



INSTITUTO
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Taking advantage of advergames' features for advertising effectiveness
–Focus on consumer engagement in mobile era

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Doctor of Management

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University of Electronic Science and Technology of China

February, 2023



BUSINESS
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Abstract

Advancing with the rapid technology development, traditional internet advertising transmits to mobile platforms quickly. This thesis presents a new marketing strategy-advergame in mobile context, to capture the customer engagement, furthermore, to improve the advertising effectiveness. Compared with IGA (in-game advertising), incorporating brand message and casual game, advergame takes more and stronger advantage in facilitating the interactivity between customers and advertisement. However, the lack of investigation on the advertising effects induced by advergames, especially in the mobile era, determines that more academic attention needs to be put in this field.

To fill this research gap, we conceptualize advergame difficulty and advergame integration for mobile advergames to investigate their effects on impact advertising (brand) effects via customer engagement. Additionally, a cross-level interacting effect with considering time-varying (advergame repetition) within and between individuals is engraved in our conceptual model. By identifying the effects considering both the affective and cognitive aspects, we conducted our tests from a total of 146 undergraduates and developed four original measurement scales each for advergame integration and advergame difficulty from 25 qualitative interviews and quantitative factor analyses.

With 348 valid data collected from 9 consecutive days in the experiments, the research hypotheses got largely support with the analysis results from multilevel structure model. Our study has made conceptual and empirical contributions to the burgeoning advergame literature in this mobile era and enhanced the understanding of how the mobile advergame features could impact on the advertising effectiveness. Detailed research contributions and implications are discussed.

Keywords: mobile advergame; advergame difficulty; advergame integration; repeated exposure effect; customer engagement

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Resumo

Avançando com o rápido desenvolvimento tecnológico, a publicidade tradicional na internet transmite para plataformas móveis rapidamente. Esta tese apresenta uma nova estratégia de marketing-advergame em contexto mobile, para capturar o engajamento do cliente, além disso, para melhorar a eficácia da publicidade. Comparado com IGA (publicidade no jogo), incorporando mensagem de marca e jogo casual, o advergame tira mais e mais vantagem na facilitação da interatividade entre clientes e publicidade. No entanto, a falta de investigação sobre os efeitos publicitários induzidos pelos anúncios, especialmente na era móvel, determina que mais atenção acadêmica precisa ser colocada neste campo.

Para preencher essa lacuna de pesquisa, conceituamos a dificuldade do advergame e a integração do advergame para anúncios móveis para investigar seus efeitos nos efeitos da publicidade de impacto (marca) via engajamento do cliente. Além disso, um efeito de interação de nível cruzado com considerar variáveis no tempo (repetição de advérgamos) dentro e entre indivíduos é gravado em nosso modelo conceitual. Ao identificar os efeitos considerando tanto os aspectos afetivos quanto cognitivos, realizamos nossos testes com um total de 146 graduandos e desenvolvemos quatro escalas de medida originais para integração do advérgamo e dificuldade do advérgamo a partir de 25 entrevistas qualitativas e análises fatoriais quantitativas.

Com 348 dados válidos coletados de 9 dias consecutivos nos experimentos, as hipóteses de pesquisa obtiveram grande apoio com os resultados da análise do modelo de estrutura multinível. Nosso estudo fez contribuições conceituais e empíricas para a crescente literatura de anúncios nesta era móvel e aprimorou a compreensão de como os recursos de anúncios móveis poderiam impactar na eficácia da publicidade. Contribuições detalhadas da pesquisa e implicações são discutidas.

Palavras-chave: jogo de publicidade móvel; dificuldade do jogo publicitário; integração de jogos publicitários; efeito de exposição repetida; envolvimento do utilizador

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摘要

随着技术的快速发展，传统的互联网广告得以迅速在移动平台进行广泛传播。本文提出了一种新的营销策略——移动环境下的广告游戏，以促进客户参与度，进而提高广告效果。与整合了品牌信息和休闲游戏的 IGA（游戏内广告）相比，广告游戏在促进客户与广告之间的互动方面具有优势更加明显。然而，由于缺乏对广告游戏所引起的广告效应的调查，特别是在手机时代，因此这一领域需要给予更多的学术关注。

为了填补这一研究空白，我们针对手机广告游戏的游戏难度和游戏整合，探讨其通过客户参与对广告（品牌）效应的影响。此外，个体间时变(广告游戏重复)的跨层面互动效应也体现在我们的概念模型中。通过识别情感和认知方面的影响，我们对 146 名本科生进行了测试，并从 25 个定性访谈和定量因素分析中开发了 4 个原始的测量量表，分别用于广告游戏整合和广告游戏难度。

实验持续 9 天，共收集到 348 个有效数据，研究假设得到了多层次结构模型分析结果的支持。我们的研究对这个手机时代蓬勃发展的广告游戏文献研究做出了概念上和实证上的贡献，并增强了大众对手机广告游戏功能如何影响广告效果的理解。本文讨论了详细的研究贡献和影响。

关键词：移动广告游戏；广告游戏难度；广告游戏整合度；重复曝光效果；用户参与度

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Chapter 1: Introduction

1.1 Background

As smartphone becomes a necessity in our daily life, the mobile internet users have reached 4 billion worldwide with 63.40% penetration in 2019. In China, mobile internet users access mobile apps with an average of 4.2 hours in a day, the longest time spent on social networking apps has reached 88.6 minutes. Under the popularization of mobile internet, how to explore and exploit mobile internet market has attracted great attention from both practical usage and academia (Catalán et al., 2019; Çeltek, 2010; Christodoulides et al., 2011; Okazaki & Yagüe, 2012). Due to this increased interest, extensive researchers and managers want to find the most efficient way to develop strategies that could impact consumer's buying process. Among which, with technology being increasingly utilized to drive and support various individually and collectively beneficial behaviors of people, gamification has been titled as one of the most popular developments in this field (Agante & Pascoal, 2019; Bellman et al., 2014; A. Berger et al., 2018; Catalán et al., 2019; Cauberghe & Pelsmacker, 2010; Çeltek, 2010; J. Chen, 2007; Cicchirillo & Lin, 2011; Dardis et al., 2019; Goh & Ping, 2014; Grigorovici & Constantin, 2004; Y. Kim & Leng, 2017; H. Lee & Cho, 2017; M. Lee & Faber, 2007; Rifon et al., 2014; Shliapnikov & Meijer, 2014; Wang & Chou, 2019; Xu et al., 2017).

Playing game can be seen as a very humankind activity. With the popularization of mobile internet, digital games can evolve into a mass medium and raise their dissemination widely and quickly. Moreover, a wide population from children to youngster, and to adult, game is a popular casual entertainment tool and no gender difference exist when access digital games. According to a report (Terlutter & Capella, 2013) that 47% of the game players are women with the playing reasons of relieving pressure, while men mostly enjoy the competition factors. So that combining mobile digital games with operating marketing strategies like advertising will be of enormous potential.

By the enhancement of influence from internet technology (specifically in the mobile era), the landscape of the advertising industry is evolving faster than before. Popularly, two common methods of incorporating advertising into game are in-game advertising (IGA) and

advergames. IGA is a form of ad-insertion in the game context, usually coordinated and sold by independent gaming organizations. By contrast, advergames is a form of branded entertainment in which advertising messages, logos, and trade characters are found in the format of a game. Advergames are usually tailor-made by companies for brand promotion only. They are accessed via the website of the company or the brand. An important and necessary argument for justifying the difference between advergames and IGA is that “prior research suggests that advergames are likely different from IGA in terms of necessary cognitive resources for game play, in that the latter requires higher levels of involvement and attention to play than the former (Grigorovici & Constantin, 2004; H. Lee & Cho, 2017) ”.

Compared with conventional advertising such as magazine advertising (J. Kim et al., 2015), internet advertising (Edwards et al., 2002), interstitial advertising (Wang & Chou, 2019), and in-game advertising (Dardis et al., 2019; Tran & Strutton, 2013), mobile advergames integrate a brand into a game in social and mobile platforms can spread virally with both overcoming the shortcomings of conventional online advertising and taking some advantages by its own features. However, with the wide spread of mobile internet, research and practical strategies conducted for advergames are so scant. Advergames research mainly focused on online social platforms to investigate the entertainment value (Agante & Pascoal, 2019; Bellman et al., 2014; A. Berger et al., 2018; Catalán et al., 2019), the congruency of advertisement and brand (Dardis et al., 2019), incentives provided inside the game (Daems et al., 2019) and advergame’s interactivity affecting on brand recognition (Dias & Agante, 2011). Research related to mobile advergames (Catalán et al., 2019; Çeltek, 2010; Okazaki & Yagüe, 2012; Salo & Karjaluo, 2007) shows that insufficient attention has been taken on studying advergames in the mobile context. Hence, in our study, referred by Vashisht et al. (2019), who presented a relative comprehensive review on advergame studies which identified that game, individual and social factors could impact the brand-related cognition, attitude and behavioral responses of consumers, we focus on “game factors” in the mobile context to explore customer engagement (which is mostly argued as induced by gamification), which in turn affects brand effectiveness from emotional and cognitive aspects.

1.2 Research objectives

1.2.1 Game features for mobile advergames

The first presence of advergame was since 1980 when Atari 2600 games promoted their

product game cartridge. Then in 1998, a game called “Good Willie hunting” constructed by Blockdot got a huge success in bringing company recognition. With the evolution of internet, this promotional method becomes much more visible and practical in numerous fields such as commercial examples funded by Pepsi, 7 Up, NFL, and Burger King; political and military examples including “America Army” as a recruitment tool; educational examples related to “edumarket gaming” or “edutainment” as an educational simulation. In China, professional advergame producing did not start until 2004, led by some related companies like “Front Network”, indicating a fairly late start. In the following, we will take a look at some typical examples of advergames.

Pepsi, as the world's beverage giant, has developed advergames related to its products earlier. “Pepsiman”, as the representative advergame of Pepsi Cola, is easy to be fascinated with its crisp operation, magic music, and humorous style. This advergame pioneered parkour games. It was produced and published by KID, a Japanese company. There are four levels in the game, and each level has two minor levels and a boss battle. When all the levels are cleared, the old Pepsi Superman skin will be unlocked. This game also has a collection system, each level of the map will have 100 cans of Pepsi, when collected all the Pepsi, will unlock the mysterious skin. In this game, the player takes on the role of Pepsi Cola as the mascot “Pepsi Superman”. By sliding, jumping, sprinting, and braking, the player rushes through streets, through homes, through fire sites, and even through deserts, over many obstacles to the finish line. At different stages of the level, players will also have different experiences, such as putting a trash over their head to cause a left-right reversal, stepping on wooden barrels across a wooden bridge. This advergame is challenging, but with infinite continuations. The ability to save and read files allows the player to challenge endlessly.

After Pepsi Cola, 7 UP is the second most recognizable beverage of Pepsi. “Fido Dido”, a black-and-white cartoon spokesman, is one of the product's mascots. In 1993, game publisher “Virgin Games” produced and released the advergame of “Cool Spot” on the Super Nintendo and Sega MD which was extremely playable. In terms of operation, the player only needs to master the direction, jump, and shooting three actions to deal with all the scenarios in the game. A red guy in “Cool Spot” has its blood. This advergame is extremely friendly to novice players and will not be killed by monsters on arrival. In the game, the player takes the role of a character with a bottle cap, to meet many small everyday objects as the enemies in a larger scene. These enemies you fight are small creatures, such as crabs and meat worms.

For the mascot of “Fido Dido”, it also has a very interesting game. The advergame of “Fido Dido” is rich in setting creativity and variety, as you collect items and solve puzzles in

many fantastic and fun settings. From pen holders to cool roller coasters, to the inside of game consoles, to the world of dinosaurs in books, and finally to adventure in trash cans. Every level is full of whimsy. The differences between levels are also considerable. For example, in the second level of Roller Coaster, where you need start or play rides to get the items, money, and tickets to complete the level. You can use them to buy big American burgers that replenish your health, or unlock more mysterious rides. The advergame of “Fido Dido” is rich in its content and detail, and compared to other older games, its difficulty level is fairly approachable. Each level will be with a password to renew after you clear it.

