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Organic food consumption in Taiwan: Motives, involvement, and purchase intention under the moderating role of uncertainty

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Abstract

Despite the progressive development of the organic food sector in Taiwan, little is known about how consumers' consumption motives will influence organic food decision through various degrees of involvement and whether or not consumers with various degrees of uncertainty will vary in their intention to buy organic foods. The current study aims to examine the effect of consumption motives on behavioral intention related to organic food consumption under the mediating role of involvement as well as the moderating role of uncertainty. Research data were collected from organic food consumers in Taiwan via a questionnaire survey, eventually obtaining 457 valid questionnaires for analysis. This study tested the overall model fit and hypotheses through [structural equation modeling](#) method (SEM). The results show that consumer involvement significantly mediates the effects of health consciousness and ecological motives on organic food purchase intention, but not applied to food safety concern. Moreover, the moderating effect of uncertainty is statistical significance, indicating that the relationship between involvement and purchase intention becomes weaker in the condition of consumers with higher degree of uncertainty. Several implications and suggestions are also discussed for organic food providers and marketers.

[Previous](#)[Next](#)

Keywords

Consumption motives; Involvement; Purchase intention; Uncertainty; Organic foods

1. Introduction

Various food safety incidents and environmental issues have increased worldwide consumers' concern about the quality, safety, and environmental-friendliness of foods ([Central News Agency, 2013](#), [Hsu and Chen, 2014](#), [Liu et al., 2013](#)). This phenomenon has caused consumers to be more aware of possible [pesticide residues](#) in conventional

foods, the overuse of pesticides and chemical materials harmful to the environment, and the credence of production method (Fernqvist and Ekelund, 2014, Yee et al., 2005), which in turn raises questions about modern agricultural practices as well as stimulates the demand for organic foods (Mondelaers, Verbeke, & Van Huylenbroeck, 2009). In an investigation of Taiwanese organic food consumers, Chen (2007) attempted to define organic foods as foods that are not genetically modified and are produced in a natural way and specifically without the use of synthetic chemicals such as pesticides and fertilizers. Consumers tend to consider organic foods healthier, safer, and less damaging to the environment than conventionally grown foods (Mondelaers et al., 2009, Rimal et al., 2006). In response to the demand for organic foods, organic farming which aims to reflect the profound interrelationship that exists between farm biota, its production, and the overall environment, as well as respects the natural cycles of an ecosystem thus has been promoted in many countries (European Commission, 2013). In Taiwan, the area of organic farmland increased from 1018 ha in 2002 to 5015 ha in 2011, indicating a rapid compound annual growth rate of 19% (Taiwan Organic Information Portal, 2013). The progressive development of the organic food sector in Taiwan reveals the need for better understanding of Taiwanese organic food consumption.

The topic of organic consumption motives has been widely discussed by previous studies. Michaelidou and Hassan (2010) pointed out that consumers' motives to purchase organic products include social/cultural reasons (e.g., social image), economic reasons (e.g., price), product reasons (e.g., quality), and personal reasons (e.g., health and safety). In particular, concern for health, food safety, taste, environmental protection, animal welfare, and support for local economy, have been identified as driving forces to the choice of organic foods (Hamm and Gronefeld, 2004, Hughner et al., 2007, Schleenbecker and Hamm, 2013, Yiridoe et al., 2005). Hemmerling, Hamm, and Spiller (2015) conducted a literature review of organic food consumption and concluded that health, taste, safety, and environmental protection are the main purchasing motives for organic foods. In Yiridoe et al.'s (2005) review of consumer preference towards organic foods, concern for human health and safety is also identified as a key factor motivating consumers to buy organic foods.

In relation to consumer decision, a large number of studies demonstrated that organic consumption motives have a positive impact on attitudes towards organic foods, which in turn positively influence purchase intention (Honkanen et al., 2006, Michaelidou and Hassan, 2008, Pino et al., 2012). However, in spite of attitudes, factors which can drive a consumer to make efforts based on inherent values and interests about organic foods need to be considered to realize the potential forces for organic buying decision. Accordingly, incorporating the concept of involvement, which is considered as a driver for shaping attitudes and behavioral intention (Laaksonen, 1994), should provide a linkage to explain how consumer motives influence the development of certain behavior. Thøgersen and Ölander (2006) argued that individuals with a positive attitude towards organic foods may restrain from buying since they are not easily change their habits as involvement with foods is too low. This indicates that the importance of involvement on mental processing needs to be applied to organic food consumption (Aertsens, Verbeke, Mondelaers, & Huylenbroeck, 2009). Furthermore, Bezençon and Blili (2010) suggested that future research on organic consumption should include involvement in the organic decision-making processes to better understand its functions and its impact on consumption behavior. While the involvement with the organic purchasing processes remains limited (Krystallis et al., 2008, Verbeke and Vackier, 2004), research focusing on the mediating effect of involvement on the relationship between organic motives and buying intention is extremely important.

In addition, uncertainty in the context of consumer judgement, decision-making, and choice behavior has been discussed in previous studies (e.g., Chang and Liu, 2008, Urbany et al., 1989) but seldom listed as a research agenda for organic food consumption (Jager, 2000). Uncertainty can be elaborated as a state of possessing incomplete information regarding a matter (Vieira, 2008) and has been identified negatively affecting consumers' purchase intention (Shiu, Walsh, Hassan, & Shaw, 2011). Previous studies showed that insufficient related information and low knowledge about organic labelling will increase consumers' difficulties to differentiate the credence attributes and standards from that of conventional foods (Janssen and Hamm, 2011, de Magistris and Gracia, 2008). Moreover, uncertainty regarding the true attributes of organic and skepticism about organic labels are recognized harmful to consumer trust and hinder consumers from purchasing organic foods (Nuttavuthisit and Thøgersen, 2015, Yiridoe et al., 2005). Taking the current situation in Taiwan as an example, information signaling credence and standards for organic is in a chaotic status, since there are a variety of certification systems and labels, which consumers might not

be able to discern without difficulties (Chen, 2007). As such, the potential of asymmetric information and ambiguity would increase consumers' uncertainty and consequently decrease their organic purchase decision (Choe et al., 2009, Giannakas, 2002, Vermeir and Verbeke, 2006). Given the situational background of the organic food market in Taiwan, there is a need to investigate and understand how perceived uncertainty moderates the effect of purchase intention related to organic foods.

In light of the aforementioned discussion, the objectives of this study are threefold: (1) to investigate the effects of consumption motives and involvement on organic purchase intention; (2) to examine the mediating effect of involvement on the relationship between organic consumption motives and purchase intention; (3) to examine the moderating effect of uncertainty on the relationship between involvement and organic purchase intention.

