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The Yoga of sustainable diets: Exploring consumers mind and spirit

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Title: The Yoga of sustainable diets: Exploring consumers mind and spirit

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Abstract

Unsustainable food choice and dietary behaviors put pressure on ecosystems and supply chain structures worldwide. Knowledge on the intrinsic values driving food consumption behavior are, therefore, essential in order to foster sustainability on a global, national and community based level. This study aims at exploring the relationship between different food consumption related behaviors and the intrinsic value shaping constructs of spirituality and mindfulness. Online questionnaire data on self-reported dietary behavior, self-reported food choice behavior, spirituality, and mindfulness were drawn from a population subsample in India and the United States of America. Factorial relationships between spirituality and mindfulness traits were explored using exploratory factor analysis (EFA). Furthermore, multiple regression analysis was performed to estimate the effect of the derived factor structures on different food choice and dietary behavior variables. The EFA resulted in 4 factors, of which two each frame spirituality and mindfulness. These factors are: (1) supernatural spirituality, (2) natural spirituality, (3) supportive mindset, and (4) scattered mindset. In both country data sets, factors 2 and 3 had significant adverse effects on the consumption of convenience foods and a positive effect on the consumers' dietary awareness. Even though ambiguities exist concerning important dietary sustainability measures, e.g. the consumption of animal-protein based foods, this research reinforces the value of spirituality and spiritual practice measures for sustainability research, especially for consumer sciences. Further elaboration and application of these concepts may proof valuable for various stakeholders involved as they point to a more integral aspect of human psychology and behavior.

Keywords: worldview, sustainable consumer behavior, exploratory factor analysis, intrinsic motivation, cross-cultural approach, consumer values

1. Introduction

Stakeholders agree that the shift in global dietary patterns towards increased demand of resource intensive food inflicts with the aim of a sustainable transition of the global food systems (Mason and Lang 2017). As a response, food consumption behavior has received considerable attention within the national and international community (Evans et al. 2017, Meybeck and Gitz 2017, Alsaffar 2016, Spaargaren et al. 2012). Research has been applied in various fields to better understand the diverse factors shaping human diets (e.g. Sanne 2002, Drewnowski 2009). In regard to consumption behavior, modern approaches have shifted away from classical rational choice models by including concepts derived from different scientific disciplines such as sociology, anthropology, psychology, and human geography resulting in more complex, value based approaches (Power and Mont 2010). In this context, research on spirituality and spiritual practice, and in particular mindfulness practice, have been increasingly explored concerning their potential to foster sustainability. Though the concept of spirituality contradicts with core scientific principles and is therefore viewed with great

skepticism (Powell 2001, Hayes 1984), research on spirituality and spiritual practices in the scientific fields of psychology, sociology, and medical health care (e.g. Tang 2017, Isaac et al. 2016, Mason et al. 2016, Hawkins et al. 2010) has shown its effect on changing human behavior. Yet, the application of spirituality and spiritual practice within the field of sustainable consumer behavior is still relatively new, thus exhibiting limitations concerning applicability, conceptualization and operationalization (Fischer et al. 2017).

Limitations relating to the applicability mainly comprise the subjects under investigation. Most studies focus on very specific population sub-samples such as students, obese people, or clinical patients (e.g. Harizan and Abdul Rahman 2017, Mason et al. 2016, Chairy 2012). Another limitation is the conceptualization of the spirituality construct. While the conceptualization of mindfulness is clear and widely agreed upon, difficulties regarding its operationalization remain prevalent.

This study is an expansion on the topic of worldviews and intents to explore consumers' personal spirituality and the practice of mindfulness and how these two reflect on food related behaviors. Measures are based on population samples drawn from two culturally, economically and environmentally different countries, India and the USA. A factor analytical approach is used to extract applicable structures for measuring spirituality and mindfulness. The four extracted factors are: supernatural spirituality, natural spirituality, positive mindset and negative mindset. Furthermore, implications on the effects of the established constructs on different sustainability relevant food choice (informed food choice, pro-environmentalism, and dietary awareness) and eating behaviors (convenience, animal-protein based, plant-protein based, fruits and vegetables) of consumers are estimated. Through this we are able to point to the core aspects of spirituality and mindfulness that are promising in regard to the evaluation of different food choice and dietary behaviors.

Furthermore, this study adds to the body of consumer studies currently emerging around worldviews, especially concerning the issue of spirituality and its meaning for sustainable development within the food domain. Our results provide valuable knowledge on the intrinsic motivational dynamics shaping sustainable food consumption and are therefore relevant for scientists within the field of sustainable consumer research. Moreover, the findings provide implications for stakeholders, showing what dynamics may prove supportive in fostering a long-lasting sustainable dietary change within the broader society. Before introducing our study we first provide a brief background on how spirituality and mindfulness relate to relevant food choice and dietary behavior issues and point to interesting studies already applied in this research field.

2. Literature review

2.1 Theoretical considerations

Nowadays, most scientists agree that individual food consumption behavior, including shopping, diet, and food waste management, cannot be separated from the cultural, psychological, and social environment the individual is exposed to (Minton et al. 2015). This seems to make a shift towards sustainable practices more difficult since deeply conditioned dynamics, such as the cultural background, may be difficult to change. While some food consumption behaviors may be based upon rigid factors like social norms, personal health and economic offset, changes towards more sustainable eating practices are possible since there are also many motivations involved in making food consumption choices (Vermeir and Verbeke 2006). The understanding of these dynamics

especially in regard to sustainability related food behaviors has been and remains a growing field of research. Over time, classic economic and marketing theories were refined and translated into other models including determinants of habit, emotion, social context, and moral aspects (e.g. Stern 2000, Ajzen 1991, Schwartz 1977). Consequently, the relationship of more subtle factors and sustainable consumption behavior has started to receive growing attention. Especially the Norm Activation Model (Schwartz 1977) and the Value-Belief-Norm Theory (VBN) (Stern 2000) offer insightful theoretical frameworks for the understanding of how intrinsic dynamics translate into behavioral outcomes. Schwartz (1977) proposes that behavior originates from two characteristics, namely (1) a personal consciousness and (2) a feeling of responsibility for the consequences that a certain behavior will have for the environment. Sterns VBN Theory (2000) ties in with these implications by suggesting that behavior isstimulated by three core values which are of either (1) altruistic, (2) egoistic, or (3) biospheric origin. Altruistic values are oriented towards societal well-being whereas egoistic values are based on individual well-being. Issues regarding environmental well-being are called biospheric values. According to Stern´s implications, individuals are likely to take responsible actions if their values are endangered to be violated.

Originally, both theories were proposed to explain pro-environmental consumption behaviors. Hence, their scope to explain food choice and dietary behavior is limited. For these behaviors the Attitude-Behavior-Context Theory (Guagnano et al. 1995) provides a more adequate theoretical base. According to this theory, behavior is a context dependent interactive process based on personal attitudes. That is, behavior is only activated by personal attitudes if the external conditions like financial, social, and legal situation are neutral.

Within the context of sustainable food choice and dietary behavior this theory may explain why different behaviors are expressed even though it does not align with the personal attitude towards sustainability, e.g. when green products are not purchased due to a high price even though the individual has a positive attitude towards them. A further extension to these theories was developed by Zepeda and Deal (2009). Their Alphabet theory aims at explaining food purchase behavior. Its explanatory fundament is built upon VBN theory, ABC Theory and four additional factors, namely (1) habit, (2) knowledge, (3) information seeking, and (4) demographic data. According to this theory, attitudes are formed through VBN as well as through knowledge and information seeking. The translation of these attitudes into context dependent behavior is mediated through habit. In fact, habits play a key role for expressing food choice and dietary behavior, especially, when external conditions are stable (Sainsbury et al. 2018, Zepeda and Deal 2009). The extent to which habit predicts behavior is determined by the degree of mastery and the perceived control over the performed behavior (Hall and Fong 2007). This implies that, if there are no changes in contextual parameters as well as a sufficient amount of perceived mastery and control over food choice and diet, changes in behavior may be initiated through changes in habitual behavior (Sainsbury et al. 2018) or motivational drivers (Vermeier and Verbeke 2006).

