Original Article

Higher Body Mass Index, Less Exercise, but Healthier Eating in Married Adults: Nine Representative Surveys Across Europe

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Research Highlights

- We model the link between marital status and BMI for nine European countries.
- Four independent explanations for this link are tested.
- We test if weight-related behaviors explain differences in BMI by marital status.
- Married individuals have a higher BMI than singles, but differences are small.
- Married individuals eat healthier, but (at least married men) exercise less.

Abstract

Numerous studies show that married individuals enjoy better health than those who were never married. This representative survey examines whether they also have a healthier body mass index (BMI) and weight-related behaviors, and tests four independent explanations. Face-to-face interviews were conducted with representative samples (N = 4,555) from nine European countries (Austria, France, Germany, Italy, the Netherlands, Poland, Russia, Spain, UK). On average, never married respondents had a lower BMI than married respondents (p = .048). Married individuals reported stronger preferences for organic/fair trade food and regional/unprocessed food, and paying less attention to dietary convenience or dietary fat and body weight. Importantly, married men also exercised less (all ps < .05). Despite these behavioral differences, only attention to dietary fat and body weight (p = .001) predicted BMI differently for married versus never married men. There were few country differences in the relationship between marital status and BMI. All analyses were controlled for age and socio-economic status. In conclusion, despite more favorable eating-related cognitions and behaviors, married respondents had a higher BMI than never married respondents, but differences were small. The link between marital status and BMI cannot be fully described by one single explanation. Obesity interventions may benefit from considering specific weight-related behaviors in married versus never married individuals.

Keywords: body weight, marital status, exercise, eating, representative survey, Europe

Introduction

Are married people healthier? The short answer is yes. Numerous studies have demonstrated that married individuals enjoy better health and longevity than those without a partner (Umberson & Karas Montez, 2010; Waite & Gallagher, 2000; see Wilson & Oswald, 2005, for a review; but more recent studies have not found differences in health dynamics between married and cohabiting couples, e.g. Kohn & Averett, 2014a, 2014b; Musick & Bumpass, 2012). An important indicator of general health is the body mass index (BMI). Excess body weight and obesity are risk factors for numerous diseases, including ischemic heart disease, diabetes, and certain forms of cancer (World Health Organization [WHO], 2013). Are people who are married also better off than never marrieds on this indicator of health?

Conceptualizing the Link Between BMI and Marital Status

There are several competing, but not necessarily mutually exclusive, explanations linking BMI and marital status. The *marriage-market* explanation suggests that individuals who are married, and thus no longer concerned with attracting a mate, gain weight. Following the same logic, divorcees strive to lose weight when they re-enter the marriage market (e.g., Averett, Sikora, & Argys, 2008; Lundborg, Nystedt, & Lindgren, 2007). In contrast, the *marriage-selection* explanation posits that people with a lower BMI—an indicator of attractiveness (e.g., Tovée, Reinhardt, Emery, & Cornelissen, 1998) and health (WHO, 2013)—are more likely to be selected as marriage partners (Mukhopadhyay, 2008). According to this approach, it is not marriage per se that affects health indicators such as BMI (see also Fu & Goldman, 1996); rather, people with better health or lower BMI are preferentially selected into marriage. Consistent with this explanation, obese women in the U.S. are less likely to marry than are women of normal weight (Averett & Korenmann, 1996), notwithstanding an overall marriage rate of over 90% (Kreider & Ellis, 2011).

In sum, the two explanations make conflicting predictions about the link between BMI and marital status. The marriage-market explanation predicts that married individuals have a higher BMI than never marrieds, supposedly as a result of being released from the pressures of the marriage market. The marriage-selection explanation, in contrast, predicts that married individuals have a BMI comparable or lower to that of never marrieds, supposedly because a relatively low BMI is associated with higher attractiveness and better chances of being selected into marriage. The marriage-market explanation leaves open the behavioral changes that result in BMI increase when people get married. Two other explanations, however, have addressed those potential changes.

Behaviors that Link BMI and Marital Status

The *negative-protection* explanation assumes that marriage comes with spousal obligations such as regular family meals (Sobal & Rauschenbach, 2003). Dining together, relative to dining solo, can have various consequences: For one, people often consume more calories in company than they do alone (see Herman, Roth, & Polivy, 2003, for a review). Further, the poor but seductive eating habits of one spouse may migrate to the other. Indeed, Worsley (1988) showed that husbands detrimentally influence the diet of their wives by increasing the consumption of fat and meat while reducing that of fruit and vegetables. Also, married individuals, particularly women, have been found to exercise less than those who are never married (Rapp & Schneider, 2013). Consistent with these findings, the negative-protection explanation predicts that, in a marriage, weight-controlling behaviors (e.g., regular exercising) will be "crowded out" and less healthy eating habits (e.g., consumption of convenience food) will spread; consequently, the BMI of married individuals can be expected to be higher than that of never marrieds.

In contrast, the *marriage-protection* explanation proposes that marriage has advantageous behavioral consequences for health and weight. For one, spouses can monitor

each other's health behavior, keeping the other from engaging in risky behaviors such as the frequent consumption of high-calorie food or or supporting them in being physically active (Khan, Stephens, Franks, Rook, & Salem, 2013). Relatedly, married couples also tend to have more financial resources (Averett et al., 2008) and are thus better able afford a healthier lifestyle (e.g., buying fresh produce or a gym membership).

Mixed Empirical Findings Concerning BMI and Marital Status

Echoing the conflicting predictions of the explanations reviewed above, empirical findings on the relation between BMI and marital status are mixed: Some cross-sectional studies have found that married individuals have a lower BMI (e.g., Noppa & Bengtsson, 1980, in a population sample of Swedish women; Sund, Jones, & Midthjell, 2010, in a sample of Norwegian men and women); other studies have found no differences in the BMI of married and never married individuals (e.g., Kittel, Rustin, Dramaix, Debacker, & Kornitzer, 1978, in an industrial population of Belgian men; Umberson, Liu, & Powers, 2009, in a U.S. national sample); and still other studies have observed married individuals to have a higher BMI (e.g., in a large Australian random sample, Ball, Mishra, & Crawford, 2002; in a national US sample, Hahn, 1993; in representative German samples, Heineck, 2006, Klein, 2011; and in representative U.S. samples in which only married men—not women—had a higher BMI, Sobal, Rauschenbach, & Frongillo, 1992; Wilson, 2012). Mixed results have also been obtained in longitudinal studies: Although studies examining weight changes across *marital transitions* (e.g., from being single to getting married) often show that either both partners (Averett, Argys, & Sorkin, 2013; Meltzer, Novak, McNulty, Butler, & Karney, 2013) or women, in particular, gain weight, other studies have found no such regularity (Dinour, Leung, Tripicchio, Khan, & Yeh, 2012 for a review).