2. Theoretical development

In order to select organic consumption motives for the present study, several literature reviews were used to determine the most prominent motives related to organic food consumption. According to Schleenbecker and Hamm's (2013) review summary, health (including food safety), sensory characteristics (such as taste and freshness), and ethical properties (such as environmental protection and animal welfare) are seen to be the most important organic consumption motives. They specified that health aspect is the most prominent motives for organic consumption in Europe, Australia, Asia, and America. The importance of food safety and environmental protection are also identified to be the main reasons for buying organic foods in China (Sirieix, Kledal, & Sulitang, 2011) and Thailand (Tsakiridou, Boutsouki, Zotos, & Mattas, 2008). In addition, several studies reviewed organic marketing research across countries and concluded that consumers most frequently relate health, safety, and environmental protection to organic foods (e.g., Hemmerling et al., 2015, Yiridoe et al., 2005). Based on the review findings and considering Taiwan as an Asian developing organic market similar to China and Thailand, the current study thus considered health consciousness, food safety concern, and ecological motives as the three main organic motives related to organic consumption decision. In the following section, the relationships between the three main organic motives and involvement are discussed first, followed by discussion regarding the relationships between involvement and organic purchase intention, and finally discussion regarding the mediating role of involvement and the moderating role of uncertainty existing in organic food consumption.

2.1. Health consciousness and involvement

Health-conscious consumers can be referred to active participants in their own health care (Gould, 1988). People who care about health are considered proactive participants in health management, and they normally take the initiative to engage themselves in some health behaviors in order to improve or maintain quality of life as well as free from illness (Michaelidou & Hassan, 2010). According to Hill and Lynchehaun (2002), health-conscious consumers perceive that organic foods can improve their health because they tend to believe that organic foods are more nutritious than conventional foods. In addition, organic food consumption has been perceived as a healthier eating habit by organic consumers, but so far there has not been a clear scientific confirmation (Seal & Brandt, 2007). Given that involvement refers to "a person's perceived relevance of the object based on inherent needs, values, and interests" (Zaichkowsky, 1985), individuals would become more involved if their consumption motive is strongly linked to their inherent values (O'Cass, 2001). Accordingly, it can be postulated that individuals' motive related to health benefits of organic food consumption will trigger their involvement with organic purchase decision, as the health image of organic foods is closely associated with their strong health consciousness. Consequently, this study developed hypothesis H1:

H1

Health consciousness has a positive influence on organic food involvement.

2.2. Food safety concern and involvement

Food safety concern refers to consumers' concern for pesticide residues, fertilizers, artificial additives, and preservatives in foods, as well as food production methods and agricultural practices (Yee et al., 2005). Recurring food safety incidents makes consumers concern themselves with food safety issues (Hsu & Chen, 2014). As such, people

with food safety concern will seek safer foods in order to avoid the intake of substances that are harmful to the human body. According to [Wilkins and Hillers \(1994\)](#), consumers perceive that conventional foods sold on the market may contain chemical substances, and one reason for purchasing organic foods is to avoid the chemical substances or pesticide residues that conventional foods might have. Since organic farming emphasizes sustainability, free from chemicals, ecological balance, and natural methods ([Taiwan Organic Information Portal, 2013](#)), buying organic foods is the only way to avoid the majority of residual chemical substances on foods ([Velimirov & Lindenthal, 2012](#)). As [Bezençon and Blili \(2010\)](#) stressed in their study, a product's related risk would affect the level of consumers' involvement. Accordingly, the safety attribute of organic foods can be linked to the inherent values of consumers who concern for food safety, and subsequently will lead to higher involvement with organic foods. In light of this, this study developed hypothesis **H2**:

H2

Food safety concern has a positive influence on organic food involvement.

2.3. Ecological motives and involvement

Ecological motives refer to environmental and animal rights concern ([Honkanen et al., 2006](#)). [Harper and Makatouni \(2002\)](#) claimed that consumers with ecological motives (such as ethical consumers) try to not harm the environment and incline to choose products that are environmentally friendly and respectful to animal welfare. [Strong \(1996\)](#) also noted that ethical consumers are strongly adhered to social and environmental principles. According to [Wilkins and Hillers \(1994\)](#), organic foods have been perceived as an environmentally-friendly choice and place importance on animal welfare. Some consumers even believe that 'organic' is equal to the concept of 'free-ranged', that is to say, keeping animals without farm fences ([Harper & Makatouni, 2002](#)). Moreover, [Lockie, Lyons, Lawrence, and Mummery \(2002\)](#) found that organic consumers consider environmental protection and animal welfare more important than non-organic consumers do. Therefore, the ecological attribute of organic foods can be connected to the inherent values of consumers who concern for the environment and animal rights, and subsequently will lead to higher involvement with organic foods. Accordingly, this study proposed hypothesis **H3**:

H3

Ecological motives have a positive influence on organic food involvement.

3. Involvement and organic purchase intention

Involvement has been recognized as a key factor influencing purchase behavior ([Laaksonen, 1994](#)). By prompting a person to search for a product's relevant information to create a picture of the consequence of purchasing the product for evaluation, the person's involvement with a product will eventually affect the person's intention to purchase the product ([Richins & Bloch, 1986](#)). Previous studies have pointed out that individuals' high involvement with a product would enhance their willingness to purchase the product (e.g., [Kim, Kim, & Park, 2010](#)). Specifically, consumers tend to have a higher level of involvement with purchasing organic products than conventional goods due to credence attributes of organic products ([Barrena and Sánchez, 2010](#), [Lind, 2007](#), [Thøgersen et al., 2012](#)). [Vermeir and Verbeke \(2006\)](#) also found that consumers who are more involved with organic also have a more positive attitude and a stronger intention to buy organic foods. Consequently, the current study developed hypothesis **H4**:

H4

Involvement has a positive influence on organic purchase intention.

4. The mediating effect of involvement

[Bravo, Cordts, Schulze, and Spiller \(2013\)](#) found that, in addition to the direct effect of consumption motives on organic buying behavior, the purchase of organic foods is influenced by a person's perception of the importance of organic foods. If the attributes of a product are in connection with an individual's consumption motives, the individual will be prompted by a certain level of involvement or emotional arousal, which will trigger the individual to perceive the product as relevant to him or her ([Schmidt & Frieze, 1997](#)). Such involvement would drive consumers

to contemplate the product's association with their inherent values, need, or benefits, and further stimulate the occurrence of purchase behavior. In the same vein, a person's health consciousness, concern for food safety, and ecological motives would arouse the person's interest in organic foods, enhance his or her level of involvement, and strengthen the person's intention to purchase organic foods. Therefore, it can be postulated that involvement is a mediator linking the relationship between organic consumption motives and organic purchase intention.