“Burger King” is a culinary business advergame, in which if a lot of people like your restaurant, they will order it. Players operate their own shops, and according to the needs of customers provide burger types with choosing the corresponding ingredients to make burgers. “Burger King” is a highlight of burger freedom, an advergame where players can learn more about how to make a burger and make customers love the way Burger King cooks. The numerous choices in this advergame greatly increase the service experience of the participants, which makes the “Burger King” business more prosperous in real or virtual. Imperceptibly, this makes Burger King's delicious burger become a popular fast food. “Burger king” advergame’s features: 1. Unlock new gameplay, upgrade the restaurant, players can get more benefits; 2. Enjoy the skills and energy invested in the entire burger making process, players can get more harvest. Meanwhile, the main highlights of the "Burger King" advergame are as follows: 1. With a wide selection of game operations, players can improve their cooking skills and cook their favorite burgers; 2. A variety of props to choose from, such as: chips, cold drinks, potatoes and more other items, a variety of additions, cheese, onions, mayonnaise, make the user feel immersive; 3. Through the real simulation of the burger production site, such as making toppings and food additives to make juicy burgers, through making delicious burgers for customers, and earning virtual currency to unlock new restaurants, further increasing the realistic experience of players.

At the same time, in the online context, research on advergames has also got a great deal of attention (Agante & Pascoal, 2019; Catalán et al., 2019; Daems et al., 2019; Dias & Agante, 2011; Gross, 2010; Peters & Leshner, 2013; Purswani, 2010). A systematic review and synthesis of advergames research conducted by Vashisht et al. (2019) identified that game, individual and social factors could influence consumers’ responses in cognition, attitude and behaviors related to the brand. Wherein game factors include brand prominence (prominent vs subtle), brand proximity (local vs peripheral), game-product congruity (low, moderate or high) or thematic relevance, mode of presentation (audio, video or audio-video) and game

repetitiveness, single player game vs multiple-players game, 3D and 4D technology, technical platform; individual and social factors include brand knowledge, game involvement, entertainment, persuasion knowledge, flow status, influence from parents, sophistication level of audiences and gamer's mood, individual personality, need for cognition, opinion leadership, culture, game advertising regulation, brand beliefs, and behavioral aspects.

Because advergame in the mobile context can be more easily accessed, compared with online advergames, advergames in mobile can spread more virally. And the prominent benefits offered by advergames is argued as coming from the feature of "replayability". So, the first feature of mobile advergames we want to focus on in our study is the "game repetition" which, as the trait of mobility, has got some attentions recently (Y. Kim & Leng, 2017). Advergames in the mobile context can be accessed easily without time or space limitation, this feature will provide more opportunities for easy and repeated access during a day (Çadırcı & Gungor, 2019). The advantage of mobile internet enables players to access advergames anytime they want and the replayability of advergames increases the advertising exposure. Evidence does show that strong brand recognition can be gained from frequent game playing and the apparent benefits come from repetitive entertainment (Cauberghe & Pelsmacker, 2010). "Repetition" has got a lot of attention in online advertising, a recent study for ad frequency empirically has tested that different ad frequencies can differently influence advertising effectiveness in both affective and cognitive aspects (Burton et al., 2019).

Another prominent feature of mobile advergames can be seen from the intrinsic characteristics of advergames with the "integration" and the "interactivity." The integration of advergame refers to an advergame represented as an exclusive form of branded entertainment where game is incorporated as a part of it to deliver brand message. While IGA is placing ads into computer or video games with a background display. For example, an in-game billboard or advertising appears during a game pause when games load, or as a necessary part of game or featured within cut-scenes. Compared with IGA, advergames refers to games which are specifically made to advertise a product. These two types of advertising form both take high interactivity; however, from the comparison of advergames and IGA, we can see that advergame as a brand entertainment more specifically addresses the "integration" character. Integrating advertising into games can bring a list of benefits. On the one hand, integrating advertising message into game as an entertainment context can engage consumer into advertising campaign voluntarily because the innate nature of game is enjoyable which can easily lead customer engagement. The other is that, according to Affect Transfer Mechanism, the entertaining and pleasant characteristics of game appealing positive attitude are more

likely to expand to the integrated brand (Mallinckrodt & Mizerski, 2007). Hence, in the mobile context, we choose “integration” as another mobile advergame feature to investigate the advertising effectiveness.

The essence of a game includes the overall pace, how fast the objects placed in game move, the steering speed and how many levels the game has. Similarly, advergame as a game, can only play its full effects when getting to an optimal challenging condition. According to dynamic difficulty adjustment (DDA), the high degree of game difficulty will induce frustration while the low level of game difficulty may result in some boring (Alexander et al., 2013). By combination of flow theory, research studied in gamified interactions facilitating brand connections found that optimally challenging condition facilitates self-brand connections through leading to emotional and cognitive brand engagement under gamification (A. Berger et al., 2018). Similarly, a recent study of IGA contended that the effects of playing difficulty were reflected on differently impacting negative and positive affective responses where difficult condition induces negative affective response while easy condition results in positive affective responses more (Dardis et al., 2019). So, in our study, the investigation of “advergame difficulty” becomes an important part of our research objectives wherein clarifying the “game difficulty” feature in mobile advergames.

Put together, addressing and clarifying the features of mobile advergames influencing advertising effectiveness in the mobile context becomes the first research objective in our study. Regarding Vashisht et al. (2019)’s study, game factors concluded for advergames including brand prominence (prominent vs subtle), brand proximity (local vs peripheral), game-product congruity (low, moderate or high) or thematic relevance, mode of presentation (audio, video or audio-video) and repetitiveness of the game, single player game vs multiple-player game, technical platform, and internet advergames generally supported by 3D and 4D technology. In our study, we develop and refine the mobile advergame features as “advergame repetition, advergame integration and advergame difficulty” to specify and measure mobile advergame’s characteristics in facilitating advertising effectiveness. The game factors of advergames are mobile, advergame and game relevant, which are well suited to mobile advergames research. Our study offers insights into how the role of mobile advergames characteristics plays in influencing advertising effectiveness.

More specifically, the first research objective we attempt to address is summarized as follows:

(1) Conceptualize and clarify the characteristics of the advergames and identify which of these characteristics are better predictors of the effectiveness of advergames in the mobile

context.

1.2.2 Customer engagement in mobile advergames

Researchers such as Xu et al. (2017) argued that since games could engage players and motivate actions, by introducing game-like motivation into non-game contexts, similar levels of motivation and engagement are likely to be created. So, the same is with advergame which incorporates advertising into game to bring a high level of motivating and engaging. Information technologies have resulted in challenges facing the mobile internet. Companies are now confronted by technology-driven customer empowerment, user-generated content, and social interaction (Christodoulides et al., 2011). These trends embedded with novel technology and higher motivations resulted from advergames make customer engagement particularly creative and maintainable. Additionally, customer engagement has got a lot of attention during the organizational science development (Dessart et al., 2015). How to determine the adequate approach to foster customer engagement in mobile advergames should be a complex task.

Advantages of customer engagement have been a highly relevant topic for researchers. From the perspective of brand or advertising, when customer engagement occurs, brand or advertising can reap immense benefits. These benefits range from brand commitment (Lin, 2007), brand trust (Laroche et al., 2012), and brand identification (Bagozzi & Dholakia, 2006) to brand loyalty (Algesheimer et al., 2005). Scholars show that active customer engagement is the source of innovation ideas for companies and that it makes products more likely to be purchased from the focal brand and enhances the probability of the rejection of products from rivals (Thompson & Sinha, 2008). Therefore, the benefits of keeping customers actively engaged are non-negligible for brands or advertising. Moreover, active customer engagements bring significant benefits to customers as well. These could include social benefits such as getting informational value to brand content, developing identity (Muniz & O'Guinn, 2001) and obtaining financial returns (Garnefeld et al., 2012). To be specific, if properly managed, mobile advergames might be able to encourage high levels of customer engagement and enthusiasm, bringing benefits to game members and in turn, increasing customer engagement and brand benefits.

Even that, customer engagement still seems an under investigated construct in advertising research (J. Kim et al., 2015). Specifically, for advergame, so few attention has been taken on it (Shliapnikov & Meijer, 2014). In our study, we adopted emotional engagement and cognitive engagement to explore the role of game player's engagement played in mobile

advergame features affecting the advertising effectiveness. Research related to gamification has studied engagement as affective and cognitive aspects or adding behavioral and social engagement for product brand. The investigation of the role of engagement in mobile advergame context will have both practical and theoretical implications. Therefore, the second research objective focused on investigating customer engagement which is assumed to mediate the effects of mobile advergames intrinsic features influencing the advertising effectiveness.

More specifically, the second research objective we attempt to address is summarized as follows:

(2) Conceptualize and clarify customer engagement and propose the measures to approach to achieving better advergame effectiveness from advergame integration and advergame difficulty.

1.3 Research problem and questions

Although advergames topic has drawn wide attention in advertising studies, the lack of focusing on investigating the effects of advergames characteristics in mobile context determines it as the research problem in our thesis. Additionally, the lack of theoretically-grounded research on the impact of mobile advergames characteristics on customer engagements which subsequently results in enhanced advertising effectiveness also determines the focus of our research problem.

1.3.1 Research question related to advergame integration

According to the type of games, several advergame genres can be clearly defined. Among which, the first general distinction is regarding whether it is of single-player or multiple-players. Furthermore, the classification for multiple-players can be categorized in terms of whether the game is played by a few or by a large number of players. Allowing games to be played by a large number of players, such as encouraging social interactions, has become a research interest in analyzing how this issue influences related outcomes (Terlutter & Capella, 2013). Secondly, digital games fall into either casual or hardcore games. In modern study, however, these terms were vaguely defined in academic studies. Some research mainly focuses on casual games which can be easily picked up and offer quick rewards, and in turn, bring fun experiences. As most advergames are designed as casual ones, it is important to know that these casual games can bring the positive influence from the game to the brand,

specifically for children, teenagers and women (Redondo, 2012). In the beginning, advergames simply started with online games that incorporated marketing content such as brand logos into casual environment. The games are mostly casual, which are designed to be played in either a short or long period of time, making them easily played in short breaks during a day (Terlutter & Capella, 2013). However, customers are usually over concentrated on game task and may not clearly identify the brand image integrated in the game. This limitation encourages companies to develop advergames directly around their products or brands. Although easily accessing advergames has been realized with the internet development, which may also add a viral marketing possibility, but the degree of effectively identifying related brands or products is continuously under investigated. Because the necessary cognitive resources for game play, according to Limited Capacity Model of Motivated Mediated Message Processing (LC4MP), only limited resources have been used for advertising (Lang, 2000).

According to the definition of advergames, advergame as a game, integrating advertising message into game as brand entertainment engages consumer into advertising campaign voluntarily. Advergame which brings a high level of motivating and engaging can easily result in customer engagement. Customer engagement has got a lot of attention during the organizational science development (Dessart et al., 2015) where engagement is studied as affective and cognitive asides or sometimes by adding behavioral and social engagement. Investigating how the effects of integration of advergames influence advertising effectiveness in the mobile context through customer engagement will provide a finer-granted illustration for explaining the role of integration feature, which can contribute to both theoretical research and practical applications.

However, academically, compared with the study of interactivity, the research on the effects of integration for advergames seemed to have not achieved consistent research results (Daems et al., 2019; Rifon et al., 2014). An important argument for justifying the difference between advergames and IGA is that with regard to cognitive resources needed for game play, the latter requires more engagement and attention to play than the former. The extent of integration for advertising and game in advergames may determine the effects on impacting brand effectiveness. For example, a recent study (Daems et al., 2019) focused on interaction and integration of game and advertising argued that based on LC4MP, finite cognitive resource can be used for advertising especially when players immerse in a highly engaging activity such as game playing. Experiment results did show that integration reduces brand memory contrast in interactive condition and that the main effect of integration on brand

attitude was not significant, which did not support the Affect Transfer Mechanism. However, according to Affect Transfer Mechanism, that the fun and enjoyable characteristics of game appealing positive attitude can spill over to the integrated brand has got empirical confirmation (Mallinckrodt & Mizerski, 2007). Regarding the above inconclusive research results, a clear illustration of integration effect for advergame in mobile context is necessary. Hence, how will the role of integration feature be played in mobile context becomes an important research question in our study.

Put together, based on the above discussion in terms of theoretical basis and research results of advergames integration, the first research question is proposed as follows:

Q1: What are the effects of advergame integration will be on advertising effectiveness through customer engagement in mobile context under considering affective and cognitive aspects?