Importantly, very few studies have compared the relation between BMI and marital status across countries. These studies report mixed findings (e.g., non-married women in

Denmark being more likely obese than married women; no such difference for women from Finland in cross-sectional samples, Sarlio-Lähteenkorva, Lissau, & Lahelma, 2005). One potential explanation for such mixed findings might be country differences. For example, the nine countries surveyed in this study differ substantially regarding their marriage and divorce rate (Eurostat, 2015; data for Russia are provisional data for 2011 from United Nations Statistics Divison, 2014), as well as in their risk of getting a divorce (ranging from 26% in Italy to 63% in Spain; calculated following Lundborg, Nystedt, & Lindgren, 2007, by dividing the number of divorces in 2012 by the number of marriages in 2012, with the exception of the UK, France, and Italy, where numbers are from 2011). Because of these differences between countries, differences in the relation between BMI and marital status across countries could be expected. For example, in countries with a high divorce risk such as Spain or France, the marriage-market explanation would predict that married individuals should have a lower BMI than in countries with a comparatively lower divorce risk, such as Italy or Poland (see also Lundborg et al., 2007).

Research Goals

In this article, we compare the link between marital status and BMI across representative cross-sectional samples obtained from nine European countries. Additionally, we examine potential behavioral causes of the link between marital status and BMI—specifically, eating and exercise cognitions and behaviors.

To our knowledge, this is the first investigation of marital status, BMI, and weight-related behaviors to draw on comparative representative samples from multiple European countries. This investigation is timely for several reasons: The mixed results reviewed above often stem from studies conducted in different countries. Country differences may be one reason for the mixed findings. To address this possibility, representative samples from nine different countries are compared. Relatedly, one of the major limitations of previous research

is that the assessment of key variables differs widely between studies (e.g., some differentiate between co-habiting and being married, others do not; Dinour et al., 2012). This study uses the same measures across all samples. Further, we are not aware of investigations of the relationship between BMI and marital status in some of the eastern European countries included (e.g., Russia or Poland); thus, we enter uncharted territory. Finally, using the same samples, we investigate both the explanations advanced in the marriage-market and the marriage-selection explanations, and explore the behavioral changes suggested in the negative-protection and marriage-protection explanations.

Methods and Procedures

Participants and Procedure

Participants were 10,226 individuals from nine European countries: 541 from Austria, 999 from France, 2,062 from Germany, 1,010 from Italy, 508 from the Netherlands, 1,013 from Poland, 2,016 from Russia, 1,020 from Spain, and 1,057 from the UK. The data were collected in fall 2011 by [name withheld to maintain anonymity] as part of the Lifeworlds Survey. Sampling was done using the quota method. In quota sampling a population is stratified in mutually exclusive sub-groups; interviewers are then told to find a certain number of individuals to match a sub-group. To reduce interviewer bias in the current study, each interviewer was only allowed to find up to four survey participants. Participants were representative of the populations of these nine European countries with respect to gender, age (among those 16 to 20 years and older), employment status, size of household, and region of residence according to population census data in 2011; sample size per country was chosen to maximize representativeness for these characteristics considering population size. In the analyses, each country was weighted according to its population size to achieve representativeness for this European region. Only those participants were included in the present analyses who were either (a) never married and lived alone or (b) married and had a

household size of at least two (e.g., if they reported living without children, the household size had to be exactly two; if they reported having one child, the household size had to be exactly three). Participants who reported being separated, divorced, or widowed were excluded, because in a cross-sectional sample it is impossible to disentangle the effects of a previous marriage versus being single/ living alone. In the analyses reported in this manuscript, participants who were in a relationship but not married were excluded: Cohabitation appears to be associated with different health consequences than marriage (e.g., Horwitz & White, 1998); furthermore cohabitation has been reported to be less stable than marriage (Brown, 2000), which may affect BMI, health behaviors, or both. These conditions resulted in a subset of 4,555 participants, of whom 775 were never married (448 men, 327 women) and 3,780 were married (1,891 men, 1,889 women). Importantly, some studies have not found differences in health between individuals who are married and individuals who cohabit (Kohn & Averett, 2014a, 2014b; Musick & Bumpass, 2012). Therefore, we have conducted robustness checks by running an additional set of analyses combining co-habiting and married individuals into one subgroup (resulting in 4,617 individuals in the married/ co-habiting group, of which 2,323 were male and 2,294 were female; see Supplementary Materials, Table S3 for participant characteristics, and Tables S5-S8 for results of analyses with this group).

The study was conducted in agreement with the ethical standards of [name withheld to maintain anonymity], those ethical standards were accepted by the Institutional Review Board of [name withheld to maintain anonymity]. All participants gave informed consent and acknowledged that they could stop the interview at any time without further consequences. Participants were interviewed in their homes using a computer-assisted personal interview, except for participants in Russia who for security reasons were interviewed using paper-and-pencil questionnaires.

Interview Questions

Interview questions were asked in the respective language of each country. The questions were first formulated in German, then translated by professional translators into the languages of the other participating countries and finally translated back into German to assure their accuracy and equivalence. Questions and answer categories were field tested and adjusted as needed.

Eating-related cognitions and behaviors were assessed with 44 items, responses to which were given on a 4-point Likert scale from 1 (*does not apply at all*) to 4 (*applies fully*). All items were subjected to exploratory factor analysis with varimax rotation. Inspection of the scree plot suggested a six-factor solution with eigenvalues above 1.4; three items with a factor loading lower than .3 were excluded. Due to the very low reliability of two factors (containing a total of 12 items), the total number of factors was reduced to four. These four factors can be described as follows: *preference for organic and fair trade food*, with five items (e.g., "I prefer to buy organic food and drinks"; Cronbach's $\alpha = .83$); *dietary convenience*, with 13 items (e.g., "I often use convenience food; canned/dried soup or frozen pizza"; Cronbach's $\alpha = .72$); *awareness of dietary fat and body weight*, with six items (e.g., "I favor food items and products with reduced fat levels"; Cronbach's $\alpha = .63$), and *preference for regional/unprocessed food*, with five items (e.g., "I often use food items produced or grown in the region where I live"; Cronbach's $\alpha = .67$). The 44 items that make up these four factors are described in the Supplementary Materials (Table S4).

Exercise behavior was assessed by one item, "How often do you exercise to keep fit?" Responses were given on a 5-point scale from 1 (*never*) to 5 (*every day or most days*).

Statistical Analyses

To achieve representativeness of the data for the populations of the nine European countries, probability weights based on gender, age, employment status, size of household,

and region of residence were applied in the descriptive analyses and all inferential statistics. Data were analyzed using the Complex Samples Software, SPSS Version 21, and Stata 13. Further, age and indicators of socioeconomic status (i.e., income, level of education and profession of head of household) were included as covariates in all inferential analyses; country was included as covariate in all analyses across the nine countries surveyed. Missing data in the data presented here were deleted listwise; the proportion of missing data for each demographic variable is reported in Table 1. Importantly, all analyses were also conducted on a data set that used multiple imputation to handle missing data; results are reported in the Supplementary Materials (Tables S5-S8b).

