Integrated marketing communication (IMC) has become the widely accepted and practiced concept in the marketing communications field since the early 1990s (Lee & Park, 2007, p. 238). Synergy is the core idea behind IMC. It refers to the impacts of well-coordinated messages from different promotion disciplines exceeding the power of any one message on its own (Ewing, 2009; Luck & Moffatt, 2009) or repetition of any one message (Y. Chang & Thorson, 2004).

Many scholars believed that synergy occurs through the change of brand memory structure (Heckler, Keller, Houston, & Avery, 2012; Keller, 1996; Moriarty, 1996). Well-coordinated messages lead to consumers' memory structural change in the right direction such as extending brand memory nodes and links (Keller, 1996; Moriarty, 1996). Most of the previous measurement of synergy, however, did not focus on memory structure. Those studies observed information processing (e.g., attention or motivation) or outcome of synergy (e.g., brand attitude or purchase intention) through Likert or semantic differential scales (Jin, Suh, & Donavan, 2008b; Kim, Yoon, & Lee, 2010; Loda & Coleman, 2005; Micu & Thorson, 2008; Stammerjohan, Wood, Chang, & Thorson, 2005; S.-L. A. Wang & Nelson, 2006). Although those measurement approaches have merits, knowing how to observe an individual's brand memory structure change is necessary for understanding the underlying mechanism of synergy.

Visualizing the structure of a consumer's brand association network has become an emerging field of study (John, Loken, Kim, & Monga, 2006; Oakenfull & McCarthy, 2010). The concept map technique, which can observe memory structure with a visual representation, is believed to be a promising tool. Concept map technique was originally developed by Novak and Gowin (1984) as an educational tool to help people learning how to learn more effectively. After Joiner (1998) introduced the technique to the field of marketing, the technique has been applied to various domains such as marketing strategy (Stillman, Hoang, Linton, Ritthiphakdee, & Trochim, 2008), segmentation (Carrillat, Riggle, Locander, Gebhardt, & Lee, 2009), and tourism marketing (Brandt, Mortanges, & Pahud, 2011; Ivanov, Illum, & Liang, 2010). It has also been applied to different product categories such as service, consumer durable, and non-profit organizations (French & Smith, 2013).

Nonetheless, the concept map approach used in these marketing studies were image-based. That is, those studies asked participants to map their images toward a particular brand without providing any brand messages to the participants (John, Loken, Kim, & Mong, 2006; Joiner, 1998). Concept maps in synergy studies are effect-based, which involve synergy process and synergy outcome. Ewing (2009) and Kitchen and Schultz (2009) believed that the most critical issues facing synergy measurement today is to observe how the processing of brand messages from the

initial source influences that of the subsequent source (i.e., synergy process) and whether synergy effect is yielded (i.e., synergy outcome). Therefore, there is a need for a new synergy measurement approach that can manifest brand memory structure change for synergy process and outcome.

This study aims to develop a new measurement approach that can observe the process and outcome of synergy through identifying the changes in brand memory networks. The values of this study involve: (a) developing an effect-based concept map approach for synergy; (b) identify the five memory manifests of synergy; (c) developing a scoring system of concept map on the basis of the five memory manifests of synergy; (d) testing the validity and reliability of the proposed approach; and (e) exploring the relationship of two message strategies (i.e., message consistency and information utility) and synergy through the proposed effect-based concept map approach.

LITERATURE REVIEW

The Effect-Based Concept Map Approach for Synergy

The studies employing the concept map technique usually involved three stages, including introduction, mapping, and scoring and analysis. It the *introduction stage*, previous marketing studies let the experimenters explain concept map technique to the participants using an exemplar concept map and assumed that participants knew how to draw concept maps even without previous experiences (John, Loken, Kim, & Mong, 2006; Joiner, 1998). Instead, most of the education studies hold a concept map training session to help the participants learn and practice concept map technique before the target educational programs began (Greene, Lubin, Slater, & Walden, 2012; Hough, O'Rode, Terman, & Weissglass, 2007; Kaya, 2008). This is done to increase the reliability of the map and is considered as the better approach. Nonetheless, both marketing and education studies let experimenters to explain concept map technique verbally. Such approach may introduce possible systematic errors when different experimenters performed differently in different sessions. It is thus proposed that the introduction stage should involve an instruction video and a training session to be more reliable.

