



Research Article

© 2024 Ioannis Tsartsapakis and Aglaia Zafeiroudi.
This is an open access article licensed under the Creative Commons
Attribution-NonCommercial 4.0 International License
(<https://creativecommons.org/licenses/by-nc/4.0/>)

Received: 16 October 2023 / Accepted: 20 February 2024 / Published: 5 March 2024

Personality Traits and Healthy Eating Habits and Behaviors: A Narrative Review

Ioannis Tsartsapakis¹

Aglaia Zafeiroudi²

¹Department of Physical Education & Sport Sciences,
Aristotle University of Thessaloniki,
Serres, Greece

²Department of Physical Education & Sport Sciences,
University of Thessaly,
Trikala, Greece

DOI: <https://doi.org/10.36941/jesr-2024-0022>

Abstract

Findings from many interdisciplinary studies have revealed the important roles of nutrition in improving people's physical mental and social health. Among other factors, personality influences the type of food consumed and consequently is predictive of health-related state. The aim of this review is to appraise the available scientific evidence regarding the effect of personality on eating habits, and whether personality traits are associated with behaviors that are conducive to a healthy lifestyle in general. A total of 2237 relevant articles were identified through a literature search, 21 of which were included in this review. Articles involving studies in only children, animal studies, studies on eating disorders, studies with specific types of diets that were clearly unrelated to health issues and studies conducted for marketing purposes were excluded. A variety studies have indicated that personality traits affect both the eating habits and types of diets chosen by individuals, including the preference for healthy or unhealthy foods. The analysis of personality traits indicated that conscientiousness is associated with healthy eating and maintaining health-promoting habits in general. Openness is positively associated with variety in food consumption and negatively associated with "food neophobia". Agreeableness is associated with low meat consumption. Extraversion is associated primarily with the consumption of sweet and salty foods, meat and soft drinks. Finally, neurotic and emotionally unstable people appear to have emotional dietary patterns, which are associated with unhealthy eating habits, such as relatively low fruit and vegetable consumption, and high sugar and saturated fat consumption. However, contradictory results have been found among studies. Interpretation of these results should be weighed against the different cultural environments in which the studies were taken place, and the extremely high heterogeneity among the instruments used to measure personality and eating habits. Future research should clarify whether personality influences eating habits in specific populations, such as individuals with eating disorders.

Keywords: social wellbeing; healthy lifestyle; physical activity; personality; nutrition; food choices

1. Introduction

Eating habits are the sets of choices and/or decisions that people make about the food they eat. These decisions typically include what, when, how much and where to eat (Mahmood et al., 2021). Individuals' physiological processes (such as hunger, fullness, innate desire for sugared food and brain systems) and psychological mechanisms (such as learned food desires, knowledge, motivation, attitudes, benefits, personality, cognitive procedures, and self-regulation) influence eating behavior and food selection. In the field of behavioral psychology, research on eating behavior has focused on the analysis, prevention and therapy of fatness and eating disarrays. The main aim of those studies has been to promote healthy eating habits to manage and prevent diseases, such as diabetes and hypertension, and follow a "healthy diet." No specific scientific definition of a "healthy diet" exists; however, many nutritionists emphasize fresh fruits, fibers and vegetables when using this term. Eating fruits, vegetables, whole grains, nuts and low-fat dairy products has been shown to protect against obesity and many chronic diseases (Meyer et al., 2011). In contrast, several factors have been associated with a tendency to develop inappropriate eating habits, such as changes in residence, poor time management, eating away from home, financial constraints, family influence, obsession with weight control and poor dietary perception (Deliens et al., 2014a; Deliens et al., 2014b; Ganasegeran et al., 2012). Several biological predisposition models of eating behaviour have shown that genetic factors influence taste and satiety in addition to the above factors (Bouchard, 2007). Kiple and Ornelas (2000) have suggested that individuals learn to make food choices through observation of the behaviors of their peers and personal experience. In this sense, eating habits are part of culture and are "inherited" along with other cultural elements (Kittler & Sucher, 1998; Willett, 2006). Studies have also shown that personality, thought to be largely heritable (Benis, 2018), may be linked to food preference. People with certain personality traits may be more likely to make healthier food choices (Machado-Oliveira et al., 2020).

Each individual's personality is characterized by both uniqueness (different hereditary and environmental origins) and stability (basic characteristics difficult to change) (Mischel & Shoda, 1995). Specifically, according to McGue et al. (1993), the part of the personality that remains stable appears to be associated primarily with genetic factors, whereas personality changes reflect environmental factors. Moreover, personality traits are manifestations of neurobiological mechanisms but have strong genetic components (DeFruyt, et al., 2006; Loehlin, et al., 1998; Rothbart, et al., 2000).

In a recent review, Fagan (as cited in Machado-Oliveira, et al., 2020, p. 92) has concluded that 1) openness and conscientiousness are positively associated with the tendency to eat healthy foods and 2) that the positive association between eating beneficial foods and openness mirrors that the personality trait of openness is positively correlated with the tendency to eat different and new foods, as well as with self-awareness. Conscientiousness is also positively associated with healthy eating: individuals who are more conscientious is expected to follow more easily rules and recommendations (Fagan as cited in Machado-Oliveira, et al., 2020, p. 92). Conner et al. (2017) have concluded that the consumption of plant foods is positively associated with openness, extraversion and conscientiousness. Similar results have also been found in a study in middle-aged and older adults by Weston et al. (2020), in which healthy food consumption was positively associated with openness, agreeableness and conscientiousness, but negatively associated with neuroticism. These findings are broadly consistent with the conclusions of many of the studies reviewed below.

This review examines whether personality is associated with healthy dietary behaviors, such as, eating more fruit and vegetables, and following dietary recommendations. First, the concept of personality is examined, and its definition and methods of assessment are discussed. Next, on the basis of findings from studies with different theoretical underpinnings, the influence of the "big five" personality factors on food choice is examined. Evidence from current studies on the associations between the five personality factors and their relationship with the adherence to dietary recommendations is presented in the following sections. Finally, the possible multifactorial basis of

causal factors in the personality-eating relationship is explored.

2. Methods

2.1 Article selection

The focus of this review was the correlation between the big five personality factors and dietary habits in the general population. Articles for this review were retrieved via the Hellenic Academic Libraries Link from the following databases: Scopus, PubMed, Wiley Interscience, EBSCO, Elsevier, JournalSeek, PsychARTICLES, psychEXTRA, Medscape, Psychology and Behavioural Sciences Collection, psychINFO and SPORTDiscus, in which full-text articles were available. For inclusion in this review, articles were required to meet the following criteria: original research, publication in a reputable scientific journal in English, and a primary aim of investigating associations or relationships between the big five personality factors and eating habits. Articles were then selected manually to ensure that only those associated with the topic of this review were examined. The exclusion criteria were studies: 1) examining the relationship between personality and eating disorders or other related or unrelated conditions (diabetes, heart disease, etc.); 2) examining eating habits not clearly associated with health outcomes (e.g., protein consumption); 3) examining food preferences for marketing purposes; 4) using questionnaire types other than those for the big five factors; and 5) examining children and adolescents, given that personality has been demonstrated to play a subordinate role to other factors, such as parental influence, in adolescents.

