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Abstract:

The purpose of this narrative review is to evaluate the evidence for an association between the Big Five dimensions of personality, dietary intake and compliance to dietary recommendations. Poor diet is a known risk factor for overweight and obesity and associated chronic lifestyle diseases and it has been
proposed that personality may be linked to dietary choices. Findings from
cross-sectional surveys across different countries and cultures show a positive
association between Openness and consumption of fruits and vegetables and
between Conscientiousness and healthy eating. While no evidence has been
found that personality dimensions are associated with adherence to dietary
recommendations over time, Conscientiousness is associated with a number of
prosocial and health promoting behaviors that include avoiding alcohol-related
harm, binge-drinking and smoking, and adherence to medication regimens.
With emerging evidence of an association between higher Conscientiousness
and lower obesity risk, the hypothesis that higher Conscientiousness may
predict adoption of healthy dietary and other lifestyle recommendations
appears to be supported.

Key words: personality, Big Five, dietary intake, Openness, Conscientiousness

Introduction

Poor diet, low in consumption of fruit and vegetables, is a risk factor for overweight and
obesity and chronic lifestyle diseases including hypertension, type 2 diabetes, coronary heart
disease, stroke and some cancers [1]. It is also well established that the over-consumption of
energy-dense, high sugar and high fat foods is linked to the development of obesity [2],
which is associated with co-morbidities such as hypertension [3], type 2 diabetes [4] and cardiovascular disease (CVD) [5]. Conversely, it has been shown that consumption of fruit and vegetables, whole grains, nuts and low-fat dairy products may be protective against obesity and these chronic diseases [3-5].

Many factors influence dietary intake [6]. Models of environmental and socio-cultural influences show that socioeconomic area and social support have been associated with dietary choices [7]. Those living in wealthier socioeconomic areas with higher household incomes and more food choices and who are married or have more social support consume more fruit and vegetables, whereas those who are from low-income households or who watch more television consume fewer fruits and vegetables [7, 8]. Knowledge about food may play a role [9]. It has been suggested that factual knowledge about foods such as which are healthy, or low-fat or high-fibre is not enough to ensure their consumption, but that “how-to” or procedural knowledge about where to get them, how to choose them and how to cook them may be more important [10]. Underlying these factors, models of biological predispositions of eating behaviors have shown that genetically heritable factors influence taste and satiety [11]. It has also been shown that personality, which is thought to be largely inherited [12], may be associated with food preferences and that certain personality types may be more prone to choose healthier food alternatives. [13]. Such associations have been found to occur early in life in children aged 6-12, although mediated by relationships with parents [14], and as might be expected if personality predispositions are inherited. A large meta-analysis with 78,931 men and women completed in 2012, found an inverse dose-response relationship between levels of Conscientiousness and obesity, such that those with higher levels of Conscientiousness had lower risk of being obese [15]. This finding suggests a probable link between personality and dietary intake (and other healthy lifestyle attributes including physical activity) over time such that those who are more conscientious may be more likely
to consume a healthy diet and maintain a healthy weight, and provides further impetus to the
need for a better understanding of this relationship.

In this narrative review we will address the question – are personality characteristics
associated with healthy dietary choices, such as the consumption of more fruit and
vegetables, or compliance to dietary recommendations? Firstly, we will review personality,
what it is and how it is measured. Secondly, we will assess the effect of personality
dimensions on food choice from evidence presented in cross-sectional studies. Thirdly, we
will examine the evidence from cross-sectional and longitudinal studies for associations
between personality and compliance and whether these may have a bearing on adherence to
dietary recommendations, and finally we explore the probable genetically-based
multifactorial pathway for the association between personality and dietary intake.

