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Personality as a predictor of dietary quality in spouses during midlife

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Abstract

Objective—To examine the NEO personality inventory-revised (NEO-PI-R) as a predictor of dietary quality in married couples, with focus on associations among: 1) each participant's personality as a predictor of their own dietary assessment, and 2) each participant's personality as a predictor of their spouses' dietary assessment.

Method—Participants were 850 couples from the University of North Carolina Alumni Heart Study (UNCAHS). NEO personality data was gathered during the baseline enrollment period from 1988–92. The dietary assessment was based on a modified version of the USDA Healthy Eating Index (MHEI) developed specifically for use in the UNCAHS; and data for calculating this measure were gathered from 1994–96. Analyses focused on examination of: 1) each participant's NEO assessments with their own MHEI, and 2) each participant's NEO assessments with their spouse's MHEI.

Results—Openness was associated with *self* ratings of dietary quality for both wives' (r = .28) and husband's (r = .27). Wives' Openness levels were also related to their *spouses*' ratings of dietary quality (r = .22). The primary facets of Openness accounting for the domain level findings were **O2:Aesthetics** and O4:Actions. The remaining personality domains (Neuroticism, Extraversion, Agreeableness, and Conscientiousness) were not associated with self or spousal ratings of dietary quality $(r \cdot s - .10 - .01)$.

Conclusion—Openness is associated with healthy eating habits—findings that may bear on disease prevention during midlife.

Keywords

Personality; NEO-PI-R-Diet; Spouses

Introduction

In order to optimize health and well-being in later life it is critical to consume a healthy diet in midlife. A few studies have shown that personality is associated with dietary practices. Goldberg and Stryker (Goldberg & Strycker, 2002) found that higher total fiber consumption was positively related to the personality domain of Openness to Experience and its components or facets: those more open to aesthetics, actions, ideas, and feelings were more likely to have more fiber in their diets. The avoidance of meat fats also showed positive associations with the overall domain of Openness, as well as facets of openness to aesthetics and actions. Other traits

of the Five-Factor Model (FFM) also showed associations with healthy eating: Conscientiousness was positively associated with avoidance of fats, and eating low-fat rather than high-fat foods and Neuroticism was negatively related to avoidance of food flavored with fat. The magnitude of these associations, however were smaller than those found for Openness. Others (de Bruijn *et al.*, 2005) have found that higher levels of Openness and Agreeableness are associated with fruit and vegetable consumption. In addition, Kikuchi and Watanabe (2000) found female students with higher scores on Openness to be more likely to have lower intake of animal fat, and be less likely to prefer salty foods. Also noteworthy was their finding that those high in Conscientiousness, regardless of being male or female, were more likely to consume vegetables. Finally, those higher in Agreeableness and lower in Extraversion showed more healthy behaviors, while results for Neuroticism were mixed with males high in Neuroticism avoiding cholesterol-rich foods, and regardless of gender, those high in Neuroticism preferred salty and sweet foods.

Past research generally supports these results regarding personality and healthier living. Those high in Openness are generally more willing to try alternative medicines (Honda & Jacobson, 2005), and links have been found between vegetarianism and Openness (Cechova, 1995). Studies using the Healthy Eating Index (HEI) have found inverse links between the measure and the Centers for Epidemiologic Studies Depression (CES-D) scale scores, which is positively correlated with Neuroticism factor (Tangney et al, 2002). Those high in Conscientiousness have been found to have better health-related behaviors (Roberts, Walton & Bogg, 2005) and are at a lower risk for all-cause mortality (Weiss & Costa, 2005). Combinations of the factors have also been found to yield useful information concerning health behaviors: high Neuroticism and low Conscientiousness (or Undercontrolled style of Impulse control) have been associated with smoking behavior (Terracciano & Costa, 2005).

Health psychologists stress the importance of studying personality by environment interactions, as environmental context influences the effect that personality may have on the outcomes of social interactions (Gallo & Smith, 1999). Marriage can be considered an important social context. Furthermore, spousal relationships are likely to be related to health in many ways, such as influencing the partners' weight management (Bastian *et al.*, 2005; Jeffrey & Rick, 2002; Weng *et al.*, 2004) and dieting behavior (Markey *et al.*, 2001); as well as effecting adherence to health behaviors (Erling & Oldridge, 1985; Knapp *et al.*, 1983). Therefore, examination of dietary risk factors during midlife within the social context of marriage, with a focus on the impact of personality, seems highly appropriate. Thus, the present study focuses on approximately 850 couples who are both long-term members of the UNCAHS. We will examine prospective associations between NEO personality inventory-revised (NEO-PI-R) scores and both self and spouse's MHEI scores. MHEI is a modified version of the Healthy Eating Index (Kennedy *et al.*, 2001; Kennedy *et al.*, 1995; McPherson *et al.*, 2000) that reflects overall dietary quality. Analyses will be conducted separately for wives and husbands.