A secondary search was conducted to identify studies relating personality to adherence to health-related dietary recommendations. The following keywords were used: personality traits, big five, five factor model (FFM), openness, conscientiousness, agreeableness, extraversion, neuroticism, diet, dietary intake, food intake, fruit, vegetables, compliance, adherence, health and health behavior. The preliminary search was conducted by determining which articles in the main databases met the inclusion and exclusion criteria. The screening process was performed by one of the researchers and was double-checked by a second one. As shown in Figure 1, the initial search identified 2783 studies, 546 of which were duplicates. For selection, the titles and abstracts of the remaining 2237 articles were examined. In this way, 55 articles were identified. These articles were read in full to select those that were relevant to the topic, 21 of which were included. The search was performed for the first time in May 2022 and was repeated in May 2023. Most studies to be reviewed were published from 2000 or thereafter, although we did not set a specific cutoff for the publication date.

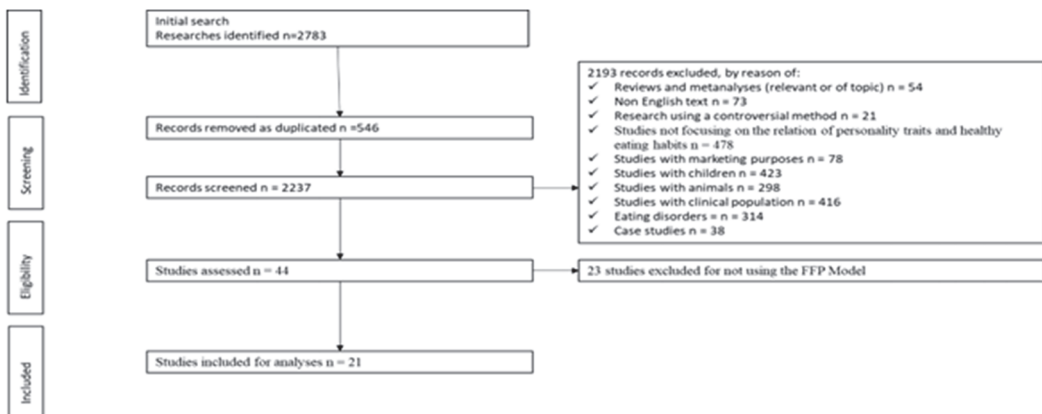


Figure 1. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) diagram of the association between personality traits and dietary patterns. FFP Model = Five Factor Personality Model.

3. Results

3.1 Personality

Personality can be defined as dynamic and organized sets of characteristics of individuals that uniquely influence their perceptions, motivations and behaviors in different circumstances, according to Ryckman (2012). Bergner (2020), in an essay on defining personality, has given the following definition: "An individual's personality is the persistent set of characteristics and styles exhibited by the individual, which are (a) predispositions (natural inclinations) of the individual, and (b) ways in which the individual is different from the "standard" individual in his/her society." Studies of the structure of personality have used factor analysis to reduce the number of factors to five, encompassing all characteristics and aspects of behavior, in the Five Major Factors of Personality or the FFM (McCrae & Costa, 1987). Over the past four decades, relevant personality research has reached the consensus that adult personality can be reliably described by these five basic factors (McCrae & Costa, 1987). As explained by John and Srivastava (1999), these personality characteristics are referred to as the big five factors because they are each broadly conceptualized (Table 1). To be a key factor, a factor must be present in all genders, races, age groups and cultural settings. Considerable research evidence has validated the five-factor model in teachers' ratings of children (Digman & Inouye, 1986), in students (Tsaousis, 2002) and in adults (Costa Jr & McCrae, 1992). High rates of agreement have also been found between males and females, adolescents and adults, and people with Black and white ancestry (Costa Jr et al., 1991). Notably, the big five traits are not merely another theory of personality but are an assessment of the structural relationships between personality traits (McCrae & Costa, 2008). Despite the critical treatment of Eysenck (1992) and McAdams (1992), this model is one of the most established in the field of personality, largely because of its long history, multidimensional evidence, and thorough validation across methods and instruments (Benet-Martínez & John, 2000; Digman, 1989, 1990; Goldberg, 1992; McCrae & Allik, 2002; McCrae & Costa, 1987; McCrae & John, 1992). Some of the most commonly used personality measurement instruments are 1) the Neuroticism, Extraversion and Openness-Five Factor Inventory (NEO-FFI 60-items) by Costa and McCrae, (Costa & McCrae, 1989), which has been translated into several languages, and tested for both validity and reliability, and is one of the most widely used instruments in the Five Factor Model (Zillig et al., 2002); 2) Goldberg's 100-item questionnaire (Goldberg's 100-item), which contains 20 items for each of the five factors (Goldberg, 1992); 3) the NEO Personality Inventory-Revised (240-item NEO-PI-R) by Costa and McCrae, which includes eight items in each of the six subscales of the Five Big Factors (Costa & McCrae, 1992); 4) IPIP-NEO-300 (Goldberg, 1999), a 300-item inventory that measures constructs similar to those in the NEO Personality Inventory (NEO PI-R; Costa Jr, 1992); and 5) IPIP-NEO-120 (Johnson, 2014), the 120-item IPIP-NEO, which compares with the properties of the longer form. Several personality traits, with high and low scores for each separate factor, are shown in Table 1.

Table 1. Personality factors in relation to Costa & McCrae's (1992) five-factor model.

Personality factor	Personality traits of people with high scores	Personality traits of people with low scores
Extraversion (E) is related to interpersonal behaviour. The degree to which people like to be all alone or with others. Experience positive feelings. Positive affect: Intense, energetic ability.	These individuals are socially active, talkative, outgoing and optimistic. They love fun and a lively social life. They express their feelings openly. They engage in dangerous sports.	These individuals are reserved and submissive people, who are usually quiet, reserved and sober; keep others at a distance; and are goal-oriented. They avoid dangerous situations.
Neuroticism (N) refers to an individual's emotional life. Evaluates how well a person fits in and feels stable. Tendency towards the exposure in negative emotions.	These individuals have emotional instability, psychological stress, maladaptation, nervous tension, susceptibility to clinical syndromes, feelings of inadequacy and hypochondria.	These individuals have adaptability, emotional stability, a sense of calm and composure, toughness, courage, and a sense of security and contentment.
Openness (O) refers to individuals valuing experiences for their own reasons. These individuals are "seekers" who enjoy exploring the unknown and new experiences.	These individuals are curious, creative and full of ideas. They have a creative imagination and are original in everything they do. They are interested in a wide range of experiences and are not "traditional" types.	These individuals are conventional, with a lack of analytical thinking and a lack of artistic sensitivity. Their interests are few and specific, without any deviation.

Personality factor	Personality traits of people with high scores	Personality traits of people with low scores
Agreeableness (A) refers to an individual's interpersonal behavior and views toward others.	These individuals are open to others. They have altruistic attitudes and trust in human relationships, and are compassionate, warm, good and kind people.	These individuals have a sense of cynicism and interventionism. They are rude, suspicious, uncooperative, vindictive and irritable, and attempt to "manipulate" others.
Conscientiousness (C) refers to the way in which an individual carries out individual tasks: attentive, hardworking, neat, organized, persistent, etc.	These individuals are organized, reliable, hard-working and self-disciplined. They are persistent and committed to achieving their goals.	These individuals are inconsistent and careless. They are unwilling, untrustworthy, careless and weak-willed, and have no specific purpose in life.

