MASTER THESIS

Will Logos Affect App Evaluation?

An Application of Fluency Processing Theory

Student: Qian Wang

Student Number: 381896

Supervisor: Dr. Z. Jiang

July 2015

Erasmus School of
Economics

Contents

Abstract

Previous studies provide evidence that processing fluency can lead to higher evaluation. Moreover, according to feeling-as-information theory, people tend to use their irrelevant feelings as sources to make judgments under certain circumstance. The author applies the processing fluency theory into logo design of mobile applications. In an online experiment using two fictitious mobile apps, the author shows that participants develop more favorite evaluation towards the app with easy-to-process (e.g., clearer font and stronger figure-background contrast) logo. However, this effect of processing fluency is fully mediated by the feeling of liking. It is believed that app logos, as an experiential attributes of product, can be processed fluently and generate positive affective reactions (e.g., liking), as a consequence of evoking higher product evaluations from app users.

1. Introduction

As reported in the Economist (2011), the number of mobile phones and tablets (about 480 million units) has exceeded the number of laptops and PCs (about 380 million units) for the first time in 2011. In the same article, the author estimated the number of mobile connected devices, such as the iPad, iPhone, and other smartphones, would reach 10 billion in 2020.[1] Due to the increasing number of mobile device users in recent years, it is predictable that mobile device will eventually become the dominate means to access the internet.

Not surprisingly, this fact has resulted in an explosive growth of the mobile application (App) used on these devices. The mobile application market has already known to be huge. Both Google and Apple now offer more than 700,000 applications each in their respective stores. Although not all apps generate revenues, the total global mobile application revenue (including pay-per-download, in-app purchases, subscriptions, and advertising) is estimated to reach $46 billion in 2016, according to ABI Research.[2]

Rapid market and revenue growth also implies intense competition. How can apps, especially apps newly launched attract users and take off successfully? There are definitely numerous factors affecting the app popularity, such as the ease of use, the functional design, app rankings, the price etc. However, as new apps have sprung every day, it is getting harder to differentiate one app from others only based on the

[1] Lessin, JESSICA E., and Spencer E. Ante. "Apps rocket toward $25 billion in sales." Wall Street Journal 4 (2013).

[2] Reisinger, Don. "Mobile app revenue set to soar to $46 billion in 2016." CNET News (2012)

functions or services provided (e.g., game apps, music apps, or news apps). In such a crowded market, more than enough apps are able to meet the "must-meet goal". Thus, besides keeping improving the functional attributes of apps, leveraging the experiential attributes of their products to differentiate themselves and to grasp more attentions from potential users can be an alternative for app marketers.

Similar to functional attributes, studies (Brakus, Schmitt, & Zhang, 2008) have proved that experiential attributes can also create value for the product in consumers' decision making process. That is, by leveraging experiential attributes of the products can generate higher evaluation of the product than that of competitors. A key question to ask is how do people process experiential attributes? Do they process experiential attributes in the same fashion as functional attributes, which are more deliberately processed on reason-based and goal-directed basis (Shafir, Simonson, & Tversky, 1993; Broniarczyk & Alba, 1994; Brown & Carpenter, 2000)? The answer to this question based on previous studies, is no. Consumers show flexibility in processing experiential attributes. To be specific, consumers can process experiential attributes faster, especially when processing fluency occurs. In additional, higher level of process fluency can trigger more positive judgment towards the object (Winkielman, Schwarz, Fazendeiro, & Reber, 2003; Reber, Schwarz, & Winkielman, 2004).

One of these experiential attributes can be easily manipulated is Logo. Based on this theoretical foundation (Makin, Pecchinenda, & Bertamini, 2012; Reber, Schwarz, & Winkielman, 2004), by designing, selecting or modifying a pleasant logo, a product can get more positive evaluation by its audience. Such fact can be applied to mobile apps more suitably than other products. First of all, mobile apps are experience goods.

Unlike search goods[3], of which the quality can be judged easily by customers before consumption, the experience goods can hardly be evaluated objectively before the consumption (Nelson, 1970). Thus, it is hard for customers to differentiate apps only depend on functional proposed and choose the right one before they really use it. Moreover, when selecting apps, consumers do not have much information to aid their decision making. Usually they only have accesses to a short introduction, or maybe some user interface (the space where interactions between users and apps) pictures of each app to browse. Imagine you want to download a game app form App Store, after searching the key words, the logo of each app is always the first thing getting into your sight before clicking anyone. Newly launched apps without enough number of comments can provide customers with even less. Hence, logo design can be a vital factor for mobile apps, especially for new apps.

To conclude, the research question of this paper is to discuss how logos, as an experiential attribute, can be designed to generate higher evaluation of new mobile apps based on processing fluency theory.

2. Literature Review

2.1 Experiential Attributes and the Role of Logos

Experiential Attributes It has been a long history in marketing research field, consumers are always regarded as rational and deliberate in making judgment and

[3] In Nelson's (1970) classification, the products to which consumers can learn their preferences before purchasing are called search goods.

choice of product according to its functional attributes (Simonson, 1989; Shafir, Simonson, & Tversky, 1993). However, recent studies have paid more attention to customer experience, which was proved that can affect customer behaviors. A marketing management area commonly referred to as "experiential marketing" born from this thinking (Schmitt, 1999). The idea of experiential marketing is that the value of a product or service purchased does not only reside in the object itself, the utilitarian and functional benefits, but also lies in the hedonic and experiential elements surrounding the product or service. Marketing research on experience includes consumer (Berry, Carbone, & Haeckel, 2002), product and service (Desmet & Hekkert, 2007; Jiang & Benbasat, 2004), off-line and online (Khalifa & Liu, 2007), consumption and brand experiences (Zarantonello & Schmitt, 2013). In this paper, the researcher will focus on the product experiences, which is one of the experiences result from direct observation and participation.

Product experience is the interaction between the consumer and the product, either before or after purchase (Schmitt, Brakus, & Zarantonello, 2015). Despite functional attributes providing instrumental and practical benefits, such as the sound quality of earphones, the accuracy of watches, and the comfortableness of chairs, products also have experiential attributes, referring to the aesthetic, experiential benefits, which can appear on packages, in logos, ads, or in shopping environments (Chitturi, Raghunathan, & Mahajan, 2007; Dhar & Wertenbroch, 2000; Strahilevitz & Myers, 1998; Henderson, Cote, Leong, & Schmitt, 2003; Mandel & Johnson, 2002).

Product experiences can be direct or indirect. Direct experiences result from a physical interaction between the consumer and the product while indirect experiences

result from a mediated interaction between the two subjects, for example, watching a product via advertising (Hoch & Ha, 1986; Kempf & Smith, 1998). Scholars working within virtual product experiences are interested in understanding how product design, aesthetics, and technology influence consumer perceptions, processing, evaluations, and behaviors (Honea & Horsky, 2012). Scholars (Gilovich, Kumar, & Jampol, 2014) also recommend that consumers should shift their consumption from material goods toward experiences. Communities and governments should encourage experiential pursuits. Additionally, there is no contrast or trade-off between material possessions and experiences. In the framework of Schmitt, Brakus and Zarantonello (2015), any purchase that results in consumption may be viewed and judged by the consumer along two value-creating dimensions, materialism and experientialism. In other words, consumer experiences have both materialistic and experiential components instead of only choosing one dimension.

Not only academics but also marketing practitioners realized the importance of insights into how consumers experience products and brands. With this knowledge, marketers can manage their unique experiences for their consumers and thus differentiating and positioning their products in competitive market. Unlike functional attributes, which always be processed deliberately on reason-based and goal-directed (Shafir, Simonson, & Tversky, 1993; Broniarczyk & Alba, 1994; Brown & Carpenter, 2000), consumer show flexibility in processing experiential attributes. That is, consumer can process experiential attributes faster, especially when processes fluency occurs. Companies can get benefits from designing good product experience to attract more customers and generate higher satisfaction.

The role of Logos Success in implementing an effective brand image can greatly affect success in the market. Logos, known as one of the brand elements, have a long history to differential products. Like names, abstract logos can be quite distinctive to be easily recognized. Nevertheless, as visual stimuli, logos can transfer well across language barriers and cultures (Keller, Parameswaran, & Jacob, 2011). Study showed that well-designed logo perceptions can lead liking and evoke more intense aesthetic responses (Bloch, 1995) and positive affects, thus encompassing strong attention and involvement (Veryzer, 1993; Pittard, Ewing, & Jevons, 2007).

However, not many marketing literatures contain comprehensive guidelines for logo design or selection so far, since this topic is very hard to be standardized. Henderson & Cote (1998) made a purely empirical analysis of 195 logos and found some factors affect the selection of good logos, such as elaborateness (complex, active, and depth), naturalness (representative and organic), and harmony (balance and symmetry), which are the three universal dimension of logo design. They found a positive relationship between harmonious designs and pleasantness responses and a bell-shaped relationship between elaborate designs and pleasingness responses. One article in 2004 also develops empirically based guidelines for select typeface in logo design (Henderson, Giese, & Cote, 2004). They conclude six underlying design dimensions which are elaborate, harmony, natural, flourish, weight, and compressed. The last three are typeface-specific design characteristics. Other factors in logo design such as the divine proportion (Pittard, Ewing, & Jevons, 2007), color (Jain & Vailaya, 1998; Madden, Hewett, & Roth, 2000) and shape (Jain & Vailaya, 1996) have also been investigated so far.

To date, most of these studies of logo design are from the perspective of aesthetic theory. They basically discussed how to design appealing logos on the aesthetic level to evoke liking from customers and occupy a place in customers' mindsets. Yet there is lack of literature discussing how logo as one of experiential attributes of a product can be perceived by customers and how can marketers apply related processing theory in logo design to generate positive affective reactions from customers.

2.2 Feeling-as-information Theory

As Schwarz (2011) noted, feelings-as-information theory conceptualizes the role of subjective experiences, including affective feelings (e.g. moods and emotions), non-affective feelings (e.g. metacognitive experiences), and bodily sensations (e.g. hungry, thirsty and painful), in judgment.