To our knowledge no study to date has examined associations among assessments of the FFM personality domains and an index of dietary quality that summarizes healthy eating patterns according to USDA guidelines. In addition, the present study has the ability to extend prior observations that have linked personality to healthy eating habits by examining their ability to replicate, prospectively over a 2–4 year interval, in a sample of approximately 1700 individuals (850 couples). Furthermore, we are unaware of any study that has examined the potential influence of one's spouses' personality ratings on one's own eating habits. In light of the past research and consistent results regarding Openness, we hypothesize the strongest relations to be found between Openness and its facets and better overall dietary quality. The constructs of Conscientiousness and low in Neuroticism are also expected to be associated with better eating habits, though at smaller magnitudes of association than O.

Methods

Sample

Data were obtained from the UNCAHS—an ongoing prospective study of coronary heart disease and coronary heart disease risk factors (Siegler *et al.*, 1992a; Siegler *et al.*, 1992b). In 1986–87, members of the entering classes of 1964–66 at UNC who had taken the Minnesota Multiphasic Personality Inventory (Hathaway & McKinley, 1943) upon admission were located and invited to join the study. This sample reflected the sociodemographic characteristics of the UNC student population in the 1960s, i.e., it consisted of primarily male Caucasians, with minority enrollment less than 1%. Follow-up questionnaires were mailed to UNCAHS participants at 12–18 month intervals. At the time of the third follow-up (1988–91) respondents were asked for permission to enroll their spouses into the study. In July 1992 89% of those spouses who requested the questionnaire returned it and were enrolled in the study. The present investigation included approximately 850 spouse pairs (exact number varies by specific construct measured) who remained married to the same spouse.

Measures

NEO Personality Inventory — **Revised (NEO-PI-R)**—The NEO Personality Inventory (NEO-PI(-R); Costa & McCrae, 1985, 1992) is a measure of the dimensions of the Five-Factor Model (FFM; Digman, 1990), with six facet scales to assess specific aspects of each of the factors of neuroticism (N), extraversion (E), openness (O), agreeableness (A), and conscientiousness (C) (Costa *et al.*, 2000;Costa & McCrae, 1992). With 240 items, it assesses 30 traits yet can be completed by most respondents in about 30 minutes. NEO-PI-R items were summed and converted to gender normed T-scores for each domain, with higher scores reflecting the greater presence of that specific personality construct.

The Modified Health Eating Index (MHEI)—The MHEI is a modified version of the USDA Healthy Eating Index (Kennedy et al., 2001; Kennedy et al., 1995) and the Alternate Health Eating Index (McCullough et al., 2002). The MHEI was developed for the UNCAHS from information gathered by the UNCAHS food frequency questionnaire, see (McPherson et al., 2000). The specific components of the index modified for UNCAHS included dividing alcohol intake into two variables to allow capture of red wine intake separate from other alcohol intake; adding dietary cholesterol, calcium and sodium; and removing the trans fat component. Prior to creating the MHEI, the nutrient values from the food frequency collected in 1994-96 were updated using the most recent USDA database to expand the available nutrient values with the individual fatty acids and other micronutrients. This step was made possible through use of the USDA FNDDS database that has date ranges for foods and nutrients, allowing accurate inclusion of values associated with consumption patterns during the identified years of data collection (Day & Siegler, 2004). Finally, following a strategy similar to that of Kennedy et al. (Kennedy et al., 1995) and McCullough et al. (McCullough et al., 2002) we used the updated nutrient values to form a summary index of a healthy diet. The components of the MHEI components are as follows: vegetables (servings/d), fruit (servings/d), nuts and soy protein (servings/d), red wine (servings/d), other alcohol (servings/d), ratio poly to saturated fat (g/d), fiber (g/d), cholesterol (md/d), calcium (mg/d) sodium (mg/d) ratio white to red meat (servings/d). Daily consumption for each of the 10 components received a score ranging from 0-10, with consumption of the USDA recommended levels receiving a score of 10. Thus, MHEI scores range from 0 to 100, with higher scores reflecting a healthier diet (a detailed scoring algorithm is available upon request).

Time of Assessment—NEO-PI-R was assessed during the baseline enrollment period from 1988–92 for participants and spouses, and the dietary measures used to calculate the MHEI were assessed from 1994–96.