Each of the five personality factors is associated with a different set of health-related practices (Raynor & Levine, 2009). For example, studies have shown that neuroticism negatively predicts physical health and subjective well-being, whereas extraversion positively predicts social competence and having a social network (Friedman et al., 2010). Different factors have been found to mediate the influence of personality on health. Gender differences in personality have been reported in the literature. For example, whereas women tend to score higher on specific personality traits (e.g., conscientiousness), men tend to score higher on other traits (e.g., openness), (Carrillo et al., 2012; Costa Jr et al., 2001; Kikuchi et al., 1999; Schmitt et al., 2008). These gender variations may be crucial in investigation of the effect of personality factors on attachment to dietary guidelines.

3.2 Personality and eating habits

The present narrative review considered all data, primarily those from research studies, on the relationship between personality and healthy eating. Most studies sampled adult individuals (De Bruijn et al., 2005; Vollrath et al., 2012), due to research on kids and young people has shown that personality appears to be less important than other factors, for example the influence of parents. Therefore, studies with adult participants were the focus of this review. Table 2 presents data from 21 studies that examined the relationships between the FFM personality traits and healthy eating habits. In summary, across populations of different ages and ethnicities, conscientiousness and openness are positively associated with healthy eating habits. Neuroticism has a negative association with healthy eating and healthy body weight, and a positive association with convenience eating.

Table 2. Studies examining the relationships between personality traits and healthy eating habits

Authors, country	Participants	Personality assessment	Eating habit assessment	Analysis	Conscientiousness (C)	Openness (O)	Neuroticism (N)	Extraversion (E)	Agreeableness (A)	Adherence to health-related dietary recommendations
(Kikuchi et al., 1999) Japan	942 students at Tokyo University	NEO Five-Factor Inventory (NEO-FFI)	Questionnaire including 14 questions on lifestyle and health consciousness	Student t-test, χ^2 -test.	Dietary habits, regular eating time, avoidance of salty foods	NA#	NA#	Smoking habit associated with high E scores	NA#	High scoring groups of E and C; high HC, high N and O groups: low HC
(Kikuchi & Watanabe, 2000) Japan	76 male and 394 female college students	NEO-FFI	40 item self-administered questionnaire (PHC study)	Pearson's correlation coefficient analysis	High C scores associated with discrepancies between HC and dietary habits	High O associated with dislike of salty taste	High N promotes salty and sweet taste preferences	E associated with lack of interest in developing healthy habits	A associated with dislike of salty tastes	Receptive to dietary advice groups with high scores for groups A and C
(Goldberg & Stuycker, 2002) USA	470 women and 380 men	NEO-PI-R, 16PF, CPI, HPI, CISS and TCI	20-item KFHQ, 17-item Bfat and Bfib	Intercorrelations among factors	NA	High O promotes consumption of fiber	NA	NA#	NA	O and C associated with measures of health-related practices
(Brummett et al., 2008) USA	850 couples who remained married to each other	NEO-PI-R	Modified Health Eating Index	Pearson's correlation coefficient analysis	NA	High O associated with healthy eating habits	NA	NA	NA	Findings may affect disease prevention during midlife
(Elfhag & Morey, 2008) Netherlands	442 patients with a mean BMI of 40.5± 5.3 kg/m ² , range 39–68 kg/m ²	NEO PI-R	DEBQ Dutch Eating Behaviour Questionnaire	Pearson correlation	Low C associated with emotional eating; high C associated with restrained eating	High O associated with restrained eating	High N associated with emotional eating; low N associated with restrained eating	Low E associated with emotional eating; high E associated with restrained eating	NA	NA
(de Bruijn et al., 2009) Netherlands	405 respondents (233 females; age range 26–87 years)	Dutch translation of Goldberg's adjective list	TPB fruit consumption	Structural equation modeling, χ^2 -test	Direct effect of high C on fruit consumption mediated by attitude and perceived BC	NA	High N associated with low fruit consumption	NA	NA	Intentional fruit consumption dependent on low N
Authors, Country	Participants	Personality assessment	Eating habit assessment	Analysis	Conscientiousness (C)	Openness (O)	Neuroticism (N)	Extraversion (E)	Agreeableness (A)	Adherence to health-related dietary recommendations
(Raynor & Levine, 2009) USA	583 college students	International Personality Item Pool Big Five short-form	National College Health Assessment	Multiple linear regression	High C associated with consumption of fruits and vegetables	NA	NA	High E associated with consumption of alcohol, binge drinking	NA	High C associated with wearing seat belts, alcohol-related harm reduction, exercise and sufficient sleep
(Möttus et al., 2002) UK	1,691 Estonians 18–89 years old	NEO PI-3; (McCrae et al., 2005)	Measured by asking participants to rate the frequency of consumption of 15 food items/week	Correlation coefficient analysis	NA	High O associated with healthy food consumption	High N associated with meat and carbohydrate consumption	NA	NA	Lower N and higher E, C and O associated with health aware diet