1.3.2 Research question related to advergame difficulty

Dynamic difficulty adjustment (DDA) states that different game difficulty will result in various emotions (Alexander et al., 2013). Usually, to make various players (who take various play skills) engage throughout the game sessions, different difficulty levels or methods have been applied or adjusted in casual games. The common sense is that when games are played by players with different abilities, excessively hard games frustrate the players, whereas easy ones bore them. Csikszentmihalyi (1988) indicated that flow as a “sweet spot” in games is balancing the effects of managing difficulty to help players stay engaged. Generally, there are two approaches, one is static whereby to provide the players with options such as “easy, average or hard” to choose the level of difficulty, while the other is dynamic whereby to adapt game difficulty with player’s ability such as designing the game difficulty levels. The cases of difficulty modes, difficulty adjustment and auto-dynamic difficulty (Constant & Levieux, 2019) have been sparked as the subject of “correct” difficulty approaches between designers and writers. Ernest (2009) referred to DDA as the system and the theory which aimed to prevent players from feeling bored or frustrated either in too easy or too difficult levels. There are passive DDA and active DDA. In the situation of passive DDA, some players do not want to constantly challenge at their highest ability. In fact, this could make the players physically or mentally exhausted with continuous playing (Qin et al., 2010). Instead, players prefer to play at their desired pace (J. Chen, 2007), because of their own “physiological motivation,” i.e., to play independently (Gilleade & Dix, 2004). The positive DDA motivates individuals who prefer to choose tasks that fit with themselves, in conjunction with player’s perceived

ability (whether challenge or enjoyment). In this situation, players prefer more down-to-earth, yet moderately difficult tasks (Slade & Rush, 1991). With games, casual players tend to seek relaxation and pleasure. Salen et al. (2004) suggested that it is more likely for these players to go for a lower level of difficulty, which indicates negative DDA. By contrast, in their research, the positive DDA was described as an experienced player who is more motivated towards success, keeps practicing until winning the game. In other research related to game difficulty, Kruger and Dunning (1999) considered that unskilled players overestimated their own performance, while skilled ones seemed to underestimate that. However, unskilled players, after being trained, could have a more reasonable assessment about their own performance. Through above research discussion, we can see that regardless of being a skilled or unskilled player, experience plays a bigger role in sound self-assessment. Motivated by the abundant research on game difficulty and the different game difficulty models, we want to investigate the game difficulty effects on mobile advergames. Particularly, how game difficulty influencing on casual mobile advergames will be analyzed when conducting experimental advergames play scenarios.

In advertising related research, game studies conducted by Dardis et al. (2019) investigated the impacts of game difficulty on the IGA memory. In their study, authors contended that game difficulty, as an important factor in the real world, has received some attention as a specific factor related to games that might influence the effectiveness of advertising in IGA. In our study, we aimed to investigate the impact of game difficulty on player's affective response and subsequent memory of advergames. As argued above, the level of game difficulty required to game play is a particular game feature that is currently under-investigated. From the affective standpoint, we assumed that in easy game situation, it will lead to more general advergames enjoyment, by which a subsequent positive mood will result in the enhancement of advertising memory in terms of the Cline and Kellaris (2007)'s study. Besides, game difficulty can affect cognitive response to video games, which will obviously impact on ad memory capabilities (Dardis et al., 2019; M. Lee & Faber, 2007).

By combination of the flow theory, research studied in gamified interactions facilitating brand connections found that optimally challenging condition facilitates self-brand connections through leading to emotional and cognitive brand engagement under gamification (A. Berger et al., 2018). Similarly, a recent study of IGA contended that the effects of playing difficulty are reflected on differently impacting negative and positive affective responses where difficult condition induces negative affective response while easy condition results in positive affective responses more (Dardis et al., 2019). However, through two experiment

studies before and after, no consistent research results were confirmed. So, whether there is any other external condition will adjust game play difficulty to affect advertising effectiveness in mobile advergame needs some more investigations.

Put together, based on the above discussion in terms of theoretical basis and research results related to game difficulty, the second research question is proposed as follows:

Q2: How game difficulty in the context of mobile advergames will affect affective and cognitive advertising effectiveness via customer engagement?

1.3.3 Research question related to advergame replayability

As the first feature of mobile advergames we have focused on the trait of mobility which is studied as “game repetition” recently (Y. Kim & Leng, 2017). Advergames in the mobile context can be accessed easily without time or space limitation, this feature will provide more opportunities for easy repeated access during a day (Çadırcı & Gungor, 2019). The advantage of mobile internet enables players to access advergames anytime they want and the replayability of advergames increases the advertising exposure. Evidence does show that strong brand recognition can be gained from frequent game playing and the apparent benefits come from repetitive entertainment (Cauberghe & Pelsmacker, 2010). Recent studies show an increasing effort to identify the determining factors for advergaming effectiveness. Among which, from different aspects, such as game-brand and game-product congruity (Gross, 2010; H. Lee & Cho, 2017; Okazaki & Yagüe, 2012; Sreejesh & Anusree, 2017; Wise et al., 2008), prominence of the brand placement (Cauberghe & Pelsmacker, 2010; Tina & Buckner, 2006; Vashisht et al., 2019), and interactivity (Sreejesh & Anusree, 2017; Sukoco & Wu, 2011) as well as individual factor of players, such as persuasion knowledge (Ham et al., 2016; VanReijmersdal et al., 2010; Vanwesenbeeck et al., 2017; Vashisht & Royme, 2016) and engagement (Bellman et al., 2014; Cauberghe & Pelsmacker, 2010; VanReijmersdal et al., 2010; Vanwesenbeeck et al., 2017) have got substantial research attention. Under the increasing popularization of mobile devices, compared with PCs, players can access advergames more conveniently without time or space limitations (Tuten & Ashley, 2016). More specifically, because of the differences between mobile devices and PCs, online and mobile advergames could have varying impacts on advertising effectiveness (Çadırcı & Gungor, 2019). Therefore, mobility as the unique feature of mobile devices, the research focusing on “advergames replayability” becomes a need to further analyze the advertising effectiveness.

“Repetition” has got a lot of attention in online advertising, a recent study for ad

frequency empirically tested that different ad frequencies can differently influence advertising effectiveness in both affective and cognitive aspects (Burton et al., 2019). According to Berlyne's two-factor theory (Berlyne, 1970), studies on general internet advertising found that initial consecutive repetition may enhance the familiarity of brand message under the "wear-in" factor which brings more positive affect. While over repetitions sometimes more than ten times will be under the "wear-out" factor (Burton et al., 2019), and the negative affect will be over the positive one. Additionally, in the stage between "wear-in" and "wear-out" where it happens 4-10 times of advertising repetitions, the effect of brand cognition becomes higher than affect. However, research on mobile advergames repetition has not got sufficient attention yet, except that one study empirically confirmed that game repetition did facilitate purchase intention (Y. Kim & Leng, 2017). In comparison with online advergames, mobile advergames give players more opportunities for repetitive play during the day. In this case, consumers experience a higher exposure to the advertisement, which is more beneficial to companies. However, not so much research attention has been put on the effect of repeated exposure of mobile advergames. In addition, previous research has substantially argued that repetition in video games negatively impacts on the experiences of players (Chou & Ting, 2003). How repetition can interact with other features of mobile advergame like integration and game difficulty to influence advertising effectiveness especially on both affective and cognitive aspects is under investigated and can be an important research topic. We believe that some research and managerial interests will be found when investigating the effects of integration and game difficulty in consecutive repetition condition.

Put together, based on the above discussion in terms of theoretical basis and research results related to mobile advergames replayability, the third research question is proposed as follows:

Q3: Do the effects of advergame integration and advergames difficulty on advertising effectiveness change with consecutive repeated game play in the mobile context?

1.4 Research purpose

This study aims to explore the intrinsic characteristics of mobile advergames, and in turn, to investigate their effects on advertising effectiveness from cognitive and affective aspects through customer engagement. The research framework for our study draws from the following three theories: the Affect Transfer Mechanism proposed by VanReijmersdal et al. (2012) and Rifon et al. (2014), which argued that when advertising message inserted into

informative or entertainment context, the attitudes toward the stimulus can be transferred to advertising; the LC4MP proposed by Lang (2000), which is critical to understand the effectiveness of placing brand and product in advergames; and the Flow theory proposed by Csikszentmihalyi (1988), which is featured as “a state in which people are so involved in an activity that nothing else seems to matter.” The Affect Transfer Mechanism (Rifon et al., 2014; VanReijmersdal et al., 2012) proposes that the fun and enjoyable characteristics of a game can spill over to the integrated brands. Integrating advertising into games might induce positive advertising attitude that come along with the excitement and enjoyment of gaming (Herrewijn & Poels, 2013; Siemens et al., 2015). The LC4MP theory gives suggestions that individual’s cognitive resources to process activities through encoding, storage and retrieval are finite when the cognitive resources required from the stimulus are over one’s ability, and his/her ability to recognize or recall diminishes (Cicchirillo & Lin, 2011). According to the flow theory, if advergames create environment to make customers motivated and engaged, it will easily lead them into a flow state. Some studies described the role of flow or its antecedents in influencing the advertising effectiveness in digital games (Nelson et al., 2006; Schneider et al., 2005).

Firstly, we will discuss the proposed mobile advergames characteristics (advergame integration, advergame difficulty, and advergame replayability), followed by providing the explanation of their relationships with advertising effectiveness from cognitive and affective aspects. Then the two components (cognitive and affective) of customer engagement which mediate the effects of mobile advergames characteristics on influencing advertising effectiveness will be emphasized. The proposed research framework is based on the stimulus-organism-response (S-O-R) model from Mehrabian and Russell (1974) environmental psychology model. In our study, the mobile advergames characteristics are considered as a specific environmental feature which activates individual’s emotional and cognitive state and then causes related behavioral response (Robert & John, 1982). The stimulus portion of the model stands for the features of an environment studied as mobile advergames characteristics (advergame integration, advergame difficulty, and advergame replayability) which will influence the internal state of individuals (Baker et al., 1992), which is studied here as affective and cognitive customer engagement. Hence, the emotional and cognitive state of customer represented as affective and cognitive engagement in our study is the organism (Loureiro & Ribeiro, 2011). “Once a customer has experienced the environmental stimuli, the customer processes the stimuli into meaningful information to help him/her understand the environment before making a decision” (Koo & Ju, 2010). This process becomes the research

stream in which we design the hypotheses where mobile advergames characteristics facilitate customer engagements. According to Reitz (2012), response is the final stage of the S-O-R. Both approach behaviors (e.g., purchasing, using, and positively communicating with others) and avoidance behaviors (e.g., no intention of returning/purchasing, negative word-of-mouth) (Robert & John, 1982) can be these responses. And these responses can be both behavioral and attitudinal (Loureiro & Ribeiro, 2011). Therefore, the outcomes of advertising gotten from customers' attitude or memory with the customers' experience are reflected in customers' responses, here, interpreted by brand attitude and brand recognition.

However, existing research on mobile advergames has its own weakness. Firstly, with extensive use of approaches to study advergame's features such as "interactivity, brand prominence or brand proximity, game-product congruence or thematic relevance, and game repetition," these studies have not fully acknowledged the intrinsic nature of mobile advergames. Due to the nature of mobile phone and the integration of advertising and game, there is a most prominent lack of investigation into the inherent nature of mobile advergames, which entails three parts (mobility, advertising, and game), and is the key foundation of mobile advergames. Secondly, the current approaches to the features of mobile advergames are fragmented with each study looking at a selected aspect of the characteristics of the mobile advergames. In an extensive literature review, the studies show that the advergames characteristics could have a diverse array of presentations, including but not limited to studying a series of advergame's features. Thirdly, the mobility, integration and advergame difficulty tend to be seen as a background element contributing to the mobile inherent characteristics. In contributing to facilitate customer engagements, they are interactively associated with each other rather than as one of the inherent or dissociable characteristics. Specifically, the research on mobile advergames did not cover the inherent characteristics, which led to a simple-dimensional rather than a relative comprehensive approach of the investigations. These evidences have caused the studies of advergames or mobile advergames to simply transpose to other research context, without taking into account the interactive effects of their inherent characteristics, especially for mobile advergames. Although past approaches to capture advergames characteristics have clear advantages and strong conceptual or experimental foundations, they generally presented a distributed and partial view of mobile advergames' characteristics. Additionally, each perspective is based upon a different view, with fundamentally diverging theories, methods, and designs. Some studies have tried to put together and match different theories and combine them into a same model. Nevertheless, it seems that no real attempts have been made to draw a holistic picture of the inherent

characteristics of mobile advergames. The diversity of approaches clearly shows that mobile advergames characteristics have multiple dimensions and should not be considered as single-faceted.

Secondly, our study builds on major studies of customer engagement, and defines it in mobile advergames as “the state that reflects customers’ individual dispositions toward mobile advergames, and expressed through varying levels of affective and cognitive manifestations” (Brodie et al., 2011; Brodie et al., 2013; Hollebeek, 2011, 2011). Customer engagement is considered as a concept relevant to psychology and motivation, which is manifested as a specific engagement subject, i.e., the customer. As a concept specific in context, customer engagement can therefore be shaped and offer a wide range of contextual adaptations, including advergames.