Both spirituality and mindfulness are promising driving forces in shaping and reshaping intrinsic value structures. Mindfulness is considered important for the deviation of customary practices and habits whereas spirituality affects intrinsic motivational structures. In regard to food consumption behavior both constructs may support scientists, businessmen and politicians in (better) understanding issues of consumer food choice and dietary behavior but also in navigating consumption behavior towards

more sustainable practices, e.g. reduced meat consumption, environmentally-friendly produced food products, and food waste management.

2.2 The role of spirituality in food choice and diet

Although initially sneered as strictly esoteric practices, spirituality and mindfulness have become of interest to researchers of various scientific disciplines. This development, starting almost 100 years ago, is a result of a fundamental shift in the societal and scientific understanding of psychology (Powell 2001). Over time, spirituality and mindfulness became important measures for human behavior, especially in the therapeutic, sociological and psychological context. In consumer sciences, the importance of both measures has also been gaining growing attention, with more and more studies focusing on the various benefits and limitations of these two concepts for determining consumer behavior (Rodriguez-Rad and Ramos-Hidalgo 2018, Fischer et al. 2017). This is especially true for the concept of spirituality which, until recently, has been strongly associated with religion but is now perceived as a separate psychological construct (Hill et al. 2000). The distinction between spirituality and religion in the scientific discourse proofs important as it helps to understand modern societal developments where more and people increasingly identify as spiritual but not religious (Ball et al. 2001, Hill et al. 2000). Nowadays, it is commonly agreed upon that religion may be part of one's personal spirituality, but spirituality does not necessarily require religious belief.

Despite the conceptual distinction of the term spirituality, its definition and clear delineation remains challenging and various interpretations are used. Screening through the available literature on spirituality, it is striking that there are numerous definitions and perspectives on spirituality. As an example, in 1999, Pargament defined spirituality as the "*search for the sacred*". Almost 15 years later, Jager Meezenbroek and colleagues (2012b) referred to spirituality as "*one´s striving for and experience with the essence of life*". Those two examples highlight the inherently abstract character of the term itself, which poses great challenges to its validation and measurement. To overcome these terminology issues, Kale (2004) conducted an extensive literature research and summarizes spirituality as *"the engagement to explore- and deeply and meaningfully connect one´s inner self – to the known world and beyond".* He further summarizes the term spirituality according to four dimensions: (1) a sense of the inner self, (2) a sense of meaning, (3) a sense of interconnectedness, and (4) a sense of the beyond. The first dimension refers to the human soul or universal consciousness inherent to every person. The second dimension comprises the human experience on earth and the seeking for a higher truth or meaning and purpose in life. Interconnectedness describes the recognition of an encompassing energy that links all living and non-living things. The last dimension, a sense of the beyond, refers to the belief in a higher force, universal spirit, or god.

Kales (2004) suggestion aligns with considerations of Wilber (2004) who further describes spirituality as a crucial component shaping human´s worldview. In his article on integrated human psychology, he further points out that spirituality is a personal experience, expressed through behavior. This connection between spirituality and human behavior has already been explored in various scientific contexts (e.g. Afsar et al. 2016, Vandenberghe and Costa Prado 2009, Ball et al. 2001). Consequently, these implications point to a positive influence of spirituality on both general behavior and behavioral change. McGhee and Grant (2008) identify four major characteristics that generally distinguish more spiritual people from less spiritual people, namely: (1) caring for others, (2) faith in higher forces, (3) inter-connectedness of matter, and (4) importance of action. The first characteristic refers to a greater concern towards the well-being of others. The second characteristic relates to the belief in greater forces. The third characteristic suggests the equal importance of all living and non-

living matter. The last characteristic refers to the belief that any individual action is of great importance for the whole system. Possible implications of spirituality on food choice and dietary decisions presented by Ulluwishewa (2014) and Subrahmanyan and Gould (2012) who describe spirituality as a driving force for increasing altruistic values through motivating care and gratitude towards the self, others and the surrounding, and naturally reducing a materialistic and self-centered character. With an individual evolving into spirituality, these factors will find a deep grounding in the psychological disposition, shape personal values and eventually translate into behaviors that mirror these belief systems. As such, spirituality is understood as a deeply intrinsic motivation that translates into individual attitudes (Sharma and Sharma 2017). The predictive strengths of spirituality then lie in this strong connection to human psychology, pointing to the fact that spirituality shapes consumption behavior on various, often very subtle, layers of consciousness with major implications for any kind of social development (Carroll 2004, p.2).

Given the numerous interpretations of the term spirituality, its conceptualization within consumer sciences remains a central challenge. This could explain why studies aiming at measuring the effect of spirituality on general consumer food choice and dietary behavior are still scarce. One of the first papers reflecting on spirituality in regard to consumption decisions was published by Ball and colleagues (2001) who argue that individuals with a higher level of consciousness are more likely to perceive consumption as an opportunity for spiritual growth by consuming products that add to the greater benefit of all. In a more recent study, David Lee and colleagues (2016) explored spirituality of undergraduate students in the USA. The results show that students who emerged in spirituality through spiritual practice and value beliefs are more likely to express sustainable consumption behavior which is expressed in compassionate self-concepts, healthy food choices, self-confidence, volunteerism, and self-reliance. At the same time, high levels of spirituality let the participants reduce non-sustainable acts of consumption like compulsive buying and materialism. Similar supportive effects of spirituality on consumption behavior were investigated by Sharma and Sharma (2017) who linked spirituality to perceived consumer effectiveness and related it to green purchase intentions. They found that the spiritual identity of consumers positively reflects on green purchase intention when mediated through perceived consumer effectiveness. A recent study of Rodriguez-Rad and Ramos-Hidalgo (2018) explored the effects of spirituality, ethics and moral identity on consumer behavior. Here, consumers with a high level of internalized spirituality were more likely to support companies following sustainable practices.

2.3 The role of mindfulness in food choice and diet

There are different ways to nurture personal spirituality. Commonly, ritual and different spiritual practices, like yoga, tai chi and meditation are recognized as essential tools for spiritual growth. One of these practices that emigrated from traditional Eastern belief systems into modern day life is the practice of mindfulness. Though mindfulness is commonly practiced in spirituality, people practicing mindfulness are not necessarily spiritual. Accordingly, the term mindfulness refers to an awareness for the present moment, including everything that happens within the individual and in the surrounding environment (Ericson et al. 2014). According to Langer (1989), mindfulness can be both a state and a trait. The former perceives mindfulness as a catalyst for general psychological well-being and the latter describes mindfulness in regard to personal differences based on four cognitive fields, namely (1) novelty producing, (2) novelty seeking, (3) flexibility, and (4) engagement. Both novelty producing and seeking refer to the individuals' openness to experience. Flexibility refers to

the ability to question habitual norms and nomological practices. The last category describes a state of dynamic evaluation and interpretation of one's environment. If practiced regularly, mindfulness stimulates traits of compassion, empathy and care, and promotes feelings of non-reactivity, well-being and happiness (Rosenberg 2005). Furthermore, mindfulness encourages the individual to reflect on true wants, needs and desires within a light of caring compassion for the self, others, and the environment (Fischer et al. 2017, Sangharakshita 2003).