In the following, we describe the steps of the analyses reported. First, we present weighted summary statistics of the demographic characteristics for the full sample and the subsample used in the analyses (see Table 1; for demographic characteristics divided by country for the full sample, a subsample only including single vs. married individuals, and a subsample including single vs. married/co-habiting individuals, see Supplementary Materials, Tables S1, S2, and S3, respectively). Next, we conducted a linear regression to test the effects of marital status and gender on BMI, using marital status, gender, and their interaction as predictors; and age, indicators of socio-economic status, and country as covariates (Figure 1). Then, we ran the same linear regression model for each country separately (not including country as covariate; Figures 2a and b). In the next set of analyses we examined the relation between weight-related behaviors and BMI. First, using a linear regression model, we tested whether marital status and gender predicted weight-related behaviors differently (Figures 3a and b; Table 2). To understand whether there were differences in eating- and exercise-related cognitions and behavior by marital status, linear regressions with marital status and eating- or exercise-related variables as predictors and BMI as outcome, were run separately for men and women (Table 3). Importantly, all analyses reported in this manuscript included interactions

with gender or were separated by gender because gender has been suggested to differentially impact health and health-related behaviors (e.g. Rapp & Schneider, 2013; Worsley, 1988).

Results

Participant characteristics. Participants reported their gender, age, marital status, weight, height, and household size as well as employment status, income level, and education level of the head of household (Table 1). BMI was calculated by dividing self-reported weight in kilograms by height in meters squared; socioeconomic status was operationalized as income, education level, and profession of the head of household. These variables were included as covariates in all analyses. Although height and weight were not measured directly, the self-reporting of both variables is more accurate in a personal interview situation than in settings in which the interviewee is not visible (e.g., telephone interviews; Ezatti, Martin, Skjold, Hoorn, & Murray, 2006).

Table 1. Participant Characteristics (Weighted)

		Full sample (N = 10 226)	Subsample used in analyses (N = 4 555)
		%	%
Gender	Male	47.6	52.1
	Female	52.4	47.9
	% Missing values	0.0	0.0
Age	16–19	7.6	0.8
	20–29	16.8	11.5
	30–39	16.8	23.5
	40–49	17.6	20.3
	50–59	15.2	14.5
	60+	26.0	29.4
	% Missing values	0.0	0.0
Marital status	Never married	23.2	14.9
	Married	50.2	85.1
	% Missing values	0.5	0.0
BMI	Underweight (BMI < 18.5)	3.2	1.8
	Normal weight (BMI 18.5–24.9)	47.7	43.8
	Overweight (BMI 25.0–29.9)	33.4	38.4
	Obese (BMI >30)	13.9	10.9
	% Missing values	1.7	1.4

		Full sample (N = 10 226)	Subsample used in analyses (N = 4 555)
		%	%
Employment status	Blue-collar worker	22.4	16.1
	White-collar employee	25.7	27.0
	Manager	6.7	4.4
	Self-employed	9.2	9.6
	Currently not working/retired	28.5	38.1
	Never worked/other	4.6	5.9
	% Missing values	2.9	0.6
Income level	Low	31.0	29.6
	Medium	31.5	35.9
	High	15.1	14.5
	% Missing values	22.4	20.0
Education level	Low	29.2	28.1
	Medium	45.3	44.4
	High	24.8	27.1
	% Missing values	0.7	0.4
Household size	1 person	16.0	14.9
	2 persons	30.2	43.3
	3 persons	23.1	18.3
	4 and more persons	30.7	23.5
	% Missing values	0.0	0.0
Country	Austria	1.6	1.9
	France	11.8	11.8
	Germany	16.2	19.0
	Italy	11.9	11.1
	Netherlands	3.1	4.6
	Poland	7.4	5.5
	Russia	27.0	26.4
	Spain	9.2	7.9
	UK	11.8	11.8
	% Missing values	0.0	0.0

Note. Employment status, income level, and education level refer to the head of household.

Differences in BMI

On average, married individuals had a higher BMI than never marrieds, consistent with the marriage-market explanation and different from the marriage-selection explanation (Fig. 1). A linear regression with BMI as dependent variable, marital status, gender, and their interaction as predictors, as well as age, indicators of socioeconomic status, and country as covariates, showed five main effects: marital status, B = 0.64, SE=0.32, p = .048, gender, B =

-0.75, *SE*=0.18, $p < .001$, age $B = 0.06$, *SE*=0.01, $p < .001$, education of head of household $B = -0.68$, *SE*=0.12, $p < .001$, and country $B = 0.12$, *SE*=0.03, $p < .001$. R^2 for the model was .070. There was no interaction between marital status and gender, $B = 0.20$, *SE*=0.50, $p = .684$. Importantly, results are comparable when including individuals that are co-habiting in the "married" category (see Table S5 in the Supplementary Materials).

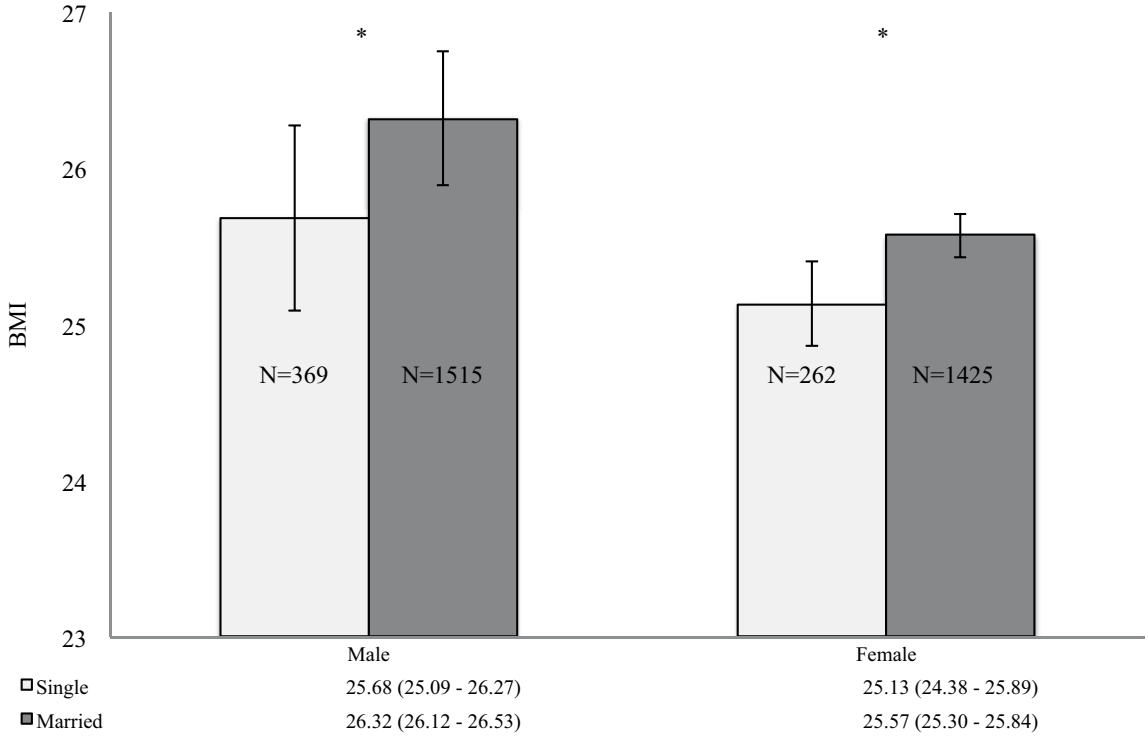
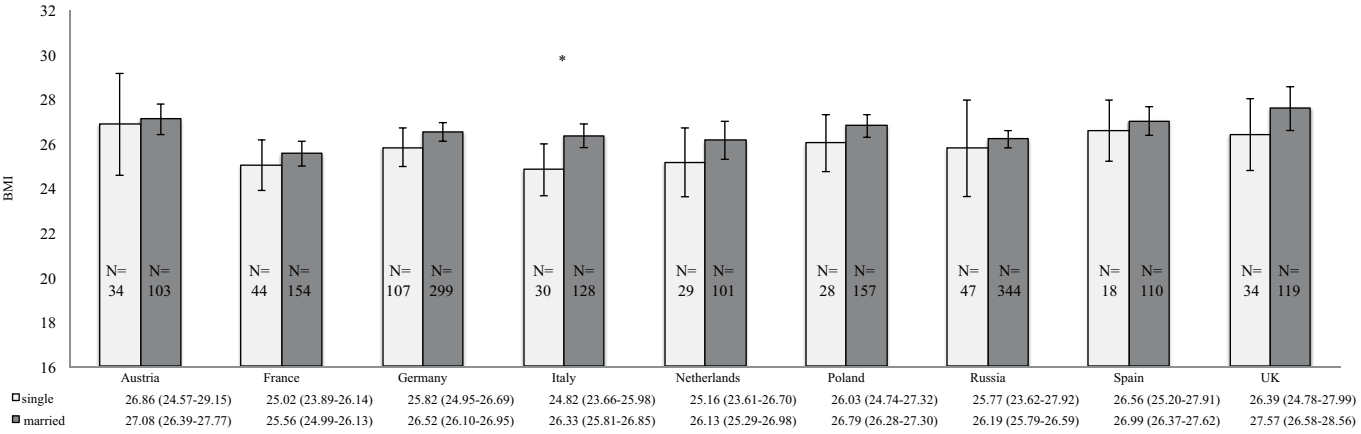