Some views hold that customer engagement is a better approach to capture the connection of mobile advergames characteristics and advertising effectiveness. Firstly, customer engagement allows for the specificity of the online environment (Christodoulides et al., 2011) which encourages new forms of customer behaviors. Admittedly, for a number of reasons customer engagement seems to be a good fit for online contexts. For example, it is social and interactive by nature and can happen in the presence of the engagement subject (the customer) and its engagement partner (the mobile advergames) (Breidbach et al., 2014). This makes customer engagement particularly dynamic and interactive (Brodie et al., 2011), which is a fundamental principle of internet-mediated communication. Customer engagement could potentially enhance the understanding of focal customer-brand and customer advertising, and customer game interactions with information and communication technology (ICT)-mediated environments (Breidbach et al., 2014; Sawhney et al., 2005). Mollen and Wilson (2010) posited that engagement should be understood as the ‘definite umbrella term’ for online interactions. (Breidbach et al., 2014) consolidated this argument by explaining how customer engagement is the most suitable approach to understand customer to customer and customer to firm interactions in the context of ICT-mediated engagement platforms. Customer engagement is largely conceptualized as a multi-dimensional concept, including emotional, cognitive and behavioral facets (Brodie et al., 2011). Customer engagement offers a way to measure brand-related behaviors in a more refined and multi-dimensional manner, which can help develop stronger relations between group and brand-related behaviors (Bagozzi & Dholakia, 2006). Customer engagement acknowledges the combined role of individual and social consumer behaviors in brand-related contexts. Customer engagement is positioned in the extended realm of brand relationships and builds on the existing relationship marketing

literatures (Vivek et al., 2012). As mobile internet environments and relevant research quickly shift to interactive, participatory and consumer-empowering modes of action and investigation, the relationship marketing paradigm is forced to rebuild itself. However, despite its clear advantages, the concept of customer engagement in mobile advergames is still unsophisticated, requiring further improvement. Although, Brodie et al. (2013) are aware of the convergence of customer engagement and call for further studies on this topic, the application of customer engagement in ICT-driven context remains weakly defined; moreover, an empirical contribution for customer engagement in mobile advergames is still limited to date. Although, customer engagement is deeply rooted in the relationship marketing paradigm and offers an expanded view of itself, the concept of customer engagement in mobile advergames seems to be still in its infancy (Dholakia et al., 2004). Robust conceptualizations are only emerging and current empirical operationalizations are divergent and still not profound, especially for advergames (Hollebeek et al., 2014). In our study, we use customer engagement as a frame of reference to understand and measure the participation of mobile advergames. In the field of advergames, a number of potential drivers and outcomes have been determined in existing studies, how the inherent mobile advergames characteristics drive customer engagement which subsequently affect advertising effectiveness will illustrate a fairly well research framework for investigating mobile advergame's inherent features.

In order to address these matters, our study focuses on the investigation of inherent mobile advergames characteristics, and propose customer engagement as the adequate approach to connect the effects of inherent mobile advergames characteristics on influencing advertising effectiveness. Our study offers a more powerful and relevant framework for understanding the effects of inherent characteristics of advergames formed in mobile context. Contributed to the research on advergames in the mobile context, our study targets the research gaps by clarifying the effects of advergame integration and game difficulty on advertising effectiveness with considering the mobile context, namely "replayability." Extending the research on advergame's intrinsic features in the mobile context, this study explores and exploits the role of customer engagement for mobile advergames and subsequently measures their effects on advertising effectiveness from both cognitive and affective aspects. Advergames take their own intrinsic features such as brand prominence (prominent vs subtle), brand proximity (local vs peripheral), game-product congruity (low, moderate or high) or thematic relevance, mode of presentation (audio, video or audio-video) and the repetitiveness of games, single-player game vs multiple-players game, technical platform, and 3D and 4D technology. In our study, we focus on casual advergames, and

compared with IGA, extract “advergame integration,” “advergame difficulty” and “mobile advergame replayability” as the focal characteristics of advergames in the mobile context. Given exploring the effects of intrinsic characteristics of mobile advergames, and their relationships with advertising effectiveness through customer engagement, our study offers insights into identifying the exclusive characteristics of mobile advergames and investigating the role customer engagement plays in bridging utilization of mobile advergame’s features for improving mobile advertising campaigns.

Specifically, our study endeavors to reach the following objectives:

Clarifying the intrinsic features of mobile advergames and proposing measures for them as approach to investigate their effects on advertising effects.

Understanding the role of customer engagement in bridging the intrinsic features of mobile advergames on influencing advertising effectiveness from both cognitive and affective aspects.

The second research aim is the complementation of the first one. On the basis of clarifying the intrinsic characteristics of mobile advergames, exploring the customer engagement’s role from multidimensional aspects (cognitive and emotional) on connecting mobile advergame’s features to influence advertising effectiveness, the research will give a clear illustration on how the effects of advergames occur in the mobile context. Given this novel research approach, we can better understand how to utilize the features of mobile advergames to improve advertising effectiveness and understand the conditions that encourage customer engagement in the mobile context, which in turn improve the effects of mobile advertising campaigns. To date, the research on mobile advergames is still fragmented, this study will therefore focus on mobile advergame’s intrinsic features and the role of customer engagement, which will shine lights on contributing to the advergames research in the mobile context.

1.5 Summary

To reap the intended research achievements, we will address the above-mentioned research purposes through the following chapters.

In Chapter 2, including the related Literature Review and Hypothesis Design, our study commences with the introduction of traditional advertising to advergames in the mobile context; then identifies the instinct features of mobile advergames consisting of advergame integration, advergame difficulty, and its replayability. Next, by combining previous

literatures on customer engagement, a critical analysis of integrating customer engagement in the paths of mobile advergames features influencing advertising effectiveness is designed. A comprehensive research framework in showing the antecedents and outcomes of mobile advergames is also formed in Chapter 2.

In Chapter 3, a conceptual model in describing our research purposes for mobile advergames is established to serve as a basis on which the methodology of this study is designed. And a series of decisions regarding the methodology in seeking out the outcomes of research questions are outlined. Beginning with philosophical process, different steps are taken for data collection, research measurement design, validation, and sampling procedures. Also, the sample features are addressed hereby, as well as the data analytic techniques. In accordance with our research purposes and questions, the paradigmatic stance derived by post-positivism is guided in this context.

In Chapter 4, compared with the developed constructs such as customer engagement and brand effectiveness, a process forward to developing measures of mobile advergames features, advergame integration and advergame difficulty is first addressed. Specific steps to create scale of advergame integration and advergame difficulty are conducted in our scale development paradigm. After concluding and specifying the interview summary, four research items for each research variables are developed. After that, the developed items are subjected to customer engagement and brand effectiveness. Lastly, this section concludes by presenting descriptive statistics, exploratory factor analysis and confirmatory factor analysis to confirm the reliability and validity of the focal research variables.

In Chapter 5, research hypotheses are tested using the multi-level structural equation modeling (MSEM) by considering time varying as the cross-level interaction. In 2×2 conditions with low advergame integration and low advergame difficulty, high advergame integration and low advergame difficulty, low advergame integration and high advergame difficulty, and high advergame integration and high advergame difficulty, four times of MSEM are operated respectively and separately. Following detailed analysis and results presentation, this section closes with a summary of the research hypotheses test.

Detailed discussion on the research findings from Chapter 4 and Chapter 5 is conducted in Chapter 6. Comparing 2×2 types of experiment scenarios, discussion of mobile advergames features in influencing brand effectiveness via customer engagement in four times of MSEM analysis are interpreted, respectively. Following the discussion of advergame repetition effects on adjusting the impact of mobile advergames, the features influencing brand effectiveness are concluded for this chapter.

Finally, in Chapter 7, an account of key contributions including theoretical and managerial implications in the field of advergames in the mobile context are discussed and presented. Suggestions for developing future advergames research and recommendations for advertisers in utilizing advergames in mobile are presented, and limitations of the current research with suggestions to generate compelling future study are discussed in details.

Chapter 2: Literature Review and Hypotheses Design

2.1 Introduction

Studying advergames and its features in the mobile context is the focal elements of this study. An extensive literature review for advergames with four main sections were structured in this chapter. Then, with introducing features of advergames in the mobile context one by one, the designed research hypotheses were presented, respectively.

The first section focused on introducing the advergames, includes the development from traditional advertising to advergames in mobile, the importance and effectiveness of advergaming in marketing, demographic characteristics for advergames and advergames' influence on consumer perception and behavior. Advergames is a specific form of advertising, and is a particular manifestation of gamification for advertising in itself. This section builds on advergames literature, defines the importance and effectiveness of advergames, identifies the demographic influence factors for advergames and its influence on consumers. These explanations for advergames offer a unique and essential basis to our research objectives and contribution to the development.

In the second section of this chapter, as the aims of this research are to advance the impact of instinct features for advergames in mobile, core studies on advergames integration, advergame difficulty and repetition are reviewed. According to the combination of the Affect Transfer Mechanism, the LC4MP, the DDA, and the flow theories, the steps for research designing and approaches used to the research hypotheses forming are operated from this section.

Firstly, the definition of information integration and advergames integration are introduced as a novel way to conceptualize the first feature of advergame. In this section, three types of information integration and its congruence to understand advergame integration are presented. As far as we know, it is the first time that this concept is presented in social sciences and marketing related to advergames, with the critical evaluation of information integration in the advergame literature.

Then, the advergame difficulty, combined with DDA and flow theory, is mapped out as the relevant variable to investigate brand effectiveness of advergame in mobile. Additionally,

at its heels, by identifying the definition of information repetition and advergame repetition, an interacting effect in the second level with measuring the time varying effect is investigated.

In the last section of Chapter 2, the literatures addressing gamification and customer engagement are reviewed, followed by the design of mediating effects of customer engagement in the paths from features of mobile advergames influencing brand effectiveness, with considering both affective and cognitive aspects.

Also in this chapter, through presenting relevant research review on advergame integration, advergame difficulty, advergame repetition in mobile, and gamification with customer engagement, an overall research gap in advergames literature and an overarching research task are presented. Highlighting the research gaps in the process of going over previous research brings us to the articulation of our research questions that help form the research framework by presenting the research hypotheses design.

2.2 Mobile advergames

2.2.1 From traditional advertising to advergames

With the popularization of internet, an increasing number of consumers have moved to online platforms for shopping, entertainment, research, and other purposes. Conventional marketing strategies such as banners and videos are being quickly abandoned by prospective customers. Good reasons, such as mobility, playfulness and easily access, make mobile advergames as the powerful marketing tool increasingly winning users' eyeballs. As the name suggests, advergames incorporate advertising message, brands of products, or corporate logos with casual games, and present in social media, which have evolved as an acceptable and engaging platform. Presentation of advergames in social media through mobile devices make it possible to spread flexible. Interactive Software Federation of Europe reported in 2012 that almost 83% smartphone users play games online by free apps or download. This new consumer phenomenon leads a new way of content consuming and distributing. Although a wide range of video games is available, mobile devices have been common, age of game playing has increased, technology focused on consumer profile transformation becomes advanced, advergames get great attentions both from academics and industrialists, few attention has put on the mobile advergame's research. Mobile advergames should be investigated as an effective interactive marketing tool currently.

As a marketing platform, advergames have been around for decades. With the increase of

game players in smartphone in Asia, 46% of smartphone game players on daily basis make advergames a creative and effective marketing tool to promote related brands. In the past, the prohibitive costs make it unaffordable for the large global company to develop and roll out advergames. Rolling out advergames as new campaigns was a stunted and disjointed progress then. The growth and development of smartphones break out this situation. Popular use of smartphones allows users to access advertising by brands in video games in a free or low-cost way. Games is one of the most used ways by advertisers to reach their customers effectively. Advergames as a new advertising technique has got greater acceptance among users, the acceptance from users is important for a new technology or marketing strategy when it is initially adapted. Additionally, advergames provide new methods to gratify the demands of advertising personalization.

The first business case of advergaming dated back to 1980, when the Atari 2600 games were developed by Kool Aid and Pepsi to promote their products. In 1998, a huge success of advergames through Blockdot company recognition campaign was achieved by constructing a game named "Good Willie Hunting." Since then, more and more attentions have been brought to this new promotional method. Currently, with the increasing internet evolution, video games now have an unexpected higher visibility in practice. As it catches up with the reality of daily life, this virtual gaming world is gaining momentum. Advergames offer services by establishing integration and interactivity between advertising messages and video games (Dobrow, 2004). More generally, advergames induce to make consumers aware of the advantages, specialties and characteristics about the product. Advergames represent a unique form of product brand, as game entertainment is part of it to make the game a carrier for advertising brand (Deal, 2005). By that, integration and interactivity of game and brand is creating. Gaming is an efficient way to build the top-of-mind awareness of the brand among consumers (Dahl et al., 2009). Most prior studies focused on research conducted in the U.S. market, especially in the industry of children's food. Much wider research was slowly realized among grown-ups and the world-wide market.