The instruction video shows the map drawing process step by step. The exemplar concept map in the instruction video cannot not prime any associations of the target brand (John, Loken, Kim, & Mong, 2006). Therefore, the exemplar brand is different from the target brand and target product category. No list of brand attributes will be provided to the participants (i.e., unstructured method). Participants are instructed to indicate the valence of node (i.e., +, -, and n indicating positive, negative, and neutral respectively) at the time of drawing each node (Ivanov et al., 2010; Joiner, 1998;

Schnittka, Sattler, & Zenker, 2012). After drawing all nodes, participants are instructed to draw links between associated nodes and label the strength of each association (i.e., 1, 2, and 3 indicating weak, medium, and strong relationship respectively)(John, Loken, Kim, & Monga, 2006). Keller (1993) suggested that uniquness of brand associations could be measured through having consumers reporting the perceived unique aspects of the brand. Therefore, participants are instructed to highlight unique nodes of the brand, which has been ignored in previous studies. After seeing the instruction video, participants were asked to draw a concept map of a brand other than the target and exemplar brands and product categories to familiarize the mapping process.

After the introduction stage, participants proceeded to the *mapping stage*. The target brand name is provided as the central node in the concept map (Joiner, 1998). Education studies which involved only one tested educational program let participants draw two maps, one before and one after the educational programs (Greene et al., 2012; Hough et al., 2007; Segalàsa, Ferrer-Balasb, & Mulderc, 2008). The pre and post approach cannot observe how the first brand message influences the subsequent brand message. It is recommended that participants draw a concept map after each exposure to the brand message so that the synergy process can be observed. Participants are asked to draw maps as directed in the instruction video. A paper instruction which shows the key steps in the instruction video is also provided. Participants are allowed as much time necessary to complete the maps after seeing each brand message.

In the *scoring and analysis stage*, each concept map is transformed into quantitative scores. The proposed scoring system for synergy is based on the five memory manifests of synergy, involving favorability, uniqueness, strength, size, and density. The following section is going to discuss the five memory manifests of synergy and the scoring system of effect-based concept map in detail.

Memory Manifests of Synergy and the Scoring System

Like concept map approach, many scholars have used spreading activation theory to explain the mechanism of synergy (Jin et al., 2008b; Keller, 1996; Moriarty, 1996). Some scholars believe that synergy exists when subsequent exposures to the coordinated brand messages positively affect the favorability, uniqueness, and strength of the existing brand memory network. For example, Keller (1996) believes that synergy is valid only if subsequent exposure affect the favorability, uniqueness, and strength of existing associations in some way. Jin, Suh, and Donavan (2008b) also suggested that synergy occurs due to repeated exposures to the same message from different promotional disciplines, which increases the association strength between

nodes in the existing memory network and increases the likelihood of the nodes being recalled. Favoribility of association refers to the level of positive nodes to the target brand. Uniqueness of assocaition refers to the level of brand-specific nodes (Keller, 1993, 2009; Schnittka et al., 2012). Finally, strength of association refers to the level of association strength to the target brand (Keller, 1993).

Other scholars believe that synergy exists when subsequent exposures to the coordinated brand messages positively affect the size and density of brand memory network. Size of associations refers to total number of nodes associated with the target brand. Density of associations, on the other hand, refers to total number of links to the target brand (Joiner, 1998). Jin, Suh, and Donavan (2008b) suggested that the changes in encoding from one promotional discipline to the other will add new nodes and new cue-target associations in the existing memory network, resulting in better memory performance and thus synergy. Keller (1996) believed that synergy is valid only if subsequent exposure creates additional associations. Moriarty (1996) suggested that integrated and repeated message over time through different channels and sources create integrated and coherent memory structure. A highly integrated and coherent memory structure is manifested by many links among all conceptual nodes (Grebitus & Bruhn, 2011; Joiner, 1998) and cross links between different chunks of associations (French & Smith, 2013; Khalifa & Kwok, 1999).