When thinking about something, people commonly assume that any thoughts coming to mind and any feelings they experience bear on what they are thinking about (Higgins, 1998). Hence, people attend to use their feelings as a source of information as all other types of information, with different feelings providing different types of information, if they do not realize such feelings come from irrelevant source in fact (Storbeck & Clore, 2007).

For example, when answering the level of life-satisfaction, interviewees should report higher life-satisfaction when they were called on sunny days then on rainy days (Schwarz & Clore, 1983, Experiment 2). The reason is that sunny weather can trigger a better mood than raining weather for most people. A better mood can be a stimulus which leads people to make higher evaluations. From this experiment researchers also

found that when people realize their feelings are unrelated sources to their task on hand they do not rely on their feelings anymore. Moreover, it can be inferred that sad mood facilitate the analytic reasoning need for attributional analyses. Thus its ability to cause bias on people's judgments is easy to be eliminated. In contrast, this reasoning is less likely happened to happy moods, which always require less analytic thinking (Schwarz & Clore, 1983). This result is consistent with the suggestion of Wyer and Carlston (1979) that happy moods do not need as many explanations as sad mood. Thus lead people less susceptible to attributional manipulations.

Furthermore, human cognition has situated nature, meaning that people will choose different processing strategies systematically under different situations (moods). Sad moods may foster a bottom-up processing style, attention to details at hand, and limited playfulness and creativity while happy moods may foster a top-down processing style that relies more on general knowledge structures and more focused attention of playfulness and creativity (Schwarz, 2011).

Psychologists are also interested in how metacognitive experience of ease or difficulty can affect judgment. For example, accessibility experiences (Schwarz, 1998) suggested the ease or difficulty people feel when generating recall and thought. Most models of judgment show that when people recall more positive attributes, higher evaluation will be made of an object. That is, more evidences of the occurrence of an event accessible in mind, people should assume it is more likely to happen.

Another example is processing fluency (Winkielman, Schwarz, Fazendeiro, & Reber, 2003), which will be discuss exhaustively later. Processing new information can be easy or difficult, the same as bringing information to mind. Easy processing

can be experienced as pleasant (Winkielman & Cacioppo, 2001) and this affective can itself generate positive judgment.

Inferences from feelings are also sensitive and malleable to the environment. In some conditions, such as under time pressure (Siemer & Reisenzein, 1998), lack of reliable analyses accessible or less importance of the task on hand, the influence of feelings increases. For instance, people rely on their feelings less when they can access to other sources such as expertise (e.g., Ottati & Isbell, 1996; Sedikides, 1995). Besides, moods exert generates a stronger influence when people make decision for themselves than others (Raghunathan & Pham, 1999) or when they evaluate the hedonic pleasure than the activity's instrumental value for academic achievement (Pham, 1998).

People in happy mood can be persuaded more easily. As Petty & Caioppo (1986) noted, although strong arguments are more persuasive than weak arguments in general, argument strength exerts little influence when recipients do not engage in systematic message elaboration. Hence, happy recipients are easier to be persuaded than sad recipients. Studies (Schwarz, Bless, & Bohner, 1991) found that recipients in happy mood can be moderately and equally persuaded by strong or weak arguments since they are in less elaboration of counter-attitudinal messages, but sad recipients can only be persuaded by strong arguments.

2.3 Fluency Processing Theory

Overall It is well-known that human cognition is highly sensitive to context. The immediate context in which the respective task is situated will profoundly affect how

people perceive simple objects and form evaluation judgments. For instance, contexts can affect people to feel as easy or difficult when processing new information, retrieving information from memory and generating thoughts. Alter & Oppenheimer (2009) explained that fluency is about the subjective experience of ease or difficulty with which individuals are able to process externally-presented stimuli. Individuals can generate quick, effortless and spontaneous judgment rendering process with fluent processing.

Fluency is one of the most prominent metacognitive cues used in reasoning (Tversky & Kahneman, 1973). In general, people prefer processing information fluent than disfluent. The more fluently an individual processes an object, the more positive evaluation he or she will make (Kelley & Jacoby, 1998; Lee & Labroo, 2004; Schwarz, 2004; Whittlesea, 1993; Winkielman, Schwarz, Fazendeiro, & Reber, 2003). Experiment also had been done to prove that consumers can process experiential attributes fluently and, as a consequence they give more positive evaluation to the product (Brakus, Schmitt, & Zhang, 2008).

In consistent with the feelings-as-information theory, the impact of processing fluency on judgment is eliminated when people attribute their feelings of fluency to an irrelevant source (Reber, Schwarz, & Winkielman, 2004). It also explained why functional attributes cannot be processed fluently, because people always process functional attributes deliberately and analytically in which case they are more likely to suspect the sources they have in minds.

Fluency and affect Winkielman and Cacioppo (2001) noted that spontaneous affective response mediates the impact of fluency on evaluative judgments. In their

study, they used a facial electromyography (EMG) to assess participants' affective reaction to fluent or disfluent stimuli. EMG can observe the activities over the region of the zygomaticus major controlling smiling muscle and the region of the corrugator supercilli controlling frowning muscle. As a result, they found high fluency only increased the activity over the zygomaticus region but not activity of the corrugators region, indicating a positive affective response. Just as the complementary finding from other studies that high level of processing fluency can lead to gradual increases in liking, as a result of affecting evaluative judgments (Reber, Winkielman, & Schwarz, 1998; Winkielman, Schwarz, Fazendeiro, & Reber, 2003). That is, the more easily a given target can be processed, the more positively it is evaluated. Accordingly, the variable that facilitates fluent perception (e.g., figure-ground contrast, presentation time and previous exposure) is likely to increase liking and generate more positive evaluations (Novemsky, Dhar, Schwarz, & Simonson, 2007).

The same as the influence of moods (affective response as a mediation), processing fluency can also affect the processing strategies. More specific, the experience of high processing fluency (which means positive affection and familiarity) will foster top-down processing strategy while low processing fluency fosters detail-oriented bottom-up strategy (e.g., Song & Schwarz, 2008).

Variables affecting fluency The pioneering mere exposure studies of Zajonc (1968, 1998) examined repeated exposure to an initially neutral stimulus, without any reinforcement, leads to favorable evaluations. Repeated exposure is just one of the variables that are able to increase processing fluency.

As mentioned before, numerous variables can influence the ease or difficulty of new information processing, from environmental conditions, the presentation format to the nature of the person's knowledge and bodily state. Some of these variables affecting the speed and accuracy of low-level processes concerned with the identification of a stimulus' physical identity and form, namely **perceptual fluency**, including symmetry (Makin, Pecchinenda, & Bertamini, 2012), figure-ground contrast (e.g., Checkosky & Whitlock, 1973), the clarity of presented (Whittlesea, Jacoby, & Girard, 1990), the duration of its presentation, or the amount of previous exposure to the stimuli. Other variables affecting the speed and accuracy of high-level processes concerned with the identification of stimulus meaning and its relation and semantic knowledge structures, namely **conceptual fluency**, such as semantic predictability, the consistency between the stimuli and its context and the availability of appropriate mental concepts for stimuli classification (Alter & Oppenheimer, 2009). Both perceptual fluency and conceptual fluency can influence the processing fluency. In this paper, the researcher will only focus on how perceptual fluency affects people's perception of logo.

3. Conceptual Framework and Hypotheses

The conceptual model is shown in figure 1. According to the results of previous studies, several factors can affect the level of processing fluency. In this study, the researcher will only focus on those affect perceptual fluency. Since the product is new, it is meaningless to take repetition or previous exposure into account. Duration is also unnecessary to control since logos are presented in app store as long as they are

available. In the purpose of investigating the pure effect of processing fluency, the researcher selects the variables which can be easily manipulated in logo design. Apparently, logos can vary in character font and the figure-ground contrast. Therefore **font clarity** and **figure-ground contrast** will be manipulated, in order to control the perceptual fluency of logos:

H1a. Strong figure-ground contrast in logo design increases processing fluency.

H1b. High level of font clarity in logo design increases processing fluency.

As the review of empirical literatures indicates (Reber, Winkielman, & Schwarz, 1998; Lee & Labroo, 2004; Schwarz, 2004), experiencing high processing fluency can generate positive affective feelings thereby leading to more positive evaluations. Theoretically, the logo, as an experiential attribute can be processed fluently by customers. In practice, marketers can manipulate factors affecting processing fluency in logo design. To be expected, a logo processed fluently by customers can lead to increases in liking, as a result of more favorite evaluation of the logo as well as the product. Additionally, when processing fluency occurs, potential users can be easily "persuaded" by short introductions and believe that the product is really as good as it explained.

Mobile apps are the products tailored to apply this philosophy. In the first place, app seekers always notice app logos at the first once apps presented in app store. Thus, logos play an important role in the app market to grasp eyes of app seekers. In the second place, as experience goods, apps can never be judged on functional level

unless it has been downloaded and used. Little information about the product has been provided, especially for newly launched apps without small number of comments. The only clues app seeker can rely on when making decisions are short introduction of the app and some pictures of the user interface, after they select one app to click. According to the feeling-as-information theory as well as processing fluency theory, feelings can play an important role in judgment making when individuals are lack of enough reliable sources. Therefore, easy-to-process logos are likely to result in higher evaluations in such circumstance.

H2. Fluently processed logos will generate higher evaluations of the product (app) from customers (potential users), compared to disfluently processed logo.

H3. Positive affective reaction (liking) generated by processing fluency will mediate the relationship between the processing fluency and the evaluation. Specifically, processing fluency will trigger a more positive affective reaction of the logo, thereby leading to a higher evaluation of the app.

