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# The Replication and Spread of Functional Food Messages: The Influence of Personalities on Internet Meme Behavior

*Jon-Chao Hong, Ming-Yueh Hwang and Kai-Hsin Tai*

## Abstract

The term Internet memes was coined to describe the phenomenon of replicating and spreading messages via social media. This study explores individual personality traits in relation to Internet meme behavior in the context of online news about functional foods based on the expectancy-confirmation process, and also the correlates between value perception and consequential behavior. An online convenience sample was used to collect data by posting on LINE, the instant communication tool, and a total of 343 questionnaires were returned, 252 valid questionnaires were used for structural equation modeling and hypothesis verification. The results found that: (1) Neuroticism was positively related and Extraversion was negatively related to value expectation for consuming functional foods; (2) The food value for health expectation participants can predict replication and usage satisfaction; (3) The usage satisfaction and replicative behavior can predict the frequency of spread messages. The results suggest that consumers with Neuroticism will need to reduce processes of Internet memes to online fake news about functional food.

**Keywords:** extraversion, fake news, internet meme, neuroticism, personality traits

## 1. Introduction

An internet meme is the phenomenon whereby information is passed through the Internet or other media. It can influence people's actions as they imitate, learn, and follow-up on the information [1]. Dawkins used memes as a conceptual tool for discussing evolutionary principles, and the concept of memetics, understood as the replication, spread, and evolution of memes, came about [2]. Extended from memes, Internet memes are defined as users' online behavior of receiving and exchanging mediated messages [3]. According to the resource exchange theory, exchange refers to transferring resources or messages between two or more social units [4]. However, social media often involve the spread of inaccurate information [5], and misinformation is more rapidly disseminated through social media than through other media when there is high uncertainty and high demand for public information about issues such as health concerns [6]. Examples of such health-related misinformation include the beliefs that a steak-only diet can beat arthritis and carrot juice cures cancer. Fake news in the world of social media is widespread,

and messages are accepted and transferred regularly by millions of internet users [7]. In fact, there are various instances of “fake news” relating to food functions that have circulated on LINE, the most popular instant messaging application (app) in Taiwan [8]. Such Internet memes may spread rapidly, but the behavior of consuming certain foods for health reasons (i.e., functional foods) [9] has not yet been explained. Thus, this study explored the spread of Internet memes related to functional food consumption behavior via LINE.

The expectation-confirmation process (ECP) [10] is a theoretical framework that has been used to explain consumer satisfaction, acceptance, purchasing, use and switching decisions [11, 12]. For example, when applied to consumer purchase decisions, the ECP suggests that consumers base their original purchase decision on the subsequent satisfaction they gain from their consumption or use of the product which helps them determine if their initial expectations about it were correct [13]. Related to consumers' need for social interaction, whether their expectations are confirmed or disconfirmed will affect their intentions to share their experience [14]. Additionally, people constantly share values as well as expectations and preferences in their social interactions via Internet memes [15]. When making decisions to choose products or services, personality characteristics have been shown to affect behavioral response [16]. That is, personality type can be a predictor of social media activity [14]. Specifically, study, users in the high extraversion personality groups were found to engage more in active social media use, including generating content, sharing with others, and engaging in groups, than those in other personality groups [17]. Memes are a never-ending process [15], and although Internet memes are prevalent on social media, there has been little research on the effects of such messages related to foods for health. Thus, this study examined personality traits related to replicative and spreading behavior in relation to foods for health based on the expectation-confirmation process model, and explored the correlates between value perception and consequential behavior.

## **2. Theoretical background**

### **2.1 Personality traits and health behaviors in the context of social media**

The Confucian Analects state that human beings should be concerned with more than 20 virtues, such as benevolence, righteousness, courtesy, wisdom, loyalty, forbearance, faithfulness, humbleness, respect, filial piety, and so on. In order to conduct this current explorative research, the present study classified some core virtues into “benevolence,” “courtesy” and “righteousness” to be elaborated as follows.