Accordingly, the hypotheses are proposed as follows:

H5a

Organic involvement mediates the relationship between health consciousness and organic purchase intention.

H5b

Organic involvement mediates the relationship between food safety concern and organic purchase intention.

H5c

Organic involvement mediates the relationship between ecological motives and organic purchase intention.

5. The moderating effect of uncertainty

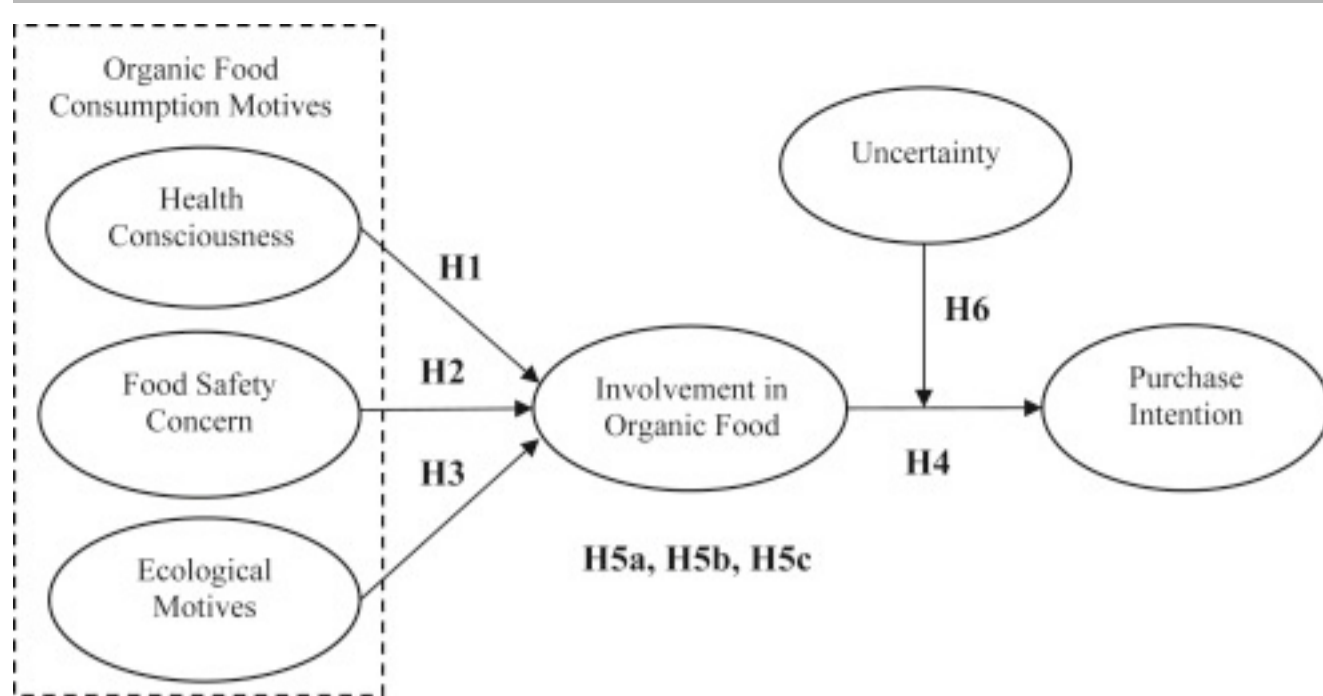
Extensive studies suggested that consumers tend to be skeptical towards green product claims, including organic foods (Janssen and Hamm, 2012, Vermeir and Verbeke, 2006). Consumers generate uncertainty because most of them do not have the technical expertise and other resources (e.g., credible knowledge and information resources) to control the basic requirements distinguishing organic foods, especially the absence of chemical components in food production (Jahn et al., 2005, de Magistris and Gracia, 2008). Additionally, consumers may feel uncertain about organic foods associated with other issues, such as whether organic foods are healthy, whether organic certification is trustworthy, and even organic foods are considered as fashionable (Aertsens et al., 2009). Since organic is a credence quality, trust in the organic integrity is essential for consumers to buy organic products (Fernqvist and Ekelund, 2014, Nuttavuthisit and Thøgersen, 2015).

Prior research has recognized that perceived uncertainty has a negative effect on trust and organic purchase intention (e.g., Shiu et al., 2011, Yiridoe et al., 2005). In particular, Vermeir and Verbeke (2006) emphasized the importance of involvement and uncertainty on mental processing applied to organic food consumption. In Jager's (2000) model of human behavior, involvement and uncertainty on cognitive processes that people use are focused to better understand the processes of breaking with routine or habitual behavior. For instance, Jager (2000) claimed that a higher level of uncertainty regarding the consequences of behavior is expected to increase the impact of the subjective norm. Applied to organic food consumption, uncertainty about the effect of organic foods will trigger people to follow the behavior of others they observe and as a majority of people rarely or not buy organic foods. As Thøgersen (2009) indicated, uncertainty is likely to hinder people from purchase organic foods in spite of favorable attitudes. Accordingly, even though buying organic foods is generally considered with higher involvement than conventional foods (Thøgersen et al., 2012), a higher level of uncertainty might reduce the likeliness of organic purchases. In contrast, if information about the production and control processes of organic foods is sufficient, credible, and easily accessible, the level of uncertainty may be decreased and higher involvement would further reinforce consumers' organic consumption behavior (Stanley and Lasonde, 1996, de Magistris and Gracia, 2008). Therefore, it is postulated that uncertainty has a moderating effect on the relationship between involvement and organic purchase intention. Consequently, this study proposed hypothesis H6:

H6

Uncertainty moderates the relationship between involvement and organic purchase intention.

Based on the aforementioned discussion, a hypothesized model is depicted in Fig. 1.



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Fig. 1. The hypothesized model.