Like spirituality, mindfulness describes a state of increased personal values ultimately aiming at inner and outer harmony (Subrahmanyan and Gould 2012, Rosenberg 2005). It is directly linked to the disruption of routines, congruence in terms of self-awareness, non-material values and well-being, as well as to pro-social behavior (Fischer et al. 2017). If practiced over a longer period of time, mindfulness fosters altruism and will eventually translate into greater pro-environmental and pro-social behavior, making it a valuable catalyst for changes in food choice and dietary behaviors (Ericson et al. 2014, Rosenberg 2005).

In contrast to spirituality, research on mindfulness is growing rapidly in various scientific disciplines such as clinical psychology (e.g. Kang and Whittingham 2010, Shapiro 2009), sociology (e.g. Lee 2015, Schipper 2012), and neurosciences (e.g. Tang et al. 2015, Zelazo and Lyons 2012). Nevertheless, its application within the field of sustainable consumer behavior is relatively new (Fischer et al. 2017). In regard to food choice and dietary behavior, few quantitative studies on the relationship between mindfulness and food intake exist. However, they show that if mindfulness is practiced for eating, it positively reflects on excessive food intake, causing people to eat less food (Allirot et al. 2018, Jordan et al. 2014, Hendrickson and Rasmussen 2013). Mason and colleagues (2016) studied the effect of mindfulness training on the sweets intake of obese people. They found that participants who regularly practiced mindfulness reduced their sweets intake. Furthermore, they pointed out that mindfulness practices need to anchor within the individual for several months before effects are visible. Similar outcomes were observed by Jacob and colleagues (2009) who explored the effect of mindfulness meditation on environmental sustainable behavior, measured through recycling behavior, household choice, and food practice. They found a weak but supportive relationship between mindfulness meditations and food practice. That is, practicing mindfulness frequently was associated with more sustainable food practices. In contrast, Hunecke and Richter (2018) only found weak relationships of mindfulness and environmentally relevant behavior including aspects of food choice (organic, regional, and seasonal) and diet (vegetarian). Their study recruited people with varying degrees of experience in mindfulness meditation and tested if they expressed differences in these behaviors. Differences amongst participants were studied in regard to five different mindfulness dimensions, namely: (1) observing, (2) describing, (3) acting with awareness, (4) non-judging, and (5) non-reactivity. For food choice and diet, weak positive relations were found only for the third mindfulness dimension. This implies that mindfulness research needs to be applied in a differentiated manner in order to understand how it contributes to sustainable changes in green behaviors.

2.4 Study aims

Though much work has already been done to properly comprehend how habit and motivation affect behavior and behavioral change dynamics, recent studies have pointed to the importance of contributions that foster a deeper understanding of the relationships between personal value processes and various food consumption related behaviors (e.g. Fischer et al. 2017). This work

responds to these suggestions by exploring the relationship between different food consumption related behaviors and the intrinsic value shaping characteristics of spirituality and mindfulness. We believe that weak effects of mindfulness on food behaviors measured in previous studies may be due to the separation of mindfulness from its original source that is spirituality. As a trait, spirituality comprises a belief system that goes beyond the mere practice of being aware, but shapes what people believe to be true in their personal reality. Therefore, mindfulness is examined within the greater context of spirituality.

Furthermore, the present study attempts to explore spirituality and mindfulness characteristics in reflection for the broader society to account for country based differences. Therefore, India and the USA were chosen as suitable study sites to examine how spirituality and mindfulness translate into behavior when exposed to different cultural, socio-economic, and environmental contexts. The concrete study questions are: (1) Are there factorial interactions between the spirituality trait and trait mindfulness? (2) What is the effect of these factorial interactions on consumer food choice and dietary behavior?

3. **Material and methods**

3.1 The questionnaire

Four different multi-item concepts were applied to capture the constructs of interest. The construct of food consumption behavior was evaluated using 41 items. Those items captured self-reported food choice behavior (e.g. the intentional purchase of organic food), dietary behavior (e.g. the consumption of animal based products), as well as some aspects related to personal, social, and cultural aspects of food consumption (e.g. health aspects of nutrition). Furthermore, self-reported pro-environmental behavior was evaluated using the pro-environmental behavior scale (PEBS) developed by Markle (2013). This scale captures environmental behavior in four dimensions, namely: (1) conservation, (2) environmental citizenship, (3) food, and (4) transportation.

Spirituality was captured through the Spiritual Attitude and Involvement List (SAIL) developed by Jaeger Meezenbroek and colleagues (2012a). This scale is designed to capture spirituality as universal self-experience and encompasses 7 dimensions, namely: (1) trust, (2) caring for others, (3) meaningfulness, (4) connectedness with nature, (5) acceptance, (6) spiritual activity, and (7) transcendent experience. Trust refers to the psychological state of belonging and connection to a higher all-encompassing force. Caring for others comprises altruistic values such as compassion and understanding. Meaningfulness reflects on the value of the individual action in context to a higher good whereas connectedness to nature emphasizes the important role of the natural environment for spiritual growth and inner harmony. The dimension of acceptance refers to faith in a higher sense. Spiritual activity takes matters of spiritual practice in consideration whereas the last dimension, transcendent experience, refers to the personal consciously experienced interactions with a higher source.

Mindfulness was captured using the Comprehensive Inventory of Mindfulness Experiences (CHIME) scale (Bergomi et al. 2014) and captures trait mindfulness according to 8 dimensions, namely: (1) inner awareness, (2) outer awareness, (3) conscious action, (4) accepting and non-judgmental attitude, (5) non-reactive and decentralized orientation, (6) open and non-avoiding attitude, (7) relativity of thoughts, and (8) insightfulness. The first two aspects of mindfulness capture the active

perception and experience of personal emotional states (inner awareness) and environmental phenomena (outer awareness). Conscious action refers to the degree of present focus that an individual expresses in every day actions. Accepting and non-judgmental attitude refers to an affectionate compassion that a person shows towards the self, whereas the fifth aspect of mindfulness is concerned with the observation and conscious detachment of thoughts and feelings as they arise from an unbalanced mind. An open and non-avoiding attitude further expands on mindfulness by considering the ability of the individual to actively participate in present life actions as they appear. Relativity of thoughts pays attention to the awareness of the unsteady mind and its conscious observation. The last dimension, insightfulness, comprises the acknowledgement of the component of learning from experience.

Due to time constraints, the PEBS, the SAIL, and the CHIME were shortened in length, with two items reflecting each dimension of the corresponding scale. This resulted in 8 items for the PEBS, 16 for the CHIME, and 14 for the SAIL. Within each dimension, items were chosen randomly. Responses were measured through five-point Likert scales ranging from 1 (never true / not at all / never / not a part of my diet) to 5 (Always true / to a high degree / always / part of my daily diet). Age, gender, education, household income and further socio-demographic information were collected in addition. After pre-testing, survey data was collected through a research panel provider in February/March 2018.

3.2 *Data analysis*

The collected observations were cleaned stepwise for timing and answering patterns. To allow for chained imputations of missing values, observations with data missingness greater than 30% were excluded (as well). Multiple imputations can only be performed if data missingness is completely at random (MCAR) or at random (MAR). Little´s test of MCAR was conducted according to implications given by Li (2013). The results of Little´s test did not support MCAR. Since there is no statistical test available to identify MAR, the probability of a missing value association was estimated for the spirituality and mindfulness variables using a t-test. Since data missingness did not reflect on the individual variables, MAR was assumed for the dataset. Overall, data missingness was calculated at 38.8 %. That is, 388 observations held at least one missing value amongst the variables measured. Althoughdata imputation is not recommended if overall missingness exceeds 30% (Azur et al. 2011), imputations were performed to estimate missing data. This decision was based on two reasons. Firstly, the overall missingness of the dataset was below 10% with the assumption of MAR. Secondly, there are statistical methods (e.g. ICE in Stata) that allow for solid imputations if missingness is below 50% (Royston, 2009). For the imputation procedure, variables were ranked according to their degree of data missingness, starting with the variable expressing the least missing data. This was possible since Stata possesses the ability to include already imputed values into further imputation estimations. Finally, data imputation was performed using chained equations modeling (MICE) since the data set contained ordinal data. For each missing value, the number of imputed estimations was set to 20 to strengthen the estimation model.

After the imputation procedure, the complete data set (1.012 observations) was utilized in a factor analysis in order to explore the factorial relationship between different items within the constructs under investigation. Based on the test for multivariate normality, the *Iterated Principal Factor* method was chosen to fit the factor model. This approach calculates measures for communality which replace the values of the original correlation matrix and are continuously re-estimated until

convergence is obtained (Habing 2003). The **E**xploratory **F**actor **A**nalysis (EFA) was selected instead of the confirmatory approach, in order to explore which items naturally account together. In total, two EFA´s were calculated. The first model comprised the PEBS, food choice and dietary behavior variables, and the second model the spirituality and mindfulness variables. For each EFA, the number of factors to retain was estimated using parallel analysis over 10 replications. Following this approach, the appropriate factor number is determined by comparing the real Eigenvalues with simulated Eigenvalues, keeping those which are greater than the average of the simulated values (Hayton et al. 2004). For the first EFA, 7 factors were retained. For the spirituality and mindfulness variables, the parallel analysis suggested to retain 4 factors.

In order to clarify the results calculated through the EFA, rotations were performed for each factor model individually. Through the rotation procedure, factor items are mathematically rotated towards the factor axis which makes their interpretation easier (Osborne 2015). The oblique rotation was chosen since the factors are expected to correlate amongst each other. Furthermore, Schmitt (2011) strongly recommends the use of the oblique rotation even if no correlations are assumed since it "…*generally results in more realistic and more statistically sound factor structures."* After the rotation procedure, items with high cross-loadings (<0.25) or low item loading (<0.35) were dismissed. This led to the final factor models. The first model comprised 35 items in total, expressing the shared variance across the PEBS, and the self-reported food choice and dietary behavior variables. The second model comprised 19 items and framed the factorial relationship of the spirituality and mindfulness traits. To check for internal model consistency, the Cronbach´s alpha of each factor was calculated.

Lastly, regression analysis was performed to gain insights into the relational dynamics between the two factor models. This analysis was conducted separately for each country to learn how the factor model translates the different socio-cultural and environmental influences. For each country, 7 different regression models were estimated. Within the regression models, the factors designed for PEBS, food choice, and dietary behavior represented the response variable (y) and the factors formed by items from the SAIL and CHIME represented the explanatory variables (x). Control variables included within the regression analysis were age (continuous), gender (categorical), education (categorical), and income (categorical). To allow for multiple regression analysis the variables gender, education, and income were transformed into dummy variables. Each regression analysis was run including a beta construct to increase the robustness of the regression model.

4. Results

4.1 Sample description

The surveys yielded 1.243 observations in total (621 from India and 622 from the USA). 18.6 % were excluded from further data analysis processes which resulted in a final data set of 1.012 observations (482 from India and 530 from the USA). Table 1 provides an overview of the socio-demographic profile of the respondents sampled in India and the United States.

Table 1: The summary chart of the socio-demographic profile of the respondents from India and the United States of America (USA) in spring 2018. Per annum income level: India: high = more than 1,200.000 INR, middle = 120.000-1,200.000 INR, low = less than 120.000 INR; USA: high= more than 100.000 USD, middle = 35.000-100.000 USD, low = less than 35.000 USD; 1,000,00 € equal 80.654,00 INR equal 1,174,11 USD, based on the official course rate (09.07.2018); education level: India: high = master´s and higher, medium = senior school and bachelor´s, low = less than senior school, USA: high = master´s and higher, medium = associate´s and bachelor´s, low = less than college.

		India		United States of America		
Demographics	**Description**	**Sample [%]**	**Population* [%]**	**Sample [%]**	**Population** [%]**	**Sample total [%]**
Age	< 26 years	33.0	45.3	16.4	34.0	24.3
	26-35 years	26.8	26.4	20.2	12.2	13.1
	36-55 years	26.0	14.6	28.3	25.4	13.1
	56-65 years	7.1	7.5	16.4	13.2	12.0
	> 65 years	7.3	6.2	18.7	15.2	13.2
Gender	Female	50.8	48.5	50.4	50.8	50.6
	Male	49.2	51.5	49.6	49.2	49.4
Education	High	81.3	6.7	16.0	13.0	47.1
	Middle	12.9	6.7	60.4	32.1	37.7
	Low	5.8	86.6	23.6	54.9	14.1
Income*	High	9.8	0.2	25.1	27.6	17.8
	Middle	52.5	32.2	44.2	42.2	48.1
	Low	25.1	67.6	29.2	30.2	27.3
Sample size		**482**		**530**		**1012**

* Population statistics drawn from the Office of the Registrar General & Census Commissioner, India 2001 (online) and statista 2015 (online) data.
** Population statistics drawn from statisticalatlas 2018 (online)
*** Income level shows response rates of below 100%

Both country samples properly correspond to the population shares reported for gender and age classes of 56 and older. Though quotas were set for the demographic variables measured, restrictions on age, education and income needed to be relaxed during data collection process in order to reach the observation number desired. Therefore, our sample is biased towards Indian consumers with high education levels and incomes greater than 120.000 INR (categories "high" and "middle"). In regard to education, this was also true for the US observations collected. In both samples, consumers younger than 26 years are underrepresented.

4.2 *Factor structures derived from the EFA*

Table 2 provides an overview of the factors extracted through the EFA procedure.

Table 2: Summary of the results of the two Exploratory Factor Analyses performed for self-reported food choice and dietary behavior (n = 1012) and trait spirituality and trait mindfulness. Data was collected through online surveys from India and the United States in spring 2018.

Factors derived	Exploratory factor analysis		
	Number of items	Item loading range	Cronbach´s alpha
Food choice and diet (n = 1012)			
Informed **F**ood **C**hoice (IFC)	8	0.53-0.85	0.902
Pro-**E**nvironmental **B**ehavior (PEB)	5	0.37-0.58	0.674
Dietary **A**wareness (DA)	5	0.46-0.65	0.699
Convenience **D**iet (CD)	2	0.55-0,72	0.582
Animal-**P**rotein based **F**ood (APF)	7	-0.43-0.84	0.822
Plant-**P**rotein based **F**ood (PPF)	4	0.44-0.57	0.664
Fruits and **V**egetables (FV)	2	0.85-0.85	0.881
Spirituality and mindfulness (n = 1012)			
Super-natural spirituality (SPIRIT I)	5	0.63-0.85	0.877
Grounded spirituality (SPIRIT II)	5	0.41-0.74	0.745
Supportive mindset (MIND I)	6	0.44-0.68	0.760
Scattered mindset (MIND II)	4	0.46-0.61	0.598

For the behavioral variables, the EFA of the merged data sets resulted in 7 factors, each corresponding to a different aspect of food choice or dietary behavior. The factors identified were: (1) informed food choice, (2) pro-environmental behavior, (3) dietary awareness, (4) convenience diet, (5) animal-protein based food, (6) plant-protein based food, and (7) fruits and vegetables.

Informed food choice (IFC) emerges from an item pool that reflects a high degree of information based responsible food consumption behavior. The 8 items feeding into this factor are mainly concerned with the intentional purchase of certified and labeled food produce (e.g. organic, fair-trade, and animal welfare characteristics) and the degree of wholesomeness of a produce. Within the behavioral EFA, IFC holds the highest internal consistency ($\alpha = 0.902$). The second factor, PEB, is formed by 5 items of the PEB questionnaire and captures environmental behavior not only related to food choice and diet but also other facets of consumption like means of transportation or energy consumption behavior. The third factor is framed around dietary diversity and well-being / health (e.g. "For my meals, I alternate between different food groups" and "I consciously choose food that is low in sugar"). Furthermore, the item loadings also suggest sensitivity for personal food consumption behaviors (e.g. "I only eat when I am hungry"). For that reason, this factor is named Dietary Awareness (DA). The fourth and the fifth factor depict the Westernization of diets. Factor 4 (convenience diet) refers to the consumption of convenience food and highly processed foods (e.g. refined sugar). It is fed by two items and has the lowest internal consistency amongst the 7 factors calculated ($\alpha = 0.582$). Factor 5 (animal-protein based foods) is concerned with the consumption of different kinds of meats e.g. red meat and processed meat and other animal based products (e.g. eggs and/or seafood). The last two factors concern plant derived foods. Factor plant-protein based

foods comprises foods high in protein like legumes, nuts, seeds and cereals. The last factor, fruits and vegetables, includes two items measuring unprocessed fruits and vegetables.

The items of the predictor variables derived from two constructs, namely mindfulness (CHIME) and spirituality (SAIL). The EFA procedure, however, resulted in four factors. Two of those factors (factor 2 and 3) combined items from both constructs to form a factor structure. The first and last factors were fed by items from the CHIME or the SAIL only. Table 3 provides a detailed overview of the items loading each factor.

Table 3: List of the item loadings of the four factors (SPIRIT I, SPIRIT II, MIND I, and MIND II) derived during EFA procedure for trait spirituality and trait mindfulness based on 1012 observations. Data was collected through online surveys from India and the United States in spring 2018.

Statement	Factor loading			
	SPIRIT I	SPIRIT II	MIND I	MIND II
I consider myself a religious person	0.847			
I consider myself a spiritual person	0.782			
There is a God or higher power in my life that gives me guidance*	0.738			
I have had experiences in which I seemed to merge with a power greater than myself*	0.709			
I meditate or pray, or take time in other ways to find inner peace*	0.635			
When I am in nature, I feel a strong sense of connection*		0.736		
The beauty of nature moves me*		0.712		
It is important to me that I can do things for others*		0.554		
I am aware of the fact that each life has its own tragedy*		0.525		
I consciously notice sounds around me, like birds chirping or cars passing by**		0.411		
I notice my thoughts and feelings, yet I am able to look at them from a distance**			0.682	
I guide myself with loving kindness through the ups and downs of life**			0.636	
When I am tangled up in stressful thoughts and feelings, I notice this quickly and can easily dissociate myself from them**			0.506	
In difficult times, I maintain my inner peace*			0.500	
When I notice that I have made things more complicated than they really are, I can smile about it**			0.498	
I approach the world with trust*			0.438	
In the everyday life, I often get distracted by memories, images or dreams**				0.605
While reading, I often have to re-read sections because I get distracted by my thoughts**				0.572
I judge myself harshly when I make a mistake**				0.476
I am aware of the fact that my judgments about situations and persons can change easily**				0.463
Cronbach´s alpha	**0.877**	**0.745**	**0.760**	**0.598**

* Items derived from the Spiritual Attitude and Involvement List (SAIL; Jaeger Meezenbroek et al. 2012a)
** Items derived from Comprehensive Inventory of Mindfulness Experiences (CHIME; Bergomi et al. 2014)

SPIRIT I depicts spirituality in close relationship to the supernatural and/or religious belief. Out of the five factors loading into SPIRIT I, three suggest the belief in a force greater than the self (e.g. "There is a God or higher power in my life that gives me guidance"). The item with the lowest internal factor

loading ("I meditate or pray, or take time in other ways to find inner peace") indicates the integration of some kind of ritualistic behavior. Here, the individual creates space in the everyday life to emerge into spiritual practice. It should be noticed that the items "I consider myself a spiritual person" and "I consider myself a religious person" are not part of the SAIL questionnaire but were added additionally. The term spirituality is sometimes associated with one's relationship to God (Vaughan 2002) which supports the religious connotation already emphasized by other items of this factor. Amongst the spirituality and mindfulness factors, SPIRIT I reveals the highest internal consistency (α = 0.877).

In contrast to SPIRIT I where the self is driven towards a higher force or the supernatural, SPIRIT II is concerned with the earthly matters of spirituality. It reflects spirituality as perceived, experienced and expressed in daily routine which reflects on every interaction with others or the environment (e.g. "It is important for me that I can do things for others" or "the beauty of nature moves me"). When observing the item structure of SPIRIT II, it is further noticeable that several items point to individuals with integrated emotional states comprising compassion (e.g. "I am aware of the fact that every life has its own tragedy") and belonging (e.g. When I am in nature, I feel a strong sense of connection"). For this factor, all items but the last derive from the spirituality scale (SAIL).

Both the third and fourth factor determined through the EFA procedure are framed around self-perception in daily experience. Yet, they reflect this from two opposing perspectives. MIND I depicts a strong responsive compassion for the self (e.g. "I guide myself with loving kindness through the ups and downs of life" and "When I notice that I´ve made things more complicated than they really are, I can smile about it"). It points to an attitude that responds supportive, allowing to experience failure. It further describes a mindset that is aware and present with emotions concerning the self (e.g. "I notice my thoughts and feelings, yet I am able to look at them form a distance"). The items "In difficult times, I maintain my inner peace" and "I approach the world with trust" originate from the spirituality construct (SAIL) further reinforcing a positive thought structure of the individual.

In contrast, MIND II refers to a rather scattered mindset. It is shaped by four items of which two refer to a state of mental absence and imbalance ("In the everyday life, I often get distracted by memories, images, or dreams" and "While reading, I often have to re-read sections because I get distracted by my thoughts"). MIND II also carries a connotation to self-criticism and non-integrated judgment (e.g. "I judge myself harshly when I make mistakes"). Among the intentional factors Mind II has the lowest but still acceptable internal reliability (α = 0.598).

4.3 Relationship between spirituality and mindfulness and food choice and dietary behavior

For each country, multiple regression analysis was performed to gain insights on the relationship between the 7 food choice and dietary behavior factors and the 4 spirituality and mindfulness factors derived from the EFA. A partial overview of the results is given in tables 4 and 5. A complete overview including the four socio-demographic control variables, age, gender, education, and income is given in the appendix.

Table 4: Regression results for various food choice and dietary behavior factors in dependence to trait spirituality and trait mindfulness factors (SPIRIT I, SPIRIT II, MIND I, and MIND II) and four socio-demographic traits (age, gender, education, and income) of Indian consumers. Level of significance at *p ≤ 0.05, **p ≤ 0.01, and ***p ≤ 0.001. This table does not include all traits considered within the analysis. Detailed tables, including the socio-demographic measures are given in the appendices.

India (n= 482)

Factor	Informed food choice			Pro-environmental behavior			Dietary awareness			Animal-protein based diet			Convenience diet			Plant-protein based diet			Fruits and vegetables		
	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	T
(Constant)	-	*0.026*	*10.55*	-	*0.018*	*57.10*	-	*0.023*	*3.74*	-	*0.030*	*-64.14*	-	0.020	-63.77	-	0.029	-0.30	-	*0.023*	*7.68*
SPIRIT I	0.14	0.008	19.51	0.11	0.005	15.45	0.03	0.007	-5.37	0.14	0.009	19.79	0.28	0.006	43.22	-0.15	0.009	-20.07	-0.11	0.007	-16.26
SPIRIT II	-0.27	0.009	-18.14	-0.17	0.006	-19.41	-0.09	0.007	-11.82	-0.39	0.010	-40.94	-0.49	0.007	-55.41	0.01	0.010	0.94	0.48	0.008	53.92
MIND I	0.22	0.010	23.48	0.41	0.007	45.29	0.70	0.009	91.76	0.24	0.011	25.31	0.13	0.008	14.95	0.02	0.011	2.02	-0.12	0.009	-13.64
MIND II	0.19	0.007	28.77	0.15	0.005	24.59	-0.01	0.006	-2.46	0.11	0.008	17.25	0.20	0.006	34.34	0.14	0.008	21.52	0.19	0.006	32.87
adjusted R²		*0.18*			*0.27*			*0.47*			*0.17*			*0.30*			*0.06*			*0.29*	

Table 5: Regression results for various food choice and dietary behavior factors in dependence to trait spirituality and trait mindfulness factors (SPIRIT I, SPIRIT II, MIND I, and MIND II) and four socio-demographic traits (age, gender, education, and income) of US consumers. Level of significance at *p ≤ 0.05, **p ≤ 0.01, and ***p ≤ 0.001. This table does not include all traits considered within the analysis. Detailed tables, including the socio-demographic measures are given in the appendices.

USA (n= 530)

Factor	Informed food choice			Pro-environmental behavior			Dietary awareness			Animal-protein based diet			Convenience diet			Plant protein based diet			Fruits and vegetables		
	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	t
(Constant)	-	*0.021*	*-31.58*	-	*0.020*	*-66.84*	-	*0.016*	*-3.40*	-	*0.018*	*-3.96*		*0.024*	*0.26*	-	*0.022*	*-14.63*	-	*0.019*	*-13.65*
SPIRIT I	0.14	0.005	25.13	0.10	0.005	17.41	-0.15	0.004	-30.11	-0.01	0.004	-0.97	0.01	0.006	1.41	-0.03	0.005	-4.99	0.02	0.005	3.84
SPIRIT II	0.45	0.008	65.64	-0.01	0.007	-1.23	0.35	0.006	54.81	0.14	0.007	18.32	-0.38	0.009	-50.45	0.45	0.008	60.36	0.34	0.008	44.73
MIND I	0.02	0.007	2.98	0.33	0.007	49.05	0.36	0.005	60.09	-0.01	0.006	-0.88	0.16	0.008	22.71	-0.14	0.007	-19.41	0.02	0.006	2.99
MIND II	0.01	0.007	2.07	0.15	0.006	25.95	-0.01	0.005	-3.57	0.13	0.006	21.35	0.19	0.007	31.61	0.03	0.006	5.66	0.08	0.006	12.72
adjusted R²		*0.31*			*0.27*			*0.40*			*0.13*			*0.16*			*0.19*			*0.20*	

4.3.1   India

For the Indian dataset, the attribute of earth-centered spirituality (SPIRIT II) and a supportive mindset (MIND I) revealed to be strong predictors for the estimated (un-)sustainable food consumption behaviors. Consumers expressing a high degree of SPIRIT II were less likely to consume high amounts of convenience products (-0.49, $p<0.01$) and animal based foods (-0.39, $p<0.01$), but more likely to consume unprocessed fruits and vegetables (0.48, $p<0.01$). Mind I was strongly positively related to dietary awareness (0.70, $p<0.01$), pro-environmental behavior (0.41, $p<0.01$), and informed food choice (0.22, $p<0.01$). That is, a supportive mindset greatly increased the likelihood of expressing sustainability behaviors. In contrast, respondents with a scattered mindset related comparably weak with dietary awareness (-0.01, $p<0.01$), and pro-environmental behavior (0.15, $p<0.01$).

The socio-demographic variables age, gender, education, and income are not given in the table above, but were part of the estimation model. Among these four variables income levels revealed to be comparably strong predictors. Respondents earning more than 1,200.000 INR per annum were more likely to consume animal-protein based foods (0.24, $p<0.01$) and make informed food choices (0.25, $p<0.01$) when compared to respondents earning 120.000 INR per annum or less. Younger respondents were more likely to consume animal-protein based foods (0.22, $p<0.01$) when compared to older respondents. The education level formed the strongest relationship with fruit and vegetable consumption. Respondents holding at least a Bachelor´s degree were more likely to consume unprocessed fruits and vegetables (Senior school or Bachelor´s degree: 0.14, $p<0.01$; Master´s degree or higher: 0.18, $p<0.01$) than respondents with lower education. Gender related weakly to all behaviors evaluated. Yet, there was a tendency of male respondents to eat more animal-protein based foods (0.07, $p<0.01$) and convenience foods (0.02, $p<0.01$) but lesser amounts of unprocessed fruits and vegetables (-0.12, $p<0.01$) when compared to females.

4.3.2   United States of America

As for the Indian sample, within the American dataset SPIRIT II and MIND I were also valuable predictors. In particular, SPIRIT II related strongly to informed food choice (0.45, $p<0.01$), convenience foods (-0.38, $p<0.01$), dietary awareness (0.35, $p<0.01$), fruit and vegetable consumption (0.34, $p<0.01$), and plant protein based foods (0.34, $p<0.01$). MIND I had a comparably large influence on dietary awareness (0.36, $p<0.01$) and pro-environmental behavior (0.33, $p<0.01$). SPIRIT I showed relatively week relationships towards all outcome variables estimated. Additionally, it is the only predictor within the American subsample that has a comparably negative relationship with dietary awareness (-0.15, $p<0.01$). This implies that with increasing supernatural-centered spirituality, dietary awareness decreases within the American sample. The influence of MIND II on the (un-)sustainable behavior variables is comparable to the estimates of the Indian regression model.

Age was a relatively strong predictor variable indicating that younger respondents were more likely to express greater pro-environmental behavior (0.35, $p<0.01$), informed food choice (0.23, $p<0.01$) and plant-protein based dietary behavior (0.12, $p<0.01$). Moreover, income levels revealed to be valuable predictors in particular for the dietary behavior variables. Respondents of higher income classes consumed more animal-protein based foods (35.000-100.000 USD/year: 0.26, $p<0.01$; >100.000 USD/year: 0.17, $p<0.01$) but also more plant-protein based foods (35.000-100.000 USD/year: 0.08, $p<0.01$; >100.000 USD/year: 0.30, $p<0.01$). Similar to the Indian dataset, males

tended to eat more animal-protein based foods (0.24, p<0.01) and convenience foods (0.13, p<0.01) and expressed a lower degree of dietary awareness (-0.10, p<0.01) and informed food choice behavior (-0.10, p<0.01). Respondents of higher education consumed comparably lower amounts of animal-protein based foods (Bachelor´s or associates: -0.08, p<0.01; Master´s or higher: -0.12, p<0.01) but more unprocessed fruits and vegetables (Bachelor´s or associates: 0.04, p<0.01; Master´s or higher: 0.13, p<0.01) than lower educated respondents.

5. Discussion

This study aimed at exploring the application of spirituality and mindfulness constructs and their influence on consumer food choice and dietary behavior. In the following section the results are discussed, first, by looking at the conceptualized structures, and second, by discussing their effect in regard to the different (un-)sustainability behaviors evaluated within this study.

5.1 Understanding the value of factors spirituality and mindfulness for sustainable consumption research

When fed into the EFA both constructs, trait spirituality (SAIL) and trait mindfulness (CHIME), remained largely independent from each other. However, during the analysis process the individual items formed four independent factors (SPIRIT I, SPIRIT II, MIND I, and MIND II) describing different states of experienced and perceived responsibility. The first two factors SPIRIT I and SPIRIT II were mostly obtained from the spirituality construct as well as from two additional questions added by the authors. Overall, the findings indicate the independence of spirituality and mindfulness as measures in their scientific application. A clear distinction between spirituality and mindfulness was also found by Leigh and colleagues (2005), who studied the implications of spirituality and mindfulness on substance abuse. They concluded that mindfulness has indeed emerged as an independent activity that does not necessarily comprise spiritual belief. While our study reinforces these implications, central questions on the possible interactions of spirituality and mindfulness on each other, e.g. as mediator or moderator for behavior or behavior change, remain unexplored within the framework of this study.