Products or services are differentiated between their intrinsic value such as self-oriented, hedonic consumption for fun and extrinsic value such as utilitarian consumptions that is more goal-oriented (Hartmann, 1968). Like other products, mobile apps can also be divided into utilitarian and hedonic categories base on the purpose or motivation of users (Kim, Park, Kim, & Lee, 2014).Difference values

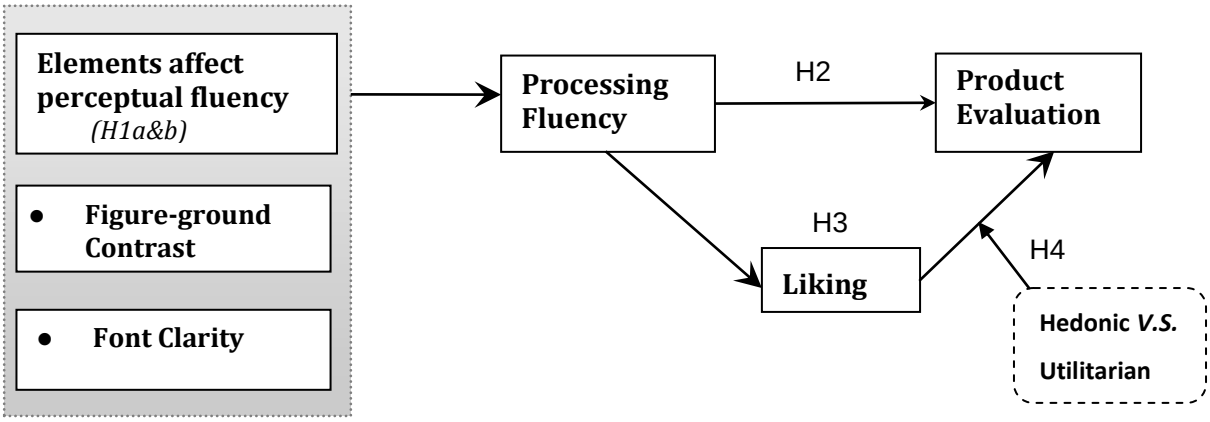
behind apps will influence decision making process of customers, as a result impacting the effect of processing fluency.

One the one hand, hedonic value is more subjective and results more from fun and playfulness than from task completion (Holbrook & Hirschman, 1982). When seeking hedonic consumption (e.g., games and music), consumers involve emotional experience because such products may evoke their feelings (Hirschman & Holbrook, 1982). Thus, feelings play a more influential role under such condition. Consumers tend to use top-down processing strategy and are less possible to do analytic reasoning hence they are more likely to be persuaded by the short introduction containing positive and emotion evoking descriptions. In contrast, when searching for something to fulfill their utilitarian needs, people are more likely to think deliberately and analytically and professional knowledge also plays a role in the decision making (Clement, Fabel, & Schmidt-Stolting, 2006). Thus, the influence of feelings or processing fluency will be discounted. On the other hand, the importance level of choosing something for hedonic and utilitarian purpose is different. Making a decision on which mobile games to play is not as a serious task as selecting which utilitarian apps to use for business analysis, as an example. Therefore, the impact of feelings and processing fluency should play different roles when making judgments of different kinds of apps. It can be concluded that the influence of feelings or fluency is more dominative for hedonic apps than utilitarian apps, due to the different purposes of the "tasks":

H4. Liking rising from processing fluency has a positive impact on product evaluation. However, the size of such effect is conditioned on the usage

purpose of the product that liking has smaller impact on product evaluation for utilitarian product compared to hedonic product.

Figure 1 Conceptual Framework



4. Method

4.1 Overall Experiment Design

The experiment uses a 2 ×2 between-subjects design. Four types of app logos are manipulated with (1) strong or weak figure-ground contrast and (2) high or low level of font clarity (see table 1). To avoid possible measurement effects, each participant was randomly assigned to one logo only. As researcher aims to test the effects of logo perception, and how these effects affect consumer evaluation, any other effects that will bias their evaluation should be eliminated, such as comments, ranking and use experience. Thus, the apps used in experiment are virtual and all logos are self-designed. To investigate the moderating effect of app type, two similar experiments will be conducted separately. All procedures are the same in two experiments, but the app category in each experiment varies.

Table 1 2x2 Between-Subject

Font clarity / Figure-ground contrast	***Clear***	***Unclear***
Strong	Strong contrast/Clear	Strong contrast/Unclear
Weak	Weak contrast/Clear	Weak contrast/Unclear

4.2 Manipulations

Four logos will be created on every permutation of font clarity and figure-ground contrast level. The researcher virtualized two kinds of app, a mobile game app named Amazing *Cookie Backer* as the hedonic app and a resume design and management app named *Resume Manager* as the utilitarian app. For each app, four logos with different manipulated variable levels were designed. In total, eight logos were designed for the experiment.

The font clarity is manipulated by changing the font (readable or unreadable) of characters in logo design. Font manipulation is probably the most common instantiation in studies related to perceptual processing (Reber & Zupanek, 2002; Novemsky, Dhar, Schwarz, & Simonson, 2007; Alter & Oppenheimer, 2008). In these studies, researchers used either a clear font or an unclear font in the questionnaires. However, due to different consumption contexts and purposes of game app and resume app, it is not suitable to apply the same font in their logo design. Apparently, the fonts of the game app should be funny and joyful while the fonts of resume app should be more serious and professional, no matter they are readable or not. To make each logo looks realistic and harmonious, the researcher uses various kinds of fonts in logo design for different app categories. For the resume app, **MV BOIL** is used as the

clear font and **sudestada** as the unclear version; for the game app, **Snap ITC** is used as the more readable font and **Jey** as the one is not (see Appendix).

The figure-ground contrast level will also be controlled. The researcher only adjusts the font color in each logo without changing the background (the largest area in the logo) color. Black color is used in characters to indicate a strong figure-ground contrast since the all backgrounds are in relative light colors for either type of app, Besides, the researcher chooses the colors slight different from the background in characters to show the weak contrast condition (see Appendix).

4.3 Variable measurement

A survey instrument with varies logo design is developed. Most construct items (measures) will be measured on a seven-point Likert-type scale.

Processing fluency In previous studies investigating perceptual fluency, most researchers use the recognition speed as a standard measure of fluency. The existing relationship between objective processing speed and subjective experiences of fluency has been examined by Reber, Wurtz, and Zimmermann (2001). Their study also showed that recognition speed is faster for stimuli strong in figure-ground contrast or font clarity. Building on their work, the researcher also measures the perceptual fluency (processing fluency) by the recognition speed in this paper. That is, how much time participant spend processing the logos. This can be done in Qualtrics by setting a hidden timing question in the logo presenting page. This question can manage how long a participant spends on that page. Moreover, considering this hidden question in Qualtrics can be affected by network speed. The subjective processing fluency will also be measured. It should be more valued in the app seeking

circumstance since potential users can look at the logos as long as they want in realty. Fluency will be measured by a self-report difficulty scale as it is a subjective experience of ease or difficulty associated with completing a mental task.

Liking The finding that perceptual fluency (processing fluency) is affectively positive will also be replicated. Researchers (e.g. Checkosky & Whitlock, 1973; Zajonc, 1998) studying the relationship between perceptual fluency and the affective judgment measured liking by directly asking participates their feeling of liking and the prettiness of the stimuli. As previous studies, liking will be measured by asking participants how much do they like the logo presented. To be more comprehensive, the researcher also asks participates for their judgment of aesthetics.

Evaluation People's evaluations of an object can be reflected from their attitude toward the object (Ajzen & Fishbein, 1977). Attitude is often regarded as an index of the degree to which an individual likes or dislikes an object and carries favorable connotations (Ajzen and Fishbein, 1980). As to product evaluation, it can be measured indirectly by knowing consumers' attitude toward the product. The scale used to measure attitudes in this paper is developed by Voss, Spangenberg and Grohmann in 2003, namely the hedonic/utilitarian (HED/UT) scale. This generalizable scale with ten semantic differential response items can measure people's attitude towards a product on two distinct dimensions, namely hedonic and utilitarian dimensions (see table 2). All construct items (measures) were measured on a seven-point Likert-type scale in designed surveys.