In the research on personality traits, many studies have used the Big Five or five-factor model, including the five dimensional traits of neuroticism, extraversion, openness to experience, agreeableness and conscientiousness [18] to assess human personality. Moreover, Gray posited that the behavioral activation system (BAS) and the behavioral inhibition system (BIS) are a paired set of neural circuitries assumed to be the way in which personality affects behavior, and which are dependent on the interaction with objects or environments [19]. Forsman postulated that an individual's extraversion tendency is due to a strong BAS but weak BIS, whereas introversion tendency is due to a weak BAS but strong BIS [20]. In line with this, Sharpe, Martin, and Roth viewed the linked construct between neuroticism and extraversion as a bipolar individual difference variable ranging from the pessimistic to the optimistic [21].

As the main social network is the Internet and its use is related to personality [22], the personality theory of neuroticism and extraversion has been especially utilized by Hamburger and Ben-Artzi to study the connection between personality and Internet use [23]. Neuroticism is often hypothesized as having a protective function when worry and anxiety motivate a person's behaviors in seizing limited social opportunities and avoiding distress [24]. In contrast, high extraversion refers to the extent to which a person is social, talkative, assertive, energetic and outgoing [25]. In addition, research by Casciaro, Carley, and Krackhardt demonstrated how individuals' perceptions of their social networking are influenced by their personality traits [26]. For instance, individuals who possess a high level of neuroticism are less likely to engage in social networks [23]. On the other hand, extraversion could be expected to cause people to enter desired social relationships, resulting in their receiving and contributing messages to and from social networks [27]. However, to date, no specific studies have been conducted on how personality relates to Internet memes. Thus, this study explores whether extraversion or neuroticism have a relationship with Internet memes.

## **2.2 Online behavior related to the expectancy confirmation process**

The importance of interaction goals in one's perception was originally highlighted by Jones and Thibaut [28], and was first incorporated into most accounts of the expectancy confirmation process by Darley and Fazio [10]. The expectancy confirmation process has been applied in a number of studies [29] involving research on social perceptions and social interaction [30, 31], which are considered as expectancy confirmation processes [32, 33]. That is, expectancy mediation research has documented overt and subtle perceiver behaviors (step 2) that mediate the effects of perceivers' expectancies (step 1) on targets' influence (step 3) [34]. In line with these three steps in the context of Internet meme behavior, we viewed value expectation as the first step, the replication of perceivers' behavior as the second step, and the spreading of messages to targets as the third step.

The most interesting theoretical gap may lie between the second and third steps of the behavioral confirmation process: the path evaluation through which perceivers' behaviors elicit expectancy-consistent target behaviors by passing information implicitly [34]. For example, the negative behaviors displayed by the targets may then confirm the perceivers' negative expectations. Thus, Internet memes support a process through which perceivers' expectancy-congruent behaviors elicit targets' expectancy-confirming performance [34]. A perceiver's positive expectancy-driven behavior (i.e., value expectation and usage satisfaction) may lead to behavioral confirmation (i.e., usage satisfaction and finding targets to spread messages to). The expectation-confirmation indirectly influences respondents' intentions through satisfaction with the social media and the perceived usefulness of the site; furthermore, interactive engagement influences the perception of usage while usage influences expectation confirmation [13]. Therefore, how these steps of online social interventions with functional foods interact is explored in this study.

## **3. Research hypotheses and model**

### **3.1 Personalities related to value expectation**

Generally, it is agreed that neuroticism and extraversion are the personality traits most significantly related to online activities [22]. Particularly, neuroticism

tends to lead to negative effects, such as affective instability and elevated stress levels, and it has also been associated with negative health behaviors [35]. On the other hand, individuals who possess the extraversion trait show online sociability and positive emotionality [36]. More specifically, expectations refer to future experiences, and therefore it can be argued that particularly low future expectations may lead to decreased suffering among people with high levels of Neuroticism [37]. On the other hand, Extraversion is related to openness to experience with a low level of value expectation [38]. People with high extraversion personalities have been shown to have less value expectation when consuming health foods [39]. Therefore, how these two personality types are associated with consumers' value expectation of consuming foods for health was hypothesized as follows:

H1: Neuroticism is negatively related to value expectation.

