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Individual differences in functional food consumption: The role of time perspective and the Big Five personality traits

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ABSTRACT

Prior research suggests inconsistent relationships between individuals' personality traits, time perspective, and specific behavior. In a large representative sample of Norwegian consumers ($N = 810$), we investigated the relationships between the Big Five personality traits, domain-specific consideration of future consequences (CFC), and consumption of functional foods. Structural equation modeling was employed to test the hypothesized associations. Both CFC-Future and CFC-Immediate were positively related to the consumption of functional foods, whereas personality traits exerted no direct influence on consumption. Several significant associations between personality traits and CFC-Future and CFC-Immediate were found, and three of the five personality traits—Conscientiousness, Agreeableness, and Neuroticism—exerted indirect effects on consumption frequency via CFC-Future. Results support an integrative and hierarchical understanding of how personality traits and time perspective interact in explaining variation in functional food consumption. The findings support the notion that (domain-specific) CFC is better conceptualized as two distinct—albeit related constructs—that are shaped, in part, by broader personality traits.

1. Introduction

Functional foods are food products that have been enriched with health-enhancing or disease-preventing ingredients (e.g., vitamins, minerals) that are part of a standard diet and consumed on a regular basis in normal quantities (Doyon & Labrecque, 2008; Laros & Steenkamp, 2005). Prior investigations into explaining consumer behavior toward functional foods have largely focused on factors such as convenience, health benefits, price, preferences, taste, and other sensory attributes (Siró, Kápolna, Kápolna, & Lugasi, 2008; Urala & Lähteenmäki, 2003). More recently, research efforts have explored factors related to the consumer such as hedonic pleasure, cognition and affect, knowledge, habits, trust, and perceived risk (Bimbo et al., 2017; Mogendi, De Steur, Gellynck, & Makokha, 2016; O'Connor & White, 2010; Santeramo et al., 2018; Verbeke, 2006). Although some recent reviews (Bimbo et al., 2017; Santeramo et al., 2018) have identified various personal values or personality traits to influence consumer acceptance or consumption of functional foods, studies investigating if and how individual differences in broader behavioral dispositions relate to functional food consumption are still scarce.

The current study addresses if and how individual differences in the Big Five personality traits (Donnellan, Oswald, Baird, & Lucas, 2006; John & Srivastava, 1999) and consideration of future consequences (Strathman, Gleicher, Boninger, & Edwards, 1994; van Beek, Antonides, & Handgraaf, 2013) are interrelated and associated with the consumption of functional foods. Consideration of future consequences (hereafter, CFC) assesses the extent that individuals' CFC influences their current behavior, and it is a frequently used measure to explain individual differences in health (e.g., Crockett, Weinman, Hankins, & Marteau, 2009; Murphy & Dockray, 2018) and food-related behaviors (e.g., Dassen, Houben, & Jansen, 2015; Olsen & Tuu, 2017). The five-factor model of personality (FFM; McCrae & Costa, 1997) is one of the most used frameworks to study individual personality traits, including their relationship to (healthy) food behavior (e.g., Goldberg & Strycker, 2002; Keller & Siegrist, 2015). This study investigates the *antecedent role of personality traits* on CFC and consumption of functional foods, and the *mediating role* of CFC. To the authors' knowledge, this is the first study to include the Big Five personality traits as precursors of CFC domain-specific to (healthy) food choice.

Time perspective is suggested to be rooted in positive and negative

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affect (Kooij, Kanfer, Betts, & Rudolph, 2018), personality traits (Kairys & Liniauskaite, 2015), or agentic traits such as self-esteem or locus of control (Shipp, Edwards, & Lambert, 2009). The current study contributes to the ongoing discussion on domain-specificity (McKay, Perry, Cole, & Magee, 2017; Murphy, Cadogan, & Dockray, 2019) and dimensionality of CFC (Joireman & King, 2016; Murphy & Dockray, 2018) and aims to extend this research area into novel health domains (i.e., functional foods). This study first examined *the dimensionality* of a CFC scale domain-specific to food choice and health outcomes. The study defines CFC as an attitudinal or cognitive-motivational construct of beliefs that is oriented toward domain-specific consequences, suggesting that individuals can be future-orientated in some behavioral domains, but not in others (McKay et al., 2017; Murphy et al., 2019). Time perspective is argued to be more dynamic and domain-specific and thus more easily subjective to change as compared to personality (Kairys & Liniauskaite, 2015). In a recent review, Kooij et al. (2018) encouraged future research to investigate if and how future time perspective mediates the relationship between personality traits and specific behaviors and outcomes, including health behavior. Although malleable across the lifespan, personality traits tend to endure over time (Cobb-Clark & Schurer, 2012). According to the Five Factor Theory (FFT; McCrae & Costa, 1996), personality traits are distal causes of behavior mediated by characteristic adaptations including (health) habits, beliefs, and attitudes (McCrae & Costa, 2008; McCrae & Sutin, 2018). In adherence to this, individual differences in CFC could help in explaining *why* Conscientiousness is positively related to consumption of less unhealthy food (viz., Bogg & Roberts, 2004) or *why* Openness and consumption of fruits and vegetables are positively associated (viz., Lunn, Nowson, Worsley, & Torres, 2014). Overall, the current study aims to explore possible associations between domain-specific CFC, the Big Five personality traits and the consumption of functional foods.

2. Theoretical framework

Hierarchically, time perspective acts as an overarching temporal construct encompassing various time-related concepts such as time attitude (Nuttin, 2014), temporal focus (Shipp & Aeon, 2019), time orientation (Zimbardo & Boyd, 1999), and CFC (Strathman et al., 1994). The concept of (future) time perspective (hereafter, FTP) has been referred to as both a motivational-cognitive or attitudinal construct, and as a stable disposition similar to personality traits (Kairys & Liniauskaite, 2015; Kooij et al., 2018). Although FTP certainly shares characteristics similar to traits (i.e., a stable, cross-situational behavioral tendency), it is frequently argued to differentiate the two (Kooij et al., 2018). Kairys and Liniauskaite (2015) concluded that the nature of time perspective is two-fold: "The core […] is relatively stable and similar to [traits] and the shell of it is dynamic and subjective to situational changes" (p. 110).

Many current decisions have future implications (Kim & Zauberman, 2019). For instance, individuals' eating behavior involves consideration of, and conflict in prioritizing between, immediate hedonism in eating pleasure and future goals or consequences for health, longer life expectancy, or well-being (van Beek et al., 2013). Typically, future time perspective is positively associated with engaging in health-promoting behaviors (Hall, Fong, & Sansone, 2015). Consideration of future consequences refers to "the extent to which individuals consider the potential distant outcomes of their current behaviors and the extent to which they are influenced by these potential outcomes" (Strathman et al., 1994, p. 743). Thus, consideration of future consequences not only assesses individuals' future time perspective (i.e., consequences in the future), but also their tendencies for enjoying the present (i.e., maximizing immediate hedonic benefits at the expense of future benefits). The present study consequently considers CFC an attitudinal or cognitive-motivational construct in accordance with commonly held views (Andre, van Vianen, Peetsma, & Oort, 2018; Kairys & Liniauskaite, 2015; Kooij et al., 2018). Finally, and in accordance with current research on CFC and health behavior, we posit a bidimensional operationalization; that is, we distinguish between CFC-Future and CFC-Immediate (e.g., J. Adams, 2012; Joireman & King, 2016).

2.1. CFC dimensionality and domain-specificity

A recent meta-analysis (Murphy & Dockray, 2018) has called attention to an ongoing debate regarding the underlying factor structure of CFC. Although most studies to date have treated the CFC scale as unidimensional (Mohammed & Marhefka, 2019), increasing evidence suggests two factors (e.g., Joireman, Balliet, Sprott, Spangenberg, & Schultz, 2008; Joireman, Shaffer, Balliet, & Strathman, 2012) or even four factors (e.g., Ryack, 2012; Zhang, Kong, Zhang, & Li, 2015). One rationale for a two-factor structure is that "individuals may consider the future consequences of their actions, the immediate consequences of their actions, or both" (p. 1273). Consequently, we first assessed the dimensionality of CFC; that is, comparing a unidimensional (CFC) with a bidimensional (CFC-Future, CFC-Immediate) factor structure.

Until recently, CFC has predominantly been interpreted as a global domain-free construct (Murphy et al., 2019); that is, CFC is fixed across all life domains. However, several investigators have proposed that CFC is domain-specific (e.g., Dassen et al., 2015; McKay et al., 2017; van Beek et al., 2013) and that domain-specificity may tackle concerns about small effect sizes and inconsistency in research findings (Joireman & King, 2016; Murphy et al., 2019; Sweeney & Culcea, 2017). For instance, Murphy et al. (2019) explicated that "it is possible that an individual can consider future behavioral outcomes in one domain (e.g., work) and relatively immediate outcomes in another (e.g., health)" (p. 2). van Beek et al. (2013) argued that food choices involve trade-offs between immediate outcomes such as pleasure/hedonism and future outcomes related to adverse health or utilitarian effects. In their study, a domain-specific adaptation of the CFC scale was developed to reflect future and immediate consideration of current eating behavior, wherein the words *food* or *eating behavior* were incorporated into the original CFC scale items. In their Dutch sample, healthy eating was only associated with consideration of immediate outcomes, such that immediate-oriented individuals consumed less healthy food. Building upon their study, Dassen et al. (2015) found that consideration of future (vs. immediate) consequences in relation to food consumption in a Dutch sample was strongly associated with healthier (vs. unhealthy) eating patterns. More recently, Rojas-Rivas et al. (2020) found similar domain-specific CFC-Future and CFC-Immediate scales to differentially explain bread choices among Uruguayan consumers; that is, future-oriented consumers chose whole bread (i.e., healthy option) whereas present-oriented people went for the less healthy option—white bread (see also McKay et al., 2017; McKay, Perry, & Cole, 2018).