Authors, country	Participants	Personality assessment	Eating habit assessment	Analysis	Conscientiousness (C)	Openness (O)	Neuroticism (N)	Extraversion (E)	Agreeableness (A)	Adherence to health-related dietary recommendations
(Mottus et al., 2013) UK	1091 people (548 males), 67.7-71.3 years old	NEO-FFI (Costa & McCrae, 1992)	168-item Food Frequency Questionnaire (FFQ) version 7.0	Correlation coefficient analysis	High C associated with health aware diet; low C associated with high BMI	Low O associated with convenience diet and preference for sweet foods	High N associated with convenience diet	NA	High A associated with health aware diet	Mediterranean style diet associated with high O and E, and low N.
(de Bruijna, 2013) Netherlands	443 undergraduate students, mean age 21.45 (SD = 2.96) years, 68.7%	Goldberg's adjective list Big five personality dimensions	Fruit consumption assessed with a validated questionnaire	Stepwise regression analysis	High C associated with consumption of more fruits	NA	NA	NA	NA	Action planning mediates the conscientiousness–fruit consumption link
(Keller & Stegrist, 2015) Switzerland	951; 468 men, mean age 56 years (SD = 15)	German version NEO-FFI	DEBQ Dutch Eating Behaviour Questionnaire FFQ	Comparative Fit Index, Root Mean Square Error of Estimation (RMSEA) and Good Fit Index.	C encourages eating fruit and discourages eating meat, sweet and savory foods and sugar-sweetened soft drink	NA	N promotes consumption of sweet and savory foods	E encourages eating sweet and savory foods, eating meat and drinking soft drinks.	NA	C encourages restrained eating and reduces outward, emotional eating; N encourages emotional and outward eating.
Authors, Country	Participants	Personality assessment	Eating habit assessment	Analysis	Conscientiousness (C)	Openness (O)	Neuroticism (N)	Extraversion (E)	Agreeableness (A)	Adherence to health-related dietary recommendations
(Jaworski & Rozenek, 2016) Poland	55 young women, 18 and 23 years, mean age 19.3 (SD = 0.96) years	NEO-FFI	Health Behaviour Inventory (HBI)	Spearman's rank correlation coefficient	High C associated with healthy eating behaviors but not consumption of products containing preservatives	NA	N not associated with fruit, vegetable or whole-grain bread consumption	High E associated with whole-grain bread consumption	Negative correlation between A and avoidance of salty foods	Both agreeableness and conscientiousness negatively correlated with behaviors connected to body mass control
(Sutin & Terracciano, 2016) USA	15,669; M age = 29, 53% female; 40% ethnic/racial minority	International Personality Item Pool (Mini-IPIP-20 item)		Multivariate analysis of covariance (MANCOVA)	Higher C associated with healthier BMI as a consequence of compliance with healthy eating rules	NA	N in women associated with higher adiposity	E in men associated with higher adiposity	NA	Similar associations across racial/ethnic groups; personality associated with objective and subjective adiposity in young adulthood
(Conner et al., 2007) New Zealand	1073 young adults 17-25 years old	NEO-FFI	Daily servings of fruit, vegetables and two unhealthy foods for comparison purposes	Hierarchical multiple regression	Higher C associated with greater fruit and vegetable consumption	Higher O associated with greater fruit and vegetable consumption	N unrelated to fruit and vegetable consumption	High E associated with greater fruit and vegetable consumption	Unrelated to fruit and vegetable consumption	Personality is important in establishing healthy dietary habits in young adulthood
(Pfeiler & Egloff, 2018b) Germany	Germany (N = 13,062) and Australia (N = 15,096) 21-102 years old	Big Five Inventory (BFI-5)	Measured by asking participants to indicate consumption frequency	Hierarchical regression analyses	NA	Higher O negatively associated with red meat, and positively associated with fish consumption and no poultry consumption	NA	Higher E associated with more consumption of each individual type of meat and all meat consumption	NA	
Authors, Country	Participants	Personality assessment	Eating habit assessment	Analysis	Conscientiousness (C)	Openness (O)	Neuroticism (N)	Extraversion (E)	Agreeableness (A)	Adherence to health-related dietary recommendations
(Pfeiler & Egloff, 2018a) Germany	German representative sample N = 4496 and N = 5125	15-item German short version of BFI-5	Trust, Patience & impulsivity, Risk aversion, life-satisfaction, well-being	Stepwise hierarchical regression analyses	Higher C and conservatism associated with lower likelihood of being vegetarian	Higher O and political interest associated with higher probability of being vegetarian	NA	NA	NA	Individual differences observed between vegetarians and meat eaters in socio-demographic, personality traits and political attitudes
(Intifil et al., 2019) Ghana	230 males and 170 females, mean age 21.99 ± 1.96 years	50-item IPIP tool	Three-Factor Eating Questionnaire (TFEQ)-18 items	χ ² analysis, independent T-test	High C positively correlated with variety in food consumption and sugar moderation	High O positively correlated with food interest	NA	High E positively correlated with acceptance of taste experiences and food interest	High A positively correlated with acceptance of taste experience, skipping of meals and variety	
(Pfeiler & Egloff, 2020) Germany	13,892 participants, mean age 44.70 (8.40) years	36-item Big Five Personality Inventory	FFQ by HILDA	Hierarchical regression analyses	High C positively associated with consumption of plant and fish products, and emotional stability, and negatively associated with carbohydrate consumption	High O positively associated with consumption of plant and fish products, and emotional stability, and negatively associated with meat consumption	NA	High E positively associated with meat consumption and negatively associated with carbohydrate consumption	NA	Carbohydrate based food negatively associated with C, E and emotional stability
Authors, Country	Participants	Personality assessment	Eating habit assessment	Analysis	Conscientiousness (C)	Openness (O)	Neuroticism (N)	Extraversion (E)	Agreeableness (A)	Adherence to health-related dietary recommendations
(Weston et al., 2020) USA	665 participants (48% female, mean age 44.09 years)	120-item NEO International Personality Item Pool	Hawaii Quantitative Food Frequency Questionnaire	Correlation coefficient analysis	High C associated with eating healthy foods	High O associated with eating healthy foods	NA	NA	High A associated with eating healthy foods	
(Golestanbakhsh et al., 2022) Iran	224 healthy female students 18-30 years old	NEO-FFI, 60 item	Dietary habit questionnaire, 20 items	Pearson's correlation coefficient, Spearman's correlation coefficient, stepwise multiple regression	High C positively associated with preference for dairy products, vegetables, nuts and salty foods, and negatively associated with preference for biscuits	Higher O correlates favorably with meat and biscuits and negatively with fruit.	High levels of N are positively associated with a likelihood of eating salty, sour and fatty foods, and is negatively associated with dairy products	Higher E correlates positively with a preference for fast food, ice cream, chocolate and cocoa, and is negatively correlated with a preference for meat.	High A positively associated with consumption of soft drinks and sugary fruit juices	Personality traits may aid in identifying young women at risk of unhealthy dietary habits
(Pristinya et al., 2022) Indonesia	14,473 men and 16,497 women 15-101 (mean = 37.34; SD = 14.916) years old	Big Five Index 15 (BFI 15)	Obtained through interviews (Strauss et al., 2016)	Correlation with binary logistic regression	High C associated with eating only healthy foods	High O associated with consumption of both healthy (recommended) and unhealthy (non-recommended) foods	High N associated with consumption of only unhealthy foods	High E associated with consumption of both healthy (recommended) and unhealthy (non-recommended) foods	High A associated with eating healthy foods and only one non-recommended food	

NA = not associated; HC = health consciousness; BC = behavioral control; IPIP = International Personality Item Pool; NEO-FFI = Neuroticism, Extraversion, Openness – Five Factor Inventory; FFQ = food frequency questionnaire; BFI-5 = Big Five Inventory – Short; NEO-PI-3 = Neuroticism, Extraversion, Openness – Personality Inventory – 3; FFM, Five-Factor Model.

3.3 *Relating the Five Factor Model to eating habits*

Behaviors that have been shown to be healthy and to contribute to improving public health include physical activity, avoiding smoking and alcohol, and eating diets rich in fruits and vegetables (Mujcic & J. Oswald, 2016; Ocean et al., 2019). To encourage such behaviors, studying the factors that determine these behaviors is essential. Over the past 20 years, all developed nations have considered the ability of individuals to access information promoting healthy food choices (Conner et al., 2017). The big five personality factors have been identified as potential determinants of eating behavior, alongside religious, environmental, cultural, social and economic factors (Wilsher, 2013). In contrast to tendencies and behaviors, which are specific, personality refers to broader traits that aid in understanding of why some people behave in healthier ways than others, beyond explanations provided by social factors. Studies have shown that agreeableness and conscientiousness are positively associated with healthy eating (De Bruijn et al., 2005). Specifically, people with high conscientiousness have healthier behaviors, including adherence to healthy diets, particularly those high in fruit and vegetable fibers, and low in fat and salt (Golestanbagh et al., 2021; Weston et al., 2020). Openness has been positively associated with fruit and vegetable consumption in several studies (Pristyna et al., 2022). Social factors and goals influence the relationships between personality and behavior (Tsartsapakis et al., 2023; 2024). The association between personality and fruit and vegetable consumption provides information about whether social factors influence personality and other healthy behaviors, such as diet (Intiful et al., 2019).