Altogether, previous studies suggested five memory manifests of synergy, including favorability, strength, uniqueness, size, and density of brand memory network. A well-coordinated subsequent brand messages should result in significantly higher level of the five memory manifests than the initial exposures to the brand message to substantiate a successfully synergized process. A well-coordinated brand message should also result in significantly more positive effects of the five memory manifests than the mere repetition of the same brand message to verify successful synergized outcomes.

When scoring the concept map, Krishnan (1996) and Delgado-Ballester, Navarro, and Sicilia (2012) scored favorability by subtracting the number of negative nodes from the number of positive nodes (i.e., positive– negative nodes). Joiner (1998) considered that favorability is the ratio of the number of positive nodes to the total number of nodes (i.e., positive/total nodes). Cognitive response theory suggested that favorability means more positive nodes to the negative nodes in the overall memory network (i.e., $\frac{Positive-negative}{Total\ nodes}$)(Petty & Cacioppo, 1996).

Schnittka et al. (2012) believed that the multitude of brand-specific association in a brand concept map shows the uniqueness of brand association (i.e., total unique nodes), and the degree to which nodes are linked in the brand memory network

manifests the strength of brand association (i.e., average strength of links).

Teichert and Schöntag (2010) held that total number of brand associations can be used to make inferences about memory network complexity (i.e., size of memory network). Finally, Grebitus and Bruhn (2011) considered number of links as one indicator for cognitive density.

Most synergy studies merely observed recognition or recall at the end of the exposures to multiple brand messages (Eveland Jr., Cortese, Park, & Dunwoody, 2004; Jin, 2003; Jin et al., 2008b; Wakolbinger, Denk, & Oberecker, 2009). Both recognition and recall reflect the strength (French & Smith, 2013; Keller, 1993) size, and density of associations (Krishnan, 1996).

Validity and Reliability Assessment

The concurrent validity of the proposed approach was assessed through correlating the scores of the five memory manifests of synergy coded from the concept maps and the scores of the related criterion variables collected through the questionnaires (Brandt et al., 2011; Joiner, 1998).

The criterion variables of favorability, uniqueness, and strength scores of the concept map were the favorability, uniqueness, and strength indices developed by Rajh (2002) and J. W. Chang (2002). Joiner (1998) found a significant and positive correlation between the ratio of the number of positive nodes to the total number of nodes of the map and attitude toward the brand. Attitude toward the brand, thus, also served as the criterion variable for favorability score of the concept map. Finally, recall was demonstrated to be positively correlated with the strength (French & Smith, 2013; Keller, 1993) size, and density of associations (Krishnan, 1996). It is, therefore, served as the criterion variable for the three map scores.

The test-retest reliability was assessed through correlating the scores of the five memory manifests of synergy administered one week apart (Joiner, 1998). A measurement is said to possess stability if a consistent result was secured for the same person with the same instrument over time (Cooper & Schindler, 2008).

Three studies were conducted to examine the validity and reliability of the proposed effect-based concept map approach and scoring system in the context of synergy for new and existing brands. Study 1 examined the concurrent validity for the new and existing brands. Study 2 and 3 investigated the reliabilities for the new and existing brands respectively.

STUDY 1

Experimental Design and Participants

This study employed a 2 (brand: new and existing) x 2 (synergy sequence: AD+PR and PR+AD) x 2 (product: low and high ticket products) post-test only between-subject factorial design. Different synergy sequences and products were involved to increase the generalizability of the results. Advertising and publicity were chosen because they were the most used communication tools in synergy studies and in professional practices (Jin, Suh, & Donavan, 2008a; Kim et al., 2010; Loda & Coleman, 2005; Micu & Thorson, 2008; A. Wang, 2006).