Figure 1: Differences in BMI by marital status and gender; means are probability-weighted means adjusted for age, socioeconomic status, and country. Error bars represent 95% confidence intervals.

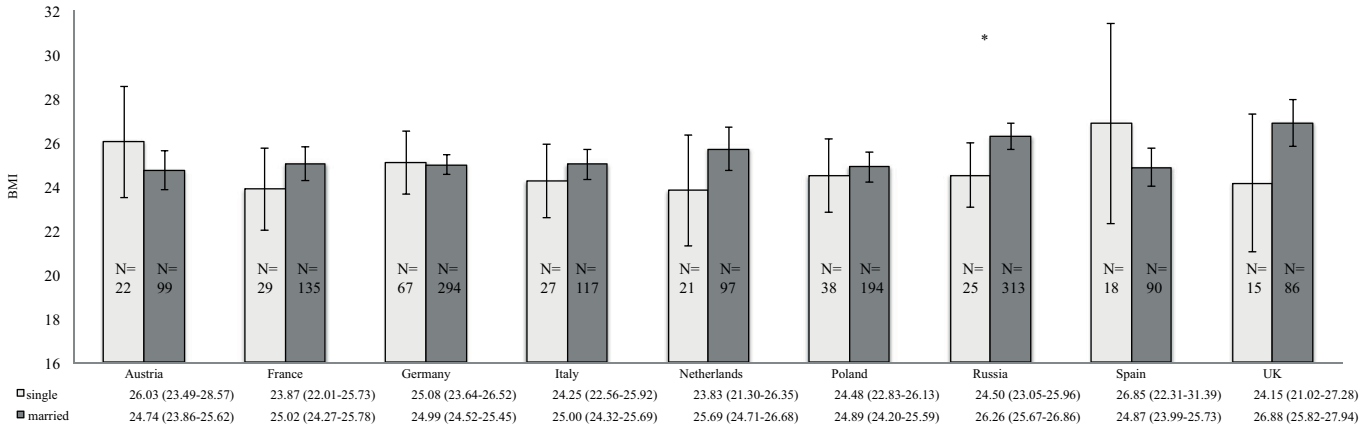
Broken down by individual countries, the regularity of married individuals having a higher BMI than never marrieds emerged relatively consistently across countries (Fig. 2a and 2b). Specifically, married men in all nine countries had a higher BMI than never marrieds. Only in Italy was the difference in BMI large enough to be statistically significant (*B*=1.51, *SE*=0.66, *p*=.021, $R^2 = .103$; results controlled for age and socioeconomic status). Married women in six of the nine countries had a higher BMI than women that had never been

married, however, this difference was only significant in Russia (B=1.75, SE=0.80, p=.029, R^2 = .176). The findings are similar when co-habitors are included in the group of married individuals (Table S6), or when missing data were handled with multiple imputations (Table S6).

(a) Men



(b) Women



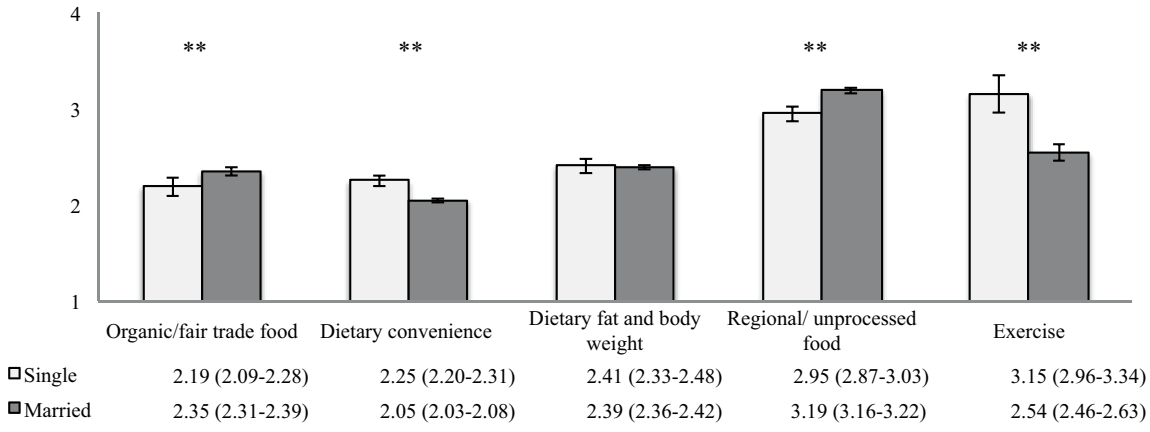
Figures 2a and b. Body Mass Indices for never married versus married individuals across the nine countries surveyed, separately for (a) men and (b) women. Means are probability-weighted means adjusted for age and socioeconomic status. Error bars represent 95% confidence intervals.