**Method of article selection**

Articles were searched for this narrative review in the following EBSCOhost databases:
Academic Search Complete, Ageline, CINAHL, Global Health, Health Source:
Nursing/Academic Edition, Medline, PsychARTICLES, psychEXTRA, Psychology and
Behavioural Sciences Collection, psychINFO, SocINDEX with full text and SPORTDiscus
with full text. For the first section on personality and dietary intake the following search
terms were used: Big Five, Big 5, five factor model, FFM, Openness, Conscientiousness,
Extraversion, Neuroticism, diet*, dietary intake, food intake, fruit*, vegetable*, and for the
second section on personality and compliance the key words: compliance, adherence, health
and health* behaviour were added. For inclusion articles had to be original research and be
published in peer-reviewed journals in English, and, as a primary endpoint in the first section,
had to investigate the association between the Big Five personality dimensions and dietary
intake but excluding eating disorders, **other personality disorders or psychopathologies**,
and in the second section, between the Big Five personality dimensions and health-related compliance behaviour. The search was conducted first in May 2012 and was repeated in January 2013 and again in May 2013. There was no specific time constraint on when articles were published, however most work in this area has been done since the year 2000.

**Personality**

Personality is the unique constellation of behavioral traits in every individual [16]. These are the distinguishable and enduring ways in which one individual varies from another, and which are consistent in different situations [16]. For example, someone described as being conscientious and reliable would be expected to exhibit this characteristic in all situations, in school, at work, in the family and when socialising, and across time. One of the best-known measures of personality is the five-factor model, or the Big Five dimensions of Neuroticism, Extraversion, Openness to experience, Conscientiousness and Agreeableness [17]. While there are thousands of words in the English language that describe personality, prominent personality theorists have elicited structure in these using factor analysis to reduce them to five groups of behavioral traits or facets called the Big Five personality dimensions [18].

Among the more popular personality measurement scales have been Goldberg’s 100-item inventory that includes twenty traits for each of the five dimensions [19], and Costa and McCrae’s 240-item NEO personality inventory – revised (NEO-PI-R) that includes eight items in each of six trait scales within the Big Five domains [20]. Some of the trait characteristics of high and low scorers on each of these dimensions are shown in Table 1.

**Insert Table 1. Personality traits associated with the five-factor model**

There are gender differences in personality. Whereas women tend to score higher in Conscientiousness, Neuroticism and Agreeableness, men score higher in Extraversion and
Openness to Experience [21]. These gender differences may prove important when investigating the influence of the Big Five personality factors in adherence to dietary recommendations and suggest evaluating men and women separately, or at least controlling for gender in the analyses.

The Big Five personality model is commonly used in dietary analyses and is the basis of this review, ensuring comparability in personality measures across the studies examined. There are older personality inventories still in use, such as Eysenck’s EPQ and Cattell’s 16PF, but it has been estimated that by the mid-2000s about eight out of nine publications measuring personality traits used Big Five personality inventories [22].

**Personality and dietary intake**

In the following sections evidence is reviewed from cross-sectional studies on the relationship between personality and dietary intake. It should be noted that we could not find randomised controlled trials examining the Big Five personality dimensions in association with dietary intake or other health-related regimes. The majority of the evidence relates to adults and since studies in children and adolescents have shown that personality may play a lesser role compared to other factors such as parental influences [14, 23], this review focuses on adult studies. The evidence from nine cross-sectional studies examining the relationship between the Big Five personality dimensions and dietary intake are summarized in Table 2. Overall, Openness and Conscientiousness are associated with healthy dietary practices across a range of populations.

**The association between dietary intake and Openness**

This section focuses on evidence presented in Table 2 relating to Openness and dietary intake. In a study of 1,691 adult Estonians, those who scored higher on Openness were found to be more likely to consume a “Health-Aware” diet that included fresh fruit and
vegetables, cereals, dairy and fish, and less likely to consume a “Traditional” diet of meat, potatoes and bread [24]. In a similar study of 1,091 elderly Scottish people, those who scored higher in Openness were more likely to have a Mediterranean-style diet with a higher intake of vegetables, fish, poultry, pasta, rice and water, tomato-based sauces, oil, vinegar and beans [25]. They were less likely to have a “Convenience” diet of tinned vegetables, meat pies, sausage rolls, and mashed potatoes or “Sweet Foods” including puddings, cakes, biscuits and chocolate [25]. The authors of these two studies, Mottus et al., hypothesised that the consumption of foods in the Mediterranean and Health-Aware diets and the avoidance of foods in the Convenience and Sweet Foods diets by people higher in Openness might result from them being more intellectually open and curious, and more adaptable to novel foods [25].