Table 2 Items adapted from prior research

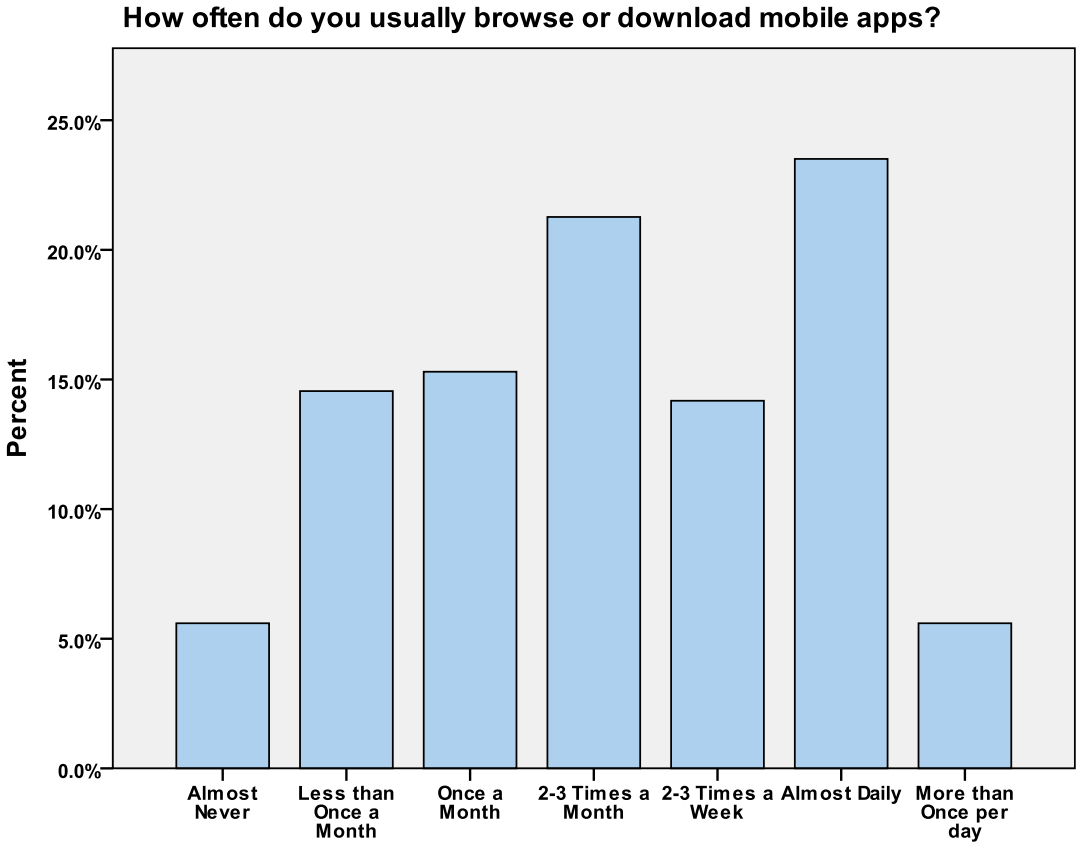
Construct	Definition	Items	Reference
Figure-ground contract	A visual relationship between foreground and background	1. Strong 2. Weak	Reber, Winkielman & Schwarz,1998
Font clarity	The font is clear expression and easy to understand	1. Clear 2. Unclear	Novemsky, Dhar, Schwarz & Simonson 2007
Processing fluency	The subjective experience of ease or difficulty associated with processing stimulus.	1. Perceptual fluency 2. Conceptual fluency	Schwarz & Clore, 1996; Winkielman et al., 2003
Liking	A feeling of pleasure and preference	1. Liking/disliking 2. Prettiness/ugliness	Reber etal., 1998 Winkielman and Fazendeiro , 2003
Evaluation	The degree to which a person likes or dislikes an object. In this paper, it is specific to product evaluation, that is, people's attitude towards a product.	***Utilitarian*** 1. Ineffective/effective 2. Unhelpful/helpful 3. Not functional/functional 4. Unnecessary/necessary 5. Impractical/practical ***Hedonic*** 1. Not fun/fun 2. Dull/exciting 3. Not delightful/delightful 4. Not thrilling/thrilling 5. Enjoyable/unenjoyable	Ajzen & Fishbein, 1980 Ajzen & Fishbein, 1977; Voss, Kevin E., Spangenberg & Grohmann ,2003
Control Variable			
Hedonic	Hedonic value comprises the intrinsic motivation in experiential, entertained, and enjoyable service use.	**Mobile game app**: Cookie Baker	Kim, J., Park, Y., Kim, C., & Lee, H. 2014
Utilitarian	Utilitarian value comprises the extrinsic motivation of a goal-directed service use.	**Resume design app**: Resume Manager	

5. Results

5.1 Data Description

All eight questionnaires were handed out online through the Qualtrics online survey platform during a month in China. All contents and scales of questionnaires had been translated from English into Chinese by Chinese native speakers. After eliminating unqualified respondents (e.g., non-respondents and submission time less than 1 minute), 268 observations were available for analysis. The surveys contained a short description of the app, the logo presented page with a hide question to count processing time, the set of questions to measure liking towards the logo and attitudes towards the app. The researcher also asked participants to report their own feeling of fluency. Finally, participants' intension to download the app (purchase intension) and some demography information like age and gender were recorded. There was no financial incentive to participate, but all respondents were thanked for in the end of the survey. The data consists of 34.7% male and 65.3% female participants. 79.5% of them are youth between 18-25 years old and the other 15.7% participants are 26-35 years old. More than half participants have a monthly income below 1100€. From figure 2, 94.4% of total participants had ever browsed or downloaded mobile apps within one months. Hence, they could be considered as the potential app users. Among all 268 observations, 137 participants answered the questionnaires of the game app while 131 participants filled in questionnaire of the resume app.

Figure 2 The frequency participants browse or download mobile apps.



5.2 Test of Processing Fluency

Two-way ANOVA To test the affects of font clarity and figure background contrast on processing fluency (H1a and H1b), two 2(Font Clarity) ×2(Figure-ground contrast) between groups ANOVAs were conducted to compare means of the processing fluency for both types of apps separately. In this study, both the objective fluency (the page submission time) and the subjective fluency (self-reported fluency) were measured in the questionnaire. In this section, both of them had been compared.

Game app In support of H1a, the two way ANOVA yield a significant main effect for the figure-ground contrast for both processing time ($F=13.239$, $p<.000$) and

self-reported processing fluency (F=32.562, p<.000). Table 3 indicated subjects did spent less time to processing logos in strong figure-ground contrast and they reported more fluency as well on average. Similarly, in support of H1b, the main effect of font clarity was significant for self-reported processing fluency (F=41.882, p<.000), though this effect did not happen for processing time (F=1.660, p<.2). That may because in game app design, half of the background was full of other objects. Therefore participant might pay less attention to the characters part. The clarity×figure-ground contract interaction was not significant for both processing time and self-reported processing fluency. This suggested the effect of figure-background contract was not different for clear or unclear logos.

Table 3 Mean processing time and difficulty score for Game App

Font Clarity	***Clear***		***Unclear***	
Figure-Ground Contract	**Strong**	**Weak**	**Strong**	**Weak**
Processing Time (Seconds)	3.15 (1.14)	4.54 (2.48)	3.81 (1.60)	4.69 (1.54)
Difficulty Score	2.41 (1.32)	4.46 (2.19)	4.71 (2.33)	6.70 (2.18)
	n=41	n=28	N=45	N=23

Note: Higher means indicate less fluency for both measurements

Resume app The same ANOVA method was conducted of resume app data as well. In contacts, the figure-ground contrast effect was not significant (F=0.192, p<.662) for processing time while it was significant when concerning to the difficulty score (F=4.089, p<.05). That is, when the figure-ground contrast level became stronger, participants only indicated a more fluent processing in the fluency they

reported themselves instead of the processing time recorded systematically. This finding could be explained as there was only a short word 'Resume' in resume app logo design, which could be processed rapidly once participants saw it. It is too difficult to detect such subtle time differences. Moreover, the resume app data generated a significant main effect for the font clarity for both processing time ($F=12.031$, $p<.005$) and self-reported processing fluency ($F=21.159$, $p<.000$). In this situation, logos with clearer font were processed more fluently (see table 4), in both measurements. Again, the clarity×figure-ground contrast interaction was not significant for both processing time and self-reported processing fluency. To conclude, the hypothesis testing results in all measurement situations were summarized in table 5.

Table 4 Mean processing time and difficulty score for Resume App

Font Clarity	***Clear***		***Unclear***	
Figure-Ground Contract	**Strong**	**Weak**	**Strong**	**Weak**
Processing Time (Seconds)	3.23 (1.49)	3.39 (1.40)	4.40 (2.34)	4.53 (2.05)
Difficulty Score	3.22 (1.80)	4.02 (2.10)	5.03 (2.19)	5.80 (2.50)
	n=23	n=43	N=35	N=30

Note: Higher means indicate less fluency for both measurements

Table 5 Hypothesis testing results in all measurement situations

Measurement	**Processing Time**		**Self-reported fluency**	
	Game app	Resume app	Game app	Resume app
H1a (figure-ground contrast)	**Support**	**Reject**	**Support**	**Support**
H1b (Font clarity)	**Reject**	**Support**	**Support**	**Support**

5.3 The Relationship between Processing Fluency and Evaluation

Exploratory Factor Analysis Although the HED/UT is a well-established scale, confirmation of the validity and unidimensionalty were still required. First of all, the exploratory factor analysis was run to verify the two dimensions which the HED/UT scales suggested (Voss, Spangenberg, & Grohmann, 2003). Unfortunately, both data of the game app and resume app failed to validate the two dimensions based on the result of factor analysis, all items loading on only one factor. Although the game app data generated two factors at beginning, the only item might load on component 2 was the unnecessary/necessary, which could also be loaded to component 1. Therefore, this 'fictitious' variable of game app evaluation had been eliminated because of its high and more or less equal loading factors on both factors (Janssens, Wijnen, De Pelsmacker, & Van Kenhove, 2008). Due to this fact, the evaluation could only be regarded as a unidimensional latent variable with all items in further analysis.

Table 6 Factor Loading Component Matrix for both app types

	Resume App Component	**Game App** Component	
	1	1	2
Ineffective/effective	.804	.808	-.285
Unhelpful/helpful	.827	.877	-.159
No functional/functional	.795	.862	.286
Unnecessary/necessary	.829	.708	.620
Impractical/practical	.876	.840	.381
Not fun/fun	.762	.883	-.218
Dull/exciting	.816	.858	-.276
Not delightful/delightful	.813	.838	-.421
Not thrilling/thrilling	.778	.790	.198
Enjoyable/unenjoyable	.862	.872	-.012

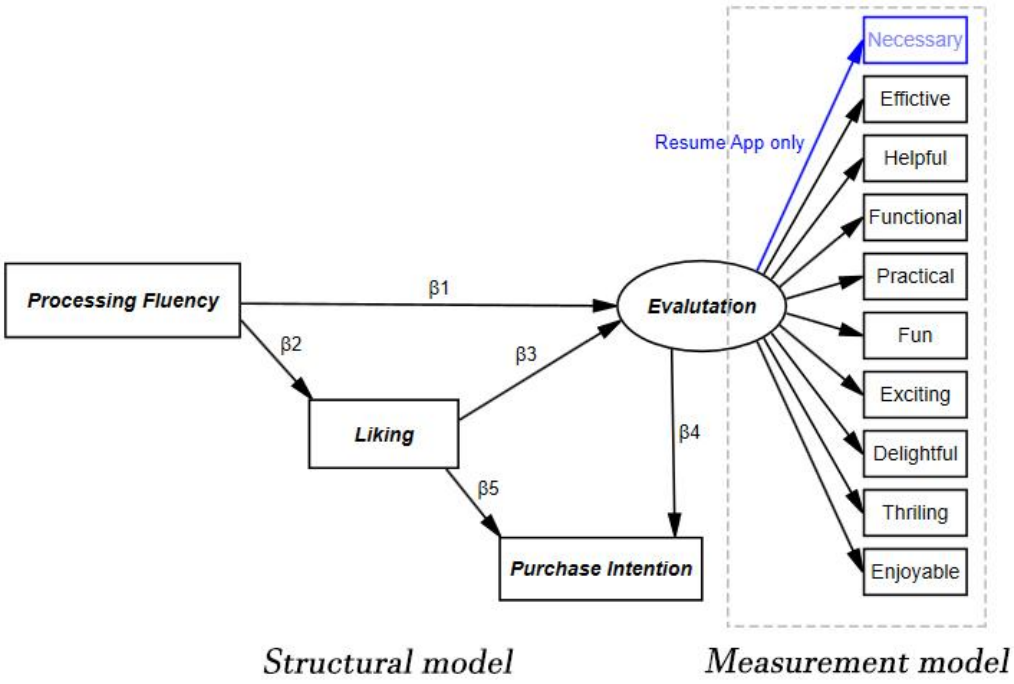
*The numbers mean factor loadings for each variable onto each factor after rotation

Structural Equation Model A simple Structural Equation Model (SEM) base on H2 and H3 was build to investigate the relationship between processing fluency and evaluation, which supposed to be mediate by liking (see figure 3).

Structural Equation Models, often called LISREL (Linear Structural Relations) model, is a multivariate technique combining aspects of factor analysis and multiple regression. Compare to linear regression, it can deal with a system of regression equations (called a model), not only simple or multiple linear regressions (Nachtigall, Kroehne, Funke, & Steyer, 2003). The biggest advantage of SEM is that it allows for the use of latent variables and considers a series of equations simultaneously. It has been widely used in many social science disciplines. In the area of marketing research, SEM is an important tool for both

B2B marketing studies (Selnes & Sallis, 2003; Steenkamp & Baumgartner, 2000) and B2C customer analysis (Luo & Bhattacharya, 2006).

Figure 3 The hypothesized Structural Equation Model



Because of the invalid of the two dimensions of HED/UT scale as the exploratory factor analysis suggested before, a new valid evaluation measurement model should be constructed before the parameter estimation. In the first place, all items related to the evaluation would be treated as direct indicators of evaluation construction in the measurement model part. However, a big number of indicators will increase the potential for shared secondary influences and cross-loadings among the indicators, contributing to overall lack of model fit. Besides, the more indicators per latent construct are used, the larger sample size is needed because of more free parameters. Ten or nine indicators were too many in this case. Redundant items can be eliminated according to the modification

indices in the Confirmatory Factor Analysis (CFA) (Hall, Snell, & Foust, 1999). This will be illustrated in the next section.

Both subjective (self-reported) and objective (processing time) processing fluency would be tested as variables in different models. The moderating effect of app type would be examined by separately fitting game app data and resume app data in different models. Finally, besides all that stated in the hypothesis, participant purchase intension was also included in the structural equation model.

Measurement Model Confirmatory Factor Analysis (CFA) was conducted in AMOS to assess how well the measurement items reflected latent variables in the hypothesized structure of game app firstly. That is the measurement model part in the whole model. The measurement model estimated with all items was not well fitted as expected. Although all items had high factor loading of the evaluation construction, none of other indexes was qualified ($\chi 2$ = 145.664 with a P-value=.000, GFI=.795, AGFI=.658, RMSEA=.180). Thus, modification index (MI), which indicating the expected value that $\Delta\chi 2$ would decrease as a result of freeing such parameter (Keith, 2014), was used to modify the measurement model.

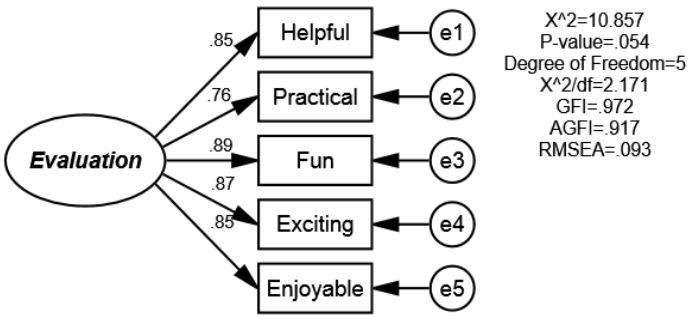
Table 7 Measurement model specified for game app

			M.I.	Par Change
e6	<-->	e8	9.772	-.227
e6	<-->	e7	13.933	.202
e5	<-->	e8	4.566	-.143
e4	<-->	e9	13.089	.243
e4	<-->	e8	13.059	.288
e4	<-->	e7	7.870	-.167
e4	<-->	e6	13.018	-.237
e3	<-->	e8	4.509	.184

			M.I.	Par Change
e3	<-->	e7	6.647	-.167
e3	<-->	e6	16.614	-.291
e3	**<-->**	**e4**	**35.336**	**.465**
e2	<-->	e5	4.243	-.105
e1	<-->	e9	9.760	-.198
e1	<-->	e5	6.968	.151
e1	<-->	e2	8.670	.170

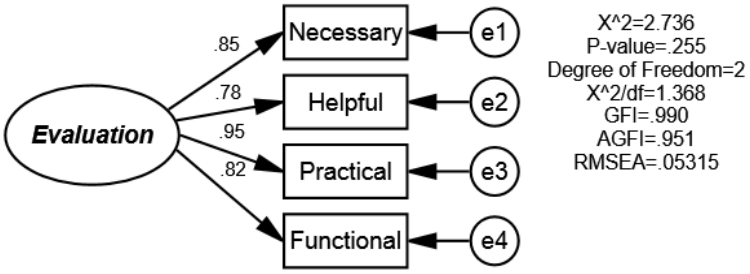
According to table 7, the largest MI was between e3 and e4. The variables e3 and e4 represented the unique variances of Practical and Functional. Moreover, highly correlated error terms recognized that items similar in wording or content may be more closely related than accounted for by the factor they measure or the correlation between latent factors (Christensen, et al., 1999). The large value suggested these 2 items measured something in common of evaluation. If this covariance (correlation) were set free, it would suggest the unique variances of the Practical and Functional items are related above and beyond the effect of Evaluation. Indeed, Practical and Functional are somehow semantically identical. Note e4 also had high correlation with e6, e8 and e9. To reduce the item redundancy, items with higher MI value would be removed. Since modification indexes would change with each additional adjust, one could not make several changes at a time (Hair, 2010). This process was repeated until a satisfied model was identified. In the end, five items, Helpful, Practical, Fun, Exciting and Enjoyable, were retained to indicate the evaluation construction of game app. This modification resulted in a significant improvement over the original model as indicated by a significant change in all fit indexes (see figure 4). Besides, the reliability was high for this evaluation scale (Cronbach's Alpha=.926).

Figure 4 Final Measurement Model for *Game App*



The same procedure was applied to build evaluation construction of resume app as well. The ten items full measurement model had a bad fit indices as expected, the $\chi 2 = 161.923$ with a P-value = .000, the GFI=.772, the AGFI = .641 and the RMSEA = .167. After examining the MI value step by step, the thrilling item was also removed due to its lower factor loading (0.66) and its meaning was somehow useless to evaluate a resume app. As a result, only four items, which are Necessary, Helpful, Practical and Functional, were retained for the measurement model of resume app. All of the fit indexes of the measurement model of resume app reached the recommended threshold value (see figure 5). The reliability test of these four items suggested a Cronbach's Alpha=.912, indicating a high reliability of these scales.

Figure 5 Final Measurement Model for *Resume App*



Structural Model SEM is a technique which required adequate sample size. In general, the accuracy and stability of SEM result increases with increases in the sample size used in the analysis (Fan, Thompson, & Wang, 1999). Unfortunately, no consensus had been made in the literature concerning what would be the appropriate sample size for SEM. One prevalent lower bound of total sample size should be at least 200 (Kline, 1998). However, recent publication (Hair, 2010) suggested that SEM models containing five or fewer constructs, each with more than three indicators, can be adequately estimated with sample as small as 100-150. According to this rule, 137 and 131 responses for game app and resume app respectively, were enough to get robust results. The maximum likelihood (ML) estimation method had been selected, as it is not only more stable, but also demonstrates higher accuracy in terms of empirical (the RMSEA) compared to the other estimators such as GLS or WLS. Another advantage of ML is that it is considerably more insensitive to variations in sample size and kurtosis (Olsson, Foss, Troye, & Howell, 2000).

Parameter Estimation Two models, one with objective fluency (processing time) and the other using subjective fluency (self-reported fluency) as the independent variable for each app type were estimated. Four structural equation models had been examined in total. All of the goodness-of-fit statistics of these proposed theoretical models reached recommend threshold. As the $\chi 2$ values of each model were insignificant, there were no significant discrepancy between the original sample covariance matrix and the covariance matrix reproduced based on model specifications. Besides, other fit indices also indicated a good model fit. The goodness-of-fit indexes GFIs and AGFIs were all above .90 while the badness-of-fit index RMSEAs were below the threshold .08 (Hair, 2010). Thus, all models were accepted as providing good fit to the data (see table 8).

Table 8 Model Fit Indices

SEM FIT INDICE						
Model Specification	**X^2(P)**	**X^2/df**	**GIF**	**AGIF**	**CFI**	**RMSEA**
Game app (Processing Time)	25.377 (P=.115)	1.410	.957	.913	.988	.055
Game app (Self-reported fluency)	25.392 (P=.114)	1.411	.959	.918	.998	.055
Resume app (Processing Time)	14.724 (P=.257)	1.227	.971	.932	.994	.042
Resume app (Self-reported fluency)	12.113 (P=.437)	1.009	.976	.944	1	.009
Rule of Thumb	*Insignificant*	1-3	>0.9	>0.9	≈1	<.08

H2 stated processing fluency of app logo will increase the evaluation of the app. Moreover, this affect is not direct but is mediated by the feeling of liking (H3). To evaluate the estimated causal relations, the actual size of each parameter was assessed in terms of the standardized coefficients. Table 9 concluded the standardized coefficients and significances of all paths for four models.