Weight-Related Behaviors and BMI

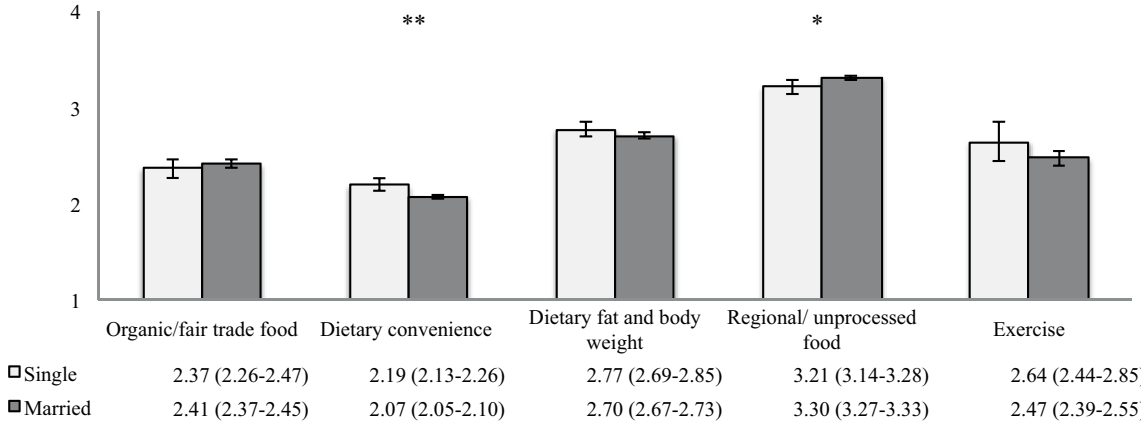
Next, the marriage-protection explanation was tested against the negative-protection explanation. The former suggests that partners in a marriage have healthier lifestyles; the latter, that the unhealthy habits of one spouse migrate to the other. Five linear regressions—four for the eating-related factors and one for exercise behavior—were conducted. Eating- and exercise-related cognitions and behaviors were used as dependent variables, marital status, gender, and their interaction as predictors, and age, indicators of socioeconomic status, and country as covariates.

Relative to never marrieds, married people reported stronger preferences for regional/unprocessed food and paying less attention to dietary convenience across all countries; married men also paid more attention to organic/fair trade food than single men (Table 2, Fig. 3a and b). These results suggest that the dietary repertoire of partners in a marriage is of higher quality and involves healthier food, consistent with the marriage-protection explanation. Yet, this is only part of the story. In line with the negative-protection explanation, at least married men also exercised significantly less (Fig. 3a and b).

(a) Men



(b) Women



Figures 3a and b. Means of cognitions and behaviors related to BMI, separately for (a) men and (b) women. Means are probability-weighted means adjusted for age, socioeconomic status, and country. Error bars represent 95% confidence intervals. Behaviors related to BMI were rated on a scale from 1 (does not apply at all) to 4 (applies fully). ** p<.01, *p<.05

Were there gender differences in behavior? Men and women differed in three eating-related cognitions (all but dietary convenience), with men generally reporting weaker preferences for organic/fair trade foods as well as regional/unprocessed foods, and paying less attention to dietary fat and body weight. There was an interaction effect between marital status and gender for the preferences for convenience food and regional/unprocessed food: never married men valued dietary convenience more, and purchased less regional/unprocessed food, than did married men or never married or married women. There was also an interaction between marital status and gender for exercise, with never married men exercising more than never married women or married men or women. Importantly, results replicated when co-habitors were included in the analyses or when missing data were handled with multiple imputations (see Table S7).

Table 2. Do eating- or exercise-related cognitions and behaviors differ between never married and married men and women? Results of linear regressions with eating- and exercise-related cognitions and behaviors as dependent variables, marital status, gender, and their interaction as predictors, and age, socioeconomic status, and country as covariates.

	Marital status	Gender	Marital status * gender	R^2
Organic/fair trade food	*B*=0.15, *SE*=0.05, *p*=.003	*B*=0.07, *SE*=0.03, *p*=.013	*B*=0.08, *SE*=0.07, *p*=.246	.012
Dietary convenience	*B*=-0.20, *SE*=0.03, *p*<.001	*B*=0.01, *SE*=0.02, *p*=.660	*B*=-0.09, *SE*=0.04, *p*=.048	.086
Dietary fat and body weight	*B*=-0.003, *SE*=0.04, *p*=.932	*B*=0.31, *SE*=0.02, *p*<.001	*B*=0.05, *SE*=0.06, *p*=.381	.110
Regional/ unprocessed food	*B*=0.25, *SE*=0.04, *p*<.001	*B*=0.13, *SE*=0.02, *p*<.001	*B*=0.15, *SE*=0.06, *p*=.007	.080
Exercise	*B*=-0.57, *SE*=0.10, *p*<.001	*B*=-0.10, *SE*=0.06, *p*=.092	*B*=-0.37, *SE*=0.14, *p*=.009	.063

Next, to understand whether there were gender differences in cognitions and behavior dependent on marital status, linear regressions with marital status, eating- or exercise-related variables, and their interaction as predictors, and BMI as outcome, were run (Table 3). All regressions were controlled for effects of age, indicators of socioeconomic status, and country. For men, an interaction occurred. Specifically, the more attention *never married* men paid to dietary fat and body weight, the higher their BMI; for *married* men, in contrast, no such relation emerged. For women, there were no significant interactions between marital status and eating- or exercise-related cognitions and behaviors. Again, results were comparable when co-habitors were included in the analyses or when missing data were handled with multiple imputations (see Tables S8a und S8b).

Table 3. Do eating- or exercise-related cognitions and behaviors predict BMI differently depending on marital status? Results of regression analyses, separately for men and women; all results controlled for age, socioeconomic status, and country.