A total of 115 valid cases remained in the study, which exceeded 25 to 47 valid cases in previous studies involving multiple concept maps (Greene et al., 2012; Hough et al., 2007; Kaya, 2008; Segalàsa et al., 2008). Each participant drew two concept maps, one after each brand message, resulting a total of 230 concept maps. The number of participants in each treatment condition ranged from 13 to 16. The participants were mostly female (n = 93, 80.9%) and aged between 20 to 36 years old with the mean age of 22.50 (*SD* = 2.14).

Pretests and Stimulus Materials

The purpose of the pretests was to develop consistent advertisement and publicity messages because message consistency is believed to be the necessary condition for synergy (Navarro-Bailon, 2012). This study involved three pretests, two for the new brands (*n* = 12 and 11) and one for the existing brands (*n* = 30). The procedure of the three pretests was the same. Participants were recruited from the entire university through e-mail and randomly assigned to each treatment group. Each participant viewed four brand messages: one print advertisement and one print publicity for a low- and a high-ticket product respectively. The orders of the communication tools and product categories were counterbalanced. Most target brand messages passed the message consistency tests. Those did not pass the test were revised and used in the main study.

The low- and high-ticket products involved Lovehouse laundry detergent and IIDA smartphone for the new brands, and Bailan laundry detergent and Acer notebook for the existing brands. The existing brands were well-known brands which have been in the market for over thirty years. The product categories and existing brands were selected because of their positive impression and high usage rate among college undergraduate and graduate students (E-ICP, 2012).

The test advertisements and publicities were color printed and professionally made to mimic the print advertisements and publicities of the brands. The stimulus materials were inserted in magazines that were most read by college students (E-ICP,

2012) and frequently involved advertising and publicity messages of the target product categories. The first and second brand messages appeared before and after the first main article of the magazine respectively.

Procedure

Participants were recruited from the entire university through e-mail and randomly assigned to each treatment group. After arriving lab, participants read and signed consent form. The proposed procedure plus additional steps for examining validity (i.e., the four questionnaires) was followed after that.

At the introduction stage, a concept map training session was held. An instruction video taught participants how to use XMind software to draw concept map using an exemplar brand and product category (i.e., Darlie toothpaste) which was not related to the target product categories and brands. After viewing the instruction video, participants were asked to practice drawing a concept map for a brand (i.e., Wrigley's chewing gum), which was also not related to the target product categories and brands. The introduction stage took about ten minutes.

At the mapping stage, participants were asked to answer the first questionnaire containing personal relevance measures before reading any stimulus materials. They then were requested to read the magazines from the first page. After reading the first test message, a page insert instructed participants to stop reading and start developing the first concept map and answering the second questionnaire using the computer before them. After that, participants were instructed to continue reading the magazine and completed the second concept map and the third questionnaire for the second brand message. After exposing to the two brand messages, the final questionnaire containing the manipulation check, confound check, and several demographic questions were employed.

The participants were allowed to have as much time necessary to complete each map and questionnaire. Experimenters constantly monitored the procedure, and participants' responses were treated as invalid if the participants did not follow the instructed procedure. The entire mapping stage took about forty minutes. All participants were debriefed and thanked with monetary incentives at the end of the study.

Measures

Personal relevance. This study adapted the personal involvement inventory developed by Zaichkowsky (1994) to measure personal relevance. Participants were asked to rate the product in terms of important, interesting, relevant, exciting, means a lot to me, appealing, fascinating, valuable, involving, and needed (Cronbach's α

= .91).

Recall. The participants were asked to write down the brand concepts that they could remember. The sum of all accurate remembrance of the brand message was treated as the index for recall (Eveland Jr., Marton, & Seo, 2004).

Favorability, Uniqueness, and Strength. The favorability index was adapted from J. W. Chang (2002). Participants were asked to rate the product in terms of good, like, favorable, high quality, very likely to try, and superior product (Cronbach's α = .95).