A similar observation was made by Brummett et al. [26] in their investigation of 850 middle-aged married couples in the U.S. These investigators used the US Department of Agriculture Healthy Eating Index to derive a measure of dietary quality which included serves per day of fruit, vegetables, nuts, soy protein and red wine, the ratio of polyunsaturated fat to saturated fat and the intake of fibre, cholesterol, calcium and sodium [26]. They found a positive association between Openness and healthier eating but conjectured that it may not have been a result of a desire for healthier foods, but rather a consequence of interest in the experience of trying new things [26]. This does not explain, however, why Openness to new experiences and intellectual curiosity should be especially associated with healthy food choices, and why it does not apply to other new and novel foods, such as, for example, the latest fast foods or the dishes, healthy and unhealthy, demonstrated on TV cooking shows.

In their study of a community sample of 750 adults to assess a wide range of possible influences on dietary intake including personality, demographic variables, the presence of psychopathology, other health-related practices and vocational interests, Goldberg and
Stycker also found that Openness was the most consistent predictor of healthy dietary habits [13]. However, they argued that the link between Openness and dietary practices needed to be understood in the historical and cultural context of the study, and that the relationship between particular types of food and Openness may not be the same across different cultures [13]. Mottus et al., on the other hand, argued that since they found similar healthy dietary patterns in Scotland and Estonia, it seems to be possible to identify personality types associated with similar dietary patterns across different cultures [24]. Each of the countries in which these associations have been studied, which include Estonia, Scotland, Japan and the US, has its own unique food culture and it is possible to imagine that factors such as price, availability and local marketing of foods might be different in these countries, and that these differences might impact the relationship between personality and dietary intake. This suggests the need for local studies to inform any dietary interventions based on personality.

Insert Table 2. Cross-sectional studies examining the relationship between personality and dietary intake

The association between dietary intake and Conscientiousness

Overall, the evidence presented in Table 2 suggests there is a small positive association between Conscientiousness and healthy eating habits. Unlike the rationale proposed for the association of Openness to healthy eating being the result of a willingness to try new and novel foods [24], it has been suggested that individuals higher in Conscientiousness are likely to make healthy choices as part of an overall tendency to adopt a healthy lifestyle, such as exercising regularly, avoiding risky behaviors and eating fruit and vegetables [27]. Kikuchi et al. found such a relationship in Japan in two studies among college students [28, 29]. They investigated the Big Five personality dimensions in relation to health consciousness and healthy habits such as not smoking, limiting alcohol
consumption, eating regularly and getting enough sleep, and receptivity to dietary advice[28, 29]. Participants who were high scorers on Conscientiousness had regular eating times, avoided salty foods, and were more receptive to advice to eat more yellow and green vegetables. In a similar study, Raynor & Levine conducted an Internet survey among 583 college students and found that higher Conscientiousness was positively associated with a number of health promoting behaviors including consuming more fruit and vegetables [27]. The association between Conscientiousness and dietary intake may be mediated by other aspects of behaviour [30, 31]. In a study among 405 Dutch adults aged from 26 to 87 years, while there was an association between Conscientiousness and fruit consumption, after including attitude, subjective norm and perceived behavioural control (from the theory of planned behaviour) in the statistical model, the association became non-significant, suggesting that the effect of Conscientiousness on fruit consumption was mediated by aspects of this behavioural model [30]. This was further elucidated in a cross-sectional analysis of 443 college students to determine the relationship between personality, action planning and fruit consumption [31]. In this study, those higher in Conscientiousness consumed more fruit and this was mediated by a greater propensity for self-regulatory action planning [31]. The ways in which personality may be related to behaviour are considered later in this review.

