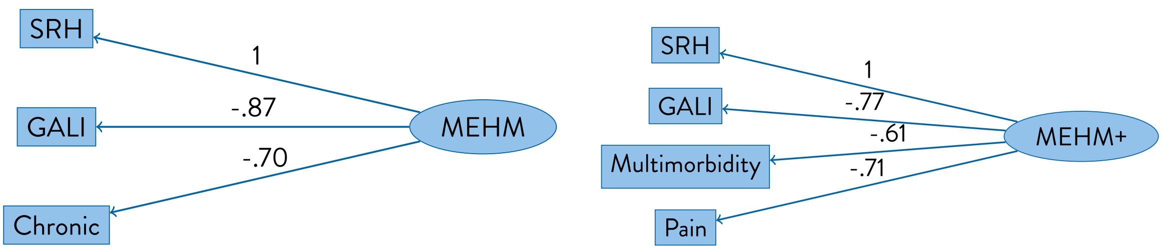
Figure 1 shows Cronbach's α by age group, which we estimated based on polychoric correlations due to the ordinal and binary nature of the MEHM's items (Gadermann et al. 2012). The figure shows that both versions of the MEHM exhibit a good internal consistency as α was well-above the conventional threshold of .70 in every age group and version. Additionally, MEHM+'s internal consistency is consistently significantly greater than that of the original MEHM, with every age group displaying α-values above the more strict threshold of .80. Overall, these finding suggest that both versions show a sufficient internal consistency to combine them into generic health measures. Additionally, confirmatory factor analyses based on polychoric correlation matrices resulted in a single factor with an eigenvalue > 1, corroborating both versions' suitability for combination into a latent variable.

Figure 1: Ordinal α by MEHM-Version and Age (95% CI)



Source: PUMA-Survey & DEAS 2008 & 2014, weighted data, own calculations based on polychoric correlations
MEHM+: MEHM incl. multimorbidity option and pain
$n = 12,037$

Figure 2: Results from Generalized Structural Equation Modeling

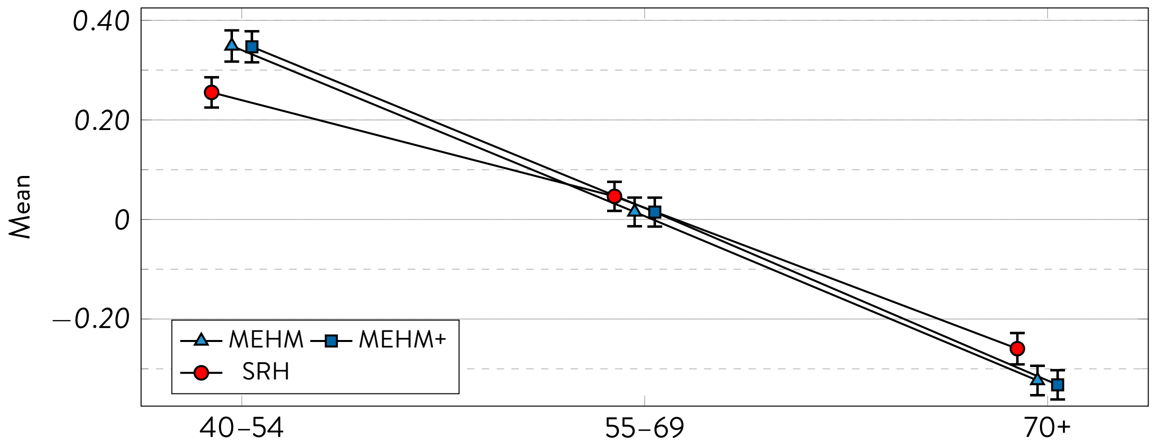


Source: DEAS 2008 & 2014, weighted data, own calculations
$n = 12,037$

The results from generalized structural equation modeling of generic health as a latent variable for both versions of the MEHM are shown in Figure 2. All effects of the latent variables on the indicators were in the expected direction with a more positively rated SRH indicating a better latent health while stronger health-related activity restrictions and the presence of chronic diseases and health conditions suggesting a worse latent health in MEHM. The same was true for MEHM+ with multimorbidity and a higher intensity of chronic pain as signs of worse overall health.