H2: Extraversion is positively related to value expectation.

### **3.2 Value expectation related to replicated behavior**

According to Kyle, Absher, and Norman [40], involvement is a reflection of individual self-concept, needs and values. McIntyre and Pigram posited that active involvement can be measured in terms of attraction, self-expression and centrality in one's life [18]. Researchers (e.g. [41]) have considered the expectation values that affect consumers' intention to replicate in reporting that replication may increase one's confidence to perform an action again if the reliability of the effect is considerable [42]. The following hypothesis was therefore proposed:

H3: Value expectation is positively related to replicative behavior.

### **3.3 Value expectation related to usage satisfaction**

According to Vargo and Lusch [43], value is idiosyncratic, experiential, contextual and meaning-laden. Building on this notion, managers working in business customer organizations are constantly and idiosyncratically making decisions affected by experiences. Eccles, Adler, Futterman, Goff, and Kaczala highlighted that the expectancy value theory is composed of two essential elements, namely, expectation and usage satisfaction [44]. The classical economic viewpoint states that current utility can be indirectly affected by one's beliefs about future events since beliefs can change the frontier of future possibilities and thus motivate different consumption behaviors today [45]. That is, the expectations to enhance future health can increase present utilities [46]. In this sense, expectation and usage satisfaction are value-enhancing, and so the following hypothesis was proposed:

H4: Value expectation is significantly related to usage satisfaction.

### **3.4 Replicative behavior related to usage satisfaction**

Flint, Blocker, and Boutin found that when selling goods, anticipating what customers want will result in higher customer satisfaction [47]. From the perspective of social psychology, the attempt to replicate "social priming" effects has been interpreted as incidental values affecting usefulness judgments [48]. However, replicating "social priming" effects (e.g. [49, 50]) may increase confidence and behavioral satisfaction [41]. Accordingly, the following hypothesis about replicative behavior relevant to usage satisfaction was proposed:

H5: Replicative behavior is positively related to usage satisfaction.



### 3.5 Usage satisfaction related to the spread of messages

Expectation-confirmation theory posits a positive relationship between expectation and satisfaction, predicting that consumers would subsequently confirm positive expectations and would either continue purchasing goods [51] or if satisfied, encourage others to make the same purchase, because they would communicate and make their behaviors explicit [52] regardless of any possible negative responses they receive [53]. Regarding social interaction, Shifman suggested that individual replicative behavior and the spread of messages to others can be analyzed in the context of social media [54]. Thus, the following hypothesis was proposed:

H6: Usage satisfaction is positively related to the spread of messages.

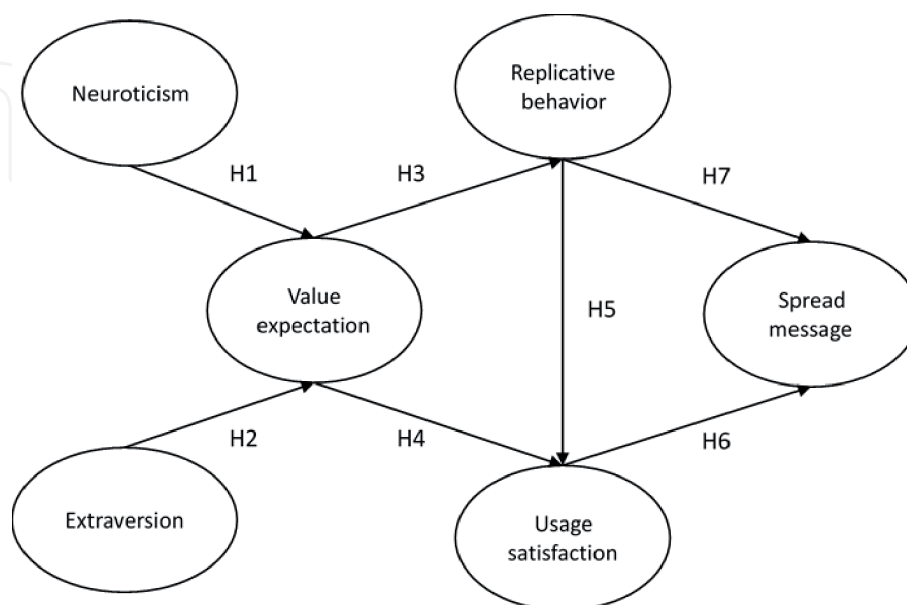
### 3.6 Replicative behavior related to the spread of messages