Statistical Analyses—The following correlations will be examined: 1) each participant's NEO assessments with their own MHEI, and 2) each participant's NEO assessments with their spouse's MHEI. Analyses will be conducted separately by gender. Primarily to give consideration to effect size, and also to guard against type I error given the number of tests conducted, only correlation coefficients of $r \ge .20$ will be referred to as significant. This is a conservative strategy, as within a sample of 850 a correlation of r = .07 is significant at the p < .05 level.

Results

Descriptive Statistics

There were no extreme mean values for wives or husbands on NEO-PI-R measures, i.e., the range of means fell between 46.6 and 54.9 (gender normed T-scores with a mean of 50, SD of 10). MHEI means (SD) were: wives =61.8 (8.7) and husbands = 59.8 (9.0). Values for MHEI are similar to those previously reported in population samples for the HEI (Kennedy et al., 2001; Kennedy et al., 1995; McCullough et al., 2002). The within couple correlations (i.e., the correlation of wives' and husbands' values) for NEO-PI-R domains were: Neuroticism r = .08; Extraversion = .10; Openness r = .27; Agreeableness r = .15; and Consciousness r = .08. The within couple correlation for MHEI ratings was r = .47 (p< .001).

Personality and the Modified Healthy Eating Index (MHEI)

Associations among NEO-PI-R domains and facets and the MHEI, for wives and husbands, are presented in Table 1. Openness was associated with *self* ratings of dietary quality for both wives and husbands. The facets within the domain of Openness that were most strongly associated with *self* ratings of dietary quality for wives were O2-Aesthetics (r = .26) and O4-Actions (r = .26); the remaining facets had correlations ranging between r = .13 to r = .17. Similarly, for husbands O4-Actions was associated with *self* ratings of dietary quality (r = .25) and the remaining Openness facets were correlated r = .14 to r = .19.

The domain of Openness was also related to *spouses*' ratings of dietary quality for wives (r = .22); with the strongest facet level association being that of O6-Values (r = .21). Openness was not related to spouses' ratings of dietary quality for husbands (r = .10); with facet level associations ranging between r = .02 to r = .12). Neuroticism, Extraversion, Agreeableness, and Conscientiousness were not associated with *self* or *spousal* ratings of dietary quality.

Discussion

For both wives and husbands alike, as hypothesized, Openness was associated with one's own patterns of healthy eating, such that higher levels of Openness were associated with more healthy dietary practices. Similarly, Openness was positively related to spousal eating patterns for wives, however, the relationship of husbands' Openness levels with their wife's dietary practices were was less than half the magnitude as that of wives' Openness levels with that of their husband's. In other words, the level of her husband's openness has less of an association or effect on how healthy the wive's diet is, but the wife's level of openness has a greater association or effect on how healthy her husband eats. Thus, it would appear that the personality construct of openness in female spouse partners may have a substantial influence on the healthy eating patterns of a marital couple. This may be due in part to the fact that wives may more often have responsibility for shopping and food preparation.

No moderate to strong relations were observed for personality factors other than Openness, which while unexpected, is not inconsistent with the past studies in this area, where the only consistent factor found associated to dietary quality was Openness. It is possible that while

Neuroticism and Conscientiousness in particular are associated with other health behaviors, they do not directly relate to healthy eating. We would also note that we adopted a somewhat stringent criteria for regarding whether or not an association was significant (i.e., we opted to focus on effect size as opposed to the typical level of p < .05 defining significance). Taking a more traditional approach would involve noting that two facets, one of Neuroticism and one of Conscientiousness—N4-Self-Consciousness for wives and C4-Acheivement striving for husbands—were associated with dietary practices, along with several of the other facets within the domains of Agreeableness and Extraversion.

In prior work on the full UNCAHS cohort we have examined associations among NEO domains and change in BMI over 14 years (Brummett *et al.*, 2006). Openness, Agreeableness, and Conscientiousness were negatively associated with BMI in both genders; and BMI was positively associated with Neuroticism in females, and was positively associated with Extraversion in males. Furthermore, Conscientiousness (Bogg & Roberts, 2004) has been associated with many health behaviors. Thus, given the demonstrated associations among Conscientiousness, Agreeableness, and Neuroticism, with BMI and health related behaviors, we might have that expected these domains to be related to healthier eating habits, yet, as previously noted, that was not the case in the present analyses.

That Openness for both wives and husbands is associated with healthier eating may not reflect a greater health consciousness among more open individuals, but rather a consequence of their heightened interest in the experiential aspects of eating. According to this interpretation the good diet of open people is a byproduct of their predilection for novelty and variety in foods which leads to their eating varied and balanced diets. Two other studies support our observed association between Openness and dietary practices.