The uniqueness and strength measures developed by Rajh (2002) were used. Uniqueness questions involved "This brand is unique," "The characteristics of this brand are unique," "This brand isn't unique (r)," "This brand is different from other brands," and "This brand is the same as all other brands (Cronbach's α = .91)." Measures of strength were "I know that the characteristics of this brand are," "I am unaware of this brand's characteristics (r)," "The characteristics of this brand are unfamiliar to me (r)," and "I can recall the characteristics of this brand without effort (Cronbach's α = .81)."

Attitude toward the brand. The brand attitude was measured through ten items, including pleasant, good, positive, favorable, like, useful, high quality, beneficial, valuable, and agreeable (Cronbach's α = .96)(Bartra & Stayman, 1990).

Elaboration. Elaboration index was adapted from Eveland Jr. and Dunwoody (2002). The items included "I tried to think of the practical applications of the product," "I tried to relate to ideas in the message to my own past experiences," "I thought about how what I read related to other thinks I know," "I found myself making connections between the message and what I've read and heard about elsewhere (Cronbach's α = .80)."

Message consistency. Message consistency index involved 24 question items revised from previous literatures (Cronbach's α = .91)(Chen, 2011; Chen & Wong, 2012; Delgado-Ballester et al., 2012; Eveland Jr. & Dunwoody, 2002; Lee & Park, 2007; Low, 2000; McGrath, 2011; Navarro-Bailon, 2012; Navarro, Sicilia, & Delgado-Ballester, 2009; Reid, 2005).

Five point Likert scale was used for the abovementioned measures.

Manipulation and Confound Check

This study selected products that were highly related to the participants to ensure adequate level of processing. The results of one-sample t test showed that participants considered the four products significantly relevant to them: (new brands) laundry detergent: M = 3.39, SD = .39, $t(27)$ = 5.22, p = .00; smartphone: M = 3.93, SD = .57, $t(27)$ = 8.60, p = .00; (existing brands) laundry detergent: M = 3.39, SD = .51, $t(29)$ = 4.18, p = .00; note book: M = 4.23, SD = .47, $t(28)$ = 14.02, p = .00.

Message consistency is essential for synergy (Navarro-Bailon, 2012). The brand messages were developed to meet this criterion. One-sample t test showed that the advertising and publicity messages for the four brands were significantly consistent: (new brands) Love house laundry detergent: $M = 3.81$, $SD = .39$, $t(27) = 10.98$, $p = .00$; IIDA smartphone: $M = 3.39$, $SD = .58$, $t(27) = 3.56$, $p = .001$; (existing brands) Bailan laundry detergent: $M = 3.49$, $SD = .43$, $t(29) = 6.32$, $p = .00$; Acer note book: $M = 3.65$, $SD = .48$, $t(28) = 7.30$, $p = .00$.

Concept map reflects the mental structure of the participants after integrating new and existing brand knowledge (i.e., elaboration). Adequate level of elaboration was expected for each brand. One-sample t test confirmed that significantly high level of elaboration was paid to the messages of the four brands: (new brands) Love house laundry detergent: $M = 3.58$, $SD = .59$, $t(27) = 5.23$, $p = .00$; IIDA smartphone: $M = 3.46$, $SD = .67$, $t(27) = 3.61$, $p = .001$; (existing brands) Bailan laundry detergent: $M = 3.83$, $SD = .48$, $t(29) = 9.43$, $p = .00$; Acer note book: $M = 3.86$, $SD = .47$, $t(28) = 9.97$, $p = .00$.

Validity Test

Concurrent validities were examined for both the initial and subsequent exposures to the brand messages. The questionnaires for advertisement and publicity involved the same criterion measures. The first and second exposures involved both advertising and publicity messages, and the new and existing brands involved both high and low ticket items. The data were combined to extend the generalizability of the results.

For the new brands, Pearson's product moment correlation showed that the three types of map scores for favorability were significantly and positively correlated with favorability and attitude toward the brand criterion scores for both the first and second exposures. Uniqueness map score was significantly and positively correlated with uniqueness criterion score at the first exposure, size map score was significantly and positively correlated with recall at the second exposure. Strength and density map scores were not significantly correlated with the corresponding criterion scores at both exposures.