Based on the findings of the nine cross-sectional studies shown in Table 2, there is consistent evidence for a modest association between personality and dietary intake, with both Openness and Conscientiousness being linked with healthy eating patterns. The significant correlation coefficients in these studies were small, varying from $r = 0.09$ to $r = 0.27$ [32].

**Personality and compliance**

In addition to cross-sectional evidence that personality may predict dietary intake, it is important to establish if personality is also associated with long-term eating habits and the
ability to comply with healthy eating guidelines. No evidence was found for Neuroticism, Extraversion, Openness or Agreeableness having a positive association with compliance in the health domain. However, Conscientiousness has been associated with compliance behaviors in a diverse range of fields of enquiry and study designs. Seven studies identified for this review are listed in Table 3. They show that Conscientiousness influenced social and civic activities such as helping in emergencies [33] and consenting to jury service [34], and a range of health promoting behaviors including wearing seat belts, avoiding smoking and binge drinking, engaging in alcohol-related harm reduction [27] and adhering to medication regimens [35-38].

In the study that showed an association between Conscientiousness and consenting to jury duty, there was an interaction between Conscientiousness and political engagement, such that those who scored higher on Conscientiousness and were politically engaged were more likely to comply with jury summons [34]. This suggests that while Conscientiousness may predict a predisposition for compliance behaviour, a sense of purpose is also required, and in the dietary domain, perhaps an appreciation of positive health benefits from a recommended diet may provide such a sense of purpose. The cross-sectional survey among college students found that Conscientiousness was associated with health promoting behaviors such as seat belt use and alcohol-related harm reduction, and was inversely associated with risky behaviors such as smoking, drinking alcohol and binge drinking [27]. For those higher in Conscientiousness, risk aversion may, therefore, also be an important motivator for healthy dietary compliance. In two of the four clinical studies showing Conscientiousness to be associated with better medication compliance, the outcome measure was, in one case, a laboratory test [35, 36] and, in the other, an electronic event measuring device [37], which eliminated the risk of self-reporting biases. While none of these studies investigated Conscientiousness in relation to compliance to dietary recommendations they show those
higher in Conscientiousness to be purposeful, risk averse and health aware: all characteristics that would be consistent with such compliance.

Insert Table 3. Studies examining the relationship between Conscientiousness and compliance

How personality may influence dietary intake

Taken together the studies included in Tables 2 and 3 suggest that higher Openness and Conscientiousness predict healthier dietary intake and that higher Conscientiousness predicts compliance to desirable social and health behaviors. However, no longitudinal evidence was found of associations between personality and dietary intake or adherence to dietary guidelines over time.

How personality is associated with dietary intake may be further elucidated by considering the theory of personality proposed by McCrae and Costa [39] in the context of behavioral models of food intake found in the nutrition literature. These behavioral models show that food choices are influenced by external factors such as the food environment and interpersonal relationships, which interact with internal factors including biological predispositions, conditioning and intrapersonal factors such as values, perceptions and motivations [6]. McCrae and Costa describe three core components of personality: basic tendencies, characteristic adaptations and expressed personality [39]. Basic tendencies of Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness, are described as having a biological origin and being genetically heritable. These basic tendencies interact with external influences to form characteristic adaptations that include habits, attitudes, skills, roles and relationships, and self-concept and self-schemas, and these interactions give rise to specific behavioral styles expressed as personality [39]. Characteristic adaptations can and do vary widely in different families, cultures and circumstances but, according to the theory, the basic personality tendencies remain constant [39].
How this personality theory may potentially fit into the dietary behavioral model is illustrated in Figure 1. It shows how these many factors that play a role in dietary intake may be related. While it does not show the relative importance of each factor, it does suggest the complexity of the relationships, the possible central role of basic personality tendencies and the many factors that may impact the intra-individual characteristic adaptations, expressed personality and behaviour, including dietary intake. Investigating these relationships and how they are expressed in practice may have an important bearing on how personality is viewed and whether or not basic personality characteristics can be considered as part of dietary interventions.