Combined, these studies suggest that domain-specific measures of CFC are preferable to global measures in predicting specific behaviors. This recognition can be attributed to the notion of compatibility (Ajzen & Fishbein, 2005), which states that "measures of attitude and behavior involve exactly the same target, act, context, and time (TACT) elements, whether defined at a very specific or at a more general level" (p. 29). We argue that consumption of functional foods is a convenient means to achieve or maintain a healthier diet, resonating both a desire for convenience and taste (present orientation) and a desire for healthy eating (future orientation). Our conceptualization of CFC as a domain-specific attitudinal construct would suggest that adhering to the principle of compatibility could strengthen the association between CFC and consumption of functional foods. This study contributes to the existing literature (Dassen et al., 2015; van Beek et al., 2013) in exploring if and how domain-specific CFC is related to functional food consumption:

H1a. CFC-Future is *positively* associated with functional food consumption frequency.

H1b. CFC-Immediate is *positively* associated with functional food consumption frequency.

2.2. The Big Five personality traits and (healthy) food choice

Personality traits are individual characteristics of "relatively stable patterns of behavior, thoughts, and emotions" (Parks-Leduc, Feldman, & Bardi, 2015, p. 3), which are predictive of various general behavioral patterns including health and eating habits (Bogg & Roberts, 2004; Goldberg & Strycker, 2002). The dominant representation of personality is the Five Factor Model (McCrae & Costa, 1997; Roccas, Sagiv, Schwartz, & Knafo, 2002), which represents the Big Five personality traits "at the broadest level of abstraction" (John & Srivastava, 1999, p. 105): Openness to Experience (Openness), Conscientiousness, Extraversion, Agreeableness, and Neuroticism.[1] According to the Five Factor Theory, personality traits, as basic tendencies, are "abstract potentials, hypothetical psychological features of the individual that, over time and in specific situations, come to be manifested in concrete realizations" (McCrae & Sutin, 2018, p. 152). Together, these structural individual differences in personality describe broad behavioral tendencies associated with future behavior and behavioral outcomes (Baumert et al., 2017).

Personality traits constitute reliable predictors of dietary and health behavior patterns (Bogg & Roberts, 2004; Goldberg & Strycker, 2002; Machado-Oliveira et al., 2020; Stevenson, 2017) through traits of Conscientiousness and Neuroticism (Carrillo, Prado-Gascó, Fiszman, & Varela, 2012), self-control (Salmon, Fennis, de Ridder, Adriaanse, & De Vet, 2014), or hedonic tendencies (Hofmann, van Koningsbruggen, Stroebe, Ramanathan, & Aarts, 2010; Lowe & Butryn, 2007). Several studies have also investigated relations between personality traits and individual eating habits, dietary intake, and food choice (Lin, Ortega, Caputo, & Lusk, 2019). A review by Lunn et al. (2014) emphasized "a positive association between Openness and consumption of fruits and vegetables and between Conscientiousness and healthy eating" (p. 403). Openness and Conscientiousness also displayed positive relationships to adhering to a healthy diet in a large U.S. community sample (Goldberg & Strycker, 2002). Furthermore, Bogg and Roberts' (2004) meta-analysis demonstrated that Conscientiousness was positively associated with the consumption of less unhealthy food, whereas Carrillo et al. (2012) provided evidence of Conscientiousness and Neuroticism affecting the food choice motives health and weight control; and, ultimately, the consumption of low-sugar, low-fat, and high-calorie foods in a Spanish sample of young consumers. Keller and Siegrist (2015) demonstrated that personality influenced food consumption and played "a role in adherence to a balanced or unbalanced diet" in a random sample of the German-speaking part of Switzerland (p. 136). For instance, high Conscientiousness was associated with more frequent consumption of fruit and vegetables, whereas high Neuroticism was related to consumption of energy-dense sweet and savory food. In a large sample of Estonian adults, Mõttus et al. (2012) demonstrated that low Neuroticism and high Extraversion, Openness, and Conscientiousness were associated with the consumption of healthier diets (i.e., cereals, fish, fruits, and vegetables). More recently, Pfeiler and Egloff (2020, p. 104607) found that Openness and Conscientiousness were related to healthier eating habits among a large representative sample of Australians.

We argue that functional foods constitute a relatively novel food category of products particularly characterized by their convenience and health-promoting attributes. In an experimental study exploring people's impressions of users of functional foods, Saher, Arvola, Lindeman, and Lähteenmäki (2004) found that "[buyers] of functional foods were regarded as more innovative" (p. 79). Openness is associated with innovativeness, such that individuals with a high degree of Openness would be more likely to seek out new situations and products (Olsen, Tudoran, Honkanen, & Verplanken, 2016). Openness is also theoretically related to Extraversion through a common higher-order factor labeled plasticity, rendering extraverted people—like *open* people—more dispositioned to "seek out stimulating experiences" (Feist, 2019, p. 31). Together, both Openness and Extraversion (i.e., plasticity) involve a general tendency toward exploration of and adaptation to novel phenomena (Feist, 2019; Olsen et al., 2016). Thus, a reasonable expectation would be that both open and extraverted individuals are more prone to consume functional foods compared to less open and introverted consumers.

Low Conscientiousness is associated with detrimental health behaviors such as smoking, substance abuse, and unhealthy dietary and exercise habits (John, Naumann, & Soto, 2008). Among the Big Five personality traits, Conscientiousness is most consistently related to the consumption of healthier diets (Stevenson, 2017). Thus, we expect that conscientious people will be more inclined to consume functional foods following their ability to plan ahead and anticipate the long-term consequences of their actions (Kooij et al., 2018).

Regarding Agreeableness, more agreeable people tend to approach novel foods more so than people low in Agreeableness (Nezlek & Forestell, 2019). Additionally, Agreeableness is associated with healthy dietary behaviors such as limiting one's intake of sugar and fats and taking vitamins (Booth-Kewley & Vickers, 1994Booth-Kewley & Vickers, 1994). It is thus reasonable to expect a positive relationship between Agreeableness and consumption of functional foods.

Finally, Neuroticism is associated with emotional, external, and restrained eating (Elfhag & Morey, 2008; Keller & Siegrist, 2015), and neurotic people are less inclined to delay gratification (Olsen et al., 2016). Neuroticism has further been linked to poor quality diets, higher neophobia, and convenience (MacNicol, Murray, & Austin, 2003; Mõttus et al., 2013; Tiainen et al., 2013). Neurotic people are also suggested to "adopt counter-regulatory emotional eating and to eat high-energy dense sweet and savory food in particular" (Keller & Siegrist, 2015, p. 136). The following hypotheses are proposed:

H2a. Personality traits (except Neuroticism) are *positively* associated with functional food consumption frequency.

H2b. Neuroticism is *negatively* associated with functional food consumption frequency.

2.3. Relationships between personality traits and future time perspective (FTP)

Time perspective and personality traits are both considered relatively stable individual determinants of behavior (Kairys & Liniauskaite, 2015). The two concepts may however be differentiated in accordance with the FFT (McCrae & Sutin, 2018), wherein personality traits are distal causes and time perspective a more proximal determinant (i.e., characteristic adaptations) of behavior (see also Loose, Robiou Du Pont, Acier, & El-Baalbaki, 2019). Indeed, in a recent review, Kooij et al. (2018) suggested the Big Five personality traits—particularly Conscientiousness—to be important antecedents of FTP. The authors posited that "more agreeable, open, extraverted, and conscientious individuals […] score higher on FTP" (p. 876). Dunkel and Weber (2010) found that Conscientiousness and Neuroticism both were strong positive predictors of FTP (as measured by the ZTPI). Some studies have also demonstrated relationships between personality traits and CFC (e.g., J. Adams & Nettle, 2009; Daugherty & Brase, 2010; Gick, 2014; Lafreniere &

[1] Briefly, Openness characterizes individuals who are imaginative, curious, and creative (Goldberg, 1992) and describes "the breadth, depth, originality, and complexity of an individual's *mental and experiential life*" (John et al., 2008, p. 120). Conscientiousness "facilitates task- and goal-directed behavior" including thinking before acting and delaying gratification (John et al., 2008, p. 120). Conscientious people are organized, dutiful, and responsible (Goldberg, 1992; John & Srivastava, 1999) and "stay healthier, thrive, and live longer" (Friedman & Kern, 2014, p. 731). Extraversion is characterized by people being sociable, enthusiastic, and adventurous (John & Srivastava, 1999) and implies "an *energetic approach* toward the social and material world" (John et al., 2008, p. 120). Agreeable people are trustful, fair, and altruistic (Goldberg, 1992; John & Srivastava, 1999). Finally, neurotic individuals are insecure, guilt-ridden, and tense (Goldberg, 1992).