For existing brands, favorability, uniqueness, size, and density map scores were all significantly and positively correlated with the corresponding criterion scores at the first and second exposures. Strength map score, again, was not significantly correlated with strength criterion score and recall at either exposure.

STUDY 2

Method

The purpose of Study 2 was to examine the test-retest reliability of the proposed approach and scoring system for the new brands. The experimental design and procedure were the same as in Study 1 except that the participants were required to appear twice, a week apart (Cooper & Schindler, 2008; Joiner, 1998). The stimulus materials involved the same brand names and product categories (i.e., Lovehouse laundry detergent and IIDA smartphone), but the layout and copy were slightly different from those in Study 1. A total of 23 students participated the study, which is close to the number of cases in previous studies involving multiple concept maps (Greene et al., 2012; Hough et al., 2007; Kaya, 2008; Segalàsa et al., 2008). Each participant drew four concept maps, two for each week, resulting a total of 92 concept maps. The majority of them were female (n = 18, 78.3%) and aged between 20 to 26 years old with the mean age of 22.83 (SD = 1.80).

Results

One-sample t test revealed that the participants considered the two new brands significantly relevant to them: (Love house laundry detergent) M = 3.34, SD = .22, $t(11) = 5.40$, p = .00; (IIDA smartphone) M = 3.65, SD = .77, $t(9) = 2.67$, p = .026.

One-sample t test also showed that the participants considered the advertising and publicity messages significantly consistent for the two new brands: (Lovehouse laundry detergent) week 1: M = 3.62, SD = .44, $t(12) = 5.06$, p = .00; week 2: M = 3.70, SD = .28, $t(12) = 8.87$, p = .00; (IIDA smartphone) week 1: M = 3.51, SD = .57, $t(9) = 2.82$, p = .02; week 2: M = 3.67, SD = .54, $t(9) = 3.86$, p = .004.

Lastly, the participants also significantly elaborated on the brand messages for the two new brands: (Lovehouse laundry detergent) week 1: M = 3.44, SD = .33, $t(12) = 4.90$, p = .00; week 2: M = 3.65, SD = .19, $t(12) = 12.28$, p = .00; (IIDA smartphone) week 1: M = 3.58, SD = .68, $t(9) = 2.68$, p = .03; week 2: M = 3.75, SD = .66, $t(9) = 3.61$, p = .006.

Pearson's product moment correlation showed that the concept map scores were stable for the same individual across the two weeks. The map scores for the first exposures across the two weeks were significantly and positively correlated with the correlation coefficients ranged from .62 to .80. Similarly, the map scores for the second exposures across the two weeks were also significantly and positively correlated. The correlation coefficients for the second exposure ranged from .46 to .81.

STUDY 3

Method

The purpose of Study 3 was to examine the test-retest reliability of the proposed approach and scoring system for the existing brands. The experimental design and procedure were the same as in study 2 except that the existing brands were involved. The stimulus materials for the existing brands were the same as in study 1. A total of 39 students participated the study. Each participant drew four concept maps, resulting a total of 156 concept maps. The majority of them were female (n = 31, 79.5%) and aged between 19 to 31 years old with the mean age of 22.77 (SD = 2.75).

Results

One-sample t test showed that the participants considered the two existing brands significantly relevant to them: (Acer notebook) M = 4.04, SD = .44, $t(17) = 9.97$, p = .00; (Bailan laundry detergent) M = 3.41, SD = .36, $t(20) = 5.24$, p = .00.

One-sample t test also showed that the participants considered the advertising and publicity messages significantly consistent for the two existing brands: (Acer notebook) week 1: M = 3.76, SD = .62, $t(17) = 5.19$, p = .00; week 2: M = 3.70, SD = .49, $t(17) = 6.07$, p = .00; (Bailan laundry detergent) week 1: M = 3.73, SD = .39, $t(20) = 8.47$, p = .00; week 2: M = 3.68, SD = .47, $t(20) = 6.63$, p = .00.