3.4 *Conscientiousness and healthy eating*

Conscientiousness is a personality trait defined as "a tendency to react in certain ways in certain circumstances" (Roberts et al., 2009). According to Bogg and Roberts (2013), conscientiousness is defined as the relatively stable pattern of individual differences in the tendency to follow socially imposed norms of impulse control, goal orientation, planning, delaying gratification, and following norms and rules. People with high conscientiousness scores tend to have healthier eating patterns than people with low scores. Conscientious people are also more likely to follow dietary guidelines, avoid unhealthy foods, plan meals and resist temptation. A study by Intiful et al. (2019) has found an association of conscientiousness with variety and sugar moderation in dietary habits among students at a Ghanaian University. The authors concluded that personality traits were associated with certain diets, but more research is needed to identify individuals at risk of diet-related illnesses and to develop appropriate interventions. Möttus et al. (2012) have claimed that the relationship between conscientious and healthy eating is due to some individuals being willing to try new food options. In contrast, most studies have proposed that individuals who score high in conscientiousness are more possible to appear healthy dietary behaviors, because of their general attitudes toward following a healthier lifestyle, such as avoiding risky behaviors, engaging in regular physical activity, and eating fruits and vegetables regularly (Raynor & Levine, 2009). In support of this view, two studies from Japan (Kikuchi et al., 1999; Kikuchi & Watanabe, 2000) examining the relationship of the FFM with health and healthy habits found that participants with higher conscientiousness scores were more likely to maintain a regular meal plan, avoid salty foods, and be more open-minded to recommendations to eat green and yellow vegetables (Kikuchi et al., 1999; Kikuchi & Watanabe, 2000). In a sample of 13,982 Australian adults, Pfeiler and Egloff (2020) found that conscientiousness was positively associated with vegetable, plant and fish consumption, and emotional stability, but negatively associated with carbohydrate intake. Golestanbagh et al. (2021) found that conscientiousness was positively associated with eating dairy, vegetables, nuts and salty foods and negatively associated with eating biscuits. Pristyna et al. (2022), in a longitudinal study of 30,900 Indonesians, found that conscientiousness was positively associated with the consumption of recommended healthy food. From the review of the above studies, the FFM is clearly predictive of individuals' dietary habits (Keller & Siegrist, 2015; Raynor & Levine, 2009). However, beyond the

ability of individuals to adhere to healthy eating guidelines, determining whether personality traits are associated with healthy eating habits in the long term is essential. Intiful et al. (2019) found a positive association of conscientiousness with dietary variety and sugar moderation, such that people with greater conscientiousness tended to eat more diverse diets and limit their sugar intake. The study also found that conscientiousness was negatively associated with disinhibition: more conscientious people were less likely to overeat in response to emotional or situational cues. In addition, Pristyna et al. (2022) found that conscientiousness and openness were positively associated with physical activity; that is, people who were more conscientious and open to experience were more likely to engage in moderate or vigorous physical activity across all domains. Moreover, conscientiousness was found to be negatively associated with obesity, as measured by body mass index (BMI). In contrast, Dumitrescu and Iacob (2021) investigated the incremental validity of conscientiousness over the components of the Health Belief Model (HBM) in the prediction of students' eating habits. Self-efficacy for healthy eating was found to be the only significant predictor of students' eating habits, and conscientiousness did not add any predictive value to the HBM components. These studies have not yielded scientific agreement among findings. Their differing theoretical frameworks and methods (e.g., sample, measurement tools, evaluation methods) are at the heart of this scientific disagreement.

3.5 Openness and healthy eating

Openness to experience, or simply openness, is a basic personality trait reflecting how open-minded, imaginative, curious and creative a person is. People who score high on openness tend to have a broad range of interests, enjoy new experiences, appreciate art and beauty, and pay attention to their inner feelings. People who score low on openness prefer familiar routines, people and ideas, and may be perceived as closed-minded or conventional (Lounsbury et al., 2009). Overall, the studies reviewed (Table 2) indicated that high levels of openness are associated with greater fruit and vegetable consumption (De Bruijn et al., 2005; Mottus et al., 2013; Möttus et al., 2012), and with the adoption of healthy diets in middle and old age (Brummett et al., 2008; Mottus et al., 2013). In a study in 1073 young adults in New Zealand (Conner et al., 2017), extraversion and openness were the most compatible personality predictors of high fruit and vegetable consumption. Moreover, self-control of food intake was to be positively associated with high scores in openness, and with low scores in neuroticism, in a study by Elfhag and Morey (2008). In contrast, no association was found between openness and emotional food intake or extrinsic food intake. In the study by Intiful et al. (2019), openness was positively associated with a strong preference for food; i.e., open individuals had no problems with eating, whereas other individuals felt guilty about eating or simply ate to acquire necessary energy. Pfeiler and Egloff (2020) found that openness had a negative association with meat consumption and a positive one with vegetable and fish consumption. These findings are consistent with the results of previous studies (Goldberg & Strycker, 2002; Möttus et al., 2012). Golestanbagh et al. (2021) observed that openness was positively associated with preferring meat and biscuits and negatively associated with fruit consumption. Finally, in a study by Pristyna et al. (2022), openness was associated with consumption of both recommended (healthy) and non-recommended (mainly unhealthy) foods. These studies imply that people who are more open to experience may have a more varied and nutritious diet than people who are less open.

3.6 Neuroticism and healthy eating

The research evidence reviewed herein (Table 2) suggests that high levels of neuroticism are negatively associated with health-promoting behaviors (Carrillo et al., 2012; de Bruijn et al., 2009; Elfhag & Morey, 2008; Keller & Siegrist, 2015; Mottus et al., 2013; Provencher et al., 2008). The neurotic aspect of personality in obese individuals is associated with emotional food intake as well as food intake due to extrinsic factors (Elfhag & Morey, 2008; Provencher et al., 2008). The studies by de Bruijn et al. (2009) and de Bruijn (2013) found a negative relationship between high neuroticism

scores and fruit consumption, while Mottus et al. (2013) found a negative relationship between neuroticism and adherence to the Mediterranean diet, and a positive relationship between neuroticism and convenience foods (fast food and sweets). Furthermore, neuroticism was negatively associated with physical activity and positively associated with the development of mental disorders in another study (Wilson & Dishman, 2015). Neuroticism was positively associated with the preference for salty, sour and fatty foods, and negatively associated with dairy consumption, according to Golestanbagh et al. (2021). Finally, neuroticism was associated with eating only unhealthy foods in the study by Pristyna et al. (2022). Intiful et al. (2019) observed that neuroticism was not significantly associated with dietary patterns. In contrast, Carrillo et al. (2012) reported opposite results from those in the above studies; in their study, neuroticism was positively associated with healthy behavior and with weight control.

4. Study Limitations

Personality has been found to be a cause factor of human behavior. Considerable evidence links personality and eating habits (Carrillo et al., 2012; de Bruijn et al., 2009). Eating habits play essential roles in individuals' health and overall quality of life (Kikuchi & Watanabe, 2000). The results of studies investigating the relationship between personality and dietary habits have not led to a scientific consensus in the fields of psychology or of nutrition. The different theoretical frameworks and methods used across studies (e.g., sample, measurement tools, scoring methods) are at the heart of this scientific disagreement. We initially included only studies using questionnaires associated with the model of the five major personality factors, to facilitate comparison of results among studies. However, this restriction resulted in a lack of representation of all studies on personality and eating habits. Regarding eating habits has been approached from only the perspective of personality. Despite the importance of personality factors, eating habits are dependent on, and influenced by, other factors, including social, economic, environmental, cultural and religious factors. Additionally, several methodological problems were identified in the studies reviewed. Many studies included participants who were students (Conner et al., 2017; de Bruijna, 2013; Golestanbagh et al., 2021; Intiful et al., 2019; Jaworski & Rozenek, 2016; Kikuchi et al., 1999; Kikuchi & Watanabe, 2000; Raynor & Levine, 2009); consequently, the relatively low socioeconomic status and changes in places of residence among students would be expected to substantially influence their eating habits beyond the effects of personality. In the study by Goldberg and Strycker (2002), the participants were paid, thus potentially affecting the results of the study, given that people who participate in surveys tend to score high in agreeableness (Carlo et al., 2005), whereas the incentive of payment was likely to have motivated participation among people with different personality traits. The tools used to record participants' eating habits were another important methodological issue identified herein. Most studies used a questionnaire that was constructed to meet research needs or some type of food frequency questionnaire. If a 24-hour diary or even a 3-day diary had been used, the results would have been much more reliable. This review was not a systematic review and consequently lacks the rigor expected of such study designs. Therefore, the full range of articles on the relationship between personality and healthy eating habits could not be included.