	Men		Women	
Predictors		R^2		R^2
Organic/fair trade food		.04		.11
Marital status	*B*=0.22, *SE*=0.70, *p*=.755		*B*=0.99, *SE*=1.29, *p*=.440	
Organic/fair trade food	*B*=-0.53, *SE*=0.27, *p*=.047		*B*=-0.29, *SE*=0.55, *p*=.598	
Marital status * organic/fair trade food	*B*=0.27, *SE*=0.30, *p*=.377		*B*=-0.18, *SE*=0.57, *p*=.751	
Dietary convenience		.04		.11
Marital status	*B*=-0.12, *SE*=1.50, *p*=.936		*B*=4.01, *SE*=2.59, *p*=.122	
Convenience	*B*=-0.29, *SE*=0.59, *p*=.620		*B*=1.89, *SE*=1.23, *p*=.126	
Marital status * convenience	*B*=0.38, *SE*=0.64, *p*=.543		*B*=-1.57, *SE*=1.26, *p*=.214	
Dietary fat and body weight		.05		.11
Marital status	*B*=3.58, *SE*=0.91, *p*<.001		*B*=0.69, *SE*=1.99, *p*=.728	
Attention to fat and body weight	*B*=0.94, *SE*=0.32, *p*=.003		*B*=-0.49, *SE*=0.66, *p*=.455	
Marital status * Attention to fat and body weight	*B*=-1.19, *SE*=0.37, *p*=.001		*B*=-0.06, *SE*=0.70, *p*=.926	
Regional/unprocessed food		.04		.10
Marital status	*B*=3.45, *SE*=1.36, *p*=.011		*B*=-1.75, *SE*=2.38, *p*=.461	
Regional/ unprocessed food	*B*=0.56, *SE*=0.46, *p*=.226		*B*=-0.71, *SE*=0.71, *p*=.317	
Marital status * Regional/ unprocessed food	*B*=-0.90, *SE*=0.50, *p*=.071		*B*=0.72, *SE*=0.75, *p*=.341	
Exercise		.05		.11
Marital status	*B*=1.02, *SE*=0.82, *p*=.214		*B*=0.70, *SE*=0.79, *p*=.376	
Exercise	*B*=-0.09, *SE*=0.20, *p*=.661		*B*=-0.21, *SE*=0.21, *p*=.328	
Marital status * Exercise	*B*=-0.13, *SE*=0.21, *p*=.523		*B*=-0.08, *SE*=0.23, *p*=.744	

Discussion

Information about BMI, marital status, and eating- and exercise-related cognitions and behaviors obtained from representative samples in nine European countries was used to test for differences in the BMI of never married and married individuals. Collapsed across the nine countries, the data showed that, on average, never married participants had a lower BMI

than married participants, consistent with the marriage-market explanation. Although this pattern generally emerged across most of the nine countries, the difference between never married and married individuals was relatively small and reached significance in only two countries. In view of the mixed findings previously reported, however, one pattern emerging across nine countries in this study is remarkably consistent: In any of the countries examined, married individuals never had a significantly *lower* BMI than never married individuals.

What explains this difference in BMI? Few previous studies have examined potentially weight-related cognitions or health behaviors as explanations for the link between BMI and marital status (e.g., Yannakoulia, Panagiotakos, Pitsavos, Skoumas, & Stafanadis, 2008). To help fill this gap, we investigated the frequency of different eating- and exercise-related cognitions and behaviors. Married individuals reported stronger preferences for regional/unprocessed food and paid less attention to dietary convenience than never married individuals. Married men also paid more attention to organic/fair trade food than single men. All these cognitions and behaviors are consistent with the notion that married individuals are more likely to engage in health-protective behaviors than never married individuals, consistent with the marriage-protection explanation. Yet, at the same time, at least married men exercised less often than never marrieds, consistent with the notion that key weight-controlling behavior is crowded out in marriage—a dynamic consistent with the negative-protection explanation.

To conclude, these findings indicate that marriage is associated with both *more* health-promoting activities (more healthy food and less convenience food) and *fewer* health-promoting activities (less exercise, at least in men). Despite these behavioral differences, only one behavior proved to be differentially related to BMI in married versus never married men: awareness of dietary fat and body weight.

Implications

Our findings highlight the importance of social context for health and body weight. Previous studies have shown that spouses' body weight is correlated, particularly for obese spouses, and that obese parents are more likely to have obese offspring (Katzmarzyk, Hebebrand, & Bouchard, 2002). Thus, understanding how social institutions such as marriage contribute to health and dietary habits that are conducive to obesity is an important step towards understanding obesity in general. Further, our findings suggest that interventions targeted to weight control ought to be tailored to the social context of individuals. Insights into which health behaviors are generally reinforced in individuals who are married (e.g., healthier nutrition) and which are crowded out in marriage (e.g., reduced exercise) can facilitate the specific targeting of these behaviors in populations at risk for obesity. Our data suggest that this might be particularly the case in men.

Marriage is an important social institution. The vast majority of individuals get married at least once in their life. Although a number of studies have investigated the health consequences of marriage (e.g., Hahn, 1993; Musick & Bumpass, 2012Sobal et al., 1992; Wilson & Oswald, 2005; Worsley, 1988), numerous questions deserve further attention, including national influences, potential mechanisms underlying the link between marriage and BMI, and gender differences. This study was a first attempt to address those questions by examining the consistency of the link between marital status and BMI across different countries, potential underlying cognitions and behaviors, as well as gender differences. Two lessons can be learned from our results. First, notwithstanding the relatively consistent picture that emerged across all nine countries, the positive link between marital status and BMI did not arise in all countries, and often did not achieve significance. Obviously, the effects are small and this may be the key to the previously mixed findings. Second, there is more than one behavior behind the link between marital status and BMI. Marriage brings

along many changes (of which only a few could be examined in this study), some of which are conducive to a healthy diet and some of which impede the goal of maintaining body weight.

Strengths and Limitations

The strength of the current investigation is the database: The same questions were posed to nine representative samples, thus permitting a comparison of nine European countries that, taken together, represent a substantial proportion of the European population. For a number of these countries, findings concerning the relation between marital status and BMI have, to our knowledge, not previously been reported. Responses were collected using face-to-face interviews, ensuring high quality of the data.

However, there are also a number of limitations. One, the data are cross-sectional. Therefore, causal inferences cannot be drawn and changes over time could not be tested. For example, it is not possible to disentangle whether never married men with a higher BMI paid attention to dietary fat and body weight because they felt they had weight problems or whether that very awareness caused an increase in BMI. Also, weight and height were self-reported, and such reports can lead to underestimation of BMI (Gorber, Tremblay, Moher, & Gorber, 2007; May et al., 2013). However, asking about height and weight in a personal interview situation, as was the case in our study, yields more accurate responses than, for example, in a telephone setting (Ezatti et al., 2006). It is important to note, that BMI is only an approximate predictor of health and health risk; other measures such as weight circumference would provide important additional information to assess the health consequences of a higher BMI in married individuals (Janssen, Katzmarzyk, & Ross, 2004). Further, the analyses reported focus on how marital status and eating- or exercise-related behaviors were associated with BMI. Of course, many additional factors may be relevant to the development of body weight, including length or quality of relationship (e.g., Klein,

2011). Future research should address these additional factors by comparing BMI trajectories after changes in marital status across longitudinal representative international samples. Lastly, participants were selected using quota sampling; while this method yields data that are representative for the previously defined segments of the population, interviewers select participants due to the predefined criteria, which might lead to selection bias. To minimize selection bias in the current study, each interviewer interviewed a maximum of four study participants. Importantly, also random-sampling, which is theoretically free of selection bias because all individuals of a population have the same probability to be included, is subject to biases in practice. For example, participants in studies using random dial selection have been shown to be better educated than a sample representative for the population at large, because well-educated individuals are more likely to participate (Wang et al., 2009).

Conclusions

Are married people really healthier? The short answer, yes, is too simplistic. Although the results show generally higher engagement in health-promoting eating cognitions and behaviors among married individuals, particularly men, married individuals had a higher BMI and also exercised less—both risk factors for poorer health. Importantly, there were surprisingly few country differences in the relation between marital status and BMI across the nine European countries considered, despite considerable differences in factors such as divorce rates. Our results suggest that—despite generally more favorable eating behavior—marriage is linked to higher BMI.