Advergame industry started earlier at abroad. As mentioned above, there were professional companies engaged in related development before 2000, and there were many companies specializing in advergame development, such as Skyworks in the United States, Titoonic in Denmark, Tamba in the United Kingdom, and so on. There are basically 1-2 advergames on the product websites of a big brand at abroad, especially in the official websites of some movie blockbusters, such as the Da Vinci Code, the Chronicles of Narnia, Kung Fu Panda and so on. The core content of these websites are advergames. Advergames

will become the main body of the manufacturer's network marketing, a lot of investment for its development and promotion, of course, will get good results, for example, many games are clicked on more than ten million. At home, however, as mentioned earlier, it was a late start, with the emergence of professional-related companies such as Front Network in Beijing in 2004.

Compared with other traditional advertising modes, the entertainment and interactivity of advergames can greatly reduce the resistance and aversion of consumers to advertising. A good advergame can arouse consumers' spontaneous attention and active participation, so that consumers have great interest in the game itself, and even addiction. The "stickiness" of games in particular allows advergames to bring more attention to advertising than ever before. As a complete computer program, advergame can provide advertisers with perfect data, but also can realize a lot of interaction between the audience and advertising and other advanced functions where traditional advertising can not achieve. Advergames have the advantages of interactivity, uniqueness, virality, technology and so on.

Interactivity: Game is a product of strong interactivity. From the selection of characters and scenes in the game to the control during the game, consumers always influence the process and result of the game with their own will. It is this high level of interactivity that enables consumers to generate strong interest and participate in the game. So in the world of advergames, participation in the game is participation in the advertisement. **Uniqueness:** Every brand is unique, so every advergame is unique. From the planning stage of the game scheme, professionals will integrate the characteristics of the brand and product into its corresponding game ideas, so that each advergame has its own unique characteristics, bringing consumers the freshest game experience. **Virality:** The spread mechanics of advergames are virality. A good advergame will be actively noticed by consumers and lead consumers consciously participate in its promotion activities. On the one hand, this communication mechanism reduces the cost of advertising for advertisers, and on the other hand, advergame greatly increases the influence of advertising. At the same time, through word-of-mouth communication among consumers, it can also better enhance the public image of the brand. **Technology:** Compared to traditional online advertising, advergames are not only a combination of brilliant creativity and beautiful design, professional companies also incorporate advanced interactive technology into them. From consumer behavior analysis to game data monitoring, as well as interactive mechanisms such as questionnaires, forwarding and lottery set in the game, all technical personnel will set up appropriate programs according to the needs of marketing, providing powerful data support for the complete solution of

advertising games from planning to delivery, so as to achieve the effect that traditional advertising cannot achieve.

The digital advertising market and user expectations are constantly changing. The great digital market spending, averagely, a quarter of total marketing budget since 2016 requires marketers' innovation and lookout for effective marketing solutions to engage their target consumers. The market scale of IGA and advergames have reached US\$ 2.67 billion in 2017. Not only America, but Asia has also been a strong market for advergames with gaming taking up 13% of total mobile advertising spending. Industry analysts say that the growth rate of advergames market in Asia is estimated to be 19% per year. The inherent characteristics of mobile advergames (e.g., the cost benefits and the ubiquity of technology) give advergames the potential advantages to put mobile advergames in a compelling proposition for marketers.

2.2.2 Importance and effectiveness of advergaming

How to utilize technological trends in creating engaging experience for the users is the key of advergame's success. Advergames incorporate marketing contents, such as brands of product and company and messages of product and company into online games (Dobrow, 2004). Incorporated with interactive games, advergames are developed around a product or a brand, or an associated character. Brands and products are integrated into the game either associatively or demonstratively. In other words, a game can be used to show the use of a product or to create a connection between the product and a certain activity or a lifestyle.

The latest trends of advergames are trying to take the advantages of social networks and mobility by originally designing games. Internet provides brands with a platform in developing custom games. In our study, we focus on mobile features of advergames and consider inherent characteristics of advergames to assume that mobile advergames can attract wide attention and are entertaining enough to go viral. At the same time, the convenient access and replayfulness of mobile advergames can achieve enormous exposure for advertising messages.

Méndiz (2010) explained that advergames, as a format of advertising, have some interesting advantages: (1) the high advertising exposure: highway billboard, magazine advertisement or popups can only hold consumers' attention for one or two seconds, while in TV, advertising time is up to 30 seconds. But mobile advergames can hold users to spend hours or even more time to play. (2) User attention on playing advergames is maximum: advergames generally incorporate with casual games, enabling direct interaction between brands and consumers. This interaction is generated in three ways - associative, illustrative

and demonstrative - creating an immersive way to maximize user attentions compared with other advertising formats. (3) More attractive to consumers: engagement that is more interactive and selective gives advergames greater appeal compared with traditional forms such as banner, video and popups. Games make users aware of brands in an active way instead of passive learning. (4) Brand recall increasing: the entertainment of games in advergames that increases brand exposure, maximizes user attention, and makes advertising more appealing are helping users to gain more brand recognition and recall.

FreshGames (2002) and WebResource (2004) reported four advantages of mobile advergames which intensify the importance and effectiveness of advergames for marketers again: (a) the cost of advergame's marketing is lower than that of traditional advertising channels such as TV and radio; (b) the development of technology for online advergames can transform the captured audience's demographic profile, behavior, needs, and preferences into valuable personal information; (c) the long retention time putting in advergames is up to 30 minutes which cannot be achieved by traditional advertising channel; and (d) the viral marketing - 81% of players invite friends to participate in a campaign together.

In China, the 2017 China Digital Entertainment Industry Annual Summit (DEAS) was held in Xiamen. Zhang Han, the head of Tencent Social Advertising Game industry, was invited to attend the summit and to give a speech, sharing with the industry how Tencent Social Advertising will help the game industry by refining the purchase volume and improving the ecological construction. At this industry event, Tencent Social Advertising won the "China Mobile Game Industry Support Award" at the "Jinling Award", which is designed to recognize the outstanding platforms that continue to empower the game industry and help the development of the industry in 2017. As the number one mobile game marketing platform, Tencent Social Advertising was awarded this award, not only because of its industry-leading foresight, but also because of its leading technology, service capability and positive ecological layout in game marketing, which has created multiple value for the industry. As the game industry has become more and more sophisticated, the way users approach games has changed dramatically. In this regard, Tencent Social Advertising has taken advantage of the trend and continued to deepen mobile game marketing. By summarizing systematic marketing methodology, upgrading intelligent delivery tools, and opening its platform and technical capabilities to advertisers, Tencent has helped the game industry upgrade its publishing mode and user acquisition methods, so as to better connect users, improve marketing efficiency, help to solve the stock market crisis, and help the long-term development of the game industry.

In addition, Tencent Social Advertising will continue to comprehensively upgrade its own capabilities and services, and build a new "play +" ecology with game manufacturers and players, so as to ensure that advertisers achieve promotion goals, while ensure the user experience is not harmed. Building the ecosystem, Tencent's Social Advertising will continue to empower advertisers in the whole life cycle of product promotion, creating a very representative benchmark case in the era of game buying. By combining its buying experience with the advantages of Tencent's Social Advertising, "Sijiu You" (四九游) has made use of its advantages to create high-quality materials and continuously optimized the materials, making the advertising conversion rate of mobile game "Hulu Baby" (《葫芦娃》) at least 30% higher than that of its products. Additionally, "Dream Fairy" (《梦想仙侠》) realizes accurate screening and approaching target user groups by labeling users. Through the integration of front-end material and back-end data model, the overall effect optimization was carried out, and the total flow of more than 600 million yuan was accumulated.

2.2.3 Demographic characteristics of advergame players

Fattah and Paul (2002) found that games are especially popular among users in the U.S. In comparison with traditional media, electronic games are taking up more users' time (Skyworks, 2007). Fattah and Paul (2002) and Santos et al. (2007) classified online game users into three large categories: (a) children and teenagers; (b) adult males; and (c) adult females.

Children and teenagers are the traditional market segment of games. In 2006, eMarketer conducted a study in U.S. which offered information about the important role of children and teenagers for online gaming and surfing. Research showed that 39.4% of children between 8 - 11 years old and 73.4% of teenagers aged 12 to 17 use the internet regularly. Playing games are the most popular activities among children and teenagers (81% of children between 8-12 years old, 78% of teenagers between 13 and 15 years old, and 87% of teenagers between 16 and 18 years old). Because of the popularity of game playing, children and teenagers have become the main target audience for advergames. According to 3DSense, reports show that 62% of teenagers spend at least one hour per week playing online games, and 34% play for more than 6 hours. However, the finite and less mature cognitive capacity of children and teenagers to cognize, accept and memorize, in addition to take positive attitudes to the advertising products or brands, cannot ensure the effectiveness of advergames on them. Additionally, the ethical problem is also a big challenge for online advergames targeting children and teenagers.

A case in point for advergaming campaign targeting children and teenagers is the Virtual Magic Kingdom created by Disney in 2005, which took the 8-12 years old to a virtual tour at Disney resorts and theme parks. Successful as it was, this type of online advergaming campaign was heavily criticized for the potential negative influence which might have on these populations (Quaid, 2006; Williard, 2005). For example, the private information might be obtained unethically, to make children and teenagers long reliant on a brand or product (Macklin, 2006). Under increasing evolution of online advergames, topics only focus on children or teenagers are considered as contradicted advergames' research. A report in D5 Games (2004) showed that the most frequent game players are over 18 years old, with an average age of 28 years old.

As internet gets popularized across the globe, online users can be found in all demographic categories (Assael, 2005). Fattah and Paul (2002) found that marketers or advertisers are more and more targeting male users ranging from 18 years old to even 65 years old. Not only on male users, a lot of research has put interest on investigating female users (Arkadium, 2004; Technology, 2005). At the beginning of 2000, one research (Arkadium, 2004) showed that the women over 40 is the major group in online game, and reports from Wi-Fi Technology News (2005) showed that female game-players spend almost 9.1 hours in playing games per week, which is much more than male game-players. According to a global survey by Global Digital Living, 52% of women play online games compared with 39% of men in North America, 53% of women compared with 27% of men in Australia, only in Asia the percentage of men game-players and women game-players is similar (49% vs 50%).

Developing effective advergames is always the main challenge for online marketers. One of the most effective strategies is to target those who are most likely to enjoy playing games online. Therefore, investigation of the demographic characteristics of advergames players can determine the effectiveness of advergames in any context. In J. Chen and Ringel's (2001) study, guidelines devoted to set strategies for advergame's success are to target most likely to enjoy online game's users and keep advergames in a simply playing way to make the users in continued interaction.

Another demographic characteristic of advergames playing may depend on gender. Arkadium (2004), Fattah and Paul (2002) suggested that women play advergames primarily to reduce or eliminate stress, while men play to compete in the game. Gender also decides the genre of advergames to play where women are more into word and puzzle games while men prefer sport or casino games. Some research (Arkadium, 2004) found that geographical

location is also a demographic characteristic in deciding the type of game preferred and the reasons for playing. Game players in Atlanta play mainly for the ease of stress; people in Dallas aim to reduce boredom when play online games; players in San Francisco like the competition from game play; and in Washington some players do this in order to be trained for gambling in casino. Special game players' demographics according to different state can offer meaningful inference when adapting advergames to specific characteristics and preferences of a well-defined group of people. To target a specific type of advergame users, Fattah and Paul (2002) indicated four possible approaches, including (1) the advergame content customized to the target customers, (2) the channel used for the promotion of the advergame, (3) adapting the contest game structure for a specific audience, and (4) using demographic information to facilitate advergame access. With the developing of internet technologies utilized in online advergames, more and more relevant user demographic information can be tracked, the data presented from the above Fattah and Paul (2002) four categories is very uplifting for the advergames industry.

The time and number of people accessing online games are growing every day, their interest in online gaming represents an excellent prospect for advergaming market. The majority of advergames studies until now were conducted in US. In the future, more research studies should identify the phenomenon of advergame players in different parts of the world.