Although the term meme refers to the concept of how influences, preferences and behaviors can rapidly spread from one individual or group to another within a given culture, most advocates of human memetics also agree that memes arise from social learning [55] with language as the principal medium of transmission [56]. Consumers with a high level of replication usually have a high level of willingness to spread their activity by introducing it to others via social networks [57]. This study therefore explored the idea that the replication of functional food consumption messages could predict message transfer to others. Thus, the following hypothesis was proposed:

H7: Replicative behavior is positively related to the spread of information.

### 3.7 Research model

In this study, we applied ECP to understand the behavioral interactions regarding functional food messages via LINE. Additionally, personalities have been shown to be stable in different situations and when perceiving and responding to online messages [16]. Accordingly, this study examined two personality traits (i.e., neuroticism and extraversion) related to replicative and transferring behaviors regarding food for health messages, focusing on ECP. The research model is shown in **Figure 1**.



**Figure 1.**  
*Verification of the research model.*

## **4. Method**

### **4.1 Procedure**

Taiwan was an early adopter of LINE, with an estimated 21 million Taiwanese people using the app by 2019 which means LINE users is about 91% of Taiwan's total population [58]. Users could use LINE to communicate with others through text, photo, audio, and video messages. It has since been adopted by the young and old alike, and has become the primary mode of communication for many families in Taiwan [8]. This study focused on individuals who had consumed functional foods recommended on LINE, and applied convenience sampling. Using the questionnaire function in Google, we posted the questionnaire to members of LINE groups who had previously sent messages about functional foods to the researchers. The research duration spanned from September 15 to 30, 2018. A total of 343 questionnaires were replied to, of which 91 invalid questionnaires were eliminated, leaving 252 valid questionnaires.

### **4.2 Participants**

Among the 252 useful samples, there were 136 females (53.4%) and 116 males (46.6%). The age range of the participants was between 26 and 40 years old. There were 126 valid samples in the 26 to 30 age group (48.9%), 67 in the 31 to 35 age group (26.3%), and 29 in the 36 to 40 age group (11.8%). As for the education level of the participants, 95 held undergraduate degrees (38.2%) and 157 held graduate degrees or above (61.8%).

### **4.3 Measuring questionnaire**

According to the research model proposed, there were six constructs in this study. A 5-point Likert scale was applied to each questionnaire item. After designing the questionnaire items, face verification was conducted to ensure the accuracy of those items; they were then subjected to analysis in order to ensure the reliability and validity of the constructs.

**Extraversion and neuroticism:** Extraversion is one of several basic higher order axes of personality variation, encompassing correlated behavioral facets of sociability, expressiveness, assertiveness, and status motivation [24, 25, 59]. Neuroticism, a personality construct characterized by emotional reactivity, anxiety, and negative emotionality [60], has been extensively linked to a higher risk of depression. The operative definitions of each dimension are as follows: (1) Neuroticism: The control level individuals have over their emotions and (2) Extraversion: The degree of individuals' assertiveness and expressiveness. The measurement items were designed accordingly.

**Value expectation and satisfaction:** This study took the content of the questionnaires based on expectancy value designed by Eccles et al. [44] as a reference, and designed two elements, value expectation and usage satisfaction, as the tools to measure individuals' expectancy values in relation to consuming functional foods. The questionnaire was designed to include seven questions.