Finally, one-sample t test showed that the participants significantly elaborate most of the brand messages except those for the Bailan laundry detergent at the second week: (Acer notebook) week 1: M = 4.04, SD = .56, $t(17) = 7.84$, p = .00; week 2: M = 3.31, SD = .37, $t(17) = 3.51$, p = .003; (Bailan laundry detergent) week 1: M = 3.88, SD = .57, $t(20) = 7.11$, p = .00; week 2: M = 2.95, SD = .72, $t(20) = -.30$, p = .77.

Pearson's product moment correlation showed that the map scores for the first exposures across the two weeks were mostly significantly and positively correlated with the correlation coefficients ranged from .47 to .66. Similarly, the map scores for the second exposures across the two weeks were also mostly significantly and positively correlated. The correlation coefficients for the second exposure ranged from .39 to .55. The strength map score for the first exposure and the uniqueness and strength scores for the second exposure were not significantly correlated.

STUDY 4

Method

The objective of study four is to examine the interaction effect of the two message strategies (i.e., message consistency and information utility) on the five memory manifest of synergy through the effect-based concept map approach.

This study employed a 2(message consistency: High and low) x 2 (information utility: High and low) x 2 (synergy sequence: AD+PR and PR+AD) x 2 (product: low and high ticket products) post-test only between-subject factorial design. Different synergy sequences and products were involved to increase the generalizability of the results. Advertising and publicity were chosen because they were the most used communication tools in synergy studies and in professional practices (Jin, Suh, & Donavan, 2008a; Kim et al., 2010; Loda & Coleman, 2005; Micu & Thorson, 2008; A. Wang, 2006).

A total of 75 valid cases remained in the study, which exceeded 25 to 47 valid cases in previous studies involving multiple concept maps (Greene et al., 2012; Hough et al., 2007; Kaya, 2008; Segalàsa et al., 2008). Each participant drew two concept maps, resulting a total of 150 concept maps. The number of participants in each treatment condition ranged from 17 to 21. The participants were mostly female (n = 66, 88%) and aged between 20 to 28 years old with the mean age of 22.16 (*SD* = 1.61).

Results

One-sample t test revealed that the participants considered the two new brands significantly relevant to them: (Love house laundry detergent) $M = 3.34$, $SD = .32$, $t(36) = 6.43$, $p = .00$; (IIDA smartphone) $M = 4.08$, $SD = .46$, $t(37) = 14.36$, $p = .00$.

Independent-sample t test showed that the participants considered high and low consistency treatments for both Love house and IIDA were successfully manipulated: (Love house laundry detergent) High: $M = 3.65$, $SD = .34$, Low: $M = 2.91$, $SD = .75$, $t(25.660) = 3.86$, $p = .00$; (IIDA smartphone) High: $M = 3.36$, $SD = .41$, Low: $M = 2.85$, $SD = .55$, $t(36) = 3.21$, $p = .00$.

Similarly, independent-sample t test showed that the participants considered high and low information utility treatments for both Love house and IIDA were successfully manipulated: (Love house laundry detergent) High: $M = 4.26$, $SD = .53$, Low: $M = 3.08$, $SD = 1.07$, $t(28.612) = 4.34$, $p = .00$; (IIDA smartphone) High: $M = 4.19$, $SD = .73$, Low: $M = 2.68$, $SD = .90$, $t(36) = 5.67$, $p = .00$.

Further analysis showed that the main effect and interaction effect on the five memory manifests of synergy were not significant.

Conclusion

Overall, the results suggested that the proposed effect-based concept map approach and scoring system for synergy was more valid for existing brands, yielded significantly stable results for the new brands, and yielded fairly stable results for the existing brands. The main effect and interaction effect of message consistency and information utility were not significant for new brands. Future studies are recommended to explore which message strategies can effectively influence the five memory manifests of synergy through the proposed effect-based concept map approach.

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