2.2.4 Advergame's influence on consumer perception and behavior

Communication technology is updating every day, the medium of advertising should be innovating according to the stream of time. Placing product or brand message into movies or TV shows was a relatively old way, viewing the long historical advertising research literature, the studies regarding attitude toward media determining advertising attitude become a common research topic. Advergames present advertising messages in online games in order to enhance their marketing effects: (1) advergames campaign's participation is depended on the player himself; (2) in comparison with general internet medium, players interact mobile advergames more easily with a more active stance; and (3) advergames encourage players to share their joyful experience with their friends or families. From the view of advertisers, advergames expose players to static or dynamic representations of brand, product or service with the purpose of capturing players' attention, and in turn, modify players' behavior and attitude (Deal, 2005). The psychological foundation of this process is the "state of flow." Csikszentmihalyi (1990) first used this concept to describe the mental status in which attention is highly maintained on a specific process while the irrelevant information from the

surroundings is shut out. A state of well-being and enhanced perception and learning capabilities are possible results from the state of flow.

The interactiveness of advergames can easily trigger the state of flow because of the game's enjoyment and mobile convenient access. As Csikszentmihalyi (1990) noted, the most successful websites are the ones where interactive experiences can be found. Some essential conditions which can create the state of flow are summarized as follows: user motivation, user telepresence, and interactivity of internet application. Inferred from Answers.com (2007), with the help of technologies, in telepresence, people feel as if they were present and they feel the "here and now" even if they are at another place in reality. In the case of advergames, players connect to a virtual game world through online technology, in which they interact with the game elements, influencing the outcome. At this moment, the advergames player's motivation is an intricate structure that is molded by a combination of various needs. These needs could be to relax, competition or have social interactions. And these motivations will determine players' choice of advergame, in turn, represent an important segmentation criterion. Maintaining the state of flow is a process in dynamically changing according to how capable the player is and how difficult the game is. If the level of game difficulty is beyond the user's capability, frustration experience will be induced and players will ditch the game, feeling upset. If the level of difficulty proposed by the game is lower than player's capability, boredom feeling will be resulted, which will directly affect the player's exit of advergames. Finally, if the level of the game difficulty matches the player's capability, the state of flow will maintain and motivate the player to replay the advergames. Even this inference contradicts (J. Chen & Ringel, 2001) that games should be as simple as possible, the implication of providing a dynamic and challenging game to engage advergame players offers important theoretical and practical research initial for advergames research. Once induced, to maintain the state of flow, the game part in advergames should evolve with challenge, because players' capability will increase with replaying the game. This also raises the question whether a dynamic difficulty progression can constitute a challenge for advergame players.

Another popular model in describing the impact of marketing messages on customer behavior is the AIDA (attention, interest, desire and action) model. Regarding advergames, the first phrase of AIDA model indicates that advergames must attract the player's attention, either through online promotions or through messages sent by friends or family. The second and the third phrases of AIDA are to maintain player's interest and create customer's desire. The ultimate goal of advergames is to sell more products or services, the second and the third

phrases of AIDA are thus essential, some players will continue to play the advergames while the intention of or action to purchase may not arouse. Once the desire is aroused, the final phrase of AIDA, purchase action will be transferred.

Considering the AIDA model, the effective characteristics of advergames can be defined as follows: (1) selecting game genre to target demographic carefully; (2) core brand messages relating closely to the game for efficient communication; (3) full integration of game and brand message to enhance the effect of both the game and the brand; (4) progressing from easy to difficult levels in a more careful manner, driving the players for better performance and keeping them for longer and repeated exposure to the game; (5) setting up a registration system for players where their personal data need to be inputted for them to show their scores or join the competition; (6) encouraging the players to share the experience with their friends or family through viral marketing; (7) motivating players to keep returning to play advergames with prize competitions; and (8) encouraging players to improve performance by presenting visible score tables.

The above characteristics provide a ground for creating and implementing effective advergames. Considering the characteristics of mobile advergames, in our study, the state of flow is created and maintained through adapting the inherent characteristics of mobile advergames focused on the integration of advertising messages and games, game difficulty, and advergames mobility. Mastering how to utilize the characteristics of game integration, game difficulty level, and game replayability to achieve the state of flow can more efficiently transmit brand and product information with mobile channel for viral marketing.

2.3 Advergame integration

2.3.1 Information integration for advergames

Information integration means assembling different information products together to facilitate information sharing, finally to increase the value of information products or services through mutual cooperation of the information products (Song et al., 2011). Two loci in challenging information product integration in the trend of online studies are that (1) to what extent does the integration influence the advertising effectiveness (cognitive, emotional and behavioral), and (2) when can this integration influence advertising effectiveness optimally (in other words, the underlying cognitive or affective process in information integration influencing advertising effectiveness need a more comprehensive explanation)? Regarding that few

studies focused on the role of information integration in exploring the online advertising effectiveness (Song et al., 2011), our study conceptualized advergame integration as incorporating advertising message into an informative or entertaining content (mobile games) which results in an advertising format, simultaneously exposes advertising product or service and media content. As mentioned earlier, two types of integrating advertising and games exist in conventional advertising research: advergames, and IGA. Nambisan (2002) identified three types of information integrations: (1) value-added integration refers to the internal integration of a focal information product with a relevant information product in a seamless fashion; (2) add-on module means the integration of a focal information product with a relevant information product through an external module or a component where focal information product and relevant information product are separated; and (3) data interface integration indicates that externally integrating the focal information product with relevant information product through a technical interface where the data between these two information products can be exchanged in some way. In value-added integration and add-on module integration, additional features are offered or some of the functions between focal and relevant information products can be shared. Moreover, in value-added integration, the internal coupling focal and relevant information products lead the boundary of focal and relevant information to become obscured. Advergames integrate brand identifiers into games through mobile or social platforms, and lead users to interact advertising brand or service with games simultaneously, which can be seen as value-added integration or add-on module integration which indicates a high intensive integration, whereas IGA inserts advertising into video games through externally displaying in the background, which can be seen as the data interface integration where only a minimal level of data and functions can be exchanged between each other. According to the above discussion, in this study, we conjecture a high degree of integration existing in mobile advergames context, the loci in challenging information product integration online also confuse the integration feature of advergames in incorporating advertising messages and mobile games.

2.3.2 Advergame integration

Advergames is a new form of online advertising, which integrates relevant brands to entertain its audience. It is designed for specific purposes with the marketing of a single brand or product. Product and brand in advergames are the focal information product which are always highly coupling with games, sometimes even obscuring the boundary of them. Advergames are able to enjoy audience in a fun and playful environment and deliver subtle associations

and experience, which could therefore persuade audience into a certain behavior (Nairn & Fine, 2008). Advergames focus on its efficacy in delivering promotional advertising message, and building brand equity or forming positive attitude by integrating advertising messages with playful game content (Hernandez & Chapa, 2010; Mallinckrodt & Mizerski, 2007). However, only inconclusive research results related to advergames integration on influencing advertising effectiveness have been achieved.

Research related to advergames shows that integrated advertising in games makes it more difficult for audience to distinguish branded advertisement from media content due to the limited cognitive capacity (Daems et al., 2019; Zarouali et al., 2019). Research related to off-line advertising (brand-integrated magazines) (VanReijmersdal et al., 2015) implied that boys prefer non-integrated print advertising due to the awareness of advertising persuasive intent. In that study, authors contended that in general, people, particularly children, are less likely to realize the persuasive intent of advertising when it integrates with other entertaining or informative content. Research related to advertising integration with internet or online advergames has got substantial attentions. Wise et al. (2008) conducted an experiment design examining that positive relationships between attitude towards game associated advergames, attitude towards advergames, and attitude towards brands are strongly existed. With a pity of that, neither cognitive nor conative aspect of advertising effectiveness was considered in that study. Salo and Karjaluoto's (2007) study illustrated that mobile medium has become widespread popular among e-commerce which accelerates mobile games as a novel medium to improve advertising. Nevertheless, research related to mobile games as advertising medium has been rarely studied. Effectively grappling internet into marketing strategies in organizations with integrating the internet with advertising can impact its performance (P. D. Berger et al., 2006). P. D. Berger et al.'s (2006) research results found that advertising profit will be got the greatest when a "full-integration" (compared with "partial integration" and "separation integration") strategy is implemented in organizations. In a study examined food advergames influencing on children, Rifon et al. (2014) found that children are responsive to advergames and brand integration and interactivity in advergames effectively affect brand recall, brand attitudes and purchase intention. Game repetition, brand integration and brand interactivity with online games were contended as dominants in determining advertising effects both in cognitive, affective and conative aspects. However, more clear strategies based on brand integration, brand interactivity with online games on influencing advertising effectiveness (cognitive vs affective) are calling on additional study in advergame's domain.

Daems et al. (2019) identified that consumers respond to advertising in a hierarchical

process which consists of three stages ranged from cognitive, affective to conative. Bruner and Kumar (2000) indicated in the first stage (cognitive) consumers receive messages about product or service and remember them, then in the second stage (affective), positive or negative attitude to advertising message is developed for consumers, finally, in the last stage (conative), actions upon cognition and affection will be practiced. In our study, we follow that process to design research hypotheses and measure each relationship between memory effect and attitude, and finally test engaging responses. LC4MP and Affect Transfer Mechanism are our theoretic bases in developing our first research hypothesis.

2.3.3 LC4MP and Affect Transfer Mechanism in advergames

As noted before, to solve to what extent and when the integration of advertising and games influences advertising effectiveness, LC4MP and Affect Transfer Mechanism are adapted in our study to illustrate these questions. Lang (2000) identified LC4MP that individual takes finite cognitive resources to process information (limited capacity to encode, store and retrieve), especially when the particular task is not the main task which can be easily ignored. Playing advergames (whether in mobile or not) is a highly engaging and immersive activity, limited cognitive resources allocated to handle advertising messages which are well fitted or integrated in games make it harder to clearly distinguish or recognize the branded product or service. Hence, in our study, we propose that higher integration of advertising message and games in advergames results in lower recognition of branded advertising product or service, which impacts the advertising effectiveness in cognitive aspect.

Affect Transfer Mechanism illustrates that games' fun and enjoyable characteristics appealing positive attitude, and this positive attitude will spill over to branded advertising product or message because of the higher integration of advertising messages and games in advergames (Mallinckrodt & Mizerski, 2007). According to the mechanism of value-added integration, the internal coupling advertising message and casual games leads the boundary of them to become obscured. The motivating and enjoyable features appealed from game playing will be easily transferred to the promoted products or service. Hence, in our study, we assume that the positive attitude incurred from game playing will improve advertising effectiveness in affective aspect for advergames. Following hypotheses are designed in our study based on the above discussion.

H1-1: Higher advergame integration will reduce brand recognition in mobile advergame.

H1-2: Higher advergame integration will improve brand attitude in mobile advergame.

2.4 Advergame difficulty

2.4.1 Dynamic difficulty adjustment for advergames difficulty

Game difficulty is always a central issue in game industry. With the game industry evolved considerably, consequently, different difficulty approaches have been used in a wide range of games to make sure that both casual and hardcore players who differ in capabilities stay engaged with games. Dynamically tuning the difficulty is to modify the game's functions, scenarios according to the skill level of the game player (Zohaib, 2018). If games are so simple, boredom will be brought to players, and the frustration will occur when the games are too difficult. DDA aims to engage players to play till end with challenging experience. Features of games, such as frequency, starting levels are set at the beginning of the game, and a recent study (Zohaib, 2018) argued that as a customized solution, DDA alleviates negative experience for players.

Referred by DDA, a too easy game causes boredom while a high difficult game results in frustration. According to DDA, in determining players' engagement, not only depending on game difficulty adjustment, but also it should be decided by players' skills or different types of players (casual or experienced) (Alexander et al., 2013). A study (Alexander et al., 2013) on investigation of game players' enjoyment revealed that more experienced players enjoy game difficulty (game levels) as their game experience increasing. Liu et al. (2009) presented an experiment in examining the real-time affect based on DDA. That was the first time among the existing game research work to test the affective state experienced by players based on DDA mechanism. In that experiment, player's affective state was adjusted in real time with different game difficulty levels and surrounding physiological signals being detected through wearable biofeedback sensors to see how they are correlated with anxiety. Experiments showed that players' physiological conditions change with real time game difficulty, which also was closely related to players' affections such as anxiety.

2.4.2 Combining flow theory with advergame difficulty

Advergames create entertaining experiences to engage consumers and these encouragements can continue for several hours (Catalán et al., 2019). Prior studies revealed that game engagements are most successful in facilitating flow experience (A. Berger et al., 2018; Kiili, 2005). The flow theory is argued as a particular framework fitted to the study of mobile advergames. Csikszentmihalyi (1988) identified flow as the optimal experience in which

individuals immerse in a pleasurable environment. This optimal experience can have positive effects such as high brand recall, positive brand attitude and subsequently increase purchase intentions. However, despite that the flow theory is closely related to game study, compared with other types of flow-inducing media experience, there are few studies of mobile advergames that are based on this theory.