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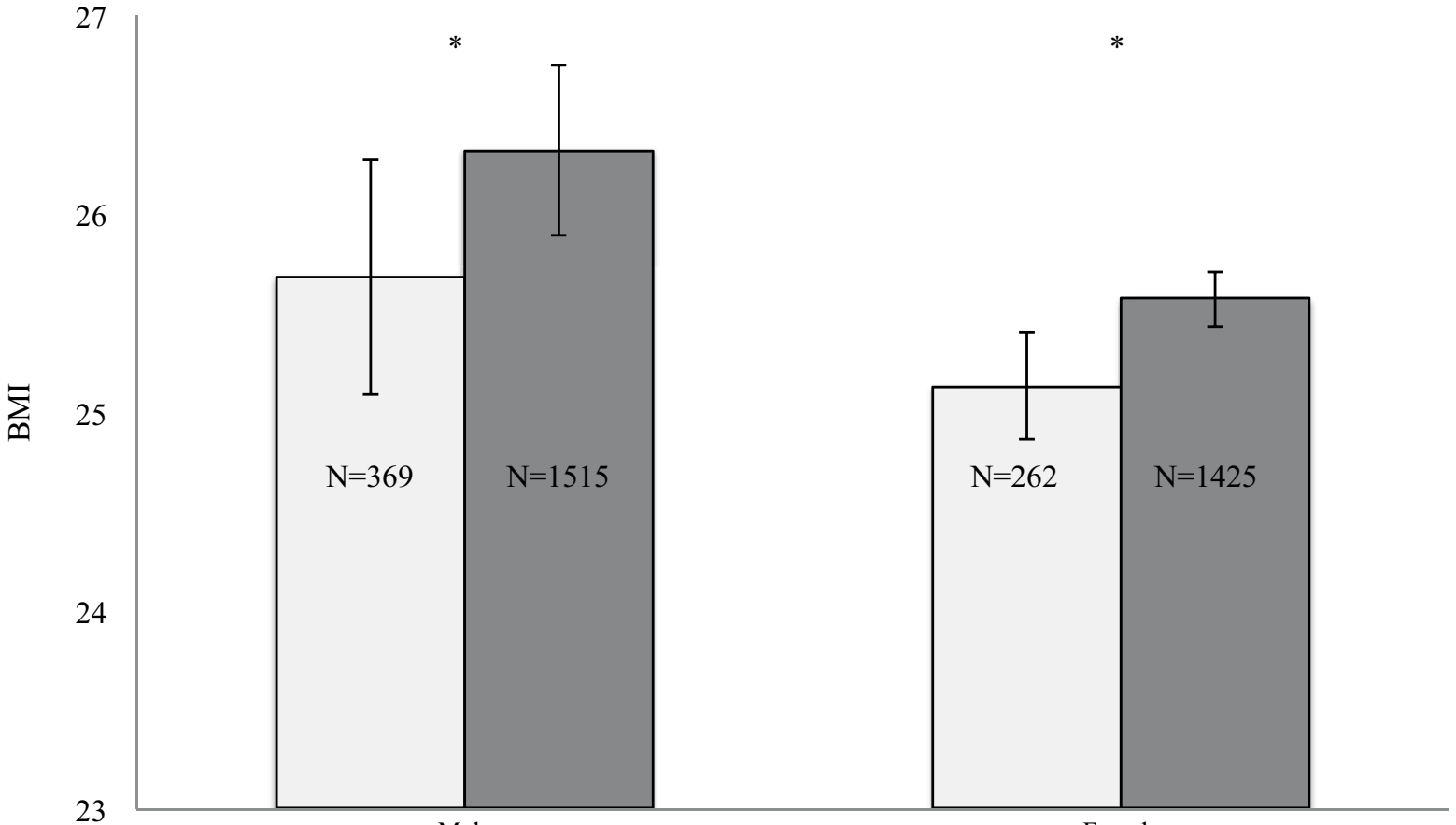

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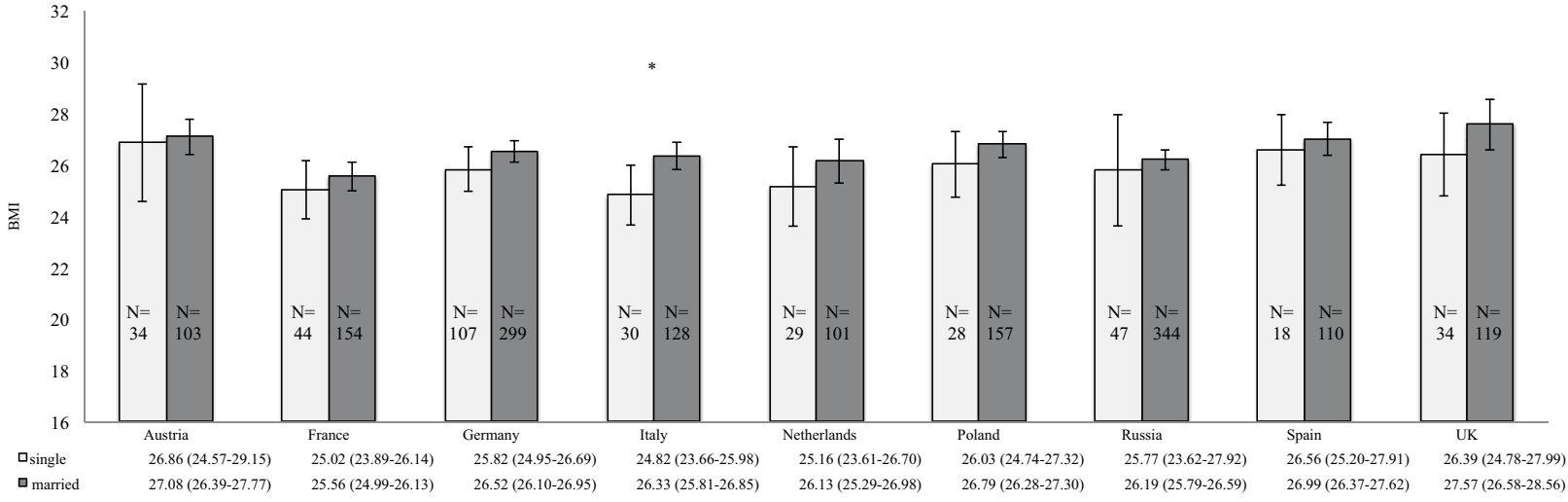