5. Implications and Applications

The findings of the present study could have several theoretical, research and practical applications in the field of nutrition, health and sport psychology:

Theoretical Applications: The findings contribute to the theoretical understanding of the relationship between personality traits and eating behaviors. They highlight the importance of considering personality traits when studying eating behaviors and suggest that different traits may be associated with different dietary patterns. This could lead to the development of new theories or models that integrate personality traits into the understanding of eating behaviors.

Research Applications: The findings suggest several directions for future research. For instance, researchers could investigate the mechanisms underlying the relationships were found. It would be interesting to explore how psychological factors like self-control and impulsivity or social influences like peer norms and family environment mediate the relationship between personality traits and eating behaviors. Longitudinal studies could also be conducted to examine how these relationships evolve over time.

Practical Applications: The findings suggest that interventions aimed at promoting healthy eating habits could be tailored based on individuals' personality profiles. For example, interventions for individuals high in conscientiousness might focus on leveraging their natural tendency towards self-discipline and healthy behaviors, while those for individuals high in neuroticism might focus on managing emotional eating and promoting healthier coping mechanisms. This personalized approach could potentially lead to more effective interventions and ultimately contribute to the promotion of healthier eating habits and better health outcomes.

6. Conclusion

The studies reviewed herein demonstrated relationships between conscientiousness and healthy food choices; healthy body weight, as a result of adherence to healthy food rules; and the tendency to adhere to healthy behaviors in general. Openness is positively associated with the consumption of fruits and vegetables and with a general tendency to improve healthy eating habits in general. Neuroticism, in contrast, is associated with the consumption of convenience foods, obesity and behaviors inconsistent with the development of healthy habits. Extraversion is associated with participation in physical activity. People with high extraversion tend to make unhealthy food choices because they believe they are perfectly healthy and also tend to participate in high-risk activities. Interpretation of these results should be weighed against the different cultural environments in which the studies were taken place, and the extremely high heterogeneity among the instruments used to measure personality and eating habits. Assessing personality traits may aid in identifying people potentially at risk of developing unhealthy eating habits. Therefore, to improve the health of individuals, and prevent behaviors that lead to inappropriate eating habits and practices, we propose personalized nutrition education based on appropriate approaches that consider individual differences in personality traits, to modify eating habits and dietary preferences. Future research should clarify whether personality influences eating habits in specific populations, such as individuals with eating disorders.

References

- Benet-Martinez, V., & John, O. P. (2000). Toward the development of quasi-indigenous personality constructs: Measuring Los Cinco Grandes in Spain with indigenous Castilian markers. *American Behavioral Scientist*, 44(1), 141–157. <https://doi.org/10.1177/0002764200044001011>
- Benis, A. M. (2018). *How Your Personality Type Is Inherited: The NPA Model of Genetic Traits*. Lulu Press, Inc. Available from: https://books.google.co.uk/books?hl=en&lr=&id=GTdtDwAAQBAJ&oi=fnd&pg=PT6&dq=personality+is+inherited&ots=wg6SABMt_k&sig=GREX27VsagGtKrUdceJ3icszZ-c&redir_esc=y#v=onepage&q=personality+is+inherited&f=false
- Bergner, R. M. (2020). What is personality? Two myths and a definition. *New Ideas in Psychology*, 57, 100759. <https://doi.org/10.1016/j.newideapsych.2019.100759>
- Bogg, T., & Roberts, B. W. (2013). The case for conscientiousness: Evidence and implications for a personality trait marker of health and longevity. *Annals of Behavioral Medicine*, 45(3), 278–288. <https://doi.org/10.1007/s12160-012-9454-6>
- Bouchard, C. (2007). The biological predisposition to obesity: beyond the thrifty genotype scenario. *International Journal of Obesity*, 31(9), 1337–1339. <https://doi.org/10.1038/sj.ijo.0803610>