Cramer, 2006). Gick (2014) demonstrated that for university students, Conscientiousness was positively associated with CFC and CFC-Future, but negatively related to CFC-Immediate. In a study of U.S. urban citizens (J. Adams & Nettle, 2009), CFC was positively associated with Conscientiousness, Agreeableness, and Openness and negatively related to Neuroticism. With the exception of Neuroticism both Lafreniere and Cramer (2006) and Daugherty and Brase (2010) found positive correlations of Conscientiousness, Openness, and Agreeableness with CFC in Canadian and U.S. undergraduates, respectively. Finally, Thelken and de Jong (2017) showed that Conscientiousness, Agreeableness, and Neuroticism were positively related to CFC-Future; whereas Conscientiousness was positively, and Extraversion negatively related to CFC-Immediate. Consequently, we proposed the following hypotheses:

H3a. Personality traits are *positively* associated with CFC-Future.

H3b. Personality traits are *negatively* associated with CFC-Immediate.

2.4. The mediating role of CFC

Personality traits are "broad-bandwidth" individual differences that offer parsimony at the expense of predictive accuracy (Saucier & Goldberg, 2004). In other words, personality traits can demonstrate predictive abilities pertaining to broad domains of behavior (e.g., health), albeit to a lesser extent predict specific behaviors (e.g., eating functional foods) within a given domain (see e.g., Epstein, 1979). Descriptive approaches to personality (e.g., FFM) are well-suited to assess inter-individual differences in behavior (Baumert et al., 2017), yet have limitations in providing explanations as to why certain traits are associated with specific behaviors. A means to address such a limitation is to introduce mediating mechanisms responsible for the personality–behavior link. Aside from direct associations between personality traits and FTP and health-related behaviors and outcomes, FTP can take on a mediational role in the personality–health relationship (Kooij et al., 2018), asking "why personality traits have their consequential effects" (Hampson, 2012, p. 317).

The mediating role of (future) time perspective, including CFC, within the health domain has received some research attention (e.g., J. Adams, 2009; J. Adams & White, 2009). However, although plausible, the mediating role of time perspective in the personality–behavior relationship has not been widely explored (Loose et al., 2019). Kooij et al. (2018) advocated that FTP "may function as an important link in the relationships between personality traits and individual motivation and behavior" (p. 868). Their meta-analysis provided evidence of indirect effects of personality traits on several health-related outcome variables as mediated by FTP. A review of CFC (Joireman & King, 2016) also called for research "locating CFC within a broader developmental framework" (p. 322). Our theoretical model conceptualized CFC as a mediator between personality traits and behavior (Fig. 1), and we proposed the following hypotheses:

H4a. CFC-Future mediates the relationship between personality traits and consumption frequency.

H4b. CFC-Immediate mediates the relationship between personality traits and consumption frequency.

3. Materials and methods

3.1. Data collection and sample characteristics

In January 2019, a sample of the Norwegian adult population—representative for sex, age, and region—responded to an online survey. The final sample included 810 respondents, randomly selected from a pre-recruited pool of respondents administered by a reputed research agency—YouGov. Respondents were aged 18–74 years, 50.6% were men, 28.4% had 1–3 years of university education, and 26.0% had ≥4 years of university education. Respondents completed an online survey measuring the Big Five personality traits, domain-specific CFC, and consumption frequency of functional foods, along with other measures not part of this study.

3.2. Measures

A functional food was defined as a food product enriched with minerals, vitamins, fatty acids, or proteins for health-enhancement or disease-prevention, part of a standard diet and consumed on a regular basis in normal quantities (Doyon & Labrecque, 2008; Laros & Steenkamp, 2005). Participants were given the definition prior to the assessment of consumption frequency. Consumption of functional foods was assessed on a scale from 1 (*never/seldom*) to 7 (*several times per day*) following the question: "On average during the last 6 months, how often have you consumed functional foods?" Similar measures have been used to assess self-reported consumption frequency of food (Olsen, Scholderer, Brunsø, & Verbeke, 2007), including functional foods (Goetzke, Nitzko, & Spiller, 2014).

Domain-specific CFC was measured by eight items adapted from van Beek et al. (2013), of which four items were designed to reflect consideration of distal health outcomes of current food choices (CFC-Future) and four items more proximal consequences (CFC-Immediate). The adaptation of the original items consisted in stronger emphasis on *food choice* (vs. *eating behavior*) and *health outcomes* (vs. *outcomes*). This framing, particularly the emphasis on health outcomes, is suggested to clarify the interpretational ambiguity related to the original scale of whether respondents "imagine either positive or negative consequences on their health" (Tórtora & Ares, 2018, p. 710). Sample items were "I often choose to eat food with positive health effects in the long term" (CFC-Future) and "I only choose my food to satisfy immediate needs, figuring possible future health problems will take care of themselves" (CFC-Immediate). The eight items were scored on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*).

The Big Five personality traits were measured with the Mini-International Personality Item Pool (Mini-IPIP; Donnellan et al., 2006), a 20-item short form of Goldberg's (1999) 50-item IPIP-FFM. The Mini-IPIP is a validated and frequently used instrument, cited more than 1300 times (Perry, Hoerger, Molix, & Duberstein, 2019), wherein each of the five personality traits is assessed by four items. The current study applied a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Negatively worded items were reverse coded prior to further analysis. In addition, sociodemographic variables sex, age group, and education level were included in the structural models as control variables.

3.3. Analytical procedures

The two-stage procedure of Anderson and Gerbing (1988) was followed for confirmatory factor analyses (CFA) and structural equation modeling (SEM) using RStudio (RStudio Team, Version February 1, 5019, 2019) with *lavaan* package version 0.6–5 (Rosseel, 2012). A CFA was performed to investigate the relationships between items and their corresponding latent constructs. Average variance explained (AVE) and maximum shared variance (MSV) were measures of convergent and discriminant validity, respectively, whereas construct reliability (CR) assessed internal consistency in scale items. Satisfactory convergent validity is represented by AVE >0.5, discriminant validity by AVE > MSV, and CR by CR > 0.7 (Hair, Black, Babin, & Anderson, 2013).

Moreover, two measurement models were specified and compared to assess the appropriate factor structure of the CFC scale. Sample size-independent model fit indices included root mean square error of approximation (RMSEA < 0.07), comparative fit index (CFI > 0.92), standardized root mean square residual (SRMR < 0.08), and the Tucker-Lewis Index (TLI > 0.92) (Hair et al., 2013). Confounding effects of common method bias were controlled for by applying an unmeasured latent methods factor to the measurement model (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

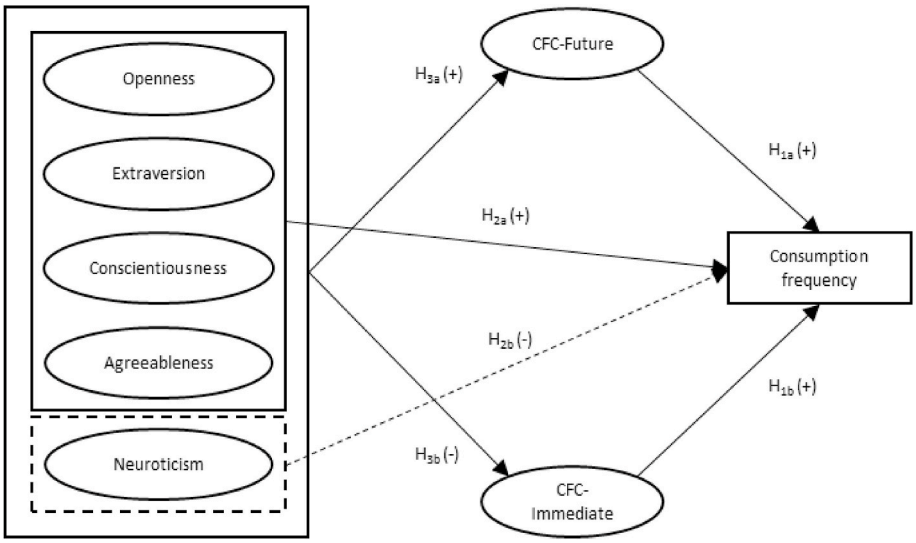

Fig. 1. Conceptual model depicting the hypothesized relationships between the Big Five personality traits, domain-specific CFC, and consumption of functional foods.
CFC: consideration of future consequences.

Finally, a bias-corrected bootstrap procedure with 5000 resamples was run to test for specific indirect effects of personality traits on consumption frequency through CFC-Future and CFC-Immediate, respectively.

4. Results

4.1. Reliability and validity of measures

To assess the appropriate factor structure of the CFC scale, two measurement models were specified, and their model fit were compared. The first model specified CFC as a single unidimensional factor (immediate items reverse-coded). Model fit was poor, $\chi^2(20) = 981.71$, RMSEA = 0.24, CFI = 0.62, SRMR = 0.16, TLI = 0.46. The second model assumed two correlated factors (i.e., CFC-Future vs. CFC-Immediate). Model fit improved significantly, $\chi^2(19) = 107.71$, RMSEA = 0.08, CFI = 0.97, SRMR = 0.04, TLI = 0.95. Hence, a two-factor representation of CFC was retained for further analysis.

The full measurement model included seven latent constructs: CFC-Future, CFC-Immediate, Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. Initial model fit was suboptimal, $\chi^2(329) = 2053.65$, RMSEA = 0.08, CFI = 0.79, SRMR = 0.08, TLI = 0.75. To improve overall model fit, the measurement model was screened for problematic items (i.e., low factor loadings and high error correlations). Consequently, one item per latent personality construct was omitted.[2] The moderated measurement model demonstrated improved fit, $\chi^2(209) = 842.26$, RMSEA = 0.06, CFI = 0.90, SRMR = 0.06, TLI = 0.88. Modification indices suggested some correlated error terms which would improve model fit. However, allowing for correlated error terms—especially between items measuring different latent constructs—is usually not advised without a theoretical reason (Hermida, 2015; Landis, Edwards, & Cortina, 2009) and therefore such modifications were not implemented. CFC-Future and CFC-Immediate demonstrated convergent and discriminant validity, respectively AVE >0.50 and AVE > MSV, and CR > 0.70. Openness, Conscientiousness, Agreeableness, and Neuroticism were just below the convergent validity threshold of 0.50. Conscientiousness and Neuroticism showed inadequate discriminant validity (AVE < MSV) and were just below the construct reliability limit (CR < 0.70). Omitting additional items to achieve better overall model fit, and adequate validity and reliability estimates, was deemed inappropriate on the grounds that the latent constructs then would only be reflected by two items and hence become unidentifiable on their own (e.g., Howell, Breivik, & Wilcox, 2007). Common method bias was not observed. Table 1 presents the final measurement model.

Descriptive results suggest that respondents considered potential future health consequences related to their current food choices (mean CFC-Future = 4.89) more than the immediate rewards (mean CFC-Immediate = 3.54). Consumption of functional foods was positively related to CFC-Future ($r = 0.16$, $p < .001$) but not CFC-Immediate ($r = 0.04$, $p = .29$). Openness ($r = -0.10$, $p < .05$) and Agreeableness ($r = -0.09$, $p < .05$) were negatively correlated with the consumption of functional foods. All five personality traits were intercorrelated ($r = -0.68 – 0.51$, $p < .001$). Average consumption frequency of functional foods (M = 2.87) corresponded to between 1 and 3 times a month and once a week. Table 2 displays correlations and descriptive statistics for study variables.

Compared to men, women were more considerate of future consequences and less of immediate consequences of their food choices. Women also reported higher scores on Extraversion, Agreeableness, and Neuroticism in comparison to men. Age and education level were positively associated with CFC-F and negatively related to CFC-I. Moreover, age and education level were positively related to Openness and Agreeableness and negatively related to Neuroticism. Age was also positively associated with Conscientiousness and Extraversion. A weak negative correlation between age and consumption frequency of functional foods was also observed.

4.2. Tests of structural models and indirect effects

Four structural equation models were specified and tested (Table 3), controlling for sociodemographic variables sex, age group, and education level. Our first research objective was to test the relationships of domain-specific CFC-Future and CFC-Immediate to consumption frequency of functional foods. Model 1 therefore specified CFC-Future and CFC-Immediate as predictors of consumption frequency. Goodness-of-fit measures were adequate, $\chi^2(46) = 160.80$, RMSEA = 0.06, CFI = 0.96,

[2] Structural models were also specified without scale modification (i.e., using the original Mini-IPIP scale in full), which resulted in similar parameter estimates, but severely poorer model fit indices as compared to the model with scale modification.

Table 1
Standardized factor loadings, reliability and validity.

Construct and item	Factor loading	Composite reliability	Average variance extracted
Consideration of future consequences		0.83	0.55
I consider how my health might be in the future, and try to influence my health with my day to day food choices	0.83		
I often choose to eat food with positive health effects in the long term	0.74		
I think it is important to take warnings about negative health consequences of the food I eat seriously even if the consequences will not occur for many years	0.75		
I think it is more important to choose food with favorable distant health consequences than food with less favorable immediate consequences	0.63		
Consideration of immediate consequences		0.83	0.55
I only choose my food to satisfy immediate needs, figuring possible future health problems will take care of itself	0.79		
I generally ignore warnings about possible future health problems in consequence of what I eat because I think they will be resolved before they reach crisis level	0.74		
I think that sacrificing particular food now is usually unnecessary because future health consequences can be dealt with at a later time	0.62		
I only choose food that satisfies my immediate needs, figuring that I will take care of potential future health problems that may occur at a later date	0.80		
Openness		0.73	0.49
open5: I have a vivid imagination	x		
open10: I am not interested in abstract ideas (reverse scored)	0.74		
open15: I have difficulty understanding abstract ideas (reverse scored)	0.82		
open20: I do not have a good imagination (reverse scored)	0.50		
Conscientiousness		0.67	0.42
cons3: I get chores done right away	x		
cons8: I often forget to put things back in their proper place (reverse scored)	0.69		
cons13: I like order	0.41		
cons18: I make a mess of things (reverse scored)	0.79		
Extraversion		0.75	0.50
extr1: I am the life of the party	x		
extr6: I don't talk a lot (reverse scored)	0.78		
extr11: I talk to a lot of different people at parties	0.56		
extr16: I keep in the background (reverse scored)	0.76		
Agreeableness		0.74	0.49
agre2: I sympathize with others' feelings	x		
agre7: I am not interested in other people's problems (reverse scored)	0.71		
agre12: I feel others' emotions	0.57		
agre17: I am not really interested in others (reverse scored)	0.79		
Neuroticism		0.68	0.43
neur4: I have frequent mood swings	0.83		
neur9: I am relaxed most of the time (reverse scored)	x		
neur14: I get upset easily	0.60		
neur19: I seldom feel blue (reverse scored)	0.49		

Note. x indicates omitted items to improve model fit. Model fit: $\chi^2(209) = 842.26$, RMSEA = 0.06, CFI = 0.90, SRMR = 0.06, TLI = 0.88.

SRMR = 0.04, TLI = 0.94. Both CFC-Future ($\beta = 0.22$, $t = 5.13$, $p < .001$) and CFC-Immediate ($\beta = 0.12$, $t = 2.64$, $p < .01$) were significantly associated with consumption frequency. These results support hypotheses H_{1a} and H_{1b}.

The second objective was to investigate the link between the Big Five personality traits and consumption frequency of functional foods. Thus, Model 2 assessed the direct effects of Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism on consumption frequency. None of the Big Five personality traits were significantly associated with consumption frequency and model fit was unsatisfactory, $\chi^2(121) = 574.06$, RMSEA = 0.07, CFI = 0.88, SRMR = 0.05, TLI = 0.83. Findings were thus unsupportive of hypotheses H_{2a} and H_{2b}.

Introducing the Big Five personality traits as precursors of CFC-Future and CFC-Immediate to the model, two additional analyses were run. The first analysis assumed only indirect effects of personality traits on consumption frequency via CFC-Future and CFC-Immediate, constraining the direct paths to equal zero (Model 3a, full mediation). The second model allowed all paths to be freely estimated (Model 3b, partial mediation). A chi-square difference test comparing the two nested models implied marginally improved model fit, $\Delta\chi^2_{(5)} = 10.85$, $p = .05$. No change to the other fit indices was observed.

In the full mediation model (Model 3a), both CFC-Future ($\beta = 0.22$, $t = 5.11$, $p < .001$) and CFC-Immediate ($\beta = 0.12$, $t = 2.77$, $p < .01$) were significant predictors of consumption frequency. The partial mediation model (Model 3b)—allowing for direct effects of personality traits on consumption frequency—attenuated the effect of CFC-Immediate on consumption ($\beta = 0.08$, $t = 1.73$, $p = .08$), leaving CFC-Future the only significant predictor of consumption frequency ($\beta = 0.24$, $t = 5.29$, $p < .001$). Extraversion was not associated with neither CFC-Future ($\beta = -0.05$, $t = -0.98$, $p = .33$) nor CFC-Immediate ($\beta = -0.02$, $t = -0.37$, $p = .71$), thus lending no support to hypotheses H_{3a} and H_{3b}. Neuroticism was positively associated with CFC-Future ($\beta = 0.23$, $t = 2.80$, $p < .01$) but not CFC-Immediate ($\beta = -0.01$, $t = -0.17$, $p = .86$), supporting hypothesis H_{3a} but not hypothesis H_{3b}. Openness was only related to CFC-Immediate ($\beta = -0.18$, $t = -3.21$, $p < .01$) and not to CFC-Future ($\beta = 0.09$, $t = 1.53$, $p = .13$), supporting hypothesis H_{3b} but not H_{3a}. Conscientiousness ($\beta = 0.25$, $t = 3.15$, $p < .01$) and Agreeableness ($\beta = 0.18$, $t = 2.60$, $p < .01$) were both positively associated with CFC-Future and negatively related to CFC-Immediate ($\beta = -0.17$, $t = -2.32$, $p < .05$; $\beta = -0.14$, $t = -2.17$, $p < .05$, respectively), thus supporting hypotheses H_{3a} and H_{3b} (Table 3). The Big Five personality traits explained 15.6% and 20.6% of the variance in CFC-Future and CFC-Immediate, respectively. Together, the Big Five personality traits, CFC-Future, and CFC-Immediate accounted for 6.4% of the variance in consumption

Table 2
Correlation matrix and descriptive statistics for study variables.

	O	C	E	A	N	CFC-F	CFC-I	CF
O	–							
C	0.37***	–						
E	0.25***	0.32***	–					
A	0.51***	0.41***	0.48***	–				
N	−0.36***	−0.68***	−0.41***	−0.34***	–			
CFC-F	0.22***	0.22***	0.08	0.28***	−0.06	–		
CFC-I	−0.35***	−0.32***	−0.21***	−0.35***	0.26***	−0.41***	–	
CF	−0.10*	−0.03	−0.06	−0.09*	0.05	0.16***	0.04	–
Mean	*4.60*	*4.88*	*4.03*	*5.18*	*3.69*	*4.89*	*3.54*	*2.87*
SD	*1.13*	*1.14*	*1.23*	*1.11*	*1.20*	*1.02*	*1.19*	*1.66*

Note. ***$p < .001$, **$p < .01$, *$p < .05$, O = Openness, C = Conscientiousness, E = Extraversion, A = Agreeableness, N = Neuroticism, CF = Consumption frequency (of functional food), CFC-F = consideration of future consequences–future, CFC-I = consideration of future consequences–immediate.

Table 3
Structural equation models and fit indices, controlling for sex, age group, and education level.

Relationship	Hypothesis	Model 1		Model 2		Model 3a (Full mediation)		Model 3b (Partial mediation)	
		Std β	*t*-value	Std β	*t*-value	Std β	*t*-value	Std β	*t*-value
CFC-F → CF	H_{1a}	0.22	5.13***			0.22	5.11***	0.24	5.29***
CFC-I → CF	H_{1b}	0.12	2.64**			0.12	2.77**	0.08	1.73
O → CF	H_{2a}			−0.10	−1.79			−0.10	−1.89
E → CF	H_{2a}			−0.01	−0.20			0.01	0.10
C → CF	H_{2a}			0.07	0.89			0.02	0.26
A → CF	H_{2a}			−0.05	−0.79			−0.09	−1.32
N → CF	H_{2b}			0.02	0.27			−0.03	−0.43
O → CFC-F	H_{3a}					0.08	1.47	0.09	1.53
O → CFC-I	H_{3b}					−0.18	−3.26**	−0.18	−3.21**
E → CFC-F	H_{3a}					−0.05	−0.97	−0.05	−0.98
E → CFC-I	H_{3b}					−0.02	−0.37	−0.02	−0.37
C → CFC-F	H_{3a}					0.25	3.17**	0.25	3.15**
C → CFC-I	H_{3b}					−0.17	−2.32*	−0.17	−2.32*
A → CFC-F	H_{3a}					0.18	2.53*	0.18	2.59**
A → CFC-I	H_{3b}					−0.14	−2.19*	−0.14	−2.17*
N → CFC-F	H_{3a}					0.23	2.79**	0.23	2.80**
N → CFC-I	H_{3b}					−0.01	−0.18	−0.01	−0.17
Model fit indices:									
χ^2 (df)		160.80 (46)		574.06 (121)		976.84 (279)		965.99 (274)	
RMSEA		0.06		0.07		0.06		0.06	
CFI		0.96		0.88		0.89		0.90	
SRMR		0.04		0.05		0.05		0.05	
TLI		0.94		0.83		0.87		0.87	
$\Delta\chi^2(\Delta df)$		–		–		–		10.85 (5)	

Note. ***p < .001, **p < .010, *p < .050. CFC-F = consideration of future consequences–future, CFC-I = consideration of future consequences–immediate, CF = consumption frequency (of functional food), O = Openness, E = Extraversion, C = Conscientiousness, A = Agreeableness, N = Neuroticism.

frequency.[3]

Results of the bootstrap tests of indirect effects are presented in Table 4. No indirect effects of personality traits via CFC-Immediate were found. Contrarywise, three significant indirect effects via CFC-Future were established. Conscientiousness, Agreeableness, and Neuroticism were all associated with higher consumption frequency of functional foods via greater CFC-Future. As no direct effects of personality traits exist, this result suggests indirect-only mediation (Rucker, Preacher, Tormala, & Petty, 2011; Zhao, Lynch, & Chen, 2010).

5. Discussion

The current study examined the simultaneous role of the Big Five personality traits and domain-specific CFC in relation to the consumption of functional foods among a representative sample of Norwegian consumers. Model 1 established a significant association of both CFC-Future and CFC-Immediate with functional food consumption frequency, the former being the stronger predictor. This result is consistent with prior research investigating the links between domain-specific CFC and dietary behavior (e.g., Dassen et al., 2015; van Beek et al., 2013). In Model 2, direct effects of the personality traits on consumption frequency were tested and revealed as nonexistent and non-significant.

[3] Some discrepancies between bivariate and structural relationships can be observed. Exploring the effects in a stepwise fashion, we discovered that: (1) CFC-F acts as a suppressor of the relationship between CFC-I and CF since the magnitude of the relationship between the CFC-I and CF ($r = 0.04$, $p = .29$) becomes larger and highly significant ($\beta = 0.12$, $p = .01$) when CFC-F is included. This outcome suggests that both the present and future consequences are important in determining consumption frequency and there is a possible synergy between them; and (2) by introducing the personality traits one by one into the model, it was observed that Conscientiousness acts as a suppressor of the bivariate relation between Neuroticism and CFC-F ($r = -0.06$, $p = .21$ vs. $\beta = 0.23$, $p < .01$); while the bivariate relationship between Neuroticism and CFC-I ($r = 0.26$, $p < .001$) dissipates by the introduction of Conscientiousness to the model ($\beta = -0.01$, $p = .86$), suggesting that Conscientiousness acts as a confounder of the relation between Neuroticism and CFC-I. These are sensible findings claiming that, given a certain level of conscientiousness, neurotic individuals take into consideration the future consequences and no longer emphasize the immediate consequences.

Table 4
Bootstrap estimates of the indirect effects.

Predictor	Mediator	B	SE	Z	Beta	BC 95% CI	
						Lower bound	Upper bound
Openness	CFC-Future	0.03	0.03	1.28	0.02	−0.01	0.09
Conscientiousness	CFC-Future	0.09	0.04	2.39*	0.06	0.03	0.19
Extraversion	CFC-Future	−0.02	0.02	−0.81	−0.01	−0.06	0.02
Agreeableness	CFC-Future	0.07	0.03	2.06*	0.04	0.02	0.15
Neuroticism	CFC-Future	0.07	0.03	2.27*	0.06	0.02	0.15
Openness	CFC-Immediate	−0.02	0.02	−1.28	−0.01	−0.07	0.00
Conscientiousness	CFC-Immediate	−0.02	0.02	−1.13	−0.01	−0.07	0.00
Extraversion	CFC-Immediate	0.00	0.01	−0.27	0.00	−0.03	0.01
Agreeableness	CFC-Immediate	−0.02	0.02	−1.17	−0.01	−0.07	0.00
Neuroticism	CFC-Immediate	0.00	0.01	−0.13	0.00	−0.03	0.02

Note. ***$p < .001$, **$p < .01$, *$p < .05$, B = unstandardized estimate, SE = standard error, Beta = standardized estimate, BC = bias-corrected, CI = confidence interval.

Although hypothesized, this finding was not unexpected owing to the specificity of behavior in question and the conceptual distance between global traits and specific consumption/behavior (Epstein, 1979; Saucier & Goldberg, 2004). The absence of a direct relationship could thus be explained by a lack of compatibility (Ajzen & Fishbein, 2005)—had the behavior in question been broader and more general (e.g., consumption of healthy foods) the hypotheses would more likely have been supported.

Except for Extraversion, the other four personality traits demonstrated significant relationships to either both CFC-Future and CFC-Immediate or one of the two. The direction of relationships was in accordance with expectations. For instance, Conscientiousness was positively associated with CFC-Future and negatively associated with CFC-Immediate, which suggests that the more conscientious individuals are the more considerate they are of future health outcomes related to their food choices. Oppositely, less conscientious individuals are more susceptible to consider the immediate consequences (rewards) of their food choices. Similar patterns of association were evident for Openness and Agreeableness, whereas Neuroticism was only significantly associated with CFC-Future. The pattern of relationships is congruent with some previous investigations of the personality–time perspective relationship (Gick, 2014; Kooij et al., 2018; Thelken & de Jong, 2017). This study confirms the existing literature proposing a conceptual distinction between present and future time perspective (Joireman et al., 2008, 2012). Results further extend previous studies (J. Adams & Nettle, 2009; Daugherty & Brase, 2010; Lafreniere & Cramer, 2006) by providing empirical evidence about the differential antecedent role personality traits exert on future vs. present orientation (i.e., positive vs. negative valence), and thus offer a broader understanding of the associations as compared to a one-dimensional conceptualization.

A comparison between the full and partial mediation models lent support for retaining the latter model following a significant chi-square difference test. The association between CFC-Immediate and consumption frequency was reduced to non-significance when allowing for direct effects of personality traits (i.e., partial mediation). Interpretation of the partial mediation model suggests that personality traits are associated with consumption frequency of functional foods solely through their relationship to CFC-Future.

Indeed, Conscientiousness, Agreeableness, and Neuroticism exerted positive influence on consumption frequency via greater CFC-Future. The mediating role of CFC-Future provides an explanation as to why some personality traits are associated with higher consumption frequency of functional foods. The domain-specific approach to FTP in the present study is interpreted as consideration of future health consequences of present food choices (CFC-Future), which further can be viewed as a conflict or tradeoff between sensorial hedonism (e.g., eating pleasure) in the now and potential (negative) health-related outcomes in the future. Conscientious individuals are characterized by their ability to think before acting and delay gratification (John et al., 2008). Engaging in functional food consumption is argued to constitute a convenient means to adhere to a healthy diet and is a more likely behavioral consequence to people considerate of and influenced by potential detrimental future health effects related to current food choices.

Agreeableness is related to trustfulness, fairness, and altruism (Goldberg, 1992; John & Srivastava, 1999), and although Murray and Booth (2015) posited that Agreeableness is generally unrelated to health, others have demonstrated associations between the two (e.g., Booth-Kewley & Vickers, 1994; John et al., 2008). The positive relationship between Agreeableness and future time perspective (Kooij et al., 2018) is supported in the current study, which further highlights the important mediating role that CFC-Future plays in explaining the link between Agreeableness and functional food consumption. Similarly—and although higher Neuroticism previously has been linked to less healthy eating (T. B. Adams & Mowen, 2006)—the current results indicated that higher Neuroticism was associated with greater consumption frequency of functional foods as mediated through stronger CFC-Future.

5.1. Limitations and future research

Some limitations need to be addressed. First, the cross-sectional design makes assessment of causality inconclusive (Spector, 2019). The theoretical hierarchical link between the three concepts (i.e., personality traits, time perspective, and behavior) is however well established and the current research provides a process explanation of the relationship (Hampson, 2012; Kooij et al., 2018). Additionally, all data were self-reported and prone to method biases. For example, dietary self-reports are prone to measurement error and pose threats to validity (Subar et al., 2015). Self-reported food frequency measures are, however, commonly applied within social psychology research (e.g., Armitage & Conner, 2001). The construction of a new domain-specific scale to assess CFC poses another potential limitation. Although domain-specific scales better predict relevant outcomes, further development has been suggested forestalled until measurement issues pertaining to the general CFC construct have been sorted (Joireman & King, 2016). Relatedly, competing conceptualizations of and scales to assess time perspective could have been used (e.g., ZTPI, Temporal Focus Scale). Additionally, specification of time frames (e.g., 3 vs. 10 years into the future) has been proposed to improve the precision of time perspective measurements (Mohammed & Marhefka, 2019).

Furthermore, although the Mini-IPIP measure of personality traits is widely applied (Perry et al., 2019), several investigators have noted mixed findings of model fit and low item factor loadings (Baldasaro, Shanahan, & Bauer, 2013; Cooper, Smillie, & Corr, 2010; Laverdière, Morin, & St-Hilaire, 2013; Perry et al., 2019). Typically, RMSEA and SRMR demonstrate reasonable fit whereas CFI and TLI do not—much like in the current study (e.g., Baldasaro et al., 2013; Perry et al., 2019). An unfortunate consequence of modifying scales is that it reduces comparability with similar studies. Model fit "failures" are not however unique to the Mini-IPIP scale–other personality inventories display

similar shortcomings (Hopwood & Donnellan, 2010). Finally, time perspective is only one of many plausible mechanisms potentially relevant to the personality–(health) behavior relationship. Future research would benefit from applying a more comprehensive personality inventory in combination with both a domain-specific CFC and the original CFC or CFC-14 scales (Joireman et al., 2012), and furthermore, include other relevant mediators such as health habits, eating values, or attitudes toward functional foods.

6. Conclusions

The present research responded to the call for integrating FTP as a potential mechanism through which basic personality traits can influence specific behaviors (i.e., consumption of functional foods). Several relations between the Big Five personality traits and CFC and consumption frequency emerged. Although hypothesized—and prior research has demonstrated links between the Big Five personality traits and various health-related behaviors—the conceptual distance between basic traits and specific behaviors is eminent and suggestive of mediating mechanisms accounting for variation in outcome measures. The indirect effects of Conscientiousness, Agreeableness, and Neuroticism on consumption through CFC-Future—and the absence of direct effects—are particularly interesting. The current work has shed some light on FTP as one such potential mechanism and provides initial empirical evidence of an integrative understanding of the personality–behavior relationship.

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Declaration of competing interest

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References

Adams, J. (2009). The mediating role of time perspective in socio-economic inequalities in smoking and physical activity in older English adults. *Journal of Health Psychology, 14*, 794–799. https://doi.org/10.1177/1359105309338979

Adams, J. (2012). Consideration of immediate and future consequences, smoking status, and body mass index. *Health Psychology, 31*, 260–263. https://doi.org/10.1037/a0025790

Adams, T. B., & Mowen, J. C. (2006). Identifying the personality characteristics of healthy eaters and exercisers: A hierarchical model approach. *Health Marketing Quarterly, 23*, 21–42. https://doi.org/10.1300/j026v23n01_03

Adams, J., & Nettle, D. (2009). Time perspective, personality and smoking, body mass, and physical activity: An empirical study. *British Journal of Health Psychology, 14*, 83–105. https://doi.org/10.1348/135910708X299664

Adams, J., & White, M. (2009). Time perspective in socioeconomic inequalities in smoking and body mass index. *Health Psychology, 28*, 83–90. https://psycnet.apa.org/doi/10.1037/0278-6133.28.1.83.

Ajzen, I., & Fishbein, M. (2005). The influence of attitudes on behavior. In D. Albarracin, B. T. Johnson, & M. P. Zanna (Eds.), *The handbook of attitudes* (1st ed., pp. 173–221). Mahwah: Erlbaum.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*, 411–423. https://doi.org/10.1037/0033-2909.103.3.411

Andre, L., van Vianen, A. E., Peetsma, T. T., & Oort, F. J. (2018). Motivational power of future time perspective: Meta-analyses in education, work, and health. *PloS One, 13*, Article e0190492. https://doi.org/10.1371/journal.pone.0190492

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology, 40*, 471–499. https://doi.org/10.1348/014466601164939

Baldasaro, R. E., Shanahan, M. J., & Bauer, D. J. (2013). Psychometric properties of the Mini-IPIP in a large, nationally representative sample of young adults. *Journal of Personality Assessment, 95*, 74–84. https://doi.org/10.1080/00223891.2012.700466

Baumert, A., Schmitt, M., Perugini, M., Johnson, W., Blum, G., Borkenau, P., et al. (2017). Integrating personality structure, personality process, and personality development. *European Journal of Personality, 31*, 503–528. https://doi.org/10.1002/per.2115

van Beek, J., Antonides, G., & Handgraaf, M. J. J. (2013). Eat now, exercise later: The relation between consideration of immediate and future consequences and healthy behavior. *Personality and Individual Differences, 54*, 785–791. https://doi.org/10.1016/j.paid.2012.12.015

Bimbo, F., Bonanno, A., Nocella, G., Viscecchia, R., Nardone, G., De Devitiis, B., et al. (2017). Consumers' acceptance and preferences for nutrition-modified and functional dairy products: A systematic review. *Appetite, 113*, 141–154. https://doi.org/10.1016/j.appet.2017.02.031

Bogg, T., & Roberts, B. W. (2004). Conscientiousness and health-related behaviors: A meta-analysis of the leading behavioral contributors to mortality. *Psychological Bulletin, 130*, 887–919. https://doi.org/10.1037/0033-2909.130.6.887

Booth-Kewley, S., & Vickers, R. R., Jr. (1994). Associations between major domains of personality and health behavior. *Journal of Personality, 62*, 281–298. https://doi.org/10.1111/j.1467-6494.1994.tb00298.x

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*, 792–797. https://doi.org/10.1016/j.foodres.2012.09.006

Cobb-Clark, D. A., & Schurer, S. (2012). The stability of big-five personality traits. *Economics Letters, 115*, 11–15. https://doi.org/10.1016/j.econlet.2011.11.015

Cooper, A. J., Smillie, L. D., & Corr, P. J. (2010). A confirmatory factor analysis of the Mini-IPIP five-factor model personality scale. *Personality and Individual Differences, 48*, 688–691. https://doi.org/10.1016/j.paid.2010.01.004

Crockett, R. A., Weinman, J., Hankins, M., & Marteau, T. (2009). Time orientation and health-related behaviour: Measurement in general population samples. *Psychology and Health, 24*, 333–350. https://doi.org/10.1080/08870440701813030

Dassen, F. C. M., Houben, K., & Jansen, A. (2015). Time orientation and eating behavior: Unhealthy eaters consider immediate consequences, while healthy eaters focus on future health. *Appetite, 91*, 13–19. https://doi.org/10.1016/j.appet.2015.03.020

Daugherty, J. R., & Brase, G. L. (2010). Taking time to be healthy: Predicting health behaviors with delay discounting and time perspective. *Personality and Individual Differences, 48*, 202–207. https://doi.org/10.1016/j.paid.2009.10.007

Donnellan, M. B., Oswald, F. L., Baird, B. M., & Lucas, R. E. (2006). The Mini-IPIP scales: Tiny-yet-effective measures of the big five factors of personality. *Psychological Assessment, 18*, 192–**203**. https://doi.org/10.1037/1040-3590.18.2.192

Doyon, M., & Labrecque, J. (2008). Functional foods: A conceptual definition. *British Food Journal, 110*, 1133–1149. https://doi.org/10.1108/00070700810918036

Dunkel, C. S., & Weber, J. L. (2010). Using three levels of personality to predict time perspective. *Current Psychology, 29*, 95–103. https://doi.org/10.1007/s12144-010-9074-x

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*, 285–293. https://doi.org/10.1016/j.eatbeh.2007.10.003

Epstein, S. (1979). The stability of behavior: I. On predicting most of the people much of the time. *Journal of Personality and Social Psychology, 37*, 1097–1126. https://psycnet.apa.org/doi/10.1037/0022-3514.37.7.1097.

Feist, G. J. (2019). Creativity and the big two model of personality: Plasticity and stability. *Current Opinion in Behavioral Sciences, 27*, 31–35. https://doi.org/10.1016/j.cobeha.2018.07.005

Friedman, H. S., & Kern, M. L. (2014). Personality, well-being, and health. *Annual Review of Psychology, 65*, 719–742. https://doi.org/10.1146/annurev-psych-010213-115123

Gick, M. (2014). An exploration of interactions between conscientiousness and consideration of future consequences on healthy eating. *Personality and Individual Differences, 66*, 181–187. https://doi.org/10.1016/j.paid.2014.03.020

Goetzke, B., Nitzko, S., & Spiller, A. (2014). Consumption of organic and functional food. A matter of well-being and health? *Appetite, 77*, 96–105. https://doi.org/10.1016/j.appet.2014.02.012

Goldberg, L. R. (1992). The development of markers for the big-five factor structure. *Psychological Assessment, 4*, 26–42. 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. In I. Mervielde, I. J. Deary, F. De Fruyt, & F. Ostendorf (Eds.), *Personality psychology in europe* (Vol. 7, pp. 7–28). Tilburg: Tilburg University Press.

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*, 49–65. https://doi.org/10.1016/S0191-8869(01)00005-8

Hair, J., Black, W., Babin, B., & Anderson, R. (2013). *Multivariate data analysis* (Pearson new international edition, 7th ed.). New Jersey: Pearson.

Hall, P. A., Fong, G. T., & Sansone, G. (2015). Time perspective as a predictor of healthy behaviors and disease-mediating states. In M. Stolarski, N. Fieulaine, & W. van Beek (Eds.), *Time perspective theory; Review, research and application* (1st ed., pp. 339–352). Cham: Springer.

Hampson, S. E. (2012). Personality processes: Mechanisms by which personality traits "get outside the skin". *Annual Review of Psychology, 63*, 315–339. https://doi.org/10.1146/2120710-100419

Hermida, R. (2015). The problem of allowing correlated errors in structural equation modeling: Concerns and considerations. *Computational Methods in Social Sciences, 3*, 5–17. https://econpapers.repec.org/RePEc:ntu:ntcmss:vol3-iss1-15-005.

Hofmann, W., van Koningsbruggen, G. M., Stroebe, W., Ramanathan, S., & Aarts, H. (2010). As pleasure unfolds: Hedonic responses to tempting food. *Psychological Science, 21*, 1863–1870. https://doi.org/10.1177/0956797610389186

Hopwood, C. J., & Donnellan, M. B. (2010). How should the internal structure of personality inventories be evaluated? *Personality and Social Psychology Review, 14*, 332–346. https://doi.org/10.1177/1088868310361240

Howell, R. D., Breivik, E., & Wilcox, J. B. (2007). Reconsidering formative measurement. *Psychological Methods, 12*, 205–218. https://doi.org/10.1037/1082-989X.12.2.205

John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative big five trait taxonomy. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3rd ed., pp. 114–158). New York: Guilford.

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* (2nd ed., pp. 102–138). New York: Guilford.

Joireman, J., Balliet, D., Sprott, D., Spangenberg, E., & Schultz, J. (2008). Consideration of future consequences, ego-depletion, and self-control: Support for distinguishing between CFC-Immediate and CFC-Future sub-scales. *Personality and Individual Differences, 45*, 15–21. https://doi.org/10.1016/j.paid.2008.02.011

Joireman, J., & King, S. (2016). Individual differences in the consideration of future and (more) immediate consequences: A review and directions for future research. *Social and Personality Psychology Compass, 10*, 313–326. https://doi.org/10.1111/spc3.12252

Joireman, J., Shaffer, M. J., Balliet, D., & Strathman, A. (2012). Promotion orientation explains why future-oriented people exercise and eat healthy: Evidence from the two-factor consideration of future consequences-14 scale. *Personality and Social Psychology Bulletin, 38*, 1272–1287. https://doi.org/10.1177/0146167212449362

Kairys, A., & Liniauskaite, A. (2015). Time perspective and personality. In M. Stolarski, N. Fieulaine, & W. van Beek (Eds.), *Time perspective theory; Review, research and application* (1st ed., pp. 99–113). Cham: Springer.

Keller, C., & Siegrist, M. (2015). Does personality influence eating styles and food choices? Direct and indirect effects. *Appetite, 84*, 128–138. https://doi.org/10.1016/j.appet.2014.10.003

Kim, B. K., & Zauberman, G. (2019). Psychological time and intertemporal preference. *Current Opinion in Psychology, 26*, 90–93. https://doi.org/10.1016/j.copsyc.2018.06.005

Kooij, D. T. A. M., Kanfer, R., Betts, M., & Rudolph, C. W. (2018). Future time perspective: A systematic review and meta-analysis. *Journal of Applied Psychology, 103*, 867–893. https://doi.org/10.1037/apl0000306

Lafreniere, K. D., & Cramer, K. M. (2006). Examining reversal theory measures in relation to NEO personality dimensions and consideration of future consequences. *Personality and Individual Differences, 40*, 1387–1397. https://doi.org/10.1016/j.paid.2005.11.019

Landis, R. S., Edwards, B. D., & Cortina, J. M. (2009). On the practice of allowing correlated residuals among indicators in structural equation models. In C. E. Lance, & R. J. Vandenberg (Eds.), *Statistical and methodological myths and urban legends: Doctrine, verity and fable in the organizational and social sciences* (pp. 193–214). New York: Routledge.

Laros, F. J., & Steenkamp, J.-B. E. M. (2005). Emotions in consumer behavior: A hierarchical approach. *Journal of Business Research, 58*, 1437–1445. https://doi.org/10.1016/j.jbusres.2003.09.013

Laverdière, O., Morin, A. J., & St-Hilaire, F. (2013). Factor structure and measurement invariance of a short measure of the big five personality traits. *Personality and Individual Differences, 55*, 739–743. https://doi.org/10.1016/j.paid.2013.06.008

Lin, W., Ortega, D. L., Caputo, V., & Lusk, J. L. (2019). Personality traits and consumer acceptance of controversial food technology: A cross-country investigation of genetically modified animal products. *Food Quality and Preference, 76*, 10–19. https://doi.org/10.1016/j.foodqual.2019.03.007

Loose, T., Robiou Du Pont, L., Acier, D., & El-Baalbaki, G. (2019). Time perspectives mediate the relationship between personality traits and alcohol consumption. *Time & Society, 28*, 1148–1166. https://doi.org/10.1177/0961463X18758515

Lowe, M. R., & Butryn, M. L. (2007). Hedonic hunger: A new dimension of appetite? *Physiology & Behavior, 91*, 432–439. https://doi.org/10.1016/j.physbeh.2007.04.006

Lunn, T. E., Nowson, C. A., Worsley, A., & Torres, S. J. (2014). Does personality affect dietary intake? *Nutrition, 30*, 403–409. https://doi.org/10.1016/j.nut.2013.08.012

Machado-Oliveira, M. C., Nezlek, J. B., Rodrigues, H., & 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

MacNicol, S. A. M., Murray, S. M., & Austin, E. J. (2003). Relationships between personality, attitudes and dietary behaviour in a group of Scottish adolescents. *Personality and Individual Differences, 35*, 1753–1764. https://doi.org/10.1016/S0191-8869(02)00404-X

McCrae, R. R., & Costa, P. T., Jr. (1996). Toward a new generation of personality theories: Theoretical contexts for the five-factor model. In J. S. Wiggins (Ed.), *The five-factor model of personality: Theoretical perspectives* (1st ed., pp. 51–87). New York: Guilford.

McCrae, R. R., & Costa, P. T., Jr. (1997). Personality trait structure as a human universal. *American Psychologist, 52*, 509–516. https://doi.org/10.1037/0003-066X.52.5.509

McCrae, R. R., & Costa, P. T., Jr. (2008). The five-factor theory of personality. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3rd ed., pp. 159–181). New York: Guilford.

McCrae, R. R., & Sutin, A. R. (2018). A five-factor theory perspective on causal analysis. *European Journal of Personality, 32*, 151–166. https://doi.org/10.1002/per.2134

McKay, M. T., Perry, J. L., & Cole, J. C. (2018). Further evidence for the domain specificity of consideration of future consequences in adolescents and university students. *Personality and Individual Differences, 128*, 127–132. https://doi.org/10.1016/j.paid.2018.02.032

McKay, M. T., Perry, J. L., Cole, J. C., & Magee, J. (2017). Adolescents consider the future differently depending on the domain in question: Results of an exploratory study in the United Kingdom. *Personality and Individual Differences, 104*, 448–452. https://doi.org/10.1016/j.paid.2016.09.002

Mogendi, J. B., De Steur, H., Gellynck, X., & Makokha, A. (2016). Consumer evaluation of food with nutritional benefits: A systematic review and narrative synthesis. *International Journal of Food Sciences & Nutrition, 67*, 355–371. https://doi.org/10.3109/09637486.2016.1170768

Mohammed, S., & Marhefka, J. T. (2019). How have we, do we, and will we measure time perspective? A review of methodological and measurement issues. *Journal of Organizational Behavior*, 1–18. https://doi.org/10.1002/job.2414

Mõttus, 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*, 353–360. https://doi.org/10.1037/a0025537

Mõttus, 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*, 806–814. https://doi.org/10.1037/a0027041

Murphy, L., Cadogan, E., & Dockray, S. (2019). The consideration of future consequences: Evidence for domain specificity across five life domains. *Personality and Social Psychology Bulletin*, 1–16. https://doi.org/10.1177/0146167219873478

Murphy, L., & Dockray, S. (2018). The consideration of future consequences and health behaviour: A meta-analysis. *Health Psychology Review, 12*, 357–381. https://doi.org/10.1080/17437199.2018.1489298

Murray, A. L., & Booth, T. (2015). Personality and physical health. *Current Opinion in Psychology, 5*, 50–55. https://doi.org/10.1016/j.copsyc.2015.03.011

Nezlek, J. B., & Forestell, C. A. (2019). Food neophobia and the five factor model of personality. *Food Quality and Preference, 73*, 210–214. https://doi.org/10.1016/j.foodqual.2018.11.007

Nuttin, J. (2014). *Future time perspective and motivation: Theory and research method*. New York: Psychology Press.

Olsen, S. O., Scholderer, J., Brunsø, K., & Verbeke, W. (2007). Exploring the relationship between convenience and fish consumption: A cross-cultural study. *Appetite, 49*, 84–91. https://doi.org/10.1016/j.appet.2006.12.002

Olsen, S. O., Tudoran, A. A., Honkanen, P., & Verplanken, B. (2016). Differences and similarities between impulse buying and variety seeking: A personality-based perspective. *Psychology and Marketing, 33*, 36–47. https://doi.org/10.1002/mar.20853

Olsen, S. O., & Tuu, H. H. (2017). Time perspectives and convenience food consumption among teenagers in Vietnam: The dual role of hedonic and healthy eating values. *Food Research International, 99*, 98–105. https://doi.org/10.1016/j.foodres.2017.05.008

O'Connor, E. L., & White, K. M. (2010). Willingness to trial functional foods and vitamin supplements: The role of attitudes, subjective norms, and dread of risks. *Food Quality and Preference, 21*, 75–81. https://doi.org/10.1016/j.foodqual.2009.08.004

Parks-Leduc, L., Feldman, G., & Bardi, A. (2015). Personality traits and personal values: A meta-analysis. *Personality and Social Psychology Review, 19*, 3–29. https://doi.org/10.1177/1088868314538548

Perry, L. M., Hoerger, M., Molix, L. A., & Duberstein, P. R. (2019). A validation study of the Mini-IPIP five-factor personality scale in adults with cancer. *Journal of Personality Assessment*, 1–11. https://doi.org/10.1080/00223891.2019.1644341

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. https://doi.org/10.1016/j.appet.2020.104607

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*, 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Roccas, S., Sagiv, L., Schwartz, S. H., & Knafo, A. (2002). The big five personality factors and personal values. *Personality and Social Psychology Bulletin, 28*, 789–801. https://doi.org/10.1177/0146167202289008

Rojas-Rivas, E., Antúnez, L., Cuffia, F., Otterbring, T., Aschemann-Witzel, J., Giménez, A., et al. (2020). Time orientation and risk perception moderate the influence of sodium warnings on food choice: Implications for the design of communication campaigns. *Appetite, 147*, 104562. https://doi.org/10.1016/j.appet.2019.104562

Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software, 48*, 1–36. http://www.jstatsoft.org/v48/i02/.

RStudio Team. (2019). *RStudio*. Boston, MA: Integrated development for R. RStudio, Inc. Version 1.2.5019. http://www.rstudio.com/

Rucker, D. D., Preacher, K. J., Tormala, Z. L., & Petty, R. (2011). Mediation analysis in social psychology: Current practices and new recommendations. *Social and Personality Psychology Compass, 5*, 359–371. https://doi.org/10.1111/j.1751-9004.2011.00355.x

Ryack, K. (2012). Evidence that time perspective factors depend on the group: Factor analyses of the CFC and ZTPI scales with professional financial advisors. *Personality and Individual Differences, 52*, 723–727. https://doi.org/10.1016/j.paid.2011.12.039

Saher, M., Arvola, A., Lindeman, M., & Lähteenmäki, L. (2004). Impressions of functional food consumers. *Appetite, 42*, 79–89. https://doi.org/10.1016/j.appet.2003.07.002

Salmon, S. J., Fennis, B. M., de Ridder, D. T., Adriaanse, M. A., & De Vet, E. (2014). Health on impulse: When low self-control promotes healthy food choices. *Health Psychology, 33*, 103–109. https://psycnet.apa.org/doi/10.1037/a0031785.

Santeramo, F. G., Carlucci, D., De Devitiis, B., Seccia, A., Stasi, A., Viscecchia, R., et al. (2018). Emerging trends in European food, diets and food industry. *Food Research International, 104*, 39–47. https://doi.org/10.1016/j.foodres.2017.10.039

Saucier, G., & Goldberg, L. R. (2004). The structure of personality attributes. In M. Barrick, & A. M. Ryan (Eds.), *Personality and work: Reconsidering the role of personality in organizations* (1st ed., pp. 1–29). San Francisco: John Wiley & Sons.

Shipp, A. J., & Aeon, B. (2019). Temporal focus: Thinking about the past, present, and future. *Current Opinion in Psychology, 26*, 37–43. https://doi.org/10.1016/j.copsyc.2018.04.005

Shipp, A. J., Edwards, J. R., & Lambert, L. S. (2009). Conceptualization and measurement of temporal focus: The subjective experience of the past, present, and future. *Organizational Behavior and Human Decision Processes, 110*, 1–22. https://doi.org/10.1016/j.obhdp.2009.05.001

Siró, I., Kápolna, E., Kápolna, B., & Lugasi, A. (2008). Functional food. Product development, marketing and consumer acceptance—a review. *Appetite, 51*, 456–467. https://doi.org/10.1016/j.appet.2008.05.060

Spector, P. E. (2019). Do not cross me: Optimizing the use of cross-sectional designs. *Journal of Business and Psychology, 34*, 125–137. https://doi.org/10.1007/s10869-018-09613-8

Stevenson, R. J. (2017). Psychological correlates of habitual diet in healthy adults. *Psychological Bulletin, 143*, 53–90. https://psycnet.apa.org/doi/10.1037/bul0000065.

Strathman, A., Gleicher, F., Boninger, D. S., & Edwards, C. S. (1994). The consideration of future consequences: Weighing immediate and distant outcomes of behavior. *Journal of Personality and Social Psychology, 66*, 742–752. https://doi.org/10.1037/0022-3514.66.4.742

Subar, A. F., Freedman, L. S., Tooze, J. A., Kirkpatrick, S. I., Boushey, C., Neuhouser, M. L., et al. (2015). Addressing current criticism regarding the value of self-report dietary data. *Journal of Nutrition, 145*, 2639–2645. https://doi.org/10.3945/jn.115.219634

Sweeney, A. M., & Culcea, I. (2017). Does a future-oriented temporal perspective relate to body mass index, eating, and exercise? A meta-analysis. *Appetite, 112*, 272–285. https://doi.org/10.1016/j.appet.2017.02.006

Thelken, H. N., & de Jong, G. (2017). *The influence of the big five on consideration of future consequences: Theory and evidence from Dutch citizens. (Working Paper Series - centre for Sustainable Entrepreneurship; No. 1707-CSE)*. Leeuwarden: Rijksuniversiteit Groningen/Campus Fryslân.

Tiainen, A.-M. K., Männistö, S., Lahti, M., Blomstedt, P. A., Lahti, J., Perälä, M.-M., et al. (2013). Personality and dietary intake – findings in the helsinki birth cohort study. *PloS One, 8*, Article e68284. https://doi.org/10.1371/journal.pone.0068284

Tórtora, G., & Ares, G. (2018). Influence of time orientation on food choice: Case study with cookie labels. *Food Research International, 106*, 706–711. https://doi.org/10.1016/j.foodres.2018.01.045

Urala, N., & Lähteenmäki, L. (2003). Reasons behind consumers' functional food choices. *Nutrition & Food Science, 33*, 148–158. https://doi.org/10.1108/00346650310488499

Verbeke, W. (2006). Functional foods: Consumer willingness to compromise on taste for health? *Food Quality and Preference, 17*, 126–131. https://doi.org/10.1016/j.foodqual.2005.03.003

Zhang, Z., Kong, M., Zhang, L., & Li, Z. (2015). Consideration of future consequences: Preliminary evidences for a four-factor distinction. *Personality and Individual Differences, 87*, 99–104. https://doi.org/10.1016/j.paid.2015.07.022

Zhao, X., Lynch, J. G., Jr., & Chen, Q. (2010). Reconsidering baron and kenny: Myths and truths about mediation analysis. *Journal of Consumer Research, 37*, 197–206. https://doi.org/10.1086/651257

Zimbardo, P. G., & Boyd, J. N. (1999). Putting time in perspective: A valid, reliable individual-differences metric. *Journal of Personality and Social Psychology, 77*, 1271–1288. https://doi.org/10.1007/978-3-319-07368-2_2