Game app As seen in table 8, when using subjective processing time as predictor, all the relationships of game app are significant except the path from processing time to liking (β1=-.144, P=.090). Results indicated that subjective processing fluency did not increase liking, though it indeed increased the evaluation of the app (β1=-.160, P=.039). Moreover, evaluation increased with the increasing of liking significantly. In this situation, H2 was supported but not H3. Instead of mediating the relationship of processing fluency and evaluation, processing fluency increased evaluation even more remarkable. Regarding self-

reported fluency, the conclusions drew a different picture. The path between processing fluency and evaluation was not significant but both β2 and β3 were significant. It indicated a indirect effect of processing time and evaluation. Finally, the purchase intension showed positive relationships with the evaluation and liking as expected in either model.

Resume app Inconsistent with the H4 which supposed that the effect of processing fluency would be discounted when utilitarian app was evaluated, both models of resume app showed no such discount appeared. Nevertheless, the effect was even magnified in one of the resume app models. Both models (processing time and self-reported fluency) had no significant direct effect of processing fluency on evaluation while the indirect effect was verified by the significant path between processing fluency and liking as well as that between liking and evaluation. The values of these significant parameters also showed the significant effects were nearly as big as that of game app model. Surprisingly, the positive relationship of liking and evaluation is even larger when concerning the objective processing fluency in the model, which had the largest coefficient equaled to .576 among all parameters. Again, both higher evaluation and liking increase the purchase intension significantly in both models.

Table 9 Path Coefficients

PATH ESTIMATION				
	Game app (Processing Time)	**Game app** (Self-reported fluency)	**Resume app** (Processing Time)	**Resume app** (Self-reported fluency)
$\mathbf{B_1}$(PF→Evaluation)	-.160**	-.010	.043	-.144
$\mathbf{B_2}$(PF→Liking)	-.144	-.378***	-.241**	-.437***
$\mathbf{B_3}$(Liking→Evaluation)	.482***	.501***	.576***	.503***
$\mathbf{B_4}$(Evaluation→ PI)	.375***	.372***	.388***	.390***
$\mathbf{B_5}$(Liking→PI)	.248**	.250**	.185**	.184**

*Note PF=Processing Fluency, PI = Purchase Intension **P < .05, ***P < .001*

Mediation Analysis Zhao, Lynch and Chen (2010) asserted the first-step test of the significant "effect to be mediated" (Baron & Kenny, 1986) is not indispensable to establish mediation. They reconsidered the traditional Mediation Analysis and suggested that to establish mediation, the significance of indirect effect matters all. To test the mediation effect of liking, a bootstrap test (Preacher & Hayes, 2004, 2008), of indirect and effect has conducted. The results are showed in table 10.

From the output of bootstrap test, it can be concluded that mediation effects appeared in three of the four models. The mediation did not appear in the game model with processing time may because of the inaccuracy measurement of processing time in the online experiment situation. Expect that model, all other three models indicated significant indirect effects, with a 95% confidence interval excluding zero. The direct effects are all insignificant, suggesting indirect-only mediations in these models (Zhao, Lynch, & Chen, 2010). That is, other than raising the product evaluation directly, processing fluency

increased the evaluation solely by enhancing the feeling of liking and it was the liking of the logo that leads more favorite evaluations of the product.

Table 10 The Mediation Analysis

Bootstrap Results						
	Indirect Effect				***Direct Effect***	
	Estimation	***Lower Bound***	***Upper Bounds***	***SE***	***Estimation***	***SE***
Game app (Processing Time)	-.047	-.111	.008	.030	-.108**	.080
Game app (Self-reported fluency)	-.097***	-.165	-.047	.056	-.005	.088
Resume app (Processing Time)	-.091***	-.182	-.031	.037	.028	.062
Resume app (Self-reported fluency)	-.120***	-.201	-.060	.035	-.078	.055

6 Discussion and Implications

An online experiment was designed to exam the effect of applying processing fluency in app logo design on customer evaluation among young Chinese generation. Two fictitious mobile apps, one game app for hedonic purpose named ‘Amazing Cookie Baker’ and one resume manage app of utilitarian use named ‘Resume Manager’ were created by the researcher. Four logos for each app were created based on every permutation of font clarity and figure-ground contrast level, as the manipulations of processing fluency. A customer attitude scale, originally developed

by Vass et al. (2003), aiming to measure the hedonic and utilitarian dimension of customer attitudes toward product categories and brands, was used as the evaluation scale of mobile apps.

The finding that perceptual fluency (processing fluency) is affectively positive was replicated. Both clearer font and stronger figure-ground contrast facilitated the logo processing. Unlike other studies in which researchers used pictures of everyday objects, such as desk, bird, or plane (Snodgrass & Vanderwart, 1980) or simple figures like circles on different backgrounds (Reber, Winkielman, & Schwarz, 1998) as the stimulus, in present study app logos were regarded as stimulus to test the liking of participants. Different from functional attributes, logos can be processed fluently and both font clarity and figure-ground contrast have significant effects on processing fluency. Therefore, H1a and H1b were both supported.

H2 and H3 stated that processing fluency of app logo and product evaluation has a positive relationship which mediated by the feeling of liking, a kind of affective reactions. Experience and experiential value can be regarded as subjective and can generate kinds of feelings. As feeling-as-information theory suggested that people attend to use their feelings as a source to make judgments or decisions (Higgins, 1998). These hypotheses were all supported by the findings from the structural equation model. Base on the parameter estimation of the hypothesis model, when processing fluency happened, participants indeed gave higher evaluation of the app (H2). However, there was no direct effect between processing fluency and product evaluation but an indirect effect which mediated by the liking. The findings were also

in supporting of existing studies investigating the relationship between fluency processing and evaluation (Winkielman, Schwarz, Fazendeiro, & Reber, 2003).

Unexpectedly, the discounted influence of liking on evaluation when people considering something for utilitarian propose other than hedonic propose did not appear as a result. There are several reasons can explain the rejection of H4. Firstly, when answering the questionnaire, participants might not put themselves into the real situation that they need such app. They tended to only evaluate the resume app base on all the information provided other than considering the using purpose with deliberation. Moreover, such resume app is not widely used in China now. People may not use it as an important guidance to find jobs anyway. Hence, the lack of motivation of deliberate or analytical thinking for both game app and resume app generated the same effect of liking on evaluation. Although H4 was rejected in this study, the empirical finding that impact of feelings is discounted when people use deliberate or analytical thinking in decision making cannot be rejected without cautiousness.

Other limitations also remain. First of all, because this study was conducted with Chinese consumers, confounding factors such as culture and social norms may have been introduced. The participants were mostly younger consumers between 21 and 35 years old. Although this sample may be appropriate for the products used in the survey, it may still lead to a narrow variance in the responses and the proportion of female is quite high. Besides, the sample size is relatively small for estimating structural equation model. A bigger sample size can get more robust estimation results. Secondly, objective processing might not be well measured due to the internet

connection conditions of different participants in this study. To get accurate processing time, offline experiments can be the alternative. Furthermore, the use of HED/UT scale to measure the evaluation of apps turned out to be invalid. Although a unidimensional evaluation measurement based on the original HED/UT scale was rebuilt in the measurement model, the initial propose of the use of HED/UT was in vain. The invalidity of HED/UT scale may because of its application in other language and culture. Despite that both validity and reliability of HED/UT scale were strictly tested when establishing, its application to mobile app products was also less known. This result may be a signal that HED/UT scale is not able to be used efficiently under some circumstances, like in other languages, cultures and some categories of products. Other valid scales to measure customer evaluation towards mobile apps should be used or designed in further studies.

In spite of these limitations, this research has theoretical contributed to the experiential marketing area. Although the word "experiential marketing" is not new (Schmitt, 1999), its influence in marketing area has never decreased. One of the key ideas of experiential marketing is that besides residing in products and services, values also lie in the hedonic and experiential elements surrounding objects of purchase. Not only researchers want to investigate how customer behavior is influenced by these experiences, marketers have become increasingly aware of the importance of creating value within experiences for their customers in current competitive market economy environment. More and more marketing practitioners have realized that understanding how consumers experience brands and products is critical for positioning and differentiating their products. As experience is hard to

copy, many marketing practitioner put such efforts in managing customer experience to make their brands or products irreplaceable in customers' mindsets.

The evidences found out from questionnaire data in this study indicate that for mobile apps, easy-to-process logos can generate affective feelings like liking, and thus leading more favorite evaluation of the products. It reconfirmed that leveraging experiential attributes surrounding the products increases the customer evaluation. This study also provides some guidelines of logo design from a new point of view. Other than traditional logo design studies mainly started from the perspective of aesthetic theory, this study explored the possibility of applying processing fluency in logo design. Logos with clearer font (especially when the word is short) and stronger figure-contrast (when the back ground is simple) can be processed more fluently.

Moreover, compare to functional attributes, leveraging experiential attributes is particularly important for experiential products without any brand awareness, which are hard to differential from the prospective of customers. As indicated in this study, application developers can get benefits facilely from an easier-process app logo design, as potential users showed more willingness to download the app when they processing the logo more fluently. These additional experiential values lied in the elements of products can be viewed as a tie-breaker when customers have to choose between new products that are functionally equivalent ((Brakus, Schmitt, & Zhang, 2014)). The improvements of experiential attributes will be beneficial as leveraging functional attributes, which requires more human and financial resources.

Besides its importance in mobile apps market, those experiential attributes like logo can be also considered as a key factor to success in other markets. For example,

for high-tech products from startups, a well-designed logo and package can become a shortcut to takeoff since they do not have salience brand awareness or strong research and development capabilities. Online stores can also gain an immense advantage of outstanding experiential attributes. In online shopping circumstance, customers cannot touch the products directly and it is hard to tell the functional quality of the product behind the screen. Additionally, many online retailers actually sell the same products. Thus instead of the product itself, the shopping experience can be the hinge to differential themselves. For online retailers, finding out answers to questions like how to design the pictures of product displayed, what kind of web interface layout, color and background music are more liked by customers will bring great advantages.

Future research opportunities stem from both the limitations and the findings in this study. The moderate effect of consumption motivation of customers can be investigated in future studies with other experiment designs. Knowing that in which consumption circumstances customers are more likely to trust their feelings and when they rely on rational thinking can help marketers to use this knowledge of psychology into marketing area in a better way. Moreover, other demographic factors may also affect customers' dependence on their feelings when making purchase decisions. For example, when making judgments or decisions, men and women may rely on different source of information or feelings (Tuch, Bargas-Avila, & Opwis, 2010); younger generation may value experiential attributes more than older generation. All in all, further efforts can be put into examining the generalizability of the results in this study. Coming researches can direct to the application of processing fluency theory in other product categories as discussed before. Besides, questions about how other

experiential attributes other than logo will affect customer evaluation and their purchase behavior still remained to be answered in the future.

6. Conclusions

The study reconfirms the finding of previews studies that processing fluency will generate higher evaluation form customers (Reber, Winkielman, & Schwarz, 1998; Winkielman, Schwarz, Fazendeiro, & Reber, 2003; Brakus, Schmitt, & Zhang, 2008). It indicates that that logo, as experiential attributes can be processed fluently and those attributes are valued by customers as other functional attributes. Customers process logos designed with high level perceptual fluency more fluently than those with low level perceptual fluency. Moreover, an indirect effect of processing fluency on evaluation mediated by the feeling of liking is verified, indicating that easy-to-process logos can generate more pleasing affective reaction of customer thus leading a higher evaluation of the app. In additional, customers also show more willingness to download the app simultaneously.

The present study suggests some implications for marker practitioners in product logo design and alarms them the importance value of experience marketing in crowded marketplaces. For application developers, besides making logos better, they can also think of making them easier to win more customers. Similarly, for marketers in fiercely competitive marketplaces, they should also pay more attention to theses experimental attributes surrounding the product other than barely concentrating on improving functional quality of the product itself. Customers like you more and buy you more not only because how your products perform, but also how your products look and feel.

Reference

Ajzen, I., & Fishbein, M. (1977). Attitude-behavior relations: A theoretical analysis and review of empirical research. *Psychological bulletin*, 84(5), 888.

Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behaviour.

Alter, A. L., & Oppenheimer, D. M. (2009). Uniting the tribes of fluency to form a metacognitive nation. *Personality and social psychology review*.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, 51(6), 1173.

Berry, L. L., Carbone, L. P., & Haeckel, S. H. (2002). Managing the total customer experience. *MIT Sloan Management Review*.

Bloch, P. H. (1995). Seeking the ideal form: product design and consumer response. *The Journal of Marketing*, 16-29.

Brakus, J. J., Schmitt, B. H., & Zhang, S. (2008). Experiential attributes and consumer judgments. *Handbook on brand and experience management*, 174-187.

Brakus, J. J., Schmitt, B. H., & Zhang, S. (2014). Experiential product attributes and preferences for new products: The role of processing fluency. *Journal of Business Research*, 67(11), 2291-2298.

Brakus, J. J., Schmitt, B. H., & Zhang, S. (2014). Experiential product attributes and preferences for new products: The role of processing fluency. *Journal of Business Research*, 67(11), 2291-2298.

Broniarczyk, S. M., & Alba, J. W. (1994). The role of consumers' intuitions in inference making. *Journal of consumer research*, 393-407.

Brown, C. L., & Carpenter, G. S. (2000). Why is the trivial important? A reasons-based account for the effects of trivial attributes on choice. J*ournal of consumer research*, 26(4), 372-385.

Checkosky, S. F., & Whitlock, D. (1973). Effects of pattern goodness on recognition time in a memory search task. *Journal of Experimental Psychology*, 100(2), 341.

Chitturi, R., Raghunathan, R., & Mahajan, V. (2007). Form versus function: How the intensities of specific emotions evoked in functional versus hedonic trade-offs mediate product preferences. *Journal of marketing research*, 44(4), 702-714.

Christensen, H., Jorm, A., Mackinnon, A., Korten, A., Jacomb, P., Henderson, A., & Rodgers, B. (1999). Age differences in depression and anxiety symptoms: a structural

equation modelling analysis of data from a general population sample. *Psychological medicine*, 29(02), 325-339.

Clement, M., Fabel, S., & Schmidt-Stolting, C. (2006). Diffusion of hedonic goods: A literature review. *The International Journal on Media Management*, 8(4), 155-163.

Desmet, P., & Hekkert, P. (2007). Framework of product experience. *International journal of design*, 1 (1) 2007.

Dhar, R., & Wertenbroch, K. (2000). Consumer choice between hedonic and utilitarian goods. *Journal of marketing research*, 37(1), 60-71.

Fan, X., Thompson, B., & Wang, L. (1999). Effects of sample size, estimation methods, and model specification on structural equation modeling fit indexes. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 56-83.

Gilovich, T., Kumar, A., & Jampol, L. (2014). A wonderful life: Experiential consumption and the pursuit of happiness. *Journal of Consumer Psychology*, 25(1), 138-151.

Hair, J. F. (2010). Multivariate data analysis.

Hall, R. J., Snell, A. F., & Foust, M. S. (1999). Item parceling strategies in SEM: Investigating the subtle effects of unmodeled secondary constructs. *Organizational Research Methods*, 2(3), 233-256.

Hartmann, R. (1968). The structure of value: Foundations of scientific axiology.

Henderson, P. W., & Cote, J. A. (1998). Guidelines for selecting or modifying logos. *The Journal of Marketing*, 14-30.

Henderson, P. W., Cote, J. A., Leong, S. M., & Schmitt, B. (2003). Building strong brands in Asia: selecting the visual components of image to maximize brand strength. *International Journal of Research in Marketing*, 20(4), 297-313.

Henderson, P. W., Giese, J. L., & Cote, J. A. (2004). Impression management using typeface design. *Journal of marketing*, 68(4), 60-72.

Higgins, E. T. (1998). Promotion and prevention: Regulatory focus as a motivational principle. *Advances in experimental social psychology*, 30, 1-46.

Hirschman, E. C., & Holbrook, M. B. (1982). Hedonic consumption: emerging concepts, methods and propositions. *The Journal of Marketing*, 92-101.

Hoch, S. J., & Ha, Y.-W. (1986). Consumer learning: Advertising and the ambiguity of product experience. *Journal of consumer research*, 221-233.

Holbrook, M. B., & Hirschman, E. C. (1982). The experiential aspects of consumption: Consumer fantasies, feelings, and fun. *Journal of consumer research*, 132-140.

Honea, H., & Horsky, S. (2012). The power of plain: intensifying product experience with neutral aesthetic context. *Marketing Letters*, 23(1), 223-235.

Jacoby, L. L., & Dallas, M. (1981). On the relationship between autobiographical memory and perceptual learning. *Journal of Experimental Psychology*: General, 110(3), 306.

Jain, A. K., & Vailaya, A. (1996). Image retrieval using color and shape. *Pattern recognition*, 29(8), 1233-1244.

Janssens, W., Wijnen, K., De Pelsmacker, P., & Van Kenhove, P. (2008). *Marketing research with SPSS*.

Jiang, Z., & Benbasat, I. (2004). Virtual product experience: Effects of visual and functional control of products on perceived diagnosticity and flow in electronic shopping. *Journal of Management Information Systems*, 21(3), 111-147.

Keith, T. Z. (2014). *Multiple Regression and Beyond: An Introduction to Multiple Regression and Structural Equation Modeling*.

Keller, K. L., Parameswaran, M., & Jacob, I. (2011). *Strategic brand management: Building, measuring, and managing brand equity*.

Kelley, C. M., & Jacoby, L. L. (1998). Subjective reports and process dissociation: Fluency, knowing, and feeling. *Acta Psychologica*, 98(2), 127-140.

Kim, J., Park, Y., Kim, C., & Lee, H. (2014). Mobile application service networks: Apple's App Store. *Service Business*, 8(1), 1-27.

Kline, R. B. (1998). Software review: Software programs for structural equation modeling: Amos, EQS, and LISREL. *Journal of psychoeducational assessment*, 16(4), 343-364.

Lee, A. Y., & Labroo, A. A. (2004). The effect of conceptual and perceptual fluency on brand evaluation. *Journal of marketing research*, 41(2), 151-165.

Luo, X., & Bhattacharya, C. B. (2006). Corporate social responsibility, customer satisfaction, and market value. *Journal of marketing*, 70(4), 1-18.

Madden, T. J., Hewett, K., & Roth, M. S. (2000). Managing images in different cultures: A cross-national study of color meanings and preferences. *Journal of international marketing*, 8(4), 90-107.

Makin, A. D. J., Pecchinenda, A., & Bertamini, M. (2012). Implicit affective evaluation of visual symmetry. *Emotion*, 12(5), 1021.

Mandel, N., & Johnson, E. J. (2002). When web pages influence choice: Effects of visual primes on experts and novices. *Journal of consumer research*, 29(2), 235-245.

Nachtigall, C., Kroehne, U., Funke, F., & Steyer, R. (2003). should we use SEM? Pros and cons of structural equation modeling. *Methods of Psychological Research Online*, 8(2), 1-22.

Nelson, P. (1970). Information and consumer behavior. *The Journal of Political Economy*, 311-329.

Novemsky, N., Dhar, R., Schwarz, N., & Simonson, I. (2007). Preference fluency in choice. *Journal of marketing research*, 44(3), 347-356.

Olsson, U. H., Foss, T., Troye, S. V., & Howell, R. D. (2000). The performance of ML, GLS, and WLS estimation in structural equation modeling under conditions of misspecification and nonnormality. *Structural equation modeling*, 7(4), 557-595.