6. Method

6.1. Data collection

Research data were collected via a questionnaire survey outside three hypermarkets, six supermarkets, six organic food stores, and three [farmers' markets](#) in Taiwan's three metropolitan cities (i.e., Taipei City, Taichung City, and Kaohsiung City) that sell organic foods. Potential participants were intercepted as they left the stores after food shopping in order to confirm that they hold at least shared responsibility for their household's decisions on food purchases. Additionally, data were collected over a six-week period in 2014 at different times of the day and on both weekdays and weekends to get a broad representation of consumer types. Before administering the questionnaire, the filter questions were asked to know whether the person had basic awareness of organic foods and over the age of 20, since this sample group was able to make organic food decisions. If not, the questionnaire was not given. Otherwise, consumers were left alone to fill out the questionnaire and to put it anonymously in a box. To boost the response rate, the participants were given a gift (about \$ 3 USD) as an incentive for completing the survey. After data screening, the sample size is 457, of which 310 were females and 147 males. The sample has a broad age composition (40.5% less than 40, 37.4% more than 50), is relatively highly educated (64.6% had a college/university degree), prefers vegetarian food (67.6% not vegetarians but prefer vegetables in meals), lives in mid-sized family (35.9% had four family members), and has a wide composition of monthly household income (40.3% less than US\$2,000, 39.2% between US\$2001 and US\$4,000, and 19.5% more than US\$4000). The demographic profiles of the sample are shown in [Table 1](#).

Table 1. Demographic profiles of the sample (N = 457).

	n	%		n	%
1. Gender			5. Monthly household income (USD)		
Male	147	32.2	Less than \$1000	57	12.5
Female	310	67.8	\$1001–\$2000	127	27.8
2. Age			\$2001–\$3000	112	24.5
20-29	92	20.1	\$3001–\$4000	67	14.7

30-39	93	20.4	\$4001–\$5000	37	8.1
40-49	101	22.1	\$5001–\$6000	18	3.9
50-59	119	26.0	\$6001–\$7000	10	2.2
60-69	47	10.3	\$7001–\$8000	9	2.0
Above 70	5	1.1	More than \$8000	15	3.3
3. Education			Missing	5	1.1
Elementary	4	0.9	6. Dietary habit		
Junior high	11	2.4	Non-vegetarianism:mainly meat	68	14.9
Senior High	80	17.5	Non- vegetarianism:balanced diet	25	5.5
College or university	295	64.6	Non-vegetarianism:mainly vegetables	309	67.6
Postgraduate	67	14.7	Lacto-ovo vegetarianism	37	8.1
4. Household size			Vegetarianism	13	2.8
1	19	4.2	Missing	5	1.1
2	45	9.8	7. Religion		
3	95	20.8	folk religion	47	10.3
4	164	35.9	Buddhism	165	36.1
5	80	17.5	Taoism	47	10.3
6	30	6.6	I-Kuan Tao	3	0.7
7	16	3.5	Christianity	39	8.5
8	4	0.9	Catholicism	5	1.1
10	2	0.4	Irreligion	111	24.3
11	1	0.2	Others	40	8.8
Missing	1	0.2	8. Main household food purchaser		
			Myself	295	64.6
			Other members	141	30.9
			Both	21	4.6

6.2. Measures

This study used multi-item scales to measure the major constructs. These scales were adopted from past studies and modified for this study. The measurement items were back-translated by native speakers to confirm the contents and meanings were same as the original wordings. All items were assessed on 7-point [Likert scales](#) ranging from 1 (‘strongly disagree’) to 7 (‘strongly agree’). The following scales were used:

- *Health consciousness*: The six-item scale of [Michaelidou and Hassan \(2008\)](#) was used to measure respondents’ health consciousness. Higher values indicate greater consciousness about health. Example items include: “I’m very self-conscious about my health,” and “I’m alert to changes in my health.”
- *Food safety concern*: This scale was mainly derived from previous research by [Roddy, Cowan, and Hutchinson \(1996\)](#) and [Soler, Gil, and Sánchez \(2002\)](#). Four items were used to assess respondents’ concern for food safety. Higher values indicate a stronger concern for food safety. Example items include: “I’m very concerned about the amount

of artificial additives and preservatives in food,” and “I am concerned about food processing.”

- *Ecological motives:* The five-item scale regarding ecological welfare (including animal welfare and environmental protection) developed by [Lindeman and Väänänen \(2000\)](#) was used to measure respondents’ perceived importance of the food they eat on a typical day. Example items include: “has been produced in a way that animals have not experienced pain,” and “has been prepared in an environmentally friendly way.”
- *Involvement:* The four-item scale of [Cheung and To \(2011\)](#) was modified and used to assess respondents’ levels of involvement on buying organic food. Example items include: “I’m highly involved in searching and reading information about organic food,” and “organic food is very important to me.”
- *Uncertainty:* Deriving from the scale of [Shiu et al. \(2011\)](#), a six-item scale was used to measure respondents’ uncertainty about organic food knowledge, choice, and evaluation. Example items include: “organic food labels lead me to be unsure of the best choice for me,” and “I’m not confident of my personal view on organic food.”
- *Purchase intention:* The five-item scale of [Shaharudin, Pani, Mansor, and Elias \(2010\)](#) was adopted to assess respondents’ willingness to buy organic food. Example items include: “I expect to consume organic food,” and “I would buy organic food products.”

6.3. Data analysis

This study used [structural equation modeling](#) (SEM) to examine the proposed model. The model consisted of two components: a measurement model and a causal structural model. This study used AMOS 18.0 to examine the measurement model and test the hypotheses. As [Anderson and Gerbing \(1988\)](#) suggested, the data analysis began with confirmatory factor analysis (CFA) to determine whether all indicator variables appropriately reflect their underlying constructs, and whether the measurement model has acceptable fit to the data. The fit indices, comparative fit index (CFI) and root mean square error of approximation (RMSEA) were used to estimate overall model fit. The path analysis was then used to test the predicted causal relationships among the latent constructs (structural model), and determine whether the model provides acceptable fit to the data.

7. Results

7.1. Measurement model

The overall quality of the measurement model was assessed using CFA to validate the four model constructs. To determine goodness of fit, [Bagozzi and Yi \(1988\)](#) proposed that the standard factor loading be bounded between 0.50 and 0.95. The acceptable threshold value for composite reliability (CR) is above 0.70, while that for average variance extracted (AVE) is above 0.50 ([Fornell & Larcker, 1981](#)). Furthermore, modification indices (MI) can suggest remedies to discrepancies between the proposed and estimated models. MI exceeding 3.84 indicates that the model requires modification ([Anderson & Gerbing, 1988](#)). According to the analytical results, some fit indices of the measurement model fail to reach the criteria of model fit, indicating the hypothesized model needs modification.

After revising the model based on the above criteria, the CFA results (see [Table 2](#)) demonstrate that all factor loadings exceed 0.50 (from 0.63 to 0.94) and are statistically significant ($p < 0.001$). The AVE value for each construct exceeds 0.50 (from 0.62 to 0.82), indicating good [convergent validity](#). The CR values of the constructs all exceed the 0.60 threshold value (from 0.87 to 0.95), revealing good internal consistency among the items of each construct.

Table 2. Confirmatory factor analysis properties.

	Unstd. estimates	S.E.	t-value	p	Std. factor	SMC 1-SMC	Cronbach’s α	CR	AVE
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		loadings								
Health Consciousness										
1. I reflect about my health a lot.	1.000				0.639	0.408	0.592	0.907	0.909	0.627
2. I'm very self-conscious about my health.	1.296	0.091	14.224	***	0.780	0.608	0.392			
3. I'm alert to changes in my health.	1.143	0.081	14.164	***	0.792	0.627	0.373			
4. I'm usually aware of my health.	1.347	0.090	14.976	***	0.858	0.736	0.264			
5. I take responsibility for the state of my health.	1.260	0.088	14.254	***	0.804	0.646	0.354			
6. I'm aware of the state of my health as I go through the day.	1.314	0.088	14.889	***	0.857	0.734	0.266			
Food Safety Concern										
1. I'm very concerned about the amount of artificial additives and preservatives in foods.	1.000				0.774	0.599	0.401	0.873	0.878	0.707
2. The quality and safety of foods nowadays concerns me.	0.983	0.049	19.967	***	0.888	0.789	0.211			
3. I am concerned about food processing.	1.061	0.056	18.958	***	0.857	0.734	0.266			
Ecological Motives										
1. It's very important that the foods have been produced in a way that animals' rights have been respected. (e.g., sufficient living spaces)	1.000				0.766	0.587	0.413	0.912	0.918	0.739
2. It's very important that the foods have been prepared in an environmentally friendly way.	0.992	0.045	21.917	***	0.931	0.867	0.133			
3. It's very important that the foods are packaged in an environmentally friendly way.	0.974	0.047	20.615	***	0.893	0.797	0.203			
4. It's very important that the foods have been produced in a way which has not shaken the balance of nature.	0.939	0.049	19.330	***	0.839	0.704	0.296			
Involvement										
1. Organic foods are very important to me.	1.000				0.885	0.783	0.217	0.936	0.938	0.790
2. Organic foods are continually of interest to me.	1.056	0.034	31.239	***	0.930	0.865	0.135			
3. Organic issues have a great concern with me.	1.029	0.036	28.339	***	0.901	0.812	0.188			
4. I'm highly involved in searching and reading information about organic foods.	1.022	0.042	24.193	***	0.837	0.701	0.299			
Uncertainty										
1. I'm not sure of my knowledge about organic foods.	1.000				0.744	0.554	0.446	0.914	0.914	0.640
2. I'm not confident of my personal view on organic foods.	0.993	0.060	16.640	***	0.753	0.567	0.433			
3. Organic food labels lead me to be unsure of the best choice for me.	1.141	0.067	16.941	***	0.799	0.638	0.362			
4. There is too much organic product information	1.163	0.066	17.576	***	0.834	0.696	0.304			

for me to make the right choice.

5. I have no confidence in evaluating between organic foods and conventional foods. 1.235 0.068 18.157 *** 0.853 0.728 0.272

6. I'm not confident of those organic foods in the current market. 1.129 0.066 17.236 *** 0.810 0.656 0.344

Purchase Intention

1. I am glad to buy organic foods. 1.000 0.907 0.823 0.177 0.954 0.958 0.820

2. I expect to consume organic foods. 1.021 0.033 30.765 *** 0.895 0.801 0.199

3. I would buy organic food products. 1.109 0.031 36.007 *** 0.948 0.899 0.101

4. I plan to consume organic foods. 1.107 0.034 32.204 *** 0.918 0.843 0.157

5. I intend to purchase organic foods produce within the next fortnight. 1.189 0.044 26.971 *** 0.856 0.733 0.267

Note.

(1) ***p < 0.001; N = 457.

(2) $\chi^2 = 966.569$; $df = 335$; $\chi^2/df = 2.885$; AGFI = 0.836; CFI = 0.944; SRMR = 0.040; RMSEA = 0.064.

(3) SMC = Square multiple correlation, or R²; CR = composite reliability; AVE = average variance extracted.

Table 3 shows that the estimated intercorrelations among all variables were less than the square roots of the AVE in each construct. This provides support for discriminant validity and thus reduces the potential influence of common method variance (Hair, Black, Babin, Anderson, & Tatham, 2006).

Table 3. Correlations of variables.

Variables	Mean	SD	1	2	3	4	5	6
1. Health Consciousness	5.726	0.839	<i>0.792</i>					
2. Food Safety Concern	6.031	0.929	0.547**	<i>0.841</i>				
3. Ecological Motives	5.983	0.968	0.383**	0.602**	<i>0.860</i>			
4. Involvement	5.341	1.172	0.509**	0.625**	0.622**	<i>0.889</i>		
5. Uncertainty	4.383	1.320	-0.107*	-0.099*	-0.134**	-0.340**	<i>0.800</i>	
6. Purchase Intention	5.146	1.300	0.380**	0.410**	0.443**	0.788**	-0.420**	<i>0.906</i>

Note.

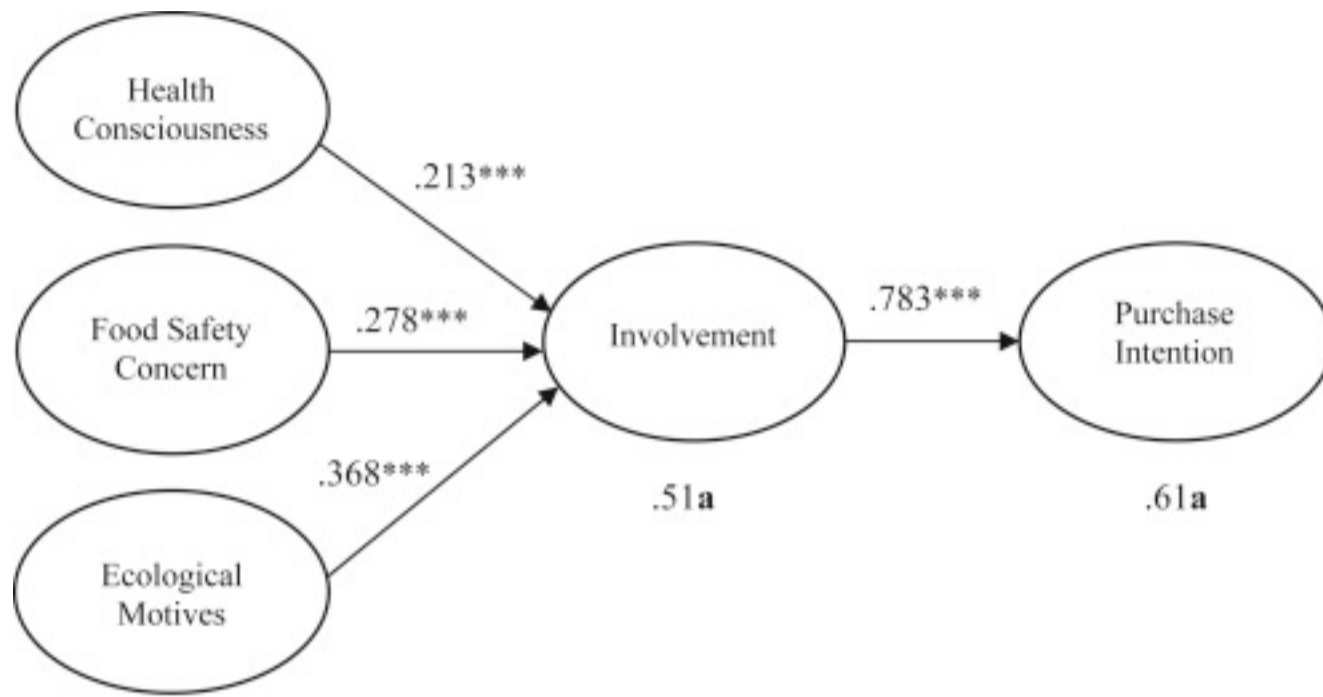
(1) *p < 0.05; **p < 0.01 (two-tailed); N = 457.

(2) The square roots of AVE for discriminant validity are italicized along the diagonal.

7.2. Hypothesis testing

This study used SEM to test the relationships between variables. Given that the acceptable threshold value for CFI is

above 0.90 and for RMSEA is below 0.08 (Hu & Bentler, 1999), the results of the maximum likelihood estimation provides adequate fit to the data (CFI = 0.956, RMSEA = 0.067). In addition, as shown in Fig. 2, the results of hypothesis testing demonstrate that *health consciousness* is positively related to *involvement*, with a standardized path coefficient of 0.213*** ($p < 0.001$), supporting H1. *Food safety concern* is positively related to *involvement*, with a standardized path coefficient of 0.278*** ($p < 0.001$), supporting H2. *Ecological motives* is also positively related to *involvement*, with a standardized path coefficient of 0.368*** ($p < 0.001$), supporting H3. Furthermore, the results demonstrate that *involvement* has a positive effect on *purchase intention*, with a standardized path coefficient of 0.783*** ($p < 0.001$), supporting H4. Consequently, H1, H2, H3, and H4 are all supported.



Note:

(1) *** $p < 0.001$; $N = 457$

(2) $\chi^2 = 610.249$; $df = 202$; $\chi^2/df = 3.021$; CFI = 0.956; RMSEA = 0.067

(3) R squares are beside latent variable (a)

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Fig. 2. The results of SEM.

In order to investigate the indirect effects of the independent variable through the mediator, percentile bootstrapping and bias-corrected percentile bootstrapping were performed at a 99% confidence interval with 10,000 bootstrap samples (Taylor, MacKinnon, & Tein, 2008). Following the suggestions of Preacher and Hayes (2008), the confidence interval of the lower and upper bounds was calculated to test whether the indirect effects were significant. As shown in Table 4, the results of the bootstrap test show that the total effect (standardized total effect = 0.360***, $p < 0.001$) and indirect effect (standardized indirect effect = 0.332***, $p < 0.001$) of *health consciousness* on *purchase intention*, and the total effect (standardized total effect = 0.360***, $p < 0.001$) and indirect effect (standardized indirect effect = 0.401***, $p < 0.001$) of *ecological motives* on *purchase intention* are all significant; while the direct effects of those are no longer significant. The above findings indicate that *involvement* plays a completely mediating role in the relationships between *health consciousness* and *purchase intention* (H5a), and between *ecological motives* and *purchase intention* (H5c). Thus, both H5a and H5c are supported. However, despite the indirect effect (standardized indirect effect = 0.348***, $p < 0.001$) and the direct effect (standardized direct effect = 0.178*, $p < 0.05$) of *food safety concern* on *purchase intention* are significant, the results show that the total effect (standardized total effect = 0.171, $p = 0.073$) of that relationship is insignificant, demonstrating that the mediating effect of *involvement* between *food safety concern* and *purchase intention* does not exist. Therefore, H5b is not supported.

Table 4. Standardized total effects, indirect effects, and direct effects of the model.

	Point estimate	Product of coefficients		Booststrapping					
		S.E.	Z	Bias-corrected percentile 95% CI			Percentile 95% CI		
				Lower	Upper	Two-tailed significance	Lower	Upper	Two-tailed significance
Total effect									
Health Consciousness → Purchase Intention	0.360	0.119	3.025	0.144	0.605	***	0.145	0.605	***
Food Safety Concern → Purchase Intention	0.171	0.101	1.693	-0.014	0.379	0.073	-0.012	0.384	0.069
Ecological Motives → Purchase Intention	0.360	0.075	4.800	0.222	0.521	***	0.211	0.509	***
Indirect effect									
Health Consciousness → Purchase Intention	0.332	0.105	3.162	0.144	0.553	***	0.145	0.555	***
Food Safety Concern → Purchase Intention	0.348	0.100	3.480	0.168	0.563	***	0.173	0.569	***
Ecological Motives → Purchase Intention	0.401	0.070	5.729	0.274	0.552	***	0.267	0.541	***
Direct effect									
Health Consciousness → Purchase Intention	0.027	0.084	0.321	-0.141	0.189	0.728	-0.142	0.188	0.738
Food Safety Concern → Purchase Intention	-0.178	0.088	-2.023	-0.369	-0.018	0.029*	-0.365	-0.015	0.032*
Ecological Motives → Purchase Intention	-0.040	0.056	-0.714	-0.149	0.070	0.484	-0.152	0.068	0.458

Note.

(1) Mediator: Involvement.

(2) Estimating of 10,000 bootstrap sample; *p < 0.05; **p < 0.01; ***p < 0.001.