**Replicating and spreading messages:** In this study, memes were examined in the context of two dimensions: replicating and spreading messages. Regarding the questions, replicative consumption is defined as the behavior of buying and eating foods for health due to external information, and spreading messages is defined as behaviors of sharing information after consuming foods for health.

## 5. Results

In this study, confirmatory factor analysis (CFA) was performed to ascertain the suitability of the questionnaire constructs, and the software AMOS 20.0 was used to verify the goodness-of-fit and pathways of the model.

### 5.1 Analysis of reliability and validity

Originally, the questionnaire consisted of six scales: neuroticism, extraversion, value expectation, usage satisfaction, replicative consumption, and intention to spread messages, each with five items. After performing CFA, all items with a residual value exceeding 0.5 were removed [61]. This left four items in each of the scales for neuroticism, extraversion, and value expectation, and three items in each of the scales for usage satisfaction, replicative consumption, and intention to spread messages. The reliability and validity of the questionnaire were then analyzed as described below.

The first step was to measure internal consistency by investigating the composite reliability (CR) of the constructs [62]. In this case, the CR values ranged from 0.71 to 0.88, which all exceed 0.7, the recommended threshold value [61]. The second step was to calculate the Cronbach's  $\alpha$  values [63]; all values exceeded 0.6, as can be seen in **Table 1**. The third step was to verify the convergent validity by ensuring that: (1) the average variance extracted (AVE) values all exceeded 0.5 [62] and (2) the factor loadings (FL) of all items exceeded 0.5 [61]. The results are listed in **Table 1** and indicate sufficient convergent validity for FL.

### 5.2 Model goodness-of-fit test

The model was hypothesized as  $\chi^2 = 398.12$ ,  $df = 183$ ,  $\chi^2/df = 2.18$ . As the result is less than 3, it reveals a level of probability  $p = 0.000$ . Correspondence between the values and the model was indicated by the following values: Root mean square error of approximation (RMSEA = 0.065), goodness of fit index (GFI = 0.956), and adjusted goodness of fit index (AGFI = 0.816). According to Hair et al.'s suggestion that Chi-squared values and other measures of fitness be considered together [61], we calculated the values of fitness which were all found to exceed 0.9, as follows: Normed Fit Index (NFI = 0.937, RFI = 0.911), Incremental Fit Index (IFI = 0.945, TLI = 0.905), and Comparative Fit Index (CFI = 0.944). It can therefore be seen that the inclusive measures indicate that the model fits the data values [61].

### 5.3 Path analysis

The following path coefficients, all of which displayed significant values [61], can be seen in **Figure 2**: Neuroticism toward value expectation was 0.258 ( $t = 3.834^{***}$ ), Extraversion toward value expectation was  $-0.359$  ( $t = -3.89^{***}$ ), value expectation toward replicative behavior was 0.442 ( $t = 8.917^{***}$ ), value expectation toward usage satisfaction was 0.6 ( $t = 16.604^{***}$ ), replicative behavior toward usage satisfaction was 0.295 ( $t = 7.364^{***}$ ), replicative behavior toward spreading messages was 0.298 ( $t = 4.713^{***}$ ), and usage satisfaction toward spreading messages was 0.176 ( $t = 2.824^{**}$ ). The explanative powers were: Neuroticism and Extraversion to value expectation was 38.1%; value expectation to replicative behavior was 26.8%; value expectation and replicative behavior to usage satisfaction was 18.6%; and replicative behavior and usage satisfaction to spreading messages was 40.4%. All of the variables in this study therefore show high predictive ability in terms of Falk and Miller's [64] suggested threshold value of 10%.