Insert Figure 1. Influences on dietary intake

The finding that Openness or Conscientiousness, or any other personality dimension is a consistent predictor of healthy food choices or compliance to dietary recommendations could have important clinical implications. Given that basic personality characteristics may be viewed as difficult to change [39] it may be possible to provide a framework for dietary recommendations based on personality type so that, for example, people who score more highly on Openness may be encouraged to follow dietary guidelines because of the novelty and newness of the diet and those who score more highly on Conscientiousness for its long-term health benefits.

Limitations and other considerations

External validity may have been an issue in some of the studies reviewed in Table 2. Among the samples were college students [27-31], patients drawn from general practice and hospital visits [24], and people in a general population who were paid to participate [13], all of which may have influenced the study participants’ attitudes to eating, mediating the association between personality and diet. For example, students’ eating habits may have been more
influenced by economic resources when compared to the general population, which may have influenced their attitudes towards food and their dietary intake independent of personality.

All the studies that showed significant diet-personality relationships utilised food frequency questionnaires. Therefore more valid dietary assessment methods such as 24 hour records should be used in future studies.

The personality measurements in the studies reviewed were all based on self-reports, and it has long been known that these may be culture-specific: a phenomenon known as the reference group effect [40]. Whether this is an issue in cross-cultural self-reports of Conscientiousness has been investigated in a study that included 21 countries, selected for their geographical and cultural diversity [41]. After controlling for the possible effect of the reference group effect, the investigators concluded that culture-specific effects did not influence mean self-rated Conscientiousness scores [41].

Another aspect of the studies reviewed is that the participants were volunteers. It has been shown that volunteer participants in research studies have higher levels of Conscientiousness and Agreeableness than non-responders (whose scores are taken from sibling’s rating) [42]. Lönnqvist et al. have hypothesised that, for those higher in Conscientiousness, participating in research might fulfil a sense of duty and that, combined with higher levels of Agreeableness and a higher need for social approval, these individuals may be more likely to respond to questionnaires in socially desirable directions [42], perhaps, as examples, overstating their own personality scores or the consumption of healthier foods such as fruit and vegetables. It is acknowledged that this was not a systematic review with the associated rigour of analysis and article selection, and that no conclusions were possible about the significance of findings across the entire spectrum of relevant published articles.

Conclusion
Personality has been shown to be a central determinant of behaviour and there is a substantial body of evidence linking personality to dietary intake. In this review, a consistent association has been found between Openness and the intake of fruits and vegetables, and between Conscientiousness and healthier eating habits, and compliance to prosocial behaviors such as attending jury duty, wearing seat belts, avoiding alcohol-related harm, binge drinking and smoking, and adherence to medication regimes. No longitudinal evidence has been found investigating personality and compliance to dietary recommendations. However, the role of Conscientiousness in other compliance behaviors and its association with lower risk of obesity seems to provide the basis for hypothesising that it might also play an important role in adoption of dietary recommendations. At least two questions emerge from this review. Does Conscientiousness predict compliance to dietary recommendations, and can dietary interventions be made specific to particular personality types? To answer these questions will require well-controlled long-term intervention studies in which personality and food consumption is measured over time in response to recommendations to make dietary changes. If these questions can be affirmatively answered there may well be a case for considering the role of personality in clinical regimens for obesity control and in planning dietary interventions.

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28 medication: Proposing and testing a conceptual model. Br J Health Psychol.