The flow, also known as the “optimal experience,” is “the state in which people are so involved in an activity that nothing else seems to matter and an experience itself is so enjoyable that people will do it even at great cost, for the sheer of doing it” (Csikszentmihalyi, 1988). Flow is also described as “a sense of that one’s skills are adequate to cope with the challenges at hand in a goal directed, rule bound action system that provides clear clues as to how one is performing” (Csikszentmihalyi, 1988). Usually, advergames always incorporate brand information into a casual game which can easily cause motivating and engaging, which in turn, will lead to a flow state. When the player’s skill level is high and the task challenge level becomes high, there is higher possibility for the player to get into a flow state (Csikszentmihalyi, 1988).

When individuals actively do something, a flow state will be easily shaped, and in flow state one is almost wholeheartedly performing an activity with intrinsic motivations. Csikszentmihalyi (1990) postulated three conditions which can help realize the flow state under summarization of multifaceted activities: (1) clear goals and progress, which will direct and organize the activity or task; (2) clear and immediate feedback, which help individuals adjust their performance with changing demands to maintain flow state; and (3) individuals can well balance their skills and task challenges and feel more confidence in completing their task at hand.

Flow, as the part of the law of readiness, is intrinsically motivating. From the perspective of flow, in the well-designed advergames, players are guided by clear goals and feedback to perform their competency. Where the positive emotions and engaging state induced by flow are closely associated with the law of intense experience. This intense experience is inextricably connected with the balance between challenge level and skill level. Horror games mean the level of challenges is significantly above player’s level of competency, which foster a feeling of anxiety; while “relaxation games” keep the level of challenges significantly below the level of player’s competency, which come into being a state of interest losing. As mentioned above, game design in marketing aims to create flow state in order to induce engagement or intrinsic motivation. The balance of skill and challenge arouses attention in player’s brain, and high motivation which is called as a flow state can drive players’

continued playing. Hence, integrating flow principles into game design is the primary strategy in marketing. In a study of video game, J. Chen's (2007) master's thesis used flow theory to explore the player's flow state by dynamically adjusting game difficulty.

Research related gamification by A. Berger et al. (2018) contended that only optimally challenging condition can lead to emotional and cognitive brand engagement, which indicates that an inverted-U shape of game difficulty effect exists. A study of IGA (Dardis et al., 2019) found that sometimes easy game condition affects positive affect more, whereas difficult game condition affects negative affect more. However, these research results were not confirmed during the two studies in using different types of games. By combining Affect Transfer Mechanism, we assume that in easy game condition more positive affect to brand can be transferred from enjoying game play. The memory of advertisements in game can be enhanced by an increasing positive mood (Cline & Kellaris, 2007). At the same time, LC4MP can shed some light on the influence of game difficulty on brand recognition. Some authors (M. Lee & Faber, 2007; Lynch & Srull, 1982) contended that the cognitive attention of the individual is constrained when forced to be allocated along the primary task and any secondary task at the same time within any given time. If game is difficult, more attention should be paid on game challenge. In this condition, not much more spare cognitive resource can be allocated to handle brand message. So, game players will demonstrate lower brand recognition.

H2-1: Over optimally challenging point, in difficult game condition, lower brand recognition will be demonstrated by game players.

H2-2: Over optimally challenging point, in difficult game condition, lower positive brand attitude will be demonstrated by game players.

2.5 Advergame repetition

2.5.1 Information repetition

Repetition is conceived as one of the biggest factors affecting subjective truth and the phenomenon of "repetition-induced truth effect," which indicates that repeated information appears more convincing than novel information to people (Unkelbach et al., 2019). The repetition effect is found in information ranging from trivia to consumer opinions (Hasher et al., 1977; Johar & Roggeveen, 2007). A seminal experimental evidence provided by Hasher et al. (1977) indicates that participants believe repeated information more than the novel.

However, even a higher frequency of occurrence confers higher validity compared with novel trivia statements, some researchers believed that mere repetition cannot guarantee the subjective truth. Another research related to information repetition increasing subjective truth is based on recognition experience and processing fluency. Arkes et al. (1989) suggested that repeated information appears more factual due to its familiarity. Processing fluency is the subjective ease of ongoing conceptual or perceptual processes, Unkelbach and Greifeneder (2013) found that participants rated easy-to-read statements as relatively more true than difficult-to-read statements.

2.5.2 Advertising repetition

Substantial research related to advertising focused on repetition effects on consumers' responses has been conducted. Multiple advertising exposures increase the advertising awareness and facilitate information process for consumers (Vuokko, 1997). The general impact of advertising repetition on different advertising media relevant to various variables has been analyzed, where the repetition effects may be either driving or hampering (Pechmann & Stewart, 1988). There are two major research gaps with regard to the impact of advertising repetition (Schmidt & Eisend, 2015). The first one is that a U-shaped curve of the effect inverted the attitude and advertising recall. However, the number of exposures to ads that maximize consumers' response is still under-investigated (Kohli et al., 2005; Nordhielm, 2002). Tellis (1997) distinguishes this topic with two points of view: (1) minimalists, who believe usually, the maximum response can be obtained with a little advertising exposure; and (2) repetitionists, who contend that optimum repetition is needed to get optimal response from the consumers. The second one is that a comprehensive and simultaneous analysis of testing advertising repetition effects depended on contingent factors is needed (Pechmann & Stewart, 1988). Pechmann and Stewart (1988) investigated that the methodological characteristics can moderate the impact of advertising repetition on attitude and recall. In their study, advertising repetition effects are described as "differential effects of each successive advertising exposure" (p. 287). In that view, advertising repetition effects include wear-in effects (the initial effect of advertising exposure is positive when it is at a certain level) and wear-out effects (no significant and negative effects of advertising effects appear after over the certain level). This view takes a step further from the mere exposure effect, which holds that mere exposure stimulates evaluation, in turn attitude or cognition of advertising occurs. The defect of Pechmann and Stewart (1988) view (wear-in and wear-out effects) is that no cumulative effects of successive advertising exposure were considered. Our study based on the prior

research examines the effects of mobile advergame's repetition on two major outcome variables - attitudes and recall via customer engagement.

Zajonc (1968) suggested using the mere exposure theory to explain these effects, which postulates that advertising repetition can result in positive attitudes because it increases familiarity. Another most used theory in explaining the repetition effects is Berlyne's (1970) two-factor theory. It comprises two phases followed an inverted U-shape by considering that when exposed to an ad, the response is nonlinear. The first phase, called "wear-in," means that individuals become familiarized with the brand messages due to advertising repetition, which reflects a positive attitude (D. S. Cox & Cox, 1988), while the second phase, called "wear-out," is characterized by increasing boredom and irritation with over repetition, which diminishes positive attitude (Berlyne, 1970). However, that on which degree the negative attitude will be stronger than the positive attitude was not clearly demonstrated in advertising research (Burton et al., 2019; Lim et al., 2015; McCoy et al., 2017), especially for advergames. For examples, Lim et al. (2015) showed that brand messages are more credible when individuals are more exposed under advertising; McCoy et al. (2017) corroborated that more advertising exposure results in better attitude; and consumers' purchase intention becomes stronger when the exposure of advertising is higher (Burton et al., 2019). In advergame's research, (J. M. Chen et al., 2016) found that mobile advergames as creative advertising presented an immediate "wear-in" effect, showing little sign of "wearing-out" over repeated exposures (J. M. Chen et al., 2016).

Contingent factors moderating advertising repetition effects gets quite attention in advertising research. "Message spacing refers to the duration between each advertising exposure" (Schmidt & Eisend, 2015). Bornstein (1989) showed that message spacing can have positive impact on attitudes, revealing the assumption that there are stronger effects of advertising repetition on spaced advertising than on advertising repeated without spacing. One explanation about this contingency influence is that when advertising repetition goes on without any breaks in between, players might wear out quickly, which prevails the positive impact of familiarity. Previous research (Heflin & Haygood, 1985) showed that highly concentrated and massed repetition leads to the negative outcomes such as annoyance and adverse impressions. Advertising length also referred as "advertising duration" (Schmidt & Eisend, 2015) is defined as the duration of exposure to a stimulus advertisement. In general, the advertising repetition effects will be stronger for shorter advertising than for longer advertising. Bornstein (1989) shows that the positive effects of advertising repetition on attitude diminish if the audience are exposed to advertising for a long time. Pechmann and

Stewart (1988) support this view by observing that the exposure to a longer advertisement could result in quicker development of the negative effects that repetition has on attitude. The final important contingency factor which gets a lot of attention on moderating advertising repetition effects is advertising embedding. Advertisement could be embedded in a television show, magazine and other channels, to compete for attention. The advertising repetition effects become bigger, because consumers are exposed to both the stimulus brand and the competitive objects that distract them, which can result in less effective advertising (Kent, 1993). When advertising is not embedded, consumers stay focused and familiarity reaches quickly in accordance with negative factors developing quickly outweighing the positive factors.

The learning theory is the foundation for explaining advertising repetition effect, that is, when processing information, respondents establish links to objects and experiences that are already stored in memory. When the message is repeated, information is recalled more easily and more frequently, since the links with already stored information grow. In addition, repetition suppresses the recalling of non-advertised objects, which further reinforces the memory of the advertised object (Jin et al., 2008). Repetition was argued as the key successful factor (both subconsciously and consciously) in advertising recall (Ebbinghaus, 2013). In Ebbinghaus's study (2013), the learning curve explains how repetition increases the recall, where learning increases quickly with the first exposure, which leads to a rapid increase in recall. Although additional exposures will diminish this effect, it still grows until the information is fully obtained.

Another research related to advertising repetition effects is the direct influencing on affecting purchase intentions referred by Burton et al. (2019). In that study, information-process model (McGuire, 1978) and consumer decision making process stages (Engel et al., 1982) are core frameworks to support advertising repetitions to effectively affect purchase intentions via cognitive and affective aspects. The information-processing model (McGuire, 1978) shows the impact of advertising on the different stages in the persuasion process: from advertising exposure, to attention, to comprehension, to acceptance, to retention, and to buying behavior. The major premises of this framework are that firstly, advertising should have both affective and cognitive influences on affecting the buying decisions of consumers and secondly, the affective and cognitive mediators vary according to the step of decision process. The consumer decision making model underpins the role of purchase intentions guided by emotions early in the persuasion process (Engel et al., 1982).

2.5.3 Advergame repetition

Compared with TV ads or banners, mobile advergames make repetitive game play easier and more frequent. The advertising repetition effects become more significant. Additionally, due to the casual nature of games, players will be more voluntarily exposed to mobile advergames (Roettl et al., 2016). With that, players are expected to be more receptive to mobile advergames. Relatively, research related to advergames has put little attention on game exposure, with the majority of the existent work focused on in-game advertising (Y. Kim & Leng, 2017). Findings from previous studies (Cauberghe & Pelsmacker, 2010) show that game repetition is positively related to advertising effectiveness. For example, in Pascoal's (2013) study, that the more exposure to an advergame, the more positive brand preferences in the advergames and more brand selection was confirmed among children. Martí-Parreño et al. (2013) investigated the game players' responses and observed that increased brand repetition in video games leads to much higher brand recall and brand recognition. At the same time, Y. Kim and Leng (2017) found that there is a positive relationship between game repetition and brand recall and recognition, and subsequently attitudes toward advertising and purchase intentions are enhanced with frequent game exposure.

In addition to enhancing the effectiveness of mobile advergames, the replayability of games might also influence player's flow experiences. In gaming context, Chou and Ting (2003) firstly studied the relationship between game repetition and flow experience in advergames' research. Results in that study show that time spent on advergames is associated with flow experience, despite no direct causation was provided. On the one hand, studies showed that individuals who experience flow in an activity incline to repeat the activity (Csikszentmihalyi, 1990; Qin et al., 2010; Webster et al., 1993). On the other, scholars argued that if the playing experience is more repetitive or immersive, the player is more likely to get engaged or in flow (Seah & Cairns, 2008). Therefore, individuals spent more time on playing are more likely to experience flow (Khang et al., 2013; Nah et al., 2014). And the empirical comparison of the two models, Chou and Ting (2003) noted that game play repetition contributes to the flow experience. As the same, mobile advergames considered the game characteristics in mobile context, and higher game replayability will cause more flow experience, which is indicated by customer engagement in our study.

2.6 The interacting effects of advergame repetition

Content-related optimization of advertising is an often used approach, such as incorporating fear appeals, humor, or other communication strategies. Investigation of mobile advergame which is the incorporation of advertising in the mobile games, could offer efficient and profitable assist for marketing managers in investing their advertising budgets in conjunction with the popularity of mobile technology. Advergames in mobile can be downloaded by free or with low-cost, moreover, without time limitation to access mobile in almost anywhere makes access to advergames more easily. This easy access can increase the frequency of game replayable. A study related to mobile advergames effectiveness (Catalán et al., 2019) showed that game repetition marginally positively influences brand attitude. However, as a hot research topic, advertising repetition needs to be more deeply investigated in the context of mobile advergames. Referred to the “rule of three” and “two-factor” theories (Burton et al., 2019), we assume that the effects of “wear-in” and “wear-out” also exist in the context of mobile advergames where low level and high level of game repetition affect brand attitude and recognition differently.