SPIRIT I characterizes a supernatural understanding of spirituality whereas SPIRIT II describes spirituality as embedded in daily experience. A similar differentiation was made by Allport (1963) who described the behavioral implications of religiousness for mental health. He suggested conceptualizing religion as motivation that is either extrinsically or intrinsically orientated. Extrinsically motivated people will turn to authority, which is expressed through a higher force but also through the active participation in religious practices when in need for guidance. Intrinsically motivated people, however, will turn to the self to find direction. Our results support this distinction by differentiating spirituality in two similar categories. Therefore, we argue that it may be more effective to base measures of trait spirituality in consumer sciences on fewer factors to capture the essential mechanism of spirituality in regard to consumption behavior. The items framing such a construct, however, need to be well selected in order to capture the holistic concept of spirituality sufficiently. An important differentiation between SPIRIT I and SPIRIT II is the aspect of experienced and perceived responsibility. In SPIRIT I, responsibility is decentralized from the self. This, however, implies a codependency where the individual action is limited in scope as it is objected to a more powerful source. This aspect is the major delineation to SPIRIT II, where full responsibility is given to the self. In this regard, the construct of spirituality captured in the framework of this study reminds

of the concept of perceived consumer effectiveness (PCE) introduced by Kinnear and colleagues (1974). PCE aims at capturing the degree to which people belief in the power of an individual consumption act in order to implement large-scale changes. Though there are similarities between the investigated factor structure of SPIRIT II and the PCE concept, we argue that both constructs are independent from each other. While actions in PCE are motivated upon the belief that the individual decision will make a difference (Rice 2006), in the spirituality construct it seems that the behavior will be undertaken in any case even though the effect on the larger environment is unclear or minimal. Hence, spirituality, especially natural spirituality (SPIRIT II), may delineate a different motivational driver for human behavior than PCE.

This implication may also hold true for the third and the forth factors (MIND I and MIND II) which both derived from the CHIME questionnaire for mindfulness. No study was found that measured mindfulness from the perspective of opposing mindsets of either being lost in thought and judgment or of focused awareness for the emotional dynamics within and outside the self. In regard to mindsets, issues of sustainable behavior are mostly investigated in terms of specific positive or negative opinions towards a product or processing method which is closely related to personal moral and ethical believes (e.g. Chen and Moosmayer 2018, Lu et al. 2015). The structure discovered in the framework of this study, however, suggests to look at those mindsets from a more fundamental viewpoint which is the cognitive presence and its mental translation to perceived experience. Further elaboration on this construct structure could proof valuable, since a supportive mindset (MIND I) was found to be a strong predictor for several of the food choice and dietary behaviors evaluated.

5.2 Effects of SPIRIT I, SPIRIT II, MIND I and MIND II on consumer food choice and dietary behavior

Though almost all predictors significantly influence the evaluated food choice and dietary behavior variables, (it becomes clear that) the different plains of spirituality and mindfulness affect different behaviors.

Supernatural spirituality (SPIRIT I) somehow relates to religion which is, similar to spirituality, also a search for the sacred but commonly contains an institutional component based on rules, regulations, and traditions (Zinnbauer et al. 1997). Although the item structure of SPIRIT I indicates religious orientation, predictive dynamics of SPIRIT I between the country sets do not reinforce a close affiliation between these two aspects. Especially, the relatively strong increase in animal-protein based foods in India and the similar predictive outcomes for the pro-environmental behavior variable in both country samples do not support this assumption but reinforces the already established delineation between spirituality and religious orientation.

Natural spirituality (SPIRIT II) reduces the consumption of convenience products like soft drinks and ready-to eat products and increases the intake of unprocessed fruits and vegetables in both countries. Within the Indian sample, SPIRIT II also decreases the consumption of animal-protein based foods, while in the American sample informed food choice and plant-protein based foods are further behaviors positively related to SPIRIT II. These results align with the indications of Rodriguez-Rad and Ramos-Hidalgo (2018) who suggest that more integrated forms of spirituality lead to a greater degree of sustainable behavior as they bridge moral identity into action. Hence, our findings point to the importance of natural spirituality within the context of sustainable social transitions. As the consumer is considered to be the major driving force for changes in diet (Reisch, Eberle, and Lorek 2013) a thorough understanding on natural spirituality as motivational driver for sustainability

behavior may be a key feature for successful implementation of interventions in this regard. However, it should be noted thatacross samples, pro-environmental behavior (PEB) either decreased (India) or remained relatively unaffected (USA) by the SPIRIT II predictor which is different from current findings emphasizing the supportive effect of spirituality on pro-environmental behavior (Afsar et al. 2016, Garfield et al. 2014). The negative relationship of SPIRIT II and PEB within the Indian sample might be explained through the items used to capture PEB. In this study, the factor measuring pro-environmental behavior comprised three out of four available domains, namely: environmental citizenship, means of transportation, and consumption of animal-based food products. However, due to differences in cultural perceptions and possibilities e.g. using a bicycle to get to work, this factor might mirror PEB from a perspective that is less suitable within the cultural context of this study.

A supportive mindset (MIND I) leads to greater pro-environmental behavior (PEB) and dietary awareness in both sample sets. Additionally, within the Indian sample, MIND I supports informed food choice. These implications were also reported by several other researchers who studied the effects of mindfulness on PEB (Panno et al. 2018, Tang et al. 2017, Barbaro and Pickett 2016), dietary awareness, and food choice (Allirot et al. 2018, Mason et al. 2016, Jordan et al. 2014). However, when comparing the results from this study with similar results it should be considered that mindfulness was not measured using a scoring system but through the calculation of factor variables. For MIND I, extracted item structures derived from the domains of decentering/non-reactive orientation, acceptance/non-judgment/compassionate attitude and insightful understanding. Furthermore, this factor was fed by two items deriving of the SAIL questionnaire for spirituality which corresponded to the domain of trust. This implies that, certain facets of mindfulness relate stronger to PEB and dietary awareness than others and are less significant for the expression of other food consumption behaviors. Though a scattered mindset (MIND II) showed similar directional dynamics when compared to the effect of MIND I, its predictive strength is weaker in many cases. For both country samples this is particularly true for informed food choice, dietary awareness and PEB. In turn, MIND II had a greater effect on the intake of convenience food and animal-protein based foods (USA only) when compared to MIND I. These findings show how important a clear delineation within the construct of mindfulness is for exploring the potential of mindfulness practices as driver for sustainable development in food practices. It further reflects on the value of a sound understanding of both spirituality and mindfulness within the sustainable research environment. This is especially relevant, since MIND I and MIND II were the only estimators among the four main predictor variables that followed similar patterns across country data sets. The existence of a universal characteristic reliably predicting food consumption behaviors across cultural and regulative circumstances may be of great value for the successful implementation of long-lasting sustainability practices into the broader societal context.

In this regard, a further differentiation of mindfulness is also necessary with respect to healthy dietary behaviors as measured through the self-reported intake of unprocessed fruits and vegetables and plant-protein based foods. Across country samples, the likelihood of these behaviors was more strongly related with a scattered mindset and not with a supportive mind. This contradicts the general understanding of mindfulness as mediator for healthy eating patterns (Fischer et al. 2017) and,hence, further scientific elaboration is required to fully understand the dynamics of mindset structures on consumption behavior. A possible explanation for this may be found in traditional spirituality where mindfulness, as spiritual practice, is used for personal development towards

enlightenment. It appears that mindfulness is used as a tool to counterbalance the shortcomings of human psyche and emotion. This implies that mindfulness still needs to be practiced and thus, the individual is in an unbalanced state of general being which may be expressed in some unbalanced or unsustainable behavior towards the self and the environment. However, this also indicates that a greater integration of mindfulness into the personal mindset eventually leads to a balanced consumption behavior.