<i>Constructs</i>	<i>M</i>	<i>SD</i>	<i>FL</i>
<b>Neuroticism: <math>M = 2.83</math>, <math>SD = 0.92</math>, <math>CR = 0.80</math>, <math>AVE = 0.61</math>, <math>\alpha = 0.79</math></b>			
1. I always worry that something will go wrong.	2.70	0.90	0.82
2. I get stressed out easily.	2.54	0.98	0.61
3. I am much more anxious than most people.	2.83	0.88	0.86
4. I cannot relax most of the time.	3.23	0.93	0.65
<b>Extraversion: <math>M = 3.48</math>, <math>SD = 0.87</math>, <math>CR = 0.77</math>, <math>AVE = 0.63</math>, <math>\alpha = 0.76</math></b>			
1. I talk to a lot of different people at parties.	3.54	0.84	0.69
2. I do not mind being the center of attention.	3.64	0.82	0.69
3. I feel comfortable around people.	3.48	0.85	0.74
4. I like to start conversations.	3.24	0.95	0.80
<b>Value expectation: <math>M = 3.46</math>, <math>SD = 0.85</math>, <math>CR = 0.88</math>, <math>AVE = 0.65</math>, <math>\alpha = 0.87</math></b>			
1. I expect that consuming foods recommended via social media is good for my health.	3.57	0.87	0.94
2. I expect that consuming foods recommended via social media could be good for my health.	3.65	0.77	0.87
3. I expect that having foods recommended via social media will cause few side-effects for my health.	3.22	0.82	0.71
4. I expect that the effect of those foods recommended via social media will last for a long time.	3.39	0.92	0.69
<b>Usage satisfaction: <math>M = 3.30</math>, <math>SD = 0.91</math>, <math>CR = 0.83</math>, <math>AVE = 0.62</math>, <math>\alpha = 0.82</math></b>			
1. I am satisfied with consuming foods recommended via social media.	3.17	0.92	0.84
2. I am satisfied with the effect of consuming foods recommended via social media.	3.46	0.78	0.82
3. I feel healthier consuming foods recommended via social media compared to real shops.	3.26	1.02	0.71
<b>Replicative consumption: <math>M = 2.90</math>, <math>SD = 0.80</math>, <math>CR = 0.71</math>, <math>AVE = 0.61</math>, <math>\alpha = 0.77</math></b>			
1. When I see messages related to foods for health posted on LINE by my friends, I almost always buy and consume them.	3.43	0.84	0.61
2. Even when I see messages posted by strangers on LINE about foods for health, I will try to buy and consume them.	2.52	0.77	0.65
3. I will consume foods most often by following online friends' suggestions.	2.74	0.80	0.79
<b>Intention to spread messages: <math>M = 3.18</math>, <math>SD = 0.81</math>, <math>CR = 0.84</math>, <math>AVE = 0.64</math>, <math>\alpha = 0.82</math></b>			
1. I will spread a message to my friends about functional foods, if I have consumed them.	3.20	0.93	0.85
2. I will spread a message related to foods for health to my friends after I have purchased them but before consuming them.	2.77	0.72	0.86
3. If I believe a type of food will be beneficial for my friends, I like to spread the message to them.	3.58	0.78	0.67