Ottati, V. C., & Isbell, L. M. (1996). Effects on mood during exposure to target information on subsequently reported judgments: An on-line model of misattribution and correction. *Journal of personality and social psychology*, 71(1), 39.

Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. *Communication and persuasion*, 1-24.

Pham, M. T. (1998). Representativeness, relevance, and the use of feelings in decision making. *Journal of consumer research*, 25(2), 144-159.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior research methods, instruments, & computers*, 36(4), 717-731.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior research methods*, 40(3), 879-891.

Raghunathan, R., & Pham, M. T. (1999). All negative moods are not equal: Motivational influences of anxiety and sadness on decision making. *Organizational behavior and human decision processes*, 79(1), 56-77.

Reber, R., Schwarz, N., & Winkielman, P. (2004). Processing fluency and aesthetic pleasure: Is beauty in the perceiver's processing experience? *Personality and social psychology review*, 8(4), 364-382.

Reber, R., Winkielman, P., & Schwarz, N. (1998). Effects of perceptual fluency on affective judgments. *Psychological Science*, 9(1), 45-48.

Reber, R., Wurtz, P., & Zimmermann, T. D. (2004). Exploring "fringe" consciousness: The subjective experience of perceptual fluency and its objective bases. *Consciousness and Cognition*, 13(1), 47-60.

Reber, R., & Zupanek, N. (2002). Effects of processing fluency on estimates of probability and frequency. *Frequency processing and cognition*, 175-188.

Schmitt, B. (1999). Experiential marketing. *Journal of marketing management*, 15(1-3), 53-67.

Schmitt, B., Brakus, J. J., & Zarantonello, L. (2015). From experiential psychology to consumer experience. *Journal of Consumer Psychology*, 25(1), 166-171.

Schwarz, N. (1998). Accessible content and accessibility experiences: The interplay of declarative and experiential information in judgment. *Personality and social psychology review*, 2(2), 87-99.

Schwarz, N. (2004). Meta-cognitive experiences in consumer judgment and decision making. *Journal of Consumer Psychology*, September.

Schwarz, N. (2011). Feelings-as-information theory. *Handbook of theories of social psychology*, 1, 289-308.

Schwarz, N., Bless, H., & Bohner, G. (1991). Mood and persuasion: Affective states influence the processing of persuasive communications. *Advances in experimental social psychology*, 24, 161-199.

Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: informative and directive functions of affective states. *Journal of personality and social psychology*, 45(3), 513.

Sedikides, C. (1995). Central and peripheral self-conceptions are differentially influenced by mood: tests of the differential sensitivity hypothesis. *Journal of personality and social psychology*, 69(4), 759.

Selnes, F., & Sallis, J. (2003). Promoting relationship learning. *Journal of marketing*, 67(3), 80-95.

Shafir, E., Simonson, I., & Tversky, A. (1993). Reason-based choice. *Cognition*, 49(1), 11-36.

Siemer, M., & Reisenzein, R. (1998). Effects of mood on evaluative judgments: Influence of reduced processing capacity and mood salience. *Cognition & Emotion*, 12(6), 783-805.

Simonson, I. (1989). Choice based on reasons: The case of attraction and compromise effects. *Journal of consumer research*, 158-174.

Snodgrass, J. G., & Vanderwart, M. (1980). A standardized set of 260 pictures: norms for name agreement, image agreement, familiarity, and visual complexity. *Journal of experimental psychology: Human learning and memory*, 6(2), 174.

Song, H., & Schwarz, N. (2008). If it's hard to read, it's hard to do processing fluency affects effort prediction and motivation. *Psychological Science*, 19(10), 986-988.

Steenkamp, J.-B. E., & Baumgartner, H. (2000). On the use of structural equation models for marketing modeling. *International Journal of Research in Marketing*, 17(2), 195-202.

Storbeck, J., & Clore, G. L. (2007). On the interdependence of cognition and emotion. *Cognition and Emotion*, 21(6), 1212-1237.

Strahilevitz, M. A., & Myers, J. (1998). Donations to charity as purchase incentives: How well they work may depend on what you are trying to sell. *Journal of consumer research*, 24(4), 434.

Tuch, A. N., Bargas-Avila, J. A., & Opwis, K. (2010). Symmetry and aesthetics in website design: It's a man's business. *Computers in Human Behavior*, 26(6), 1831-1837.

Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive psychology*, 5(2), 207-232.

Voss, K. E., Spangenberg, E. R., & Grohmann, B. (2003). Measuring the hedonic and utilitarian dimensions of consumer attitude. *Journal of marketing research*, 40(3), 310-320.

Whittlesea, B. W. (1993). Illusions of familiarity. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 19(6), 1235.

Whittlesea, B. W., Jacoby, L. L., & Girard, K. (1990). Illusions of immediate memory: Evidence of an attributional basis for feelings of familiarity and perceptual quality. *Journal of Memory and Language*, 29(6), 716-732.

Winkielman, P., & Cacioppo, J. T. (2001). Mind at ease puts a smile on the face: psychophysiological evidence that processing facilitation elicits positive affect. *Journal of personality and social psychology*, 81(6), 989.

Winkielman, P., Schwarz, N., Fazendeiro, T., & Reber, R. (2003). The hedonic marking of processing fluency: Implications for evaluative judgment. *The psychology of evaluation: Affective processes in cognition and emotion*, 189-217.

Winkielman, P., Schwarz, N., Fazendeiro, T., & Reber, R. (2003). The hedonic marking of processing fluency: Implications for evaluative judgment. *The psychology of evaluation: Affective processes in cognition and emotion*, 189-217.

Wyer, R. S., & Carlston, D. E. (1979). *Social cognition, inference, and attribution: Psychology Press*.

Zajonc, R. B. (1968). Attitudinal effects of mere exposure. J*ournal of personality and social psychology*, 9(2p2), 1.

Zajonc, R. B. (1998). *Emotions*.

Zarantonello, L., & Schmitt, B. H. (2013). The impact of event marketing on brand equity: The mediating roles of brand experience and brand attitude. *International Journal of Advertising*, 32(2), 255-280.

Zhao, X., Lynch, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of consumer research*, 37(2), 197-206.

Appendix

Questionnaires- Amazing Cookie Baker

Introduction

In this questionnaire, we want to understand your opinions of a newly launched free mobile game app named *Amazing Cookie Baker*, where kinds of delicious cookies are waiting for you and your friends to bake!
You will see a short description and the logo of the app firstly. After that, we will ask you some questions to evaluate *Amazing Cookie Baker*.

Please answer all the questions according to your true feelings after carefully reading all the information provided.

This questionnaire can be complete in 5 minutes.
Thanks for your participation!

App Description

Create your own unique bakery in *Amazing Cookie Baker* now! Tons of unique cookies, upgrades, structures and boosts to help you out! Attract more customers by updating your bakery and collecting more kinds of cookies.
What's more, you can visit friends' bakery and get help from them. And of course, your goal is to become the most popular bakery in our ranking worldwide!!

What are you waiting for? Join your friends, spend your little time with *Amazing Cookie Baker* and make your every single day sweet and cheerful!

Logos of Amazing Cookie Baker

Questionnaires- Resume Manager

Introduction

In this questionnaire, we want to understand your opinions of a newly launched professional resume design app named *Resume Manager*, which can help you to build and manage your resume or CV.
You will see a short description and the logo of this app firstly. After that, we will ask you some questions to evaluate *Resume Manager*.

Please answer all the questions according to your true feelings after carefully reading all the information provided.

This questionnaire can be complete in 5 minutes.
Thanks for your participation!

App Description

CV / Curriculum vitae or Resume is the most important mandatory document when you are applying for a job or internship. With this professional app *Resume Manager*, it's time to impress your new employers with well-developed and professional Curriculum vitae (CV) / Resume before you start your career!
Features

★ 10 Excellent resume formats, packed with industry standard professional resume templates
★ Add pictures to your resume
★ Create and update your Resume on your device
★ Save your Resume as word or PDF
★ Share or email resume

App logos of Resume Manager

Questions

Self-reported fluency:

1. **How easy or difficult you felt when processing the logo (e.g. the characters)? (The difficulty increases from 1 to 10)**

   Very easy 1 2 3 4 5 6 7 Very Difficult

Liking:

2. **How do you like the Logo of the professional resume design app?(Degrees increase from 1 to 7)**

   Ugly 1 2 3 4 5 6 7 Pretty
   Dislike 1 2 3 4 5 6 7 Very like

Evaluation:

3. **You think this app….**

Ineffective	1	2	3	4	5	6	7	Effective
Not fun	1	2	3	4	5	6	7	Fun
Not delightful	1	2	3	4	5	6	7	Delightful
Unhelpful	1	2	3	4	5	6	7	Helpful
Dull	1	2	3	4	5	6	7	Exciting
Unnecessary	1	2	3	4	5	6	7	Necessary
Impractical	1	2	3	4	5	6	7	Practical
Not thrilling	1	2	3	4	5	6	7	Thrilling
Not functional	1	2	3	4	5	6	7	Functional
Unenjoyable	1	2	3	4	5	6	7	Enjoyable

Demography:

4. **What is your gender?**

   Male/Female

5. **What is your age?**

   Under 18/18-25/25-35/36-45/46-55/55+

6. **What is your income per month?**

   Below 3000 RMB (500€)/3000-5499 RMB (500-800 €)
   5500-7499 RMB (801-1100€)/7500-9499 RMB (1101-1400€)

9500-11499 RMB (1401-1700€)/Above 11500RMB (Above 1700€)

7. **How often do you usually browse or download mobile apps?**
   Almost Never/Less than Once a Month/Once a Month/Once a Month/2-3 Times a Month/2-3 Times a Week/ Almost Daily/More than once per day

8. **Imagine that you are searching for a mobile game app/resume management app, to what extent you are willing to download this game app/resume app- Amazing Cookie Baker/Resume Manager and have a try for free?(Willingness increases from 1 to 10)**
   Not at all likely 1 2 3 4 5 6 7 8 9 10 Extremely likely