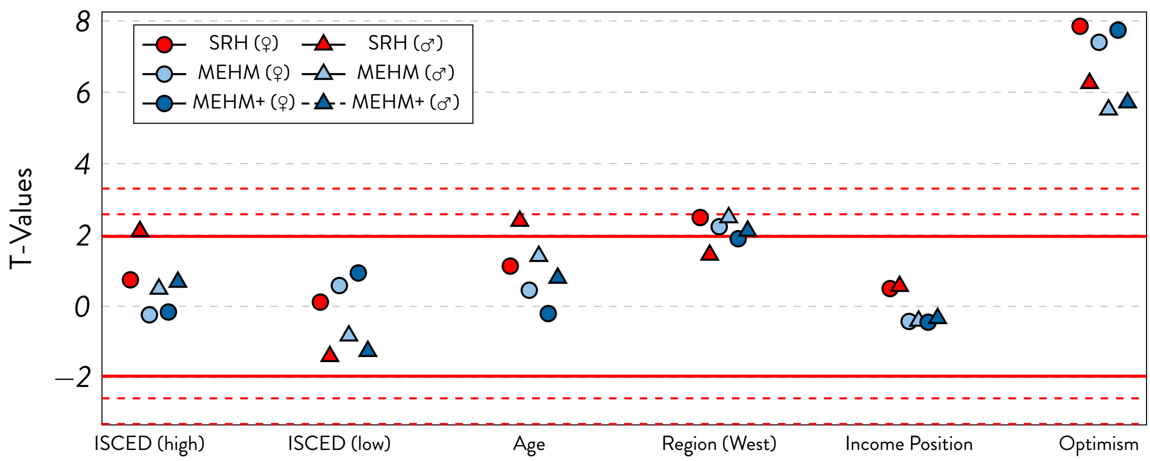
Figure 3 shows the mean health score by age group. To enable comparability, all three variables have been standardized to have a mean of 0 and standard deviation of 1 in the overall sample. Taking SRH as a benchmark, both MEHM-scores indicate a significantly better health for younger respondents (< 55 years old) while the opposite is true for the oldest age group (70 or older). Since older respondents tend to be more optimistic in their health reports than their younger counterparts (Layes et al. 2012; Oksuzyan et al. 2019), these results suggest a reduced bias from age-specific reporting behavior.

Figure 3: Comparison of Mean Health by Age Group (95% CI)



Source: DEAS 2008 & 2014, Z-standardized variables, weighted data, own calculations
n = 12,037

Figure 4: Influence of 'Non-Health' Variables on Health Measure (T-values)



Source: DEAS 2008 & 2014, weighted data, standardized dependent variables, own calculations
MEHM+: MEHM incl. multimorbidity option and pain
Controlling for: separate health-conditions, physical functioning (SF 36), lung functioning, pain intensity, being underweight, overweight, or obese, depressive symptoms (ADS-K)
n = 7,089

Figure 4 shows the T-values from a regression of non-health variables on each health measure after a broad control for health information and reference lines for customary significance levels. As health information was controlled in advance, effects from non-health variables stem either from omitted health variables or non-health biases. Across genders and age groups, explained variance from health indicators was consistently and significantly smallest for SRH ($\overline{R^2_{adj.}} = .44$) and greatest for MEHM+ ($\overline{R^2_{adj.}} = .74$) with MEHM in between ($\overline{R^2_{adj.}} = .57$). As can be seen here, using any MEHM factor score instead of SRH did not yield significant effects for high education or age for men and lead to somewhat reduced biases due to optimism. Also, the region was less strongly related to both MEHM-scores for women with a non significant effect for MEHM+. However, the regional differences were only significant for both factor scores in men which was not true for SRH. Overall, these results suggest that non-health biases were reduced in health measurement via MEHM factor scores in comparison to SRH.

Discussion

This paper set out to evaluate the necessity, feasibility, and utility of using the MEHM as an alternative to SRH to time-efficiently measure generic health in survey research. The *necessity* can be seen as a given since SRH exhibits properties that are unwanted in a generic health measure (e.g., lack of measurement invariance and non-health biases) and survey research often precludes extensive scales. As for the *feasibility*, our analyses have shown that the MEHM has a very good internal consistency and represents a single latent variable, i.e., generic health, that can be computed using generalized structural equation modeling. The *utility* of this factor has shown promise in our analysis as it reduced age-specific reporting behavior and some non-health biases that affect SRH. However, these positive properties come at the price of two additional questions and added computational effort on the side of the researcher. On the other hand, the added variables offer the option to further standardize SRH via priming and the necessary structural equation modeling might be useful to attenuate the effects of systematic response behaviors through the use of MIMIC-models. Additionally, further research on utilizing the developed measures to estimate healthy life expectancies is planned for the conference.

References

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