**Table 1.**  
*Reliability and validity analysis.*

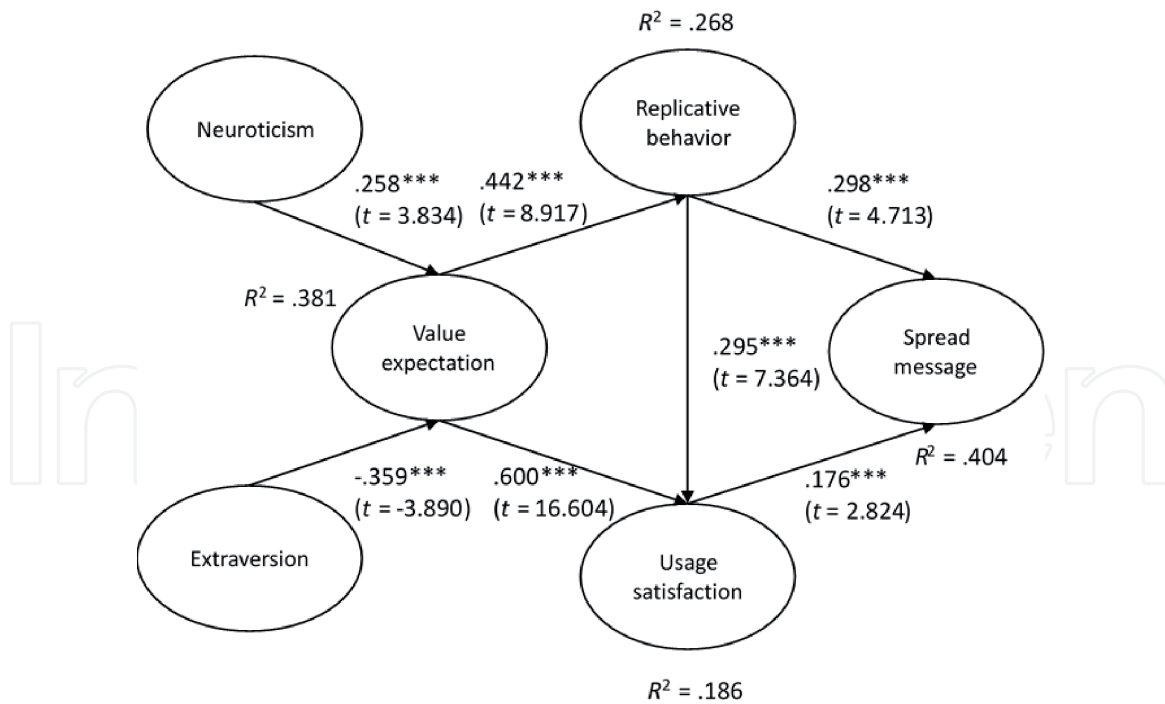


Figure 2.  
 Research model.

## 6. Discussion

Research on social perceptions and social interaction has highlighted a three-step expectancy confirmation process [33], indicating that expectancy mediation research has documented overt and subtle perceiver behaviors (step 2) that mediate the effects of perceivers' expectancies (step 1) on targets' influence (step 3) [34]. Considering these three processes in the context of Internet memes, this study viewed value expectation as the first step, replication as perceivers' behavior as the second step, and spreading messages to targets as the third step. The results are elaborated as follows.

Some individuals consume certain foods for their health benefits; the perceptions of consuming functional foods and individuals' related behavior in social networks was the focus of this study, the goal of which was to clarify how specific personal dispositions relate to meme behavior. Hypothesis 1 was proposed to test if neuroticism is related to value expectation, and it was found that a high level of Neuroticism was correlated to a high level of value expectation to buy and consume functional foods. Hypothesis 2 was proposed to test if Extraversion was related to value expectation, and it was found that a high level of Extraversion correlated to a low level of value expectation to buy and consume functional foods. To explain the results, this study viewed the social psychology framework in which expectations have been defined as future-directed cognitions that focus on a specific event or experience [65]. More specifically, expectations refer to future experiences, and therefore it can be argued that particularly lower future expectations may lead to decreased suffering among people with high levels of Neuroticism [37]. Extraversion is related to openness to experience with a low level of value expectation [38]. People with high levels of extraversion have been shown to have less value expectation when consuming health foods [39]. Accordingly, individuals with Extraversion are likely to experience less stress when buying goods.

In examining Hypothesis 3, the results revealed that value expectation is positively related to replicating behavior. This result is consistent with the perspectives of scholars who have indicated that value expectation can actually predict

replicative consumption. For example, Brandt et al. considered that values affect consumers' intention to follow and replicate a message, and if the reliability of the effect is considerable, the consumer may replicate a message with increased confidence [41]. Thus, participants with more expectations of functional foods are more likely to purchase and use them. In examining Hypothesis 4, the result showed that value expectation was positively related to usage satisfaction. According to the expectation-confirmation theory, high satisfaction can be observed when expectation is either high or has been confirmed. If expectations of utility via choices are made on the basis of those expectations, then there may be implications for optimal usage of information [46, 66]. This is supported by an outcome of this study, which showed that a high level of value expectation was correlated to a high level of satisfaction with functional food consumption.