<table>
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<th>Factors</th>
<th>Personality traits of high scorers</th>
<th>Personality traits of low scorers</th>
</tr>
</thead>
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<tr>
<td>Neuroticism</td>
<td>Highly strung, anxious and irritable, envious, moody and emotional.</td>
<td>Relaxed and imperturbable, unemotional and undemanding.</td>
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<tr>
<td>Extraversion</td>
<td>Talkative, assertive and energetic, bold, daring and unrestrained.</td>
<td>Bashful, withdrawn and untalkative, reserved and unadventurous.</td>
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<tr>
<td>Conscientiousness</td>
<td>Practical, thorough and neat, efficient, systematic and careful.</td>
<td>Disorganised, careless and sloppy, inconsistent and undependable.</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>Kind, sympathetic and trustful, cooperative and considerate.</td>
<td>Cold, demanding and harsh, unsympathetic, selfish and rude.</td>
</tr>
<tr>
<td>Openness</td>
<td>Imaginative, artistic and intellectual, philosophical, complex and bright.</td>
<td>Simple, shallow and uncreative, unimaginative and unsophisticated.</td>
</tr>
</tbody>
</table>

1 Adapted from Goldberg [19]
<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>Response rate</th>
<th>Personality dimension</th>
<th>Dietary preferences/outcomes</th>
<th>Strength of association</th>
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<tr>
<td>Mottus et al. (2012) [24]</td>
<td>976 female, 715 males, age 18-89 years, randomly selected from general practice and hospital populations in Estonia</td>
<td>NA</td>
<td>Openness</td>
<td>Health-Aware dietary pattern¹</td>
<td>0.17b***</td>
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<td>Extraversion</td>
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<td></td>
<td>Neuroticism</td>
<td>Traditional dietary pattern¹</td>
<td>0.09b***</td>
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<td>Openness (negative association)</td>
<td></td>
<td>-0.14b***</td>
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<tr>
<td>Mottus et al. (2011) [25]</td>
<td>543 females, 548 males, tested at age 70 years from the 1936 Lothian Birth Cohort in Scotland</td>
<td>29.5%</td>
<td>Openness</td>
<td>Mediterranean-style dietary pattern¹</td>
<td>0.21b****</td>
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<td>Extraversion</td>
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<td>Neuroticism (negative association)</td>
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<td>-0.07b*</td>
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<td>Health-Aware dietary pattern¹</td>
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<td>Neuroticism</td>
<td>Convenience dietary pattern¹</td>
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<td>Brummett et al. (2008) [26]</td>
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<td>Openness</td>
<td>Healthy dietary practices¹</td>
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<td>Goldberg and Strycker, (2002) [13]</td>
<td>470 females, 380 males, age 22-90 years in the US</td>
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<td>General healthy diet</td>
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<td>Kikuchi &amp; Watanabe (2000) [29]</td>
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<td>NA</td>
<td>Conscientiousness</td>
<td>Receptive to advice to eat yellow and green vegetables</td>
<td>M, OR = 4.88 (95% CI 1.28-18.57)</td>
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<td>F, OR = 2.69 (95% CI 1.39- 5.21)</td>
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<td>Kikuchi et al. (1999)</td>
<td>942 college students in Japan</td>
<td>75.1%</td>
<td>Conscientiousness</td>
<td>Avoiding salty foods</td>
<td>M, OR = 2.09 (95% CI 1.11-3.91)</td>
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<td></td>
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<td></td>
<td>Conscientiousness</td>
<td>Health consciousness</td>
<td>F, OR = 1.87 (95% CI 1.11-3.16)</td>
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<td></td>
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<td>Openness</td>
<td>Increased consumption of fruit and vegetables</td>
<td>M, OR = 11.46 (95% CI 1.54-85.10)</td>
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<td>Conscientiousness</td>
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<td>F, OR = 2.88 (95% CI 1.17-7.11)</td>
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<td>Raynor &amp; Levine (2009)</td>
<td>583 college students in the US</td>
<td>30%</td>
<td>Openness</td>
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<td>0.14**</td>
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<td>Conscientiousness</td>
<td></td>
<td>0.16**</td>
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<td>405 adults aged 26-87 years</td>
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<td>Conscientiousness</td>
<td>Increased consumption of fruit (mediated by components of the theory of planned behaviour)</td>
<td>Stepwise: attitude 0.20**</td>
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<td>: Subjective norm 0.18***</td>
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<td>Fruit consumption: 0.36*</td>
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<td>De Bruijn (2013)</td>
<td>443 college students, mean age 21.45 years</td>
<td>80%</td>
<td>Conscientiousness</td>
<td>Consumed more fruit (mediated by action planning)</td>
<td>Stepwise: action planning 0.15**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>: fruit consumption 0.30***</td>
</tr>
</tbody>
</table>