6. Conclusion

As to date, this is the first approach that quantitatively measures spiritual and mindfulness traits and their influence on food choice and dietary behavior based on a sample drawn from the general society. Our results reinforce the independence of trait spirituality and trait mindfulness as measured constructs and reveal a new perspective for the interpretation of both constructs. Within each two sub-dimensions, spirituality and mindfulness traits proved conclusive and clear in regard to their structural interpretation which is highly valuable especially if both are used as side constructs in questionnaires.

When related to food choice and dietary behavior this study proposes that specific factorial characteristics of both constructs, but especially of mindfulness, have a strong effect on sustainability relevant food consumption behaviors like pro-environmental behavior, dietary awareness, and informed food choice behavior. Hence, spiritual consciousness and mindfulness practices hold the potential to increase long-term sustainability with respect to consumer food choice and dietary behavior. However, ambiguity exists concerning important dietary sustainability measures, e.g. the consumption of animal-protein based foods. Further research would therefore benefit from a deeper scientific exploration of spirituality and mindfulness traits and specific dietary outcomes.

Our implications are important for future research focusing on the integration of spirituality and mindfulness concepts into food consumption research. Furthermore, the insights of this study support companies who aim at launching spirituality or awareness campaigns to increase their sales for sustainable food products.

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India (n= 482)

Trait	IFC			APD			DA			PEB		
	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	t
(Constant)		0.026	10.55		0.030	-46.14		0.023	3.74		0.018	57.10
SPIRIT I	0.14	0.009	19.51	0.14	0.009	19.79	0.04	0.007	5.37	0.10	0.005	15.45
SPIRIT II	-0.17	0.009	-18.14	-0.39	0.010	-40.94	-0.09	0.008	-11.82	-0.17	0.006	-19.41
MIND I	0.22	0.010	23.48	0.24	0.011	25.31	0.78	0.009	91.76	0.41	0.007	45.29
MIND II	0.19	0.007	28.77	0.11	0.008	17.25	-0.02	0.006	-2.46	0.15	0.005	24.59
year	-0.05	0.003	-9.02	0.22	0.000	38.83	-0.02	0.000	-4.45	-0.22	0.000	-39.96
gender	-0.06	0.010	-10.15	0.07	0.012	13.65	-0.07	0.009	-15.23	-0.04	0.007	-7.19
Education level												
Bachelor´s	-0.05	0.014	-6.89	-0.12	0.016	-16.09	-0.12	0.012	-19.82	-0.01	0.010	-1.10
Master´s or higher	-0.08	0.016	-10.45	-0.05	0.018	-6.86	-0.10	0.013	-16.08	-0.07	0.011	-9.05
Income level (INR/year)												
120.000-1,200.000	0.13	0.012	20.76	0.07	0.136	11.94	0.14	0.010	26.80	0.07	0.008	11.09
>1,200.000	0.25	0.020	37.76	0.24	0.022	37.16	0.02	0.017	5.31	-0.16	0.013	-26.49
adjusted R²		*0.18*			*0.17*			*0.47*			*0.27*	

India (n= 530)

Trait	FV			PPD			CD		
	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	t
(Constant)		0.705	7.68		0.029	-0.30		0.020	-63.77
SPIRIT I	-0.11	0.007	-16.26	-0.15	0.009	-20.07	0.28	0.006	43.22
SPIRIT II	0.48	0.008	53.92	0.01	0.010	0.94	-0.49	0.007	-55.41
MIND I	-0.12	0.009	-13.64	0.02	0.011	2.02	0.13	0.008	14.95
MIND II	0.20	0.006	32.87	0.15	0.008	21.52	0.20	0.006	34.34
year	-0.07	0.000	-12.42	-0.12	0.000	-18.72	0.36	0.000	66.02
gender	-0.12	0.009	-23.73	0.06	0.011	10.15	0.02	0.008	3.89
Education level									
Bachelor´s	0.14	0.012	19.21	0.05	0.896	6.52	-0.04	0.011	-5.45
Master´s or higher	0.18	0.013	24.26	0.02	0.896	2.39	0.07	0.012	9.12
Income level (INR/year)									
120.000-1,200.000	0.14	0.011	24.42	0.15	0.896	21.59	0.09	0.009	14.88
>1,200.000	0.11	0.017	18.06	0.09	0.097	13.23	0.14	0.015	23.95
adjusted R²		**0.29**			**0.06**			**0.30**	

USA (n= 34,101)

Trait	IFC			APD			DA			PEB		
	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	t
(Constant)		0.021	-31.58		0.018	-3.96		0.016	-3.40		0.020	-66.84
SPIRIT I	0.14	0.005	25.13	-0.01	0.004	-0.97	-0.15	0.004	-30.11	0.10	0.005	17.41
SPIRIT II	0.45	0.008	65.64	0.14	0.007	18.32	0.35	0.006	54.81	-0.01	0.007	-1.23
MIND I	0.02	0.007	2.98	-0.01	0.006	-0.88	0.36	0.005	60.09	0.33	0.007	49.05
MIND II	0.01	0.007	2.07	0.13	0.006	21.35	-0.01	0.005	-3.57	0.15	0.006	25.95
year	0.23	0.000	42.10	0.06	0.000	8.21	0.01	0.000	1.62	0.35	0.000	60.48
gender	-0.10	0.010	-19.61	0.24	0.009	39.66	-0.10	0.008	-19.70	0.08	0.009	16.50
Education level												
College or associate´s	-0.04	0.012	-5.91	-0.08	0.100	-12.18	0.08	0.009	13.41	0.00	0.011	0.30
Bachelor´s or higher	-0.05	0.013	-7.49	-0.15	0.011	-20.45	0.10	0.010	16.52	0.12	0.012	18.37
Income level (USD/year)												
35.000-100.000	0.06	0.012	8.76	0.26	0.011	35.41	0.02	0.009	2.92	0.05	0.012	7.10
>100.000	0.15	0.014	21.65	0.17	0.012	21.96	0.17	0.011	25.63	-0.02	0.013	-2.93
adjusted R²		0.31			0.13			0.40			0.27	

USA (n= 34,101)

Trait	FV			PPD			CD		
	beta	Std. Err.	t	beta	Std. Err.	t	beta	Std. Err.	t
(Constant)		0.019	-13.65		0.022	-14.63		0.024	0.26
SPIRIT I	0.02	0.005	3.84	-0.03	0.005	-4.99	0.01	0.006	1.41
SPIRIT II	0.34	0.008	44.73	0.45	0.008	60.36	-0.38	0.009	-50.45
MIND I	0.02	0.006	2.99	-0.14	0.007	-19.41	0.16	0.008	22.71
MIND II	0.08	0.006	12.72	0.03	0.006	5.66	0.19	0.007	31.61
year	-0.05	0.000	-7.64	0.12	0.000	20.86	0.02	0.000	3.45
gender	-0.07	0.009	-11.53	-0.03	0.010	-5.20	0.13	0.011	22.21
Education level									
College or associate´s	0.04	0.011	5.96	-0.09	0.012	-14.22	0.04	0.013	6.21
Bachelor´s or higher	0.13	0.011	19.72	-0.01	0.013	-1.69	-0.02	0.014	-2.93
Income level (USD/year)									
35.000-100.000	0.16	0.011	21.99	0.08	0.013	11.83	0.07	0.014	9.54
>100.000	0.03	0.013	4.65	0.30	0.015	40.30	-0.15	0.016	-19.80
adjusted R²		0.20			0.19			0.16	