In examining Hypothesis 5, the results revealed that replicating behavior is positively related to usage satisfaction. Flint, Blocker, and Boutin found that when selling goods, anticipating what customers want will result in higher customer satisfaction [47]. As replicating "social priming" effects (e.g. [49, 50]) may increase confidence and behavioral satisfaction [41], customer value expectation refers to the values for anticipating that would most likely facilitate usage satisfaction. In examining Hypothesis 6, the results revealed that replicative behavior is positively related to spreading messages, showing that a high level of replication is correlated to a high level of spreading functional food messages. This is supported by Shifman [54], who suggested that individual behavior replication and spread over a certain environment can be analyzed from a purely social perspective, such as buying functional foods and spreading messages.

The concept of the Internet meme concerns how influences, preferences and behaviors can rapidly spread from one individual or group to another within a given social network or medium. Consumers with a high level of replication usually have a high level of willingness to spread their activity by introducing it to others via social networks [57]. In examining Hypothesis 7, the results revealed that usage satisfaction is positively related to spreading messages, revealing that if the satisfaction individuals obtained from consuming functional foods is high, message transfer regarding that health food will also be high. This result is supported by Stukas [52], who suggested that consumers will introduce others to purchase if they are satisfied with the usage because they will communicate and make their behavior explicit.

## **7. Conclusion**

With globalization and the widespread use of the Internet, understanding how to exploit memes is a key factor within industries. Social media often involve the spread of inaccurate information [5]. Misinformation is more rapidly disseminated through social media when there is high uncertainty and high demand for public information about the issues, such as health concerns [6]. In fact, various fake news stories related to food functions have circulated on LINE in Taiwan. From the model analysis of this study, we can see that customer personality types appear to be an operant resource that may offer value anticipation and affect participants' Internet meme behavior.

### **7.1 Implications**

Foods are an alternative for taking care of one's health, and online messages about such functional foods are widely spread by the LINE population to treat problems and diseases of the major human organ systems [67]. Ultimately,

customers with extraversion will need to modify their sensing processes of online fake messages in relation to functional foods in order to successfully alter their attitudes toward Internet memes on LINE. In addition, this research can enable managers to use scientific evidence to enhance users' value expectations with a lead advantage over Internet memes.

## **7.2 Limitations and future study**

The research targets of this study were LINE users in Taiwan who shared messages related to functional foods. As such, we did not examine non-users or individuals from other countries with regard to their willingness to share messages. Future studies may involve different meme content and different groups from other countries based on popular social media use.

De Jong, Ocke, Branderhorst, and Friele found that there is a higher ratio of educated females in the higher age groups who consume functional foods [68]. Therefore, future studies can examine the Internet meme behaviors of different genders or age groups in order to further understand the factors affecting willingness to consume functional foods as a result of Internet memes.

Individuals may have low potential risk consciousness of functional foods, and the traditional idea to “cure the illness, strengthen the body” increases the health risk of people using functional foods without understanding how to decrease the risk. Future studies may emphasize the awareness of the side effects of consuming functional foods in relation to memes.

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## **Conflict of interest**

This research was not funded and the authors declare they have no conflict of interest.



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## Author details

Jon-Chao Hong<sup>1,3</sup>, Ming-Yueh Hwang<sup>2,3</sup> and Kai-Hsin Tai<sup>1,3\*</sup>

1 Department of Industrial Education, National Taiwan Normal University, No. 162, Heping East Road Section 1, Taipei, Taiwan

2 Department of Adult and Continuing Education, National Taiwan Normal University, No. 162, Heping East Road Section 1, Taipei, Taiwan

3 Institute for Research Excellence in Learning Sciences, National Taiwan Normal University, No. 162, Heping East Road Section 1, Taipei, Taiwan

\*Address all correspondence to: star99xin@gmail.com

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