- Brummett, B. H., Siegler, I. C., Day, R. S., & Costa, P. T. (2008). Personality as a predictor of dietary quality in spouses during midlife. *Behavioral Medicine*, 34(1), 5–10. <https://doi.org/10.3200/BMED.34.1.5-10>
- Carlo, G., Okun, M. A., Knight, G. P., & de Guzman, M. R. T. (2005). The interplay of traits and motives on volunteering: Agreeableness, extraversion and prosocial value motivation. *Personality and Individual Differences*, 38(6), 1293–1305. <https://doi.org/10.1016/j.paid.2004.08.012>
- Carrillo, E., Prado-Gascó, V., Fiszman, S., & Varela, P. (2012). How personality traits and intrinsic personal characteristics influence the consumer's choice of reduced-calorie food. *Food Research International*, 49(2), 792–797. <https://doi.org/10.1016/j.foodres.2012.09.006>
- Conner, T. S., Thompson, L. M., Knight, R. L., Flett, J. A. M. M., Richardson, A. C., & Brookie, K. L. (2017). The role of personality traits in young adult fruit and vegetable consumption. *Frontiers in Psychology*, 8(FEB), 119. <https://doi.org/10.3389/fpsyg.2017.00119>
- Costa, P. T., Jr., & McCrae, R. R. (1992). Revised NEO personality inventory & NEO five-factor inventory. Odessa, FL: Psychological Assessment Resources.
- Costa Jr, P. T., & McCrae, R. R. (1992). Four ways five factors are basic. *Personality and Individual Differences*, 13(6), 653–665. [https://doi.org/10.1016/0191-8869\(92\)90237-J](https://doi.org/10.1016/0191-8869(92)90237-J)
- Costa Jr, P. T., McCrae, R. R., & Dye, D. A. (1991). Facet scales for agreeableness and conscientiousness: A revision of the NEO Personality Inventory. *Personality and Individual Differences*, 12(9), 887–898.
- Costa Jr, P. T., Terracciano, A., & McCrae, R. R. (2001). Gender differences in personality traits across cultures: robust and surprising findings. *Journal of Personality and Social Psychology*, 81(2), 322. <https://doi.org/10.1037/0022-3514.81.2.322>
- Costa, P. T., & McCrae, R. R. (1989). *NEO PI/FFI manual supplement for use with the NEO Personality Inventory and the NEO Five-Factor Inventory*. Psychological Assessment Resources.
- Costa, P. T., & McCrae, R. R. (1992). Professional manual: revised NEO personality inventory (NEO-PI-R) and NEO five-factor inventory (NEO-FFI). Odessa, FL: Psychological Assessment Resources, 61.
- de Bruijn, G.-J., Brug, J., & Van Lenthe, F. J. (2009). Neuroticism, conscientiousness and fruit consumption: Exploring mediator and moderator effects in the theory of planned behaviour. *Psychology and Health*, 24(9), 1051–1069. <https://doi.org/10.1080/08870440802428241>
- De Bruijn, G.-J., Kremers, S. P. J., Van Mechelen, W., & Brug, J. (2005). Is personality related to fruit and vegetable intake and physical activity in adolescents? *Health Education Research*, 20(6), 635–644. <https://doi.org/10.1093/her/cyh025>
- de Bruijna, G.-J. (2013). Who formulates self-regulatory action plans regarding fruit consumption? An application of the Big Five personality theory. *Health Education Journal*, 72(1), 24–33. <https://doi.org/10.1177/0017896911425553>
- Deliens, T., Clarys, P., De Bourdeaudhuij, I., & Deforche, B. (2014). Erratum to: weight, socio-demographics, and health behaviour related correlates of academic performance in first year university students. *Nutrition Journal*, 13(1), 1–3. <https://doi.org/10.1186/1475-2891-13-16>
- Digman, J. M. (1989). Five robust trait dimensions: Development, stability, and utility. *Journal of Personality*, 57(2), 195–214. <https://doi.org/10.1111/j.1467-6494.1989.tb00480.x>
- Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology*, 41(1), 417–440. <https://doi.org/https://doi.org/10.1146/annurev.ps.41.020190.002221>
- Digman, J. M., & Inouye, J. (1986). Further specification of the five robust factors of personality. *Journal of Personality and Social Psychology*, 50(1), 116. <https://doi.org/10.1037/0022-3514.50.1.116>
- Dumitrescu, C., & Iacob, C. I. (2021). Predicting Healthy Eating: Conscientiousness versus the Health Belief Model. *Romanian Journal of Applied Psychology*, 23(1). <https://doi.org/10.24913/rjap.23.1.03>
- Elfhag, K., & Morey, L. C. (2008). Personality traits and eating behavior in the obese: poor self-control in emotional and external eating but personality assets in restrained eating. *Eating Behaviors*, 9(3), 285–293. <https://doi.org/10.1016/j.eatbeh.2007.10.003>
- Eysenck, H. J. (1992). A reply to Costa and McCrae. P or A and C—the role of theory. *Personality and Individual Differences*, 13(8), 867–868. [https://doi.org/10.1016/0191-8869\(92\)90003-8](https://doi.org/10.1016/0191-8869(92)90003-8)
- Friedman, H. S., Kern, M. L., & Reynolds, C. A. (2010). Personality and health, subjective well-being, and longevity. *Journal of Personality*, 78(1), 179–216. <https://doi.org/10.1111/j.1467-6494.2009.00613.x>
- Ganasegeran, K., Al-Dubai, S. A. R. R., Qureshi, A. M., Al-Abed, A.-A. A. A. A., Am, R., & Aljunid, S. M. (2012). Social and psychological factors affecting eating habits among university students in a Malaysian medical school: a cross-sectional study. *Nutrition Journal*, 11(1), 1–7. <https://doi.org/10.1186/1475-2891-11-48>
- Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. *Psychological Assessment*, 4(1), 26. <https://doi.org/10.1037/1040-3590.4.1.26>

- Goldberg, L. R. (1999). A broad-bandwidth, public domain, personality inventory measuring the lower-level facets of several five-factor models. *Personality Psychology in Europe*, 7(1), 7–28.
- Goldberg, L. R., & Strycker, L. A. (2002). Personality traits and eating habits: The assessment of food preferences in a large community sample. *Personality and Individual Differences*, 32(1), 49–65. [https://doi.org/10.1016/S0191-8869\(01\)00005-8](https://doi.org/10.1016/S0191-8869(01)00005-8)
- Golestanbagh, N., Miraghajani, M., Amani, R., Symonds, M. E., Neamatpour, S., & Haghhighizadeh, M. H. (2021). Association of personality traits with dietary habits and food/taste preferences. *International Journal of Preventive Medicine*, 12(1), 92.
- Intiful, F. D., Oddam, E. G., Kretchy, I., & Quampah, J. (2019). Exploring the relationship between the big five personality characteristics and dietary habits among students in a Ghanaian University. *BMC Psychology*, 7(1), 1–7. <https://doi.org/10.1186/s40359-019-0286-z>
- Jaworski, M., & Rozenek, H. (2016). Selected personality traits and frequency of taking some healthy eating behaviours in young women. *Journal of Public Health, Nursing and Medical Rescue*, 19(3), 42–48.
- John, O. P., & Srivastava, S. (1999). The big five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (pp. 102–138). New York, NY: Guilford Press
- Keller, C., & Siegrist, M. (2015). Does personality influence eating styles and food choices? Direct and indirect effects. *Appetite*, 84, 128–138.
- Kikuchi, Y., Inoue, T., Ito, M., Masuda, M., Yoshimura, K., & Watanabe, S. (1999). Health consciousness of young people in relation to their personality. *Journal of Epidemiology*, 9(2), 121–131. <https://doi.org/10.2188/jea.9.121>
- Kikuchi, Y., & Watanabe, S. (2000). Personality and dietary habits. *Journal of Epidemiology*, 10(3), 191–198. <https://doi.org/10.2188/jea.10.191>
- Kiple, K. F., & Ornelas, K. C. (2000). *The Cambridge world history of food* (Vol. 2). Cambridge University Press. <https://doi.org/10.1353/jwh.2003.0033>
- Kittler, P. G., & Sucher, K. P. (1998). *Food and culture in America: a nutrition handbook*. (Issue Edition 2). Wadsworth Publishing Company, Inc.
- Lounsbury, J. W., Smith, R. M., Levy, J. J., Leong, F. T., & Gibson, L. W. (2009). Personality characteristics of business majors as defined by the big five and narrow personality traits. *Journal of Education for Business*, 84(4), 200–205. <https://doi.org/10.3200/JOEB.84.4.200-205>
- Machado-Oliveira, M. C., Nezelek, J. B., Rodrigues, H., Sant'Ana, A. S., Sant'Ana, A. S., & Sant'Ana, A. S. (2020). Personality traits and food consumption: an overview of recent research. *Current Opinion in Food Science*, 33, 91–97. <https://doi.org/10.1016/j.cofs.2020.02.005>
- Mahmood, L., Flores-Barrantes, P., Moreno, L. A., Manios, Y., & Gonzalez-Gil, E. M. (2021). The influence of parental dietary behaviors and practices on children's eating habits. *Nutrients*, 13(4), 1138. <https://doi.org/10.3390/nu13041138>
- McAdams, D. P. (1992). The five-factor model in personality: A critical appraisal. *Journal of Personality*, 60(2), 329–361. <https://doi.org/10.1111/j.1467-6494.1992.tb00976.x>
- McCrae, R. R., & Allik, I. (2002). *The five-factor model of personality across cultures*. Springer Science & Business Media. <https://doi.org/10.1007/978-1-4615-0763-5>
- McCrae, R. R., & Costa, P. T. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology*, 52(1), 81. <https://doi.org/10.1037/0022-3514.52.1.81>
- McCrae, R. R., & Costa, P. T. (2008). Empirical and theoretical status of the five-factor model of personality traits. *The SAGE Handbook of Personality Theory and Assessment*, 1, 273–294. <https://doi.org/10.4135/9781849200462.n13>
- McCrae, R. R., Costa Paul T, J., & Martin, T. A. (2005). The NEO-PI-3: A more readable revised NEO personality inventory. *Journal of Personality Assessment*, 84(3), 261–270. https://doi.org/10.1207/s15327752jpa8403_05
- McCrae, R. R., & John, O. P. (1992). An introduction to the five-factor model and its applications. *Journal of Personality*, 60(2), 175–215. <https://doi.org/10.1111/j.1467-6494.1992.tb00970.x>
- McGue, M., Bacon, S., & Lykken, D. T. (1993). Personality Stability and Change in Early Adulthood: A Behavioral Genetic Analysis. *Developmental Psychology*, 29(1), 96. <https://doi.org/10.1037/0012-1649.29.1.96>
- Meyer, J., Döring, A., Herder, C., Roden, M., Koenig, W., & Thorand, B. (2011). Dietary patterns, subclinical inflammation, incident coronary heart disease and mortality in middle-aged men from the MONICA/KORA Augsburg cohort study. *European Journal of Clinical Nutrition*, 65(7), 800–807. <https://doi.org/10.1038/ejcn.2011.37>
- Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, 102(2), 246. <https://doi.org/10.1037/0033-295X.102.2.246>

- Mottus, R., McNeill, G., Jia, X., Craig, L. C. A., Starr, J. M., & Deary, I. J. (2013). The associations between personality, diet and body mass index in older people. *Health Psychology, 32*(4), 353. <https://doi.org/10.1037/a0025537>
- Möttus, R., Realo, A., Allik, J., Deary, I. J., Esko, T., & Metspalu, A. (2012). Personality traits and eating habits in a large sample of Estonians. *Health Psychology, 31*(6), 806. <https://doi.org/10.1037/a0027041>
- Mujcic, R., & J. Oswald, A. (2016). Evolution of well-being and happiness after increases in consumption of fruit and vegetables. *American Journal of Public Health, 106*(8), 1504–1510. <https://doi.org/10.2105/AJPH.2016.303260>
- Ocean, N., Howley, P., & Ensor, J. (2019). Lettuce be happy: A longitudinal UK study on the relationship between fruit and vegetable consumption and well-being. *Social Science & Medicine, 222*, 335–345. <https://doi.org/10.1016/j.socscimed.2018.12.017>
- Pfeiler, T. M., & Egloff, B. (2018a). Examining the “Veggie” personality: Results from a representative German sample. *Appetite, 120*, 246–255. <https://doi.org/10.1016/j.appet.2017.09.005>
- Pfeiler, T. M., & Egloff, B. (2018b). Personality and meat consumption: The importance of differentiating between type of meat. *Appetite, 130*, 11–19. <https://doi.org/10.1016/j.appet.2018.07.007>
- Pfeiler, T. M., & Egloff, B. (2020). Personality and eating habits revisited: Associations between the big five, food choices, and Body Mass Index in a representative Australian sample. *Appetite, 149*, 104607. <https://doi.org/10.1016/j.appet.2020.104607>
- Pristyna, G., Mahmudiono, T., Rifqi, M. A., & Indriani, D. (2022). The relationship between Big Five Personality Traits, eating habits, physical activity, and obesity in Indonesia based on analysis of the 5th wave Indonesia Family Life Survey (2014). *Frontiers in Psychology, 13*, 881436. <https://doi.org/10.3389/fpsyg.2022.881436>
- Provencher, V., Bégin, C., Gagnon-Girouard, M.-P., Tremblay, A., Boivin, S., & Lemieux, S. (2008). Personality traits in overweight and obese women: Associations with BMI and eating behaviors. *Eating Behaviors, 9*(3), 294–302. <https://doi.org/10.1016/j.eatbeh.2007.10.004>
- Raynor, D. A., & Levine, H. (2009). Associations between the five-factor model of personality and health behaviors among college students. *Journal of American College Health, 58*(1), 73–82. <https://doi.org/10.3200/JACH.58.1.73-82>
- Roberts, B. W., Jackson, J. J., Fayard, J. V., Edmonds, G., & Meints, J. (2009). Conscientiousness. In M. Leary & R. Hoyle (Eds.), *Handbook of individual differences in social behavior* (pp. 369–381). New York, NY: Guilford Press.
- Ryckman, R. M. (2012). *Theories of personality*. Cengage Learning.
- Schmitt, D. P., Realo, A., Voracek, M., & Allik, J. (2008). Why can't a man be more like a woman? Sex differences in Big Five personality traits across 55 cultures. *Journal of Personality and Social Psychology, 94*(1), 168. <https://doi.org/10.1037/0022-3514.94.1.168>
- Strauss, J., Witoelar, F., & Sikoki, B. (2016). *The fifth wave of the Indonesia family life survey: overview and field report* (Vol. 1). Rand Santa Monica, CA, USA. <https://doi.org/10.7249/wri143.1>
- Sutin, A. R., & Terracciano, A. (2016). Five-factor model personality traits and the objective and subjective experience of body weight. *Journal of Personality, 84*(1), 102–112. <https://doi.org/10.1111/jopy.12143>
- Tsaousis, I. (2002). *The traits personality questionnaire (TPQue)*. <https://doi.org/10.1027/1015-5759.20.3.180>
- Tsartsapakis, I., Chalatzoglidis, G., & Zafeiroudi, A. (2024). Investigating differences in personality traits, self-esteem, eating attitudes, and body image among participants in indoor and outdoor fitness activities. *Healthcare, 12*(1), 47. <https://doi.org/10.3390/healthcare12010047>
- Tsartsapakis, I., Zafeiroudi, A., Vanna, G., Gerou, M. (2023). Relationships of Body Dissatisfaction and Self-Esteem with Social Physique Anxiety among University Students in Different Study Programs. *Trends in Psychol.* <https://doi.org/10.1007/s43076-023-00329-0>
- Vollrath, M. E., Hampson, S. E., & Júlíusson, R. A. B. (2012). Children and eating. Personality and gender are associated with obesogenic food consumption and overweight in 6-to 12-year-olds. *Appetite, 58*(3), 1113–1117. <https://doi.org/10.1016/j.appet.2012.02.056>
- Weston, S. J., Edmonds, G. W., & Hill, P. L. (2020). Personality traits predict dietary habits in middle-to-older adults. *Psychology, Health & Medicine, 25*(3), 379–387. <https://doi.org/10.1080/13548506.2019.1687918>
- Willett, W. C. (2006). The Mediterranean diet: science and practice. *Public Health Nutrition, 9*(1a), 105–110. <https://doi.org/10.1079/phn2005931>
- Wilsher, S. H. (2013). Personality and fruit and vegetable consumption in young men: qualitative and quantitative assessment. *Proceedings of the Nutrition Society, 72*(OCE4), E213. <https://doi.org/10.1017/s0029665113002383>
- Wilson, K. E., & Dishman, R. K. (2015). Personality and physical activity: A systematic review and meta-analysis. *Personality and Individual Differences, 72*, 230–242. <https://doi.org/10.1016/j.paid.2014.08.023>
- Zillig, L. M. P., Hemenover, S. H., & Dienstbier, R. A. (2002). What do we assess when we assess a Big 5 trait? A content analysis of the affective, behavioral, and cognitive processes represented in Big 5 personality inventories. *Personality and Social Psychology Bulletin, 28*(6), 847–858. <https://doi.org/10.1177/0146167202280913>