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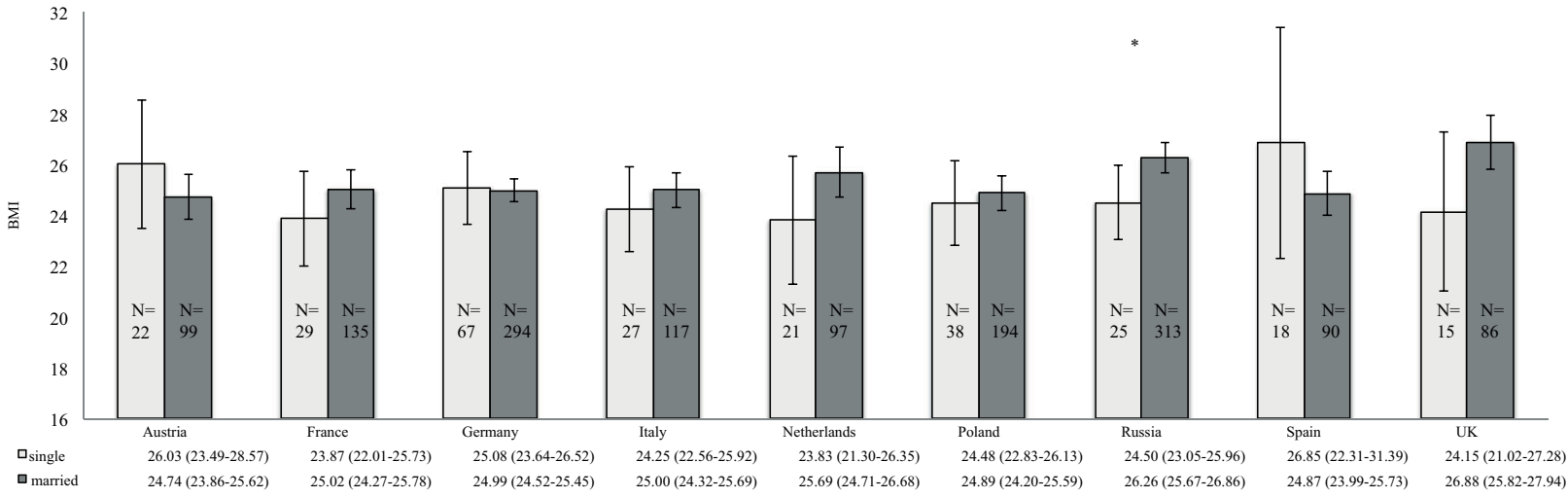

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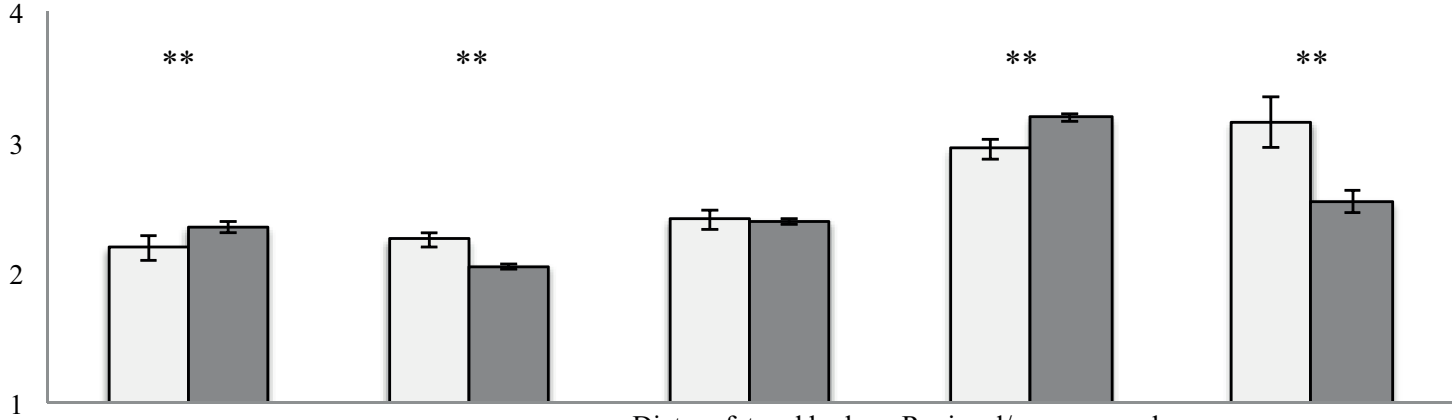
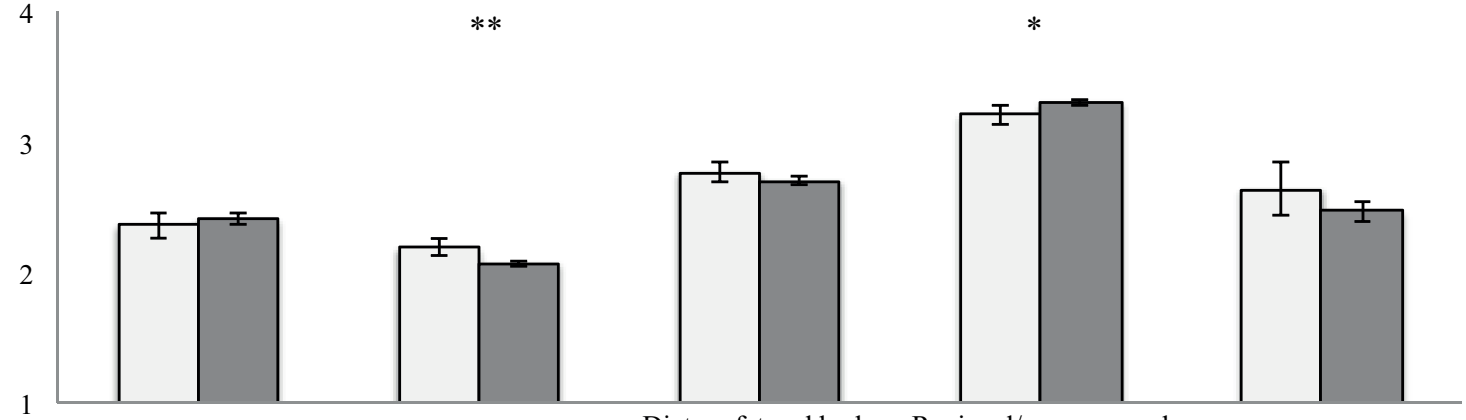


	Organic/fair trade food	Dietary convenience	Dietary fat and body weight	Regional/ unprocessed food	Exercise
Single	2.19 (2.09-2.28)	2.25 (2.20-2.31)	2.41 (2.33-2.48)	2.95 (2.87-3.03)	3.15 (2.96-3.34)
Married	2.35 (2.31-2.39)	2.05 (2.03-2.08)	2.39 (2.36-2.42)	3.19 (3.16-3.22)	2.54 (2.46-2.63)

Figures (NO AUTHOR DETAILS)



	Organic/fair trade food	Dietary convenience	Dietary fat and body weight	Regional/ unprocessed food	Exercise
Single	2.37 (2.26-2.47)	2.19 (2.13-2.26)	2.77 (2.69-2.85)	3.21 (3.14-3.28)	2.64 (2.44-2.85)
Married	2.41 (2.37-2.45)	2.07 (2.05-2.10)	2.70 (2.67-2.73)	3.30 (3.27-3.33)	2.47 (2.39-2.55)