**a** age not reported  
**b** partial correlation controlling for gender, age and education level  
**c** partial correlation controlling for age, athletic status and “Greek” status (college clubs)  
**d** zero order correlation  
**e** standardised regression coefficients  
**f** amount of explained variance  
* p = <0.05  
** p = <0.01  
*** p = <0.001  
**** minimum r value for significance set at r = > 0.20  
† Described in section “The association between personality and dietary intake”  
OR, odds ratio  
M = males  
F = females
<table>
<thead>
<tr>
<th>Study</th>
<th>Type of study</th>
<th>Participants</th>
<th>Compliance outcome</th>
<th>Strength of association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vartanian et al. (2012) [33]</td>
<td>Laboratory experiment</td>
<td>34 female college undergraduates</td>
<td>Offering help in an emergency</td>
<td>1.65*</td>
</tr>
<tr>
<td>Bloeser, McCurley &amp; Mondak (2012) [34]</td>
<td>Cross-sectional survey</td>
<td>1,977 adults (population survey but selection method not clarified)</td>
<td>Attending for jury duty: interaction effect of Conscientiousness and political engagement</td>
<td>2.94b**</td>
</tr>
<tr>
<td>Raynor &amp; Levine (2009) [27]</td>
<td>Cross-sectional Internet survey</td>
<td>583 volunteer college students, 74% female</td>
<td>Wearing seat belt</td>
<td>0.22***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Alcohol-related harm reduction</td>
<td>0.19***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Avoiding smoking</td>
<td>-0.15***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Avoiding binge drinking</td>
<td>-0.18***</td>
</tr>
<tr>
<td>Christensen &amp; Smith (1995) [35]</td>
<td>Cross-sectional survey</td>
<td>72 dialysis patients from a clinical population, 54% male</td>
<td>Haemodialysis medication adherence: reduced serum phosphorus</td>
<td>-0.24*</td>
</tr>
<tr>
<td>O’Cleirigh et al. (2007) [36]</td>
<td>1-year cohort study</td>
<td>119 sero-positive HIV patients from a clinical population, 67% male</td>
<td>Antiretroviral medication adherence CD4 count ¹ Viral load ²</td>
<td>0.15* 0.15</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stilley et al. (2004) [37]</td>
<td>6-month cohort study</td>
<td>158 adult volunteers with high cholesterol recruited through the media, 54% male</td>
<td>Anti-cholesterol medication adherence (electronic cap monitoring)</td>
<td>0.24**</td>
</tr>
<tr>
<td>Quine et al. 2011 [38]</td>
<td>8-week cohort study</td>
<td>1,070 adults from three regional GP groups, 58% female</td>
<td>Antihypertensive medication adherence (self-reported) Baseline Week 8</td>
<td>0.18**** 0.11*</td>
</tr>
</tbody>
</table>

* Unstandardised regression weight; b binomial logistic regression coefficients; c Standardised β; d zero order correlation; * p<0.05; ** p<0.01; *** p<0.001; ¹, ² CD4 immune cell count and viral load are both measures of the effectiveness of anti-retroviral medication.
Figure 1 Influences on dietary intake, adapted from Contento and McCrae and Costa. This illustration shows how genetically inherited basic personality traits interact with environmental and interpersonal factors to develop intra-individual characteristic adaptations, which combine with conditioned responses to produce expressed personality and behavior, resulting in dietary intake.