To explore the moderating effect of *uncertainty*, invariance tests of measurement model and structural model were conducted, following the suggested procedures used in [Liu, Li, and Yang's \(2015\)](#) research. Before the metric invariance test, the samples were divided into high-uncertainty (n = 255) and low-uncertainty (n = 202) groups based on the average scores (M = 4.38) as the group cutting point. Then, the equality between the factor loadings of both groups (measurement invariance) was performed. First, CFA was employed for both groups without factor loadings (unconstrained model); while another CFA was conducted for both groups with full factor loadings (full-metric invariance model). Then, the two different models were contrasted. [Table 5](#) demonstrates the results of [measurement invariance](#) test conducted for the two groups of high- and low-uncertainty groups. The fit indices of unconstrained (RMSEA = 0.05, CFI = 0.923, TLI = 0.914) and full-metric invariance models (RMSEA = 0.05, CFI = 0.923, TLI = 0.916) indicate that both models achieve good model fit. In addition, the χ^2 difference between both models

($\Delta\chi^2(22) = 26.173$) is insignificant ($p = 0.244$) and the differences of CFI and TLI values between both models ($\Delta\text{CFI} = 0.000$, $\Delta\text{TLI} = 0.002$) reach the suggested standards ($\Delta\text{CFI} \leq 0.01$, $\Delta\text{TLI} \leq 0.02$) proposed by Wang and Wang (2012), indicating that the changes caused by the different groups only have a slight impact on the measurement structure and can be neglected. Consequently, the analytical results show that full-metric invariance is supported and thus invariance test of the two-group structural model can be conducted.

Table 5. Measurement invariance test.

Models	χ^2	df	RMSEA	CFI	ΔCFI	TLI	ΔTLI	$\Delta\chi^2$	Full-metric invariance
Unconstrained	1439.115	670	0.050	0.923	–	0.914	–	$\Delta\chi^2(22) = 26.173$ ($p = 0.244 > 0.05$)	Supported
Full-metric invariance	1465.288	692	0.050	0.923	0.000	0.916	0.002		

Note.

(1) Two groups: low-uncertainty group (N = 202), and high-uncertainty group (N = 255).

(2) N = 457.

In order to perform invariance test of the structural model, Liu, Li, and Yang (2015) suggested that one can assess the equality of a given path of the group with a different model by constraining the typical parameter to be sequentially equal. Specifically, there is a contrast between the baseline model (unconstrained model) and the nested model (constrained model) with a χ^2 difference test. For both models, there is a certain parameter constraint in the two different groups. By using this test, one can identify the statistical significance of the difference in the parameter between two different groups. In the current study, following the suggestions of Liu et al. (2015), the path coefficients from *involvement* to *purchase intention* were set to be equal, and other path coefficients of both high- and low-uncertainty groups were freely estimated. Therefore, the χ^2 difference between the constrained model and the unconstrained one was used to examine H6. That is, if the χ^2 difference is significant, the moderating effect of *uncertainty* exists. As shown in Table 6, the results of the invariance test demonstrate that the χ^2 difference is significant ($\Delta\chi^2(1) = 4.149^*$, $p = 0.042 < 0.05$), indicating that the moderating effect of *uncertainty* between *involvement* and *purchase intention* exists, even though the effect is not very strong. In addition, the results show that the coefficient estimated from *involvement* to *purchase intention* is 0.717*** ($p < 0.001$) in the high-uncertainty group and 0.822*** ($p < 0.001$) in the low-uncertainty group. As expected, when consumers have a higher level of uncertainty about organic foods, the positive relationship between *involvement* and *purchase intention* will be weakened. Therefore, H6 is supported.

Table 6. Invariance test of the two-group structural model.

	Low uncertainty group (N = 202)		High uncertainty group (N = 255)		Unconstrained Model χ^2 (df = 404)	Constrained Model χ^2 (df = 405)	$\Delta\chi^2$ ($\Delta\text{df} = 1$)
	Standardized coefficients	Z-value	Standardized coefficients	Z-value			
Involvement → Intention	0.822	15.188(***)	0.717	11.717(***)	897.800	901.949	4.149* ($p = 0.042 < 0.05$)

(1) Moderator: Uncertainty.

(2) * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; $N = 457$.

8. Discussion

The results of this empirical study conducted in Taiwan confirm the previous findings (e.g., [Hemmerling et al., 2015](#), [Hughner et al., 2007](#), [Michaelidou and Hassan, 2010](#), [Schleenbecker and Hamm, 2013](#), [Vermeir and Verbeke, 2006](#), [Yiridoe et al., 2005](#)) that three sub-dimensions of organic consumption motives, including health consciousness, food safety concern, and ecological motives, are all positively related to consumer involvement with organic foods. Specifically, health-conscious respondents have more intention to engage themselves in [health-related behavior](#) and organic food consumption in relation to their inherent needs, values, and interest about human health ([Hill and Lynchehaun, 2002](#), [Michaelidou and Hassan, 2010](#)). In addition, concern for food safety has been identified essential to involvement with organic foods. This result is in line with prior literature, indicating that respondents paying attention to the attributes of “no chemical substance” (e.g., [Yin, Wu, Du, & Chen, 2010](#)), “natural” (e.g., [Lockie et al., 2002](#)), and “safety” (e.g., [Cerjak, Mesić, Kopic, Kovačić, & Markovina, 2010](#)) of foods are more likely to involve with organic food consumption. This is also coincident with [Bezençon and Blili's \(2010\)](#) findings, revealing that respondents with a higher level of food safety concern tend to avoid food safety risks by consuming organic foods. Therefore, they are inclined to have higher involvement with organic that is associated with their values and needs for safety.

Furthermore, respondents who are aware of the importance of environmental protection and animal welfare have been found having strong involvement with organic foods. This result is consistent with some research findings (e.g., [Chen, 2007](#), [Hjelmar, 2011](#), [Lockie et al., 2002](#)) but is also contradictory with other results of previous studies (e.g., [Zagata, 2012](#), [Żakowska-Biemans, 2011](#)). The inconsistent results regarding the effect of ecological motives on organic food consumption may be due to different values related to organic food consumption in different countries ([Aertsens et al., 2009](#)). For example, [Chrysohoidis and Krystallis \(2005\)](#) stated that environmental friendliness seemed to play no important role in Greece, while in other countries this seemed to be important. [Żakowska-Biemans \(2011\)](#) also mentioned that environmental and animal welfare are recognized widely, but not relevant to the purchase decision. Nevertheless, [Bezençon and Blili \(2010\)](#) claimed that the consumers with ecological motives (ethical consumers) are more likely to have ethical product adhesion, which would connect their values with the social and environmental principles underlying the organic product ([Strong, 1996](#)), and thus have a higher level of ethical product-decision involvement ([Bezençon & Blili, 2010](#)). In the current study, the positive effect of ecological motives reconfirms the results of [Chen's \(2007\)](#) research, showing that Taiwanese consumers concern about environmental protection in their daily food intake and thus have stronger involvement with organic foods that are related to their environmental values and beliefs.