2.6.1 The interaction of game repetition and advergame integration

In our study, we adopt the representative Berlyne’s two-factor theory which was initiated from 1970 and has been used to explain advertising repetition effects. There are two factors working in this theory, known as “wear-in” and “wear-out.” The “wear-in” factor indicates that initial repetitions of advertising bring familiarity which helps message penetrate. As a consequence, more positive affect will happen in the initial advertising repetition stage. Whereas the second factor, “wear-out,” means that over advertising repetition results in annoyance or boredom which, in turn, inhibits the likelihood of taking positive affect toward advertising. As the same, in mobile advergames context, as time going, the frequency of game repetitions will be increasing consecutively.

Compared with online advergames designed in computers or consoles, the ones in mobile devices make repetitive play easier. Because mobile devices can be easily carried around, players have access to advergames under any circumstance. Because of this difference, compared with computers, recent studies gave us suggestions that mobile advergames influence advertising effectiveness in a different way (Çadırcı & Gungor, 2019). Another characteristic of mobile advergames focuses on the integration of advertising and games in

mobile context. Scholars often argue that advergames in terms of blurring the boundaries of entertainment and advertising message with a complete integration of advertising and entertainment experience stimulate the shift of positive experience from game play to the promotion of brand (Redondo, 2012; Wise et al., 2008). Prior studies revealed that advergames are successful in engaging flow experiences (Roettl et al., 2016). Flow experiences have been associated with positive outcomes, such as development of a positive attitude and better evaluation forward advertising message (Hoffman & Novak, 2009). The continuous repetition caused by easy frequent access is beneficial to the companies, because the exposure of advertising to consumers becomes easier. And previous research has shown that repetition of advergames influences users' flow experiences (Chou & Ting, 2003).

In the game research literature, the attention on game replayability on advertising-related outcomes is relatively scarce. The majority of extant literature centers are around the topic of in-game advertising (Y. Kim & Leng, 2017) rather than pure advergames, research putting attentions on mobile advergames is few. The positive relationship between game repetition and advertising-related outcomes has been found in substantial previous research. Pascoal (2013) found that more preferences on brand embed in frequently exposed advergames when experimented with children. In a more recent study, Martí-Parreño et al. (2013) identified a link between greater video game exposure and higher brand recall and attitude. On the one hand, this increasing game repetition may diminish the affective effect of advergame integration transferred from game enjoyment. On the other, consecutive game repetition strengthens the familiarity of brand message, and more cognitive resources can be allocated to handle advertising message, which in turn, increase brand recognition. Based on above discussion, firstly, we propose the interacting effects of game repetition for advergame integration in the following hypotheses designed as:

H3-1: In mobile advergame context, game repetition will reinforce the effect of integration on brand recognition.

H3-2: In mobile advergame context, game repetition will reduce the effect of integration on brand attitude.

2.6.2 The interaction of game repetition and advergame difficulty

Secondly, to explain whether game repetition can adjust the effects of game difficulty on advertising effectiveness in mobile context, some insights can be got from the “flow” theory developed by fluency theory. Fluency theory consists of processing fluency, perceptual fluency and conceptual fluency.

Processing fluency based on learning theory is a well-known concept which has been widely used in advertising studies. Even few recent studies have combined the notion of process fluency into the context of advergames, it can still be regarded as a sound framework in investigating advertising effectiveness for studying mobile advergames. The explanation of processing fluency for advertising is described by the ease of converted and stored advertising information (Labroo & Lee, 2006). According to learning theory, if the cognitive conversion and storage of the advertising message become easier, information processing would then require less cognitive resources. In this case, both the feeling and the actual advertising message processing become much easier. This easiness brings a pleasant which enhance a positive effect. The easy access to mobile devices gives more opportunities to frequently replay mobile advergames. Following the two-factor (effect) theory (Berlyne, 1970), a high familiarity of adverting message will rapidly increase and the advertising information in mobile advergames will be more easily converted and stored. The enhancement of advertising effectiveness through this fluent information process will occur. Transferring this assumption into the specific field of mobile advergames, higher process fluency induced by frequent mobile advergames play encourages better memory and a more positive advertising evaluation. These will support our assumptions that game repetition will strengthen brand recognition and improve attitude to mobile advergames in difficult condition.

From the part of perceptual fluency, which is defined as the ease of identifying the physical features (Labroo & Lee, 2006), the multiple repetition of advertising exposure can enhance the simplicity of advertising message identification (Reber & Unkelbach, 2010). Moving toward mobile advergames, the latent advertising messages that are shown repeatedly because mobility can be processed more fluently, where the advertising message is more easily acknowledged. In line with the previous results on the mere exposure effect, the easier recognition of advertising message, the much more positive advertising effectiveness will be induced. When it comes to mobile advergames, the device and internet access mobility provide high possibility to present advertising repeatedly. Thus, the easy mobile advergames replayability leads to advertising message process more fluent, which generates positive affect and favorable feelings. Hence, perceptual fluency can also support our assumptions that game repetition can positively adjust brand recognition and brand attitude to mobile advergames in difficult condition.

Finally, the conceptual fluency refers to the ease of a specific target coming to the recipient's mind. By conceptual fluency, it is assumed that the easier a specific target comes into one's mind, the easier it will be processed (Kurilla & Westerman, 2008). Semantic

aspects, accessibility and contextual information can enhance the perceptual fluency. Conceptual fluency activates brain circuits through a specific target, which then enhances the ease of the target being accepted by the recipient. Again, the ease of this mental representation is a part of information processing like the higher process fluency. Analogous to process fluency and perceptual fluency, conceptual fluency results in positive affect spreading to information. When it comes to mobile advergames, frequent advergame repetition enhances the conceptual fluency, and hence various possibilities to use conceptual priming for better evaluation and attitude toward the target advertising message in mobile advergames context. Obviously and in sum, advergames as an exclusive advertising form serve as a conceptual prime in mobile context that improves conceptual fluency due to repeated advertising message processing, which then triggers positive feelings. This again leads to our assumptions that game repetition strengthens brand recognition and attitude for mobile advergames in difficult condition.

In our study, considering the high possible mobile advergames replayable with combination of flow theory and fluency theory, we propose that frequent game repetition improves advertising effectiveness from both brand recognition and brand attitude.

H4-1: In mobile advergame context, game repetition will strengthen brand recognition in difficult condition.

H4-2: In mobile advergame context, game repetition will improve brand attitude in difficult condition.

2.7 Customer engagement

2.7.1 Gamification and engagement

Gamification can be defined as applying game-designed elements and game principles into a non-game setting (Huotari & Hamari, 2012; Robson et al., 2015). According to some scholars (Deterding et al., 2011; Hamari, 2013; Hamari et al., 2014; Huotari & Hamari, 2012; Robson et al., 2015), gamification is often defined as the use or application of game features or elements to solve problems with a set of activities and processes. Gamification often relates to improve user engagement (Hamari, 2017; Hamari et al., 2014; Ruhi, 2016), organizational learning (Hamari, 2013), productivity and more. In e-marketing study, gamification has been broadly used as a tool for customer engagement for encouraging desired behaviors in the use of internet. For instance, gamification on social network services has been applicable to

increase engagement on sites, the website builder DevHub adding gamification elements into website design achieved from 10% to 80% increase in user number. Gamification application in SNS such as receiving points or badges through question-and-answer in Facebook and Twitter, the spreading links forms a viral word of mouth effect. In practice, gamification is extensively utilized in marketing. According to the report of Forbes Global 2000, over 70% companies use gamification in purpose to encourage and retain online customers. For example, Yahoo in 2011 launched its “Fango mobile app” which interacted with TV viewers with techniques like check-ins and badges. Starbucks in 2010 customized Foursquare badges to encourage customers by operating a campaign through offering discounts to customers who had most frequent visits to an individual local Starbucks. A collection of research for gamification revealed that gamification takes positive effects on individuals and organizations with existence of individual and contextual differences (Hamari et al., 2014; Koivisto & Hamari, 2014). Gamification forms a situation as game play through leveraging people’s natural impulses such as socializing, learning, mastery, competition, and self-expression (Lieberoth, 2015). Representative gamification strategies are offering incentives to players to encourage them to complete desired tasks or via players’ competition for engagement. In the context of gamification, these incentives could be points, badges or levels achievement, or a progress bar filling (Hamari & Eranti, 2011). An example of gamification strategy is that making rewards visible to other players for accomplishing tasks to encourage players to compete.

The initial study of games is about the idea of “Homo Ludens, Man Player” that put games at the heart of civilization’s development. Since then, scholars from different fields have attempted to give philosophical elaborations, conceptualizations, and classifications on games. Following this notion, games were introduced into marketing by early academic research by Holbrook et al. (1984), which built the ground for considering games as playful experiences. Prior research on gamification in digital marketing is divided into advergames and in-game advertising. As noted early, advergames are the form of entertainment-extended brand while in-game advertising is the embedding of brand or product message into a game context. Both these gamification advertising share consumers’ positive experience with interacting the company’s brand. Substantial previous research revealed that gamification produces an affective spillover on the brand or product. Researchers confirmed this truth that interactive gaming experiences contribute to consumers’ brand attitude and brand recall, particularly when customers casually browse online with no targeting product to buy in mind. Additionally, Cauberghe and Pelsmacker (2010) showed that repetition of interactions might

bore the players, while going through multiple game rounds could have negative impact on brand attitudes.

The common belief has been formed among firms is that for successful marketing, the key is creating compelling experience. The initial definition of engagement from Cambridge Dictionary means the agreement to "marry someone". For a business organization, engagement originally referred to that of the staff, which was described as "the simultaneous employment and expression of a person's preferred self in task behaviors that promote connections to work and to others, personal preference, and active, full role performance" (Kahn, 1990). With a focus on the psychological side, engagement is defined as "a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption", which proposed that engagement should be a persistent and pervasive cognitive-affective state (Schaufeli & Bakker, 2004). While customer engagement, which is defined by marketing scholars, adding the behavioral dimension, where the definition of it is customers' behavioral manifestation toward a brand or firm beyond purchase, which is resulted from motivational drivers including: word of mouth activity, recommendations, customer to customer interactions, blogging, writing reviews, and other similar activities. On the building of employee engagement literature, both psychological and behavioral dimensions are adding to the conceptualization of customer engagement. Anchoring this view, Brodie et al. (2011) defined customer engagement as follows:

"Customer engagement (CE) is a psychological state that occurs by virtue of interactive, co-creative customer experiences with a focal agent/object (e.g., a brand) in focal service relationships. It occurs under a specific set of context dependent conditions generating differing customer engagement levels; and exists as a dynamic, iterative process within service relationships that co-create value. Customer engagement plays a central role in a nomological network governing service relationships in which other relational concepts (e.g., involvement, loyalty) are antecedents and/or consequences in iterative CE processes. It is a multidimensional concept subject to a context- and/or stakeholder-specific expression of relevant cognitive, emotional and/or behavioral dimensions."

Gamification strategies have been increasingly adopted by companies to co-create such experiences with customers. Customer engagement is the cognitive and emotional connection between the characteristics of mobile advergames and the brand related outcomes. Customers who are strongly engaged are more loyal to the brand and result in better advertising effects. Sound customer experience is a key factor to engage customers. Gallup research showed that the revenue generated by highly-engaged customers is 23% higher than the average.

Advergames which are often developed on top of the templates of popular mobile games in order to promote a product or service, are encouraging customers' loyalty and product education. Previous studies have suggested that brand engagement as an experimental state that comes from the brand interactions can connect consumers' flow experiences to positive brand related outcomes on both cognitive and affective effects. As prior studies mentioned, both affective and cognitive experiences can be evoked by the flow (Moneta & Csikszentmihalyi, 1996), and in turn, cause emotive/cognitive dimensions of the process of engagement in the virtual context (Calder et al., 2009; Mollen & Wilson, 2010). Therefore, we assume that the characteristics of mobile advergames influence advertising effectiveness via customer engagement from both affective and cognitive aspects.

2.7.2 Advergames and customer engagement

More recently, customer brand engagement has emerged with the dynamics of focal customer/brand relationships as the focus. Relative to traditional concepts, such as “involvement,” customer engagement is assumed to give a holistic view of the relations between customers and a certain interactive brand. