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Consumers' attitudes and intentions toward consuming functional foods in Norway

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ABSTRACT

This study investigates antecedents of consumers' attitudes and intentions to eating functional foods in a representative sample of Norwegian consumers ($N = 810$). The theory of planned behavior (TPB), with an extension of self-efficacy and descriptive norms and, as well, hedonic and utilitarian eating values, is used as a conceptual framework. Structural equation modeling (SEM) is applied to test the hypothesized relationships. The findings differed significantly between the basic and extended model, particularly for the perceived behavioral control (PBC) constructs. Perceived control over behavior was insignificantly related to intention and consumption frequency in the basic model and significantly negatively related in the extended model. The inclusion of self-efficacy, conceptualized as confidence in the ability to consume functional foods regularly, proved to be the most important explanatory factor of intention. Descriptive and injunctive norms were both significant and relatively strong predictors of intention. However, injunctive norms lost explanatory power when descriptive norms were included in the structural model. The strong influence of attitude on intention also diminished in the extended model. Utilitarian eating values clearly outperformed hedonic eating values as a basis for explaining consumer attitude toward eating functional foods. Whereas utilitarian eating values were strongly and positively associated with participants' attitude toward the consumption of functional foods, hedonic eating values were less strongly and negatively related to attitude. Thus, the food industry needs to improve the hedonic value of functional foods to commercially succeed.

1. Introduction

Understanding consumer perceptions, attitudes, and purchasing behavior with respect to functional foods is of great importance (Calado et al., 2018; Frewer, Scholderer, & Lambert, 2003; Kraus, 2015). Some recent reviews (Bimbo et al., 2017; Mogendi, De Steur, Gellynck, & Makokha, 2016; Siró, Kápolna, Kápolna, & Lugasi, 2008) highlight knowledge and information about nutrition and health; cognitive and affective antecedents such as attitudes, perceptions and beliefs; product properties; and sociodemographic variables as important for consumer choices regarding functional foods. As for food choice in general (e.g. Pollard, Steptoe, & Wardle, 1998; Steptoe, Pollard, & Wardle, 1995), reasons for buying and/or consuming functional foods are manifold and complex. Although the findings are mixed and contradictory, functional food acceptance is closely related to consumer belief in its overall health benefit or perceived reward of consumption (Siegrist, Shi, Giusto, & Hartmann, 2015; Urala & Lähteenmäki, 2007; Verbeke, 2005); its convenience (Grunert, 2010); the perceived need for functional foods for society in general; and confidence in and safety of functional foods (Urala & Lähteenmäki, 2007); and, as well, sensory attributes such as (good) taste (Siró et al., 2008; Verbeke, 2006).

Products may provide benefits that are hedonic or utilitarian in nature (Crowley, Spangenberg, & Hughes, 1992; Okada, 2005). Hedonic products provide a more experiential consumption, evoking fun, pleasure, excitement, happiness, fantasy, or enjoyment, whereas utilitarian products are primarily instrumental, functional, goal oriented, and linked to self-control (Alba & Williams, 2013; Dhar & Wertenbroch, 2000; Holbrook & Hirschman, 1982). Hedonic attributes or values are important to food choice in general (Steptoe et al., 1995). While food products certainly have both utilitarian and hedonic qualities (to varying degrees), functional foods—in comparison—are suggested to be superior in providing utilitarian benefits (i.e. additional health benefits and convenience). Thus, this study will investigate whether consumption of functional foods is living up to its "functional terminology," that is, guided by utilitarian eating motivation, values, and/or goals.

Functional foods are not widespread in the Norwegian marketplace,

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and those that are available are not necessarily marketed as functional foods (i.e. with health claims informing consumers about the benefits of their consumption). Enrichments, which render food items functional, are implemented to many different food items in the various conventional food categories already established, such as dairy products, bakery wares, and prepared foods (Urala & Lähteenmäki, 2004). Little is known about the Norwegian functional food consumer yet, according to a recent report (Euromonitor, 2019), Norwegians are characterized as being highly skeptical of foods with health claims from manufacturers (i.e. functional foods). Nevertheless, functional foods have been recognized as an important avenue for innovation in the converging food and health domain in Norway—despite being costly and time-consuming for manufacturers (Pedersen & Schwach, 2010).

The TPB has been applied to predict and explain a vast number of behaviors (Armitage & Conner, 2001; Godin & Kok, 1996), yet only a few prior studies (e.g. O'Connor & White, 2010; Patch, Tapsell, & Williams, 2005) have investigated consumers' behavior toward functional food using the TPB framework. The current study contributes to the existing literature investigating consumer attitudes, intention, and behavior toward functional foods in three theoretical and empirical areas. First, it proposes and tests an extended version of the TPB (e.g. Rhodes, Blanchard, & Matheson, 2006; Rhodes & Courneya, 2003a) by incorporating descriptive norms (e.g. Rivis & Sheeran, 2003) and self-efficacy (e.g. Terry & O'Leary, 1995) into the model. Different norms are important in explaining consumers' eating behavior (Olsen & Grunert, 2010; Tuu, Olsen, Thao, & Anh, 2008), and self-efficacy is considered to be more predictive of intention than perceived control in the domain of both health (Rodgers, Conner, & Murray, 2008; Terry & O'Leary, 1995) and dietary behavior (Armitage & Conner, 1999a; Povey, Conner, Sparks, James, & Shepherd, 2000a). To our knowledge, few prior studies have used descriptive norms and/or self-efficacy as predictors of functional food consumption intentions (e.g. Vassallo et al., 2009, applying the health belief model). Secondly, this study examines whether functional foods satisfy consumers' utilitarian motivations, goals and values at the expense of—or in combination with—their hedonic counterparts. Successful functional products should be healthy, convenient, and tasty (Siró et al., 2008; Steptoe et al., 1995). Finally, this study, to our knowledge, is the first to explore consumer attitudes and intentions to consume functional foods using a representative sample in Norway.

2. Theoretical framework

The popularity of the TPB can be explained by its outstanding ability to explain individual intention and behavior in a parsimonious structure of attitudes, norms, and control constructs across most kinds of behavioral domains (Fishbein & Ajzen, 2010), including health-related behaviors such as physical activity and smoking (e.g. Godin & Kok, 1996; McEachan, Conner, Taylor, & Lawton, 2011); food consumption (e.g. McDermott et al., 2015; McDermott et al., 2015); and healthy eating habits (e.g. Conner, Norman, & Bell, 2002; Povey, Conner, Sparks, James, & Shepherd, 2000b). Considering consumer behavior toward functional food, only a handful of prior investigations have applied the TPB. Amongst is a study by O'Connor and White (2010) investigating Australian nonusers' willingness to try functional foods (and vitamin supplements), applying a version of the TPB in which intention was replaced by a measure of willingness to try. Another Australian study (Patch et al., 2005) used the TPB to examine intentions to consume foods enriched with omega-3.

Because of its parsimonious structure, several extended versions of the TPB have been proposed in attempts to increase its predictive ability, understanding its background factors (e.g. personality, values, demographics) or adapt to contextual environments or unconscious habits (e.g. Ajzen, 2011; Conner, 2015; Conner & Armitage, 1998). Many additional predictors have been proposed along two lines of development: (a) the multicomponent approach, which reconceptualizes the theory's major constructs (e.g. attitude, subjective norm); and (b) the approach of adding new variables in order to expand the initial model (e.g. self-identity, past behavior, and habit strength; for a review, see Conner & Sparks, 2005). In a series of studies (Rhodes & Courneya, 2003a,b, 2004; Rhodes et al., 2006), Rhodes and colleagues have investigated multiple components of the TPB, conceptualizing attitude, perceived behavioral control (PBC) and subjective norm either as two subcomponents (e.g. control vs. self-efficacy) or a general common factor (e.g. PBC). An alternative to their formative component model (Rhodes & Courneya, 2003a) is the reflective higher-order model proposed by Hagger and Chatzisarantis (2005). Both models are based on similar principles and differ only in the causal relationship (i.e. formative vs. reflective) assumed between the models' first- and second-order components (for a comprehensive discussion of the distinction between formative and reflective models, see Jarvis, MacKenzie, & Podsakoff, 2003). Yet other scholars have focused on multiple conceptualizations of subjective norms (e.g. Rivis & Sheeran, 2003); PBC (e.g. Terry & O'Leary, 1995); and attitude (e.g. Conner, Godin, Sheeran, & Germain, 2013) separately.

The current research contributes to this literature by including hedonic and utilitarian dimensions of consumer attitudes, values, and/or goals (Babin, Darden, & Griffin, 1994; Dhar & Wertenbroch, 2000; Voss, Spangenberg, & Grohmann, 2003), descriptive norms (Rivis & Sheeran, 2003) in addition to subjective (injunctive) norms, and self-efficacy (Terry & O'Leary, 1995) in addition to PBC (controllability) in order to improve the understanding and predictive power of consumers' motivation to consume functional foods in Norway. Fig. 1 depicts our conceptual framework. A discussion of the constructs and their relationships immediately follows.

2.1. Intention and consumption frequency

Intention to perform a given behavior exerts a motivational influence on the actual performance of the behavior and is its immediate antecedent (Fishbein & Ajzen, 2010). "The assumption is that people do what they intend to do and do not do what they do not intend" (Sheeran, 2002, p. 1). According to Ajzen (1991), the stronger the intention to perform a behavior, the more likely is its actual performance. Sheeran (2002) provides a meta-analysis of the intention-behavior relationship, demonstrating that intention on average contributes to explaining 28% of the variance in behavior. Thus, 72% of the variance is attributed to something else. This intention-behavior gap is also evident in predicting food-related behaviors. Dunn, Mohr, Wilson, and Wittert (2011) suggest that one explanation of the poor predictive ability of this relationship might be attributed to the complex nature of food consumption. However, its predictive ability varies and, according to another meta-analysis (McEachan et al., 2011), intention to engage in dietary behavior predicts actual behavior quite well. Moreover, behavioral intention significantly predicts eating behavior, including healthy eating behavior (Conner et al., 2002).

Most studies applying the TPB framework use a prospective design and measure behavioral responses days, weeks, or months after measuring attitudes and intentions (Fishbein & Ajzen, 2010). This behavioral construct is suggested to be different from cross-sectional studies assessing current and past behavior. However, retrospective behavior can be a satisfactory proxy for future behavior (Ajzen, 2002c). Jaccard and Blanton (2014, p. 147) suggest that, for behaviors that are stable over time, "cross-sectional analyses can be just as informative as longitudinal analyses" because the behavioral estimate is likely to be the same over time. In order to avoid any confusion between future and past behavior in TPB, this study uses the term "consumption frequency" as a proxy for the behavioral construct. Accordingly, the first hypothesis is:

H_1. Intention to consume functional foods is positively related to consumption frequency.

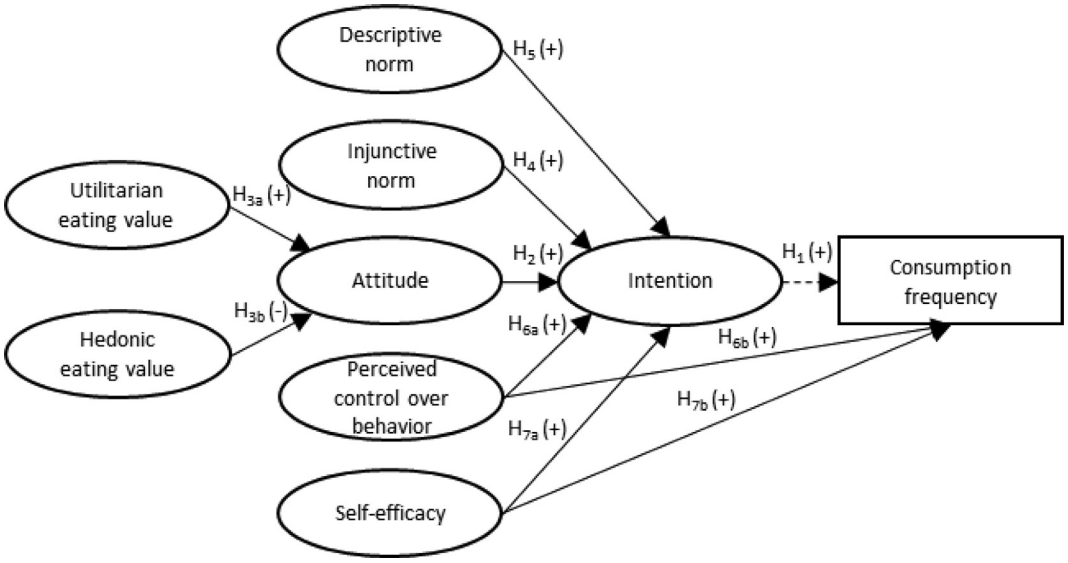

Fig. 1. Full conceptual model with hypotheses explaining attitude toward, intentions to eat, and consumption frequency of functional foods (extended model). Ovals are latent constructs, whereas the rectangle is an observed variable. The dashed line suggests a cautionary take on interpretation of the causal relationship from intention (future) to consumption frequency (past).

2.2. Attitude

Attitude is "a latent disposition or tendency to respond with some degree of favorableness or unfavorableness to a psychological object" (Fishbein & Ajzen, 2010, p. 76), which refers to the positive or negative evaluation of the outcome associated with performing a given behavior such as consuming functional food. Attitudes are multifaceted, including hedonic/affective and utilitarian/cognitive dimensions[1] (Crites, Fabrigar, & Petty, 1994; Voss et al., 2003). Following Voss et al. (2003), the hedonic dimension is characterized by the sensations derived from experiencing products (e.g. pleasure), whereas the utilitarian dimension is derived from the functions provided by products (e.g. nutritional composition). Within the food domain, attitude often shares the strongest association with intention (McDermott et al., 2015; McDermott et al., 2015; Povey et al., 2000b), including behavior toward functional food (Hung, de Kok, & Verbeke, 2016; O'Connor & White, 2010; Patch et al., 2005). In their study of functional foods enriched with omega-3, Patch et al. (2005) found attitude to be the only significant predictor of intention to consume. Along the same lines, Hung et al. (2016) demonstrated that attitude was the most important determinant for the purchasing intention of a new functional meat product. Accordingly, the second hypothesis is:

H_2. Attitude toward eating functional foods is positively related to intention.

2.2.1. Hedonic and utilitarian eating values

Consumer choice is driven by hedonic and utilitarian considerations (Dhar & Wertenbroch, 2000), and consumption takes place for hedonic gratification from sensory attributes (e.g. good taste) and for utilitarian reasons (e.g. to curb hunger, to stay healthy; Batra & Ahtola, 1990). Values precede attitudes and "constitute the most abstract level of cognition, not specific in relation to situations or objects, but influencing the perception and evaluation of these" (Brunsø, Scholderer, & Grunert, 2004, p. 195). Otherwise put, values influence the evaluation of attitude objects (e.g. Dreezens, Martijn, Tenbült, Kok, & de Vries, 2005; Homer & Kahle, 1988; Schwartz & Bilsky, 1987), including attitudes toward functional foods (Tudoran, Olsen, & Dopico, 2009). According to Vinson, Scott, and Lamont (1977), values can be conceptualized as three hierarchical levels along a central-peripheral continuum: global or personal values, domain-specific values, and evaluation of product attributes.

Food values (or eating values) are domain-specific and constitute motivational considerations influencing the choice of foods—quite similar to what Steptoe et al. (1995) refer to as food choice motives. Both constructs consider the underlying reasons for the selection of food, determined and distinguished by means of the relative importance attached to consumers' various food values/food choice motives. Similar to attitudes and goals, eating values are considered to include both utilitarian and hedonic outcomes of behavior (Babin et al., 1994). Related to food choice and consumption, utilitarian values typically include considerations of convenience, nutrition, and other health-related aspects, whereas hedonic eating values are all about the importance placed on sensory characteristics pertaining to taste and pleasure (e.g. Lusk & Briggeman, 2009).

Prior research has demonstrated a strong association of naturalness, natural content, fairness, environmental concerns, and political values with people's attitudes and preferences toward organic food (Chen, 2007; Lusk & Briggeman, 2009). Likewise, Sun (2008) found that consumers' attitudes toward healthy eating were strongly influenced by health concerns, while Pieniak, Verbeke, Vanhonacker, Guerrero, and Hersleth (2009) demonstrated a significant influence of familiarity on attitudes toward traditional foods. Žeželj, Milošević, Stojanović, and Ognjanov (2012) found that health and natural content, sensory appeal, and mood are all predictive of attitude toward functional foods. The importance of health in food choices is a key motive; it has been found to be positively related to functional food attitudes (Hauser, Nussbeck, & Jonas, 2013; Tudoran et al., 2009). Furthermore, people's willingness to pay a premium for a functional snack food (vs. a generic snack food) varies with their food values (Pappalardo & Lusk, 2016). Olsen and Tuu (2017) found that, whereas hedonic eating values (e.g. taste, enjoyment) increased consumption of convenience foods (e.g. hamburgers, pizza, snacks), utilitarian eating values (e.g. health, weight management) had the opposite influence on consumption. In the context of functional foods, we expect the contrary. Accordingly, the following hypotheses are proposed:

H_3. Utilitarian eating values are positively associated with attitude (H_{3a}), whereas hedonic eating values are negatively associated with attitude (H_{3b}).

[1] This is also referred to as experiential and instrumental, respectively (Fishbein & Ajzen, 2010).

The relevance of these hypotheses is particularly important to the functional food industry. Successful (functional) food products should be both functional and hedonic to satisfy consumer's food choice and loyalty to those products (Siró et al., 2008; Steptoe et al., 1995; Verbeke, 2006).

2.3. Subjective norms

Subjective norms reflect perceived social pressure to display a behavior which significantly contributes to the prediction of intention to engage in healthy dietary behaviors (McEachan et al., 2011)—although research is inconclusive in this area (e.g. Conner et al., 2002). The initial and probably the most widely used conceptualization within the TPB concerns injunctive norms, i.e. "perceptions concerning what should or ought to be done with respect to performing a given behavior" (Fishbein & Ajzen, 2010, p. 131). Injunctive norms thus reflect social pressure through the perception of what others approve or disapprove regarding one's conduct (Cialdini, Kallgren, & Reno, 1991). This conceptualization of subjective norms has received considerable attention in that it performs poorly within the TPB (i.e. exerts weak predictive power; Armitage & Conner, 2001). Conner and Sparks (2005), for instance, demonstrated that subjective norms were the weakest predictor of intention in a meta-analysis of meta-analyses (bearing a beta value of 0.15). Another meta-analysis (McEachan et al., 2011) found subjective norms to be more strongly associated with intention in studies employing the TPB to investigate dietary behaviors.

Descriptive norms, on the other hand, tap social pressure through what others themselves do, and reflect what is perceived to be normal conduct with respect to a behavior (Cialdini, Reno, & Kallgren, 1990). Adding descriptive norms in the prediction of intention has been found to increase explained variance after controlling for other TPB variables (Rivis & Sheeran, 2003; Sheeran & Orbell, 1999), although such evidence has been inconclusive (e.g. Povey et al., 2000b). A meta-analysis (Manning, 2009) of 196 studies provided evidence of descriptive norms and injunctive norms being conceptually different constructs within the TPB. Descriptive norms have been found to exert an influence on the intention to consume fish (Tuu et al., 2008). They also were found to predict healthy vs. unhealthy food choices, i.e. selecting a snack consistent with one's perceptions of what others before have chosen (Burger et al., 2010) and, as well, to predict vegetable intake (Stok, Verkooijen, de Ridder, de Wit, & de Vet, 2014). The latter study also showed that "a majority descriptive norm increased self-identification, positive attitudes, and self-efficacy regarding vegetable intake behavior" (p. 245). Furthermore, Robinson, Fleming, and Higgs (2014) found descriptive social norm messages (i.e. information about what others do) to be more effective than health messages in prompting healthier eating; indeed, a recent review and meta-analysis (Robinson, Thomas, Aveyard, & Higgs, 2014) concluded that providing social eating normative information (i.e. suggesting that other people are eating healthily) influenced both the quantity and types of food people chose to consume. In summary, both injunctive and descriptive norms exert predictive ability on the formation of dietary intentions, although to varying degrees and certainly not in every instance. From the above discussion, the next two hypotheses follow:

H_4. Injunctive norms are positively associated with intentions to consume functional foods.

H_5. Descriptive norms are positively associated with intention to consume functional foods.

2.4. Perceived control over behavior and self-efficacy

The construct of PBC was added to the theory of reasoned action (TRA) to account for behaviors in which people have incomplete volitional control, and "refers to people's perception of the ease or difficulty of performing the behavior of interest" (Ajzen, 1991, p. 183). A person's PBC influences his or her intention to perform a given behavior and actual performance of that behavior; it is posited to concern both perceptions of controllability (external control) and self-efficacy (internal control; Fishbein & Ajzen, 2010). Related to dietary behaviors in general, PBC exerts moderately to strong influence on both behavioral intention and behavior (McEachan et al., 2011). The construct bears much in common with Bandura (1982) self-efficacy concept, which "centers on people's sense of personal efficacy to produce and to regulate events in their lives" (p. 122). Ajzen (1991) initially argued that PBC and self-efficacy were two sides of the same coin. Empirical evidence, however, supports a distinction between the two concepts, which has made him revisit and modify the relationship between the two: "perceived behavioral control is the overarching, superordinate construct that is comprised of two lower-level components: self-efficacy and controllability" (Ajzen, 2002b, p. 680).

Armitage and Conner (1999a) coined the term "perceptions of control over the behavior" (PCB) to distinguish it from self-efficacy (and from PBC). Whereas self-efficacy taps into an individual's confidence in his or her ability to perform a behavior (e.g. competence), PCB deals with external factors that may exert influence upon one's perceived control over carrying out that behavior (e.g. availability). As is true for all TPB variables, an important aspect in the conceptualization of self-efficacy is the level of specificity: "self-efficacy does not refer to a general personality characteristic; instead, it may vary greatly within each person from task to task" (AbuSabha & Achterberg, 1123, 1997). Thus, as Bandura (1986) points out, measures of self-efficacy should target specific behaviors such as confidence in one's ability to eat functional food regularly.

One theoretical reason for making a distinction between two forms of perceived behavioral control has been developed by Terry and colleagues (e.g. Terry & O'Leary, 1995), who propose that ability and motivation (i.e. self-efficacy) come from within the individual (internal control), while factors such as task difficulty, access to necessary resources, or luck (i.e. control) are derived from outside the individual (external control; see also Manstead & van Eekelen, 1998). For instance, "a person may perceive few external barriers to performing the [behavior], yet lack confidence in his or her ability to do so" (Terry & O'Leary, 1995, p. 202). In opposition to this view, Sparks, Guthrie, and Shepherd (1997) argue that the PBC construct instead consists of perceived difficulty and perceived control, the latter referring to an individual's perception of control over his or her behavior. The former refers to how easy or difficult it is anticipated to be to engage in the behavior in question. As such, they argue for retaining "an interpretation of PBC that includes reference to internal and external constraints" (p. 431). Another argument is the self-efficacy-as-motivation, in which "can do" operationalizations reflect motivation rather than perceived capacity, i.e. "self-efficacy ratings are highly predictive of [behavior] merely because such ratings reflect a broad range of [behavioral] motives" (Williams & Rhodes, 2016, p. 124). The predictive ability of self-efficacy with respect to behavior thus translates into people likely engaging in behaviors about which they are motivated.

Research using the TPB and applying separate measures of self-efficacy and PCB (Armitage & Conner, 1999b; Terry & O'Leary, 1995; Trafimow, Sheeran, Conner, & Finlay, 2002) has found evidence of the two constructs influencing intention differently—and, in some instances, that PCB negatively influences intention. Povey et al. (2000a) propose that the predictive ability of the TPB may be improved, not only by including self-efficacy, but rather by replacing the PBC component (i.e. controllability) with self-efficacy. In contrast, Conner et al. (2002) found that a construct combining both control and self-efficacy measures exerts the strongest influence on participants' intention to eat healthily. Studies conceptualizing self-efficacy and control as two distinct constructs have usually demonstrated a relatively stronger relationship between self-efficacy and intention and self-efficacy and attitude as compared to control (for a meta-analytic review, see Armitage & Conner, 2001; Manstead & van Eekelen, 1998; Terry & O'Leary, 1995). These effects have been found to apply as well to the food

domain (e.g. low-fat diet, consumption of fruits and vegetables; Armitage & Conner, 1999a; Povey et al., 2000a). Self-efficacy (within the protection motivation theory; Maddux & Rogers, 1983) has also been demonstrated to be a strong predictor of intention to consume and buy functional food products (Cox & Bastiaans, 2007; Cox, Koster, & Russell, 2004). The following hypotheses are thereby proposed:

H_6. Perceived control over behavior (PCB) is positively associated with intention to consume (H_{6a}) and consumption frequency (H_{6b}) of functional foods.

H_7. Self-efficacy is positively associated with intention to consume (H_{7a}) and consumption frequency (H_{7b}) of functional foods.

3. Materials and methods

3.1. Data collection and sample

A sample of Norwegian consumers representative for gender, age, and region responded to an online survey in January of 2019. The sample consisted of 810 adult participants between the ages of 18 and 74 years, of whom 49% were female. The majority of respondents (54.4%) were well-educated (university or university college), and most live in households without children present (71.9%). The data collection was administered by YouGov by use of its consumer panel. Table 1 summarizes some sociodemographic characteristics of the sample.

3.2. Measures

The survey introduced the participants to a definition of functional foods based on Doyon and Labrecque (2008) and Laros and Steenkamp (2005), stating that this term refers to food products that have been enriched with minerals, vitamins, fatty acids, or proteins to make them healthier or to prevent diseases. Further, functional foods are part of a standard diet consumed on a regular basis and in normal quantities. Some examples of functional foods available in Norwegian retailing were proposed, including milk and other dairy products with added vitamin D. The behavior in question was defined as "eating functional foods regularly." Seven-point Likert-type scales with response categories ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) were used for all measures, unless explicitly stated otherwise. The overall structure of the survey instrument was fixed, yet the order of items designed to measure each construct was randomized.

Consumption of functional foods (CF) was assessed with a single measure: "On average during the last 6 months, how often have you consumed functional foods?" The scale was scored from 1 (*never/seldom*) to 7 (*several times per day*). A similar measure of food consumption frequency is presented in Goetzke, Nitzko, and Spiller (2014).

Intention (INT) was measured with three items adopted from Conner et al. (2002) and Fishbein and Ajzen (2010): "I intend to eat functional foods regularly"; "I expect to eat functional foods regularly"; "I plan to eat functional foods regularly." Participants rated the items on a Likert-type scale from 1 (*highly unlikely*) to 7 (*highly likely*).

Attitude (ATT) was measured using three items along a 7-point semantic differential scale. In accordance with recommendations and praxis (Fishbein & Ajzen, 2010; Kraft, Rise, Sutton, & Røysamb, 2005), both a hedonic and utilitarian dimension of attitude were considered in addition to a measure of global evaluation. Subjects responded to the stem, "Eating functional foods regularly would be …", followed by the three adjective pairs bad-good (global), dull-exciting (hedonic), and foolish-wise (utilitarian) (Crites et al., 1994; Voss et al., 2003).

Eating values were measured using six items following the stem, "It is important to me that the foods I eat …", wherein three items were designed to tap hedonic values (HED) and the other three items utilitarian values (UT). All items were adapted from Olsen and Tuu (2017) and inspired by Voss et al. (2003) and Babin et al. (1994). The three items reflecting *hedonic eating values* were "are fun to eat"; "provide me good sensory feelings (good taste, smell, appearance, appeal)"; and "are enjoyable to eat", whereas items tapping *utilitarian eating values* were "do not increase my weight"; "help me to avoid health issues"; and "help me to control my weight."

Subjective norms were measured by six items reflecting both *injunctive norms* (IN) and *descriptive norms* (DN) (Dunn et al., 2011; Rhodes et al., 2006). The three items measuring injunctive norms were: "Most people who are important to me [think that I should/expect me to/would want me to] eat functional foods regularly.". The three descriptive norms items were: "Most people who are important to me eat functional foods regularly"; "Most people like me eat functional foods regularly"; "How many of the people who are important to you do you think eat functional foods regularly?" The latter scale was scored from 1 (*none*) to 7 (*all*) (White, Smith, Terry, Greenslade, & McKimmie, 2009).

The participant's PBC was measured with six items reflecting *perceived control over behavior* (PCB) and *self-efficacy* (SE), as frequently used in previous studies (Armitage & Conner, 1999a; Dunn et al., 2011; Hagger & Chatzisarantis, 2005; Rhodes & Courneya, 2003b). The three items designed to capture PCB were: (1) "I have complete control over whether or not to eat functional foods regularly"; (2) "Eating functional foods regularly is beyond my control" (reverse scored); and (3) "Whether or not I eat functional foods regularly is entirely up to me." The items measuring self-efficacy were: (1) "If it were entirely up to me, I am confident that I would be able to eat functional foods regularly"; (2) "If I wanted to, I could avoid eating functional foods regularly"; and (3) "I believe I have the ability to eat functional foods regularly."

Table 1
Socio-demographic characteristics (N = 810).

Variables	Per cent
Gender	
Male	49.4
Female	50.6
Age	
Under 30 years	20.0
30–39 years	21.1
40–49 years	19.0
50–59 years	18.6
Over 60 years	21.2
Children living at home	
Yes	28.1
No	71.9
Highest education level	
Primary and lower secondary school	7.8
Upper secondary school	37.8
University or university college (1–3 years)	28.4
University or university college (4 years or more)	26.0

3.3. Analytical procedures

Initial analyses using SPSS version 25 explored data and confirmed the normality of distributions, while a two-stage procedure (Anderson & Gerbing, 1988) in AMOS version 25 was used for confirmatory factor analyses (CFA) and structural equation modeling (SEM). Convergent and discriminant validity of constructs were established by estimation of average variance explained (AVE) and maximum shared variance (MSV), respectively. Adequate convergent validity is reached when AVE > 0.5, whereas discriminant validity is present when AVE > MSV. To further establish discriminant validity, the square root of AVE should be greater than the correlations between constructs. Additionally, a series of four confirmatory-factor models with chi-square difference tests were employed to substantiate evidence of discriminant validity between one-factor and two-factor solutions of subjective norms and PBC (e.g. subjective norms vs. injunctive and descriptive norms). Finally, the threshold for construct reliability is CR > 0.7 (Hair, Black, Babin, & Anderson, 2013).

Table 2
Standardized factor loadings, reliability and validity.

Constructs and items	Factor loadings	Composite reliability	Average variance extracted
Intention (INT)		0.95	0.88
I intend to eat functional foods regularly	0.94		
I expect to eat functional foods regularly	0.92		
I plan to eat functional foods regularly	0.95		
Attitude (ATT)		0.87	0.69
"Eating functional foods regularly would be …"			
Bad-Good	0.82		
Unenjoyable-Enjoyable	0.81		
Foolish-Wise	0.86		
Hedonic eating value (HED)		0.89	0.73
"It is important to me that the foods I eat …"			
Are fun to eat	0.87		
Provide me good sensory feelings (good taste, smell, appearance, appeal)	0.81		
Are enjoyable to eat	0.87		
Utilitarian eating value (UT)		0.83	0.63
"It is important to me that the foods I eat …"			
Do not increase my weight	0.86		
Help me to avoid health issues	0.65		
Help me to control my weight	0.85		
Injunctive norm (IN)		0.95	0.87
"Most people who are important to me …"			
Think that I should eat functional foods regularly	0.96		
Expect me to eat functional foods regularly	0.90		
Would want me to eat functional foods regularly	0.95		
Descriptive norm (DN)		0.93	0.86
"Most people …"			
Like me eat functional foods regularly	0.94		
Who are important to me eat functional foods regularly	0.92		
Perceived control over behavior (PCB)		0.72	0.56
I have complete control over whether or not to eat functional foods regularly	0.73		
Whether or not I eat functional foods regularly is entirely up to me	0.77		
Self-efficacy (SE)		0.78	0.64
I believe I have the ability to eat functional foods regularly	0.80		
If it were entirely up to me, I am confident that I would be able to eat functional foods regularly	0.80		

A measurement model with eight latent variables was specified, wherein INT, ATT, IN, DN, PCB, SE, HED, and UT were included. CF was included as an observed variable. A combination of absolute and incremental model fit indices was reported, including the root mean square error of approximation (RMSEA), comparative fit index (CFI), standardized root mean square residual (SRMR), and the Tucker-Lewis Index (TLI), all of which are sample size-independent (Marsh et al., 2009). The traditional chi-square goodness-of-fit test was left out due to sample size-dependency issues (Marsh & Hocevar, 1985). Threshold values of fit indices reported were RMSEA < 0.07; CFI > 0.92; SRMR < 0.08; TLI > 0.92 (Hair et al., 2013, p. 584, Table 4). Common method bias was assessed by controlling for the effects of an unmeasured latent factor (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Thus, a second measurement model allowed all items to load simultaneously on their theoretical constructs and on a common latent factor. Differences in standardized regression weights between the two measurement models should not be substantial. To examine whether the extended model outperformed the basic TPB model, two structural models were specified and compared. The extended model included SE, DN, and HED and UT in addition to ATT, IN and PCB.

4. Results

4.1. Reliability and validity of measures

The initial measurement model was composed of 24 items reflecting

Table 3
Correlation matrix and descriptive statistics for study variables.

	INT	ATT	HED	UT	IN	DN	PCB	SE	CF
INT	–								
ATT	0.70***	–							
HED	0.09*	0.15***	–						
UT	0.32***	0.35***	0.51***	–					
IN	0.71***	0.56***	0.04	0.25***	–				
DN	0.72***	0.54***	0.04	0.23***	0.72***	–			
PCB	0.19***	0.24***	0.43***	0.26***	0.09*	0.13**	–		
SE	0.72***	0.67***	0.31***	0.40***	0.53***	0.58***	0.59***	–	
CF	0.48***	0.35***	0.01	0.19***	0.36***	0.41***	0.08*	0.40***	–
Mean	*4.05*	*4.72*	*5.45*	*5.11*	*3.78*	*3.80*	*4.89*	*4.55*	*2.87*
SD	*1.56*	*1.31*	*1.12*	*1.16*	*1.51*	*1.44*	*1.23*	*1.30*	*1.66*

Note. *** $p < .001$; ** $p < .010$; * $p < .050$.

Table 4
Structural equation models and fit indices.

	Basic model		Extended model		Hypothesis testing
	Std β	*t*-values	Std β	*t*-values	
Dependent variable: Consumption frequency (CF)					
Intention (INT)	0.48	14.49***	0.29	5.04***	H_1 supported
Perceived control over behavior (PCB)	−0.01	−0.24	−0.16	−2.64**	H_{6b} not supported
Self-efficacy (SE)	–	–	0.29	3.45***	H_{7b} supported
Dependent variable: Intention (INT)					
Attitude (ATT)	0.43	12.52***	0.29	11.12***	H_2 supported
Injunctive norm (IN)	0.47	15.36***	0.24	6.15***	H_4 supported
Descriptive norm (DN)	–	–	0.23	5.31***	H_5 supported
Perceived control over behavior (PCB)	0.05	1.84	−0.18	−3.80***	H_{6a} not supported
Self-efficacy (SE)	–	–	0.46	7.08***	H_{7a} supported
Dependent variable: Attitude					
Utilitarian eating value (UT)	–	–	0.45	9.01***	H_{3a} supported
Hedonic eating value (HED)	–	–	−0.09	−2.03*	H_{3b} supported
R^2 (%) Consumption frequency	22.9		23.0		
R^2 (%) Intention	64.8		70.5		
R^2 (%) Attitude	–		16.4		
Model fit indices:					
χ^2 (df)	143.91 (48)		893.89 (186)		
RMSEA	0.05		0.07		
CFI	0.99		0.95		
SRMR	0.03		0.12		
TLI	0.98		0.94		

Note. *** $p < .001$; ** $p < .010$; * $p < .050$.

eight latent constructs and one observed variable (consumption frequency). Two items measuring SE and PCB were omitted due to low factor loadings (0.15 and 0.37, respectively), whereas a third item measuring DN was dropped based on a screening of standardized residual covariances (i.e. 41% of residuals above 2.0 in absolute value). The omitted items were: "If I wanted to, I could avoid eating functional foods regularly"; "Eating functional foods regularly is beyond my control" (reverse scored); and "How many of the people who are important to you do you think eat functional foods regularly?", respectively. The final measurement model suggests adequate model fit, χ^2 (1 7 5) = 559.58; RMSEA = 0.05; CFI = 0.97; SRMR = 0.05; TLI = 0.96. Convergent and discriminant validity of latent variables was achieved as AVE > 0.5 and AVE > MSV, respectively. Additionally, the square root of AVE was greater than the correlations between variables. Construct reliability for each latent variable was above the threshold value of 0.7.

A series of CFAs suggested that two-factor solutions outperformed one-factor solutions. When IN and DN were combined to reflect a single social pressure construct, model fit was significantly worse, χ^2 (5) = 680.72; RMSEA = 0.41; CFI = 0.84; SRMR = 0.10; TLI = 0.68, as compared to a two-factor solution, χ^2 (4) = 26.24; RMSEA = 0.08; CFI = 1.00; SRMR = 0.02; TLI = 0.99. A similar result applied to a comparison between a single PBC factor, χ^2 (2) = 166.72; RMSEA = 0.32; CFI = 0.82; SRMR = 0.10; TLI = 0.47 vs. SE and PCB as two factors, χ^2 (1) = 3.20; RMSEA = 0.05; CFI = 1.00; SRMR = 0.01; TLI = 0.99. Initial examination of the effect of a common latent factor to the measurement model showed a case of negative error variance to one of the two PCB indicators. Hence, constraints were imposed to regression weights from PCB to its two indicators (specified to be equal) and the variance of PCB was specified to equal "1." Common method bias did not pose a serious threat, although the common latent factor caused a notable reduction in standardized regression weights for two indicators of HED (0.206 and 0.205). The magnitude of influence was still considered moderate. Standardized factor loadings and construct reliabilities for the measurement model are presented in Table 2.

The results suggest that participants, on average, neither found it likely nor unlikely to engage in regular consumption of functional foods (INT = 4.05).[2] Attitudes toward eating functional foods regularly were moderately positive (ATT = 4.72), and both hedonic and utilitarian eating values were considered important to food consumption (HED = 5.45; UT = 5.11). The participants considered social pressure to consume functional foods to be somewhat low (IN = 3.78; DN = 3.80). Furthermore, they perceived themselves to be in control over whether to engage in functional food consumption; they also had confidence in their ability to do so (PCB = 4.89; SE = 4.55). Regarding consumption of functional foods, 35.7% of respondents claimed to consume functional foods more than once a week, whereas 29.3% reported to have rarely or never consumed such food products. Correlations between some of the constructs were high (around 0.70). Especially highly correlated were INT, ATT, IN, DN, and SE. Our results indicated satisfactory discriminant validity between constructs. Table 3 displays the intercorrelations and descriptive statistics.

4.2. Tests of structural models

The extended model formed the basis for hypothesis testing. Both the basic and the extended models demonstrated adequate fit to the data (RMSEA = 0.05–0.07; CFI = 0.95–0.99; SRMR = 0.03–0.12; TLI = 0.94–0.98), except for an SRMR index of 0.12 for the extended model. Intention ($\beta = 0.29$, $t = 5.04$, $p < .001$) and self-efficacy ($\beta = 0.29$, $t = 3.45$, $p < .001$) are both significant in explaining retrospective consumption frequency, supporting hypotheses H_1 and H_{7b}, respectively. The factor PCB ($\beta = -0.16$, $t = -2.64$, $p < .01$) was also a significant predictor of consumption frequency, but the direction of the relationship was negative and hence not in support of hypothesis H_{6b}. The data showed that attitude ($\beta = 0.29$, $t = 11.12$, $p < .001$), injunctive norms ($\beta = 0.24$, $t = 6.15$, $p < .001$), descriptive norms ($\beta = 0.23$, $t = 5.31$, $p < .001$), PCB ($\beta = -0.16$, $t = -2.64$, $p < .001$), and self-efficacy ($\beta = 0.46$, $t = 7.08$, $p < .001$) significantly explained intention. The direction of the relationship between PCB and intention was negative and not in support of hypothesis H_{6a}. Hypotheses H_2, H_4, H_5, and H_{7a}, however, were supported. Next, results demonstrated a strong positive influence of utilitarian eating

[2] Mean score on a 7-point scale.

values on attitude (β = 0.45, t = 9.01, p < .001), whereas hedonic eating values was negatively associated with attitude (β = −0.09, t = −2.03, p < .05). This is supportive of hypotheses H_{3a} and H_{3b}, respectively. Hedonic and utilitarian eating values, taken together, explained 16.4% of the variance in attitude. The extended model explained an additional 5.7% of the variance in intention, as compared to the basic model. Inclusion of descriptive norms, self-efficacy, and hedonic eating values made no additional contribution to the variance explained in consumption frequency.

In comparing the basic and the extended model, several interesting findings are observed. In the basic model, intention was only influenced by injunctive norms (β = 0.47, t = 15.36, p < .001) and attitude (β = 0.43, t = 12.52, p < .001), whereas PCB (β = 0.05, t = 1.84, p = .065) failed to reach significance. Conversely, in the extended model, self-efficacy (β = 0.46, t = 7.08, p < .001) clearly was the strongest contributor in predicting intention. Attitude (β = 0.29, t = 11.12, p < .001), injunctive norms (β = 0.24, t = 6.15, p < .001) and descriptive norms (β = 0.23, t = 5.31, p < .001) also made considerable positive contributions, while PCB (β = −0.16, t = −2.64, p < .001) had a negative influence on intention. Considering consumption frequency, only intention (β = 0.43, t = 14.49, p < .001) significantly explained CF in the basic model (R^2 = 22.9%). In the extended model, both intention (β = 0.29, t = 5.04, p < .001) and self-efficacy (β = 0.29, t = 3.45, p < .001) were strongly and positively associated with consumption frequency, whereas the direction of relationship between PCB and consumption frequency was negative (β = -0.16, t = -2.64, p < .01). Explained variance in consumption frequency was 23.0%.

5. Discussion

This research investigated the ability of an extended TPB framework to explain functional food consumption among Norwegian consumers, incorporating multicomponent measures of attitude formation, norms, and PBC. Most of our expectations were confirmed. For instance, intention was positively associated with consumption frequency, which implies that prior experience with functional foods generates future intention to consume. Attitude was strongly associated with intention within the basic TPB framework, a finding that corresponds with prior research on functional foods (Hung et al., 2016; Patch et al., 2005). Although attitudes were positive toward this type of diet, they might still be weak due to functional foods not being too widespread or familiar to Norwegians. Furthermore, consumers were found to appreciate both hedonic and utilitarian eating values. Examining their simultaneous influence on attitude suggests that utilitarian (vs. hedonic) eating values exert a strong positive (vs. weak negative) influence on attitude toward eating functional foods. This corresponds well with the notion of functional foods being primarily utilitarian in nature, targeting consumers who find health and nutrition to be important food-choice criteria.

Subjective norms (i.e. injunctive norms) were found to exert a strong influence on intention within the basic model. This is congruent with previous studies (Conner et al., 2002; McEachan et al., 2011), although the predictive power within the food consumption domain has been known to vary. A multicomponent conceptualization of social pressure (i.e. descriptive and injunctive norms) suggests the two to be strongly correlated but nonetheless superior to a single-factor solution following chi-square difference testing. The relationship between the two norm constructs was stronger than what is usually found (for a meta-analysis, see Rivis & Sheeran, 2003). Whereas injunctive norms were the strongest predictor of intention in the basic model, adding descriptive norms (and self-efficacy) to the model decreased the influence of both norm dimensions relative to self-efficacy. Injunctive and descriptive norms shared a similar positive association with intention. That is, consumers' intention to eat functional foods was strongly influenced by social pressures exerted by significant others' functional food consumption—and, as well, significant others' expectations as to what you yourself should do. The role of social norms within the area of food consumption is known to vary, whereas a meta-analysis (McEachan et al., 2011) showed large effects, while others (e.g. Conner et al., 2002) showed a small or no effect. Emphasizing social norms might prove to be beneficial in the marketing of functional foods. Including descriptive norms could contribute to extending understanding of the social-pressure construct in explaining consumers' intention to consume functional foods.

The PCB construct failed to reach statistical significance as a predictor of intention and consumption frequency in the basic model. This was not quite in accordance with our expectations, but similar weak relationships have been demonstrated through meta-analysis (Armitage & Conner, 2001); also, Conner et al. (2002) found no significant association between control and eating a healthy diet. The extended model demonstrated the strong influence of self-efficacy on intention, providing evidence of the importance of expanding the controllability dimension to include a measure of confidence in the ability to perform the behavior in question (i.e. self-efficacy). We are not aware of any study investigating the role of self-efficacy on intention to buy or consume functional food products within a TPB framework, but our empirical finding is congruent with a meta-analysis by Armitage and Conner (2001) and a study by Povey et al. (2000a) into dietary behaviors, which demonstrated that self-efficacy was more strongly related to intention than was PCB. Thus, motivation to engage in consumption of functional foods largely depended on consumers' confidence in their ability to do so.

The strong association between self-efficacy and intention, however, could be attributed to the self-efficacy-as-motivation argument, which holds that "self-efficacy ratings reflect the broader concept of motivation, rather than perceived capability" (Williams & Rhodes, 2016, p. 118). Rhodes and Courneya (2004), for example, have argued that measures of self-efficacy (and control) can be confounded with measures of motivation (i.e. intention) unless controlled for.

The self-efficacy-as-motivation argument might also explain the diminishing predictive power of attitude on intention, which usually best predicts intention in the food domain, experience when self-efficacy enters the model. That is, if self-efficacy is rather a representation of respondents' intention to consume functional foods, this measurement complexity might inflate the structural weights between self-efficacy and intention and, as well, confound the effects from the other predictors (Rhodes & Courneya, 2004). Our measurement model demonstrated discriminant validity between intention and self-efficacy, which implies that items designed to reflect the two constructs are different.

The negative path coefficient from PCB is similar to a phenomenon that Rhodes and Courneya (2003a, p. 138) ascribed to either "a sign of suppression, an estimation anomaly, or an incorrectly estimated effect in causal sequencing." A suppression effect occurs when a variable "increases the predictive validity of another variable (or set of variables) by its inclusion in a regression equation" (Conger, 1974, p. 36). Negative beta weights from control-related constructs (difficulty, control) to intention have been observed before (Armitage & Conner, 1999a, 1999b; Povey et al., 2000a). Armitage and Conner (1999b) suggested this phenomenon probably represents a suppressor effect as the correlation between PCB and intention and between PCB and self-efficacy are positive, comparable with Manstead and van Eekelen (1998) and the present study.

Comparison between the basic TPB model and the extended model (which includes descriptive norm, self-efficacy, and hedonic and utilitarian eating values) suggests that the latter is superior in explaining intention to consume functional foods, increasing explained variance from 64.8% to 70.5% (F^2 = 0.19; medium- to large-effect size). The observed effect of self-efficacy on intention corresponds with prior research (for a meta-analysis, see Armitage & Conner, 2001). However, no difference in variance explained in consumption frequency was

detected. Consumption frequency was strongest associated with intention, followed by self-efficacy and PCB, respectively.

5.1. Limitations and direction for future research

The current study focused on "eating functional foods regularly" wherein functional foods are perceived as a superordinate concept rather than explicit products (e.g. milk with added vitamin D). Future research would benefit, for the first, from targeting specific functional food products, as consumers are likely to evaluate different combinations of functional ingredients and food products with various levels of favorability (Krutulyte et al., 2011; Siró et al., 2008; Urala & Lähteenmäki, 2004). Secondly, all data were self-reported (which opens up the potential for some challenges, including satisficing respondents and other method biases; Podsakoff, MacKenzie, & Podsakoff, 2012). Applying the common method factor technique as a statistical remedy to test and account for method bias suggests that common method variance did not pose a serious concern, consistent with a recent re-analysis of research in the TPB domain (Schaller, Patil, & Malhotra, 2015). Third, although measures of validity and reliability met the recommended thresholds for satisfactory values, several correlation coefficients between latent constructs were still high. Fourth, the conceptual model employed in the current study could have benefited from incorporating measures of beliefs antecedent to the major constructs (i.e. behavioral beliefs, normative beliefs, control beliefs), as suggested by Fishbein and Ajzen (2010). Beliefs are assumed to provide cognitive and affective foundations for attitudes, subjective norms, and PBC (Ajzen, 2002a), and including measures of beliefs has the advantage of providing a deeper understanding of the underlying determinants shaping consumer attitudes, subjective norms, and perceived behavioral control toward functional food consumption (Patch et al., 2005). Fifth, background factors such as sociodemographic variables (Mogendi et al., 2016; Verbeke, 2005) and personality (Ajzen, 2011; Rhodes, Courneya, & Jones, 2002) have been found to influence TPB constructs and could have been incorporated into the model to further identify individual differences in functional food consumption behavior. Lastly, the retrospective nature of the behavioral construct (i.e. prior consumption frequency) poses a limitation to the model's predictive power.

6. Conclusions

The current research contributes to the existing literature in that it provides empirical evidence of the ability of an extended TPB to predict or explain intention to consume and prior consumption frequency of functional foods among a representative sample of 810 consumers in Norway. Of particular relevance was the strong predictive power of self-efficacy on intention, which suggests consumers are motivated to consume functional foods to the extent that they perceive themselves as capable of doing so. Furthermore, social pressure to engage in functional food consumption was strongly associated with consumer intention, with both injunctive and descriptive norms equally important to the formation of intentions. Attitude, which is more strongly associated with consumers' utilitarian as opposed to hedonic eating values, also exerted significant explanatory power on intention. Overall, the extended model increased the explained variance in intention from 64.8% to 70.5% and provided a broader understanding of consumers' motivation to consume functional food. It is suggested that the food industry could benefit from improving hedonic attributes of functional foods which, in turn, might open it up for targeting new consumer segments by balancing its "functional" focus with hedonic expectations.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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