In addition to the effect of involvement on organic purchase intention, the findings of this study also confirm the mediating effect of involvement on the relationship between health consciousness as well as ecological motives and purchase intention. These findings are similar with those of previous studies (e.g., [Bravo et al., 2013](#), [Thøgersen et al., 2012](#)), in which individuals with strong health and ecological motives perceive that organic foods are important and relevant to their inherent values, and therefore are willing to make efforts related to organic buying decision (e.g., actively gather information). Nonetheless, involvement has been identified without a mediating effect on the relationship between food safety concern and purchase intention. The empirical result is different from previous findings of many studies (e.g., [Aertsens et al., 2009](#), [Vermeir and Verbeke, 2006](#)), implying that individuals who highly concern with food safety may simply perceive organic foods better satisfied with their need for safety than conventional foods, and thus are more likely to apply an automated cognitive process when buying organic foods, no matter whether there is negative publicity following a food scarce. In such circumstances, as [Thøgersen and Ölander \(2006\)](#) stated, individuals may be automatically triggered to buy organic foods by previous positive experience or favorable attitudes and norm towards organic foods without undergoing involvement.

This study has also identified that perceived uncertainty significantly weakens (but slightly) the relationship between consumer involvement and organic purchase intention. Such result is corresponding to prior research, showing that even though buying organic foods is normally considered with higher involvement than conventional foods (Thøgersen et al., 2012), strong feelings of uncertainty would reduce the effect of involvement on making organic purchase decision. This is due to the fact that incomplete information and perceived risk arising from uncertainty may negatively influence consumer purchase intention (Hassan, Shaw, Shiu, Walsh, & Parry, 2013). When individuals feel uncertain about the consequences of organic foods, they are less likely to make an organic purchase decision because they do not have related knowledge and information to accurately predict the outcome of the transaction (Chen and Huang, 2013, Thøgersen, 2009). Moreover, according to Jager (2000), higher uncertainty about the consequences of certain behavior is expected to increase the impact of the subjective norm. Individuals with higher uncertainty tend to be in a more habitual mode when buying foods and therefore are more likely to follow the behavior of others relevant to them (Thøgersen & Ölander, 2006). As such, perceived uncertainty would lead to the decrease of organic purchase intention, given the majority of people rarely or not buying organic foods (Aertsens et al., 2009).

9. Conclusions

Little research has been done on the link between consumption motives, involvement, and the moderating effect of uncertainty in relation to organic decision-making processes. The results of this empirical study reveal that the proposed model reflecting the aforementioned link has adequately validated the data collected from Taiwan. The research findings are helpful for the continued development of the organic food industry and to make a contribution to future studies in this field. Several marketing implications and suggestions derived from the findings of this study are provided as follows.

In this study, all of the three organic consumption motives have been identified exerting positive impacts on consumers' willingness of purchasing organic foods. In addition, each of the three motives has a positive impact on consumer involvement, which further exerts a positive influence on consumers' organic purchase intention. The empirical results reveal that organic food marketers should understand the values, needs, and benefits of organic foods perceived by consumers with each consumption motive regarding health, food safety, and ecological aspects in order to formulate effective marketing communication strategies. Specifically, marketers should emphasize health and safety associated benefits of organic foods by updated scientific evidence since organic foods have been found containing not only less residual of chemical pesticides but also more nutritional benefits than conventional foods in a recent meta-analysis study (e.g., Barański et al., 2014). If consumers can perceive more health and safety benefits from adopting organic foods related to their needs of well-being, they will be more willing to increase their use of organic foods. Similarly, marketers should make consumers, especially those with ecological motives, understand that organic foods are produced and packaged in a way of protecting the environment and respecting animal rights (Lockie et al., 2002). By doing so, consumers can be convinced that organic foods are strongly adhered to environmental and ethical principles they value, and thus they may intensify their organic buying behavior.

Given that involvement serves as a mediator between health and ecological motives and organic purchase intention, organic food marketers should develop marketing communications focused on promoting benefits and rewards of adopting organic foods and building consumer confidence in such foods by raising consumers' health consciousness and their perceived importance of ecological protection that are adhered to their inherent values and interests to strengthen the levels of involvement with organic purchase decision (Bezençon and Blili, 2010, Chen, 2011). However, consumer involvement seems to fail to mediate the relationship between food safety concern and organic purchase intention. This finding suggests that marketers should make consumers adopting organic foods like a habitual behavior when buying other foods as the involvement is low (Aertsens et al., 2009). Since consumers with strong habitual behavior tend to rely on the behaviors of others and will limit their search for information (Thøgersen & Ölander, 2006), organic food providers should ensure the quality and safety of organic foods and secure consumer satisfaction regarding organic food consumption in order to develop and maintain their organic purchases as a habitual behavior.

Finally, the results of this study reveal that uncertainty negatively moderates the relationship between consumer involvement and organic purchase intention. This implies that strong feelings of uncertainty have caused a negative impact on the effect of involvement on consumers' intention to buy organic foods. Since perceived uncertainty results from incomplete information in consumers and the perception of risk in the transaction process, marketers should convince consumers by providing reliable information and a positive image regarding organic foods to enhance consumer confidence in choosing organic foods. This is particularly important when consumers have higher levels of involvement, they are more likely to depend on related information and engage in extensive problem-solving in purchase decision-making (Verbeke & Vackier, 2004). Previous literature has suggested a need for establishing public trust in organic food verifying systems, such as government-recognized certification system and food traceability system, to increase consumers' ability to verify the attributes and values of organic foods claimed by the organic providers (Janssen & Hamm, 2012). It is recommended that the organic food industry adopts a food traceability system, which enables consumers to reach the farmer's records and have access to related information about the food production and distribution processes systematically, to mitigate consumers' perceived information asymmetry between consumers and organic food providers and as a result can decrease consumers' uncertainty as well as strengthen their organic purchase intention (Chen & Huang, 2013). As the organic market in Taiwan is still in development and requires an improvement in related areas, building up credible organic systems which provide reliable and comprehensive information are essential to increase consumer confidence in organic foods.

10. Limitations and future studies

Since this study only examines three organic motives as the antecedents of involvement, future studies may consider other perceptions and motives affecting consumer involvement with organic food consumption, such as taste, price sensitivity, and other possible personal characteristics. Future research may also probe into the impact of situational factors on involvement and organic purchase intention, such as peer influence and time pressure. In addition, it may also be worth to investigate consumers' organic consumption behavior in green restaurants and online organic shops to see whether any difference exists regarding the findings within various organic distribution channels or socio-demographic data. Finally, this study used convenient sampling in data collection. Future studies are encouraged to increase the representativeness of the surveyed sample by conducting, for example, a stratified sampling based on the area classification and demographic variables provided by the government sectors.

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