Not surprisingly, couples in the present sample seem to share similar dietary practices. In addition, wives and husbands were similar to one another with respect to the personality domains of Openness, Extraversion, and Agreeableness. These findings contradict some literature on assortative mating in couples which shows little or no within couple similarities on these measures of personality (Lou & Klohen, 2005; Watson *et al.*, 2004). However, many of these prior studies were conducted with smaller samples of newlywed couples. Thus, our findings add to the existing literature by suggesting that couples in longer term relations may be more similar with respect to personality than those recently married.

Study Limitations and Strengths

Although the UNCAHS contains a fairly large sample of marital couples, it is generally homogeneous with respect to age and race, thus our results may not apply to more diverse populations. The present data afforded the unique ability to explore five widely accepted personality constructs as predictors of a dietary quality index that is based on current USDA guidelines for healthy eating habits. In addition, data from the UNCAHS also provided the ability to examine the influence of one's spouses' personality traits on one's own eating habits.

Conclusions

Findings from the current study suggest that openness is an important personality construct to consider with respect to personal dietary choices that may ultimately influence dietary pathways to disease and health. In addition, not only does one's own level of openness seem to affect personal eating habits, but the same is likely to be true for one's spouse's level of openness. Given the reciprocal nature of close relationships, interventions aimed at increasing tendencies toward being more open in spouse pairs may lead to less obesity and healthier eating habits for both members of a marital dyad.

Consuming healthy foods such as fresh fruits and vegetables, whole grains, lean meat, and low fat dairy results in lowering risks for various cancers and cardiovascular and cerebrovascular diseases. In a recent study of 42,254 women, after a median follow-up of 5.6 years, women in the highest quartile of a dietary index reflecting the number of recommended foods by current dietary guidelines had at least a 30% lower risk of mortality from all sites cancer, coronary heart disease, and stroke when compared to those women in the bottom quartile (Kant). The present findings confirm in a large cohort the healthier eating practices of those higher in Openness and subsequent studies may demonstrate the health-protective effects of the personality domain of Openness with regard to lowering dietary-related risks of disease.

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Table 1
Correlations (r) of NEO-PI-R with the Modified Healthy Eating Index (MHEI): for Self and Spouse.

NEO-PI-R Domains/Facets	Wives Self MHEI	Spouse MHEI	Husbands Self MHEI	Spouse MHEI
N-Neuroticism	09	02	03	02
N1-Anxiety	08	.01	02	02
N2-Hostility	08	02	.00	05
N3-Depression	04	03	03	.00
N4-Self-Conscientiousness	10	05	05	01
N5-Impulsiveness	07	01	01	01
N6-Vulnerability	05	01	05	03
E-Extraversion	.08	.03	.08	01
E1-Warmth	.01	01	.07	.00
E2-Gregariousness	.01	01	.02	02
E3-Assertiveness	.10	.06	.07	02
E4-Activity	.11	.07	.13	.06
E5-Excitement-seeking	01	03	03	09
E6-Positive-Emotions	.08	.03	.08	.03
O-Openness	.28 *	.22 *	.27 *	.10
O1-Fantasy	.16	.13	.14	.02
O2-Aesthetics	.26 *	.18	.25 *	.12
O3-Feelings	.13	.10	.14	.07
O4-Actions	.26 *	.17	.19	.08
O5-Ideas	.17	.13	.19	.00
O6-Values	.17	.21 *	.16	.11
A-Agreeableness	.02	04	.01	.07
A1-Trust	.12	.10	.10	.09
A2-Straight-Forwardness	03	08	01	.04
A3-Altruism	.00	06	.03	.03
A4-Compliance	03	04	04	.04
A5-Modesty	09	11	07	.03
A6-Tender-Minded	.10	.04	.06	.07
C-Conscientiousness	.05	01	.02	.02
C1-Competence	.06	00	.04	.04
C2-Order	.04	.00	08	.07
C3-Dutifulness	01	06	03	.00
C4-Achievement-Striving	.08	.03	.16	.07
C5-Self-Disipline	.01	01	.00	.01
C6-Deliberation	.02	02	01	.01

^{*} Column 1 presents the correlations of the wife's personality scores with her own scores on the Modified Healthy Eating Index; Column 2 presents the correlation of the wife's personality scores with her husbands' scores on his Modified Healthy Eating Index.

^{**} Column 3 presents the correlations of the husbands' personality scores with his own scores on the Modified Healthy Eating Index; Column 4 presents the correlation of the husbands' personality scores with his wife's scores on her Modified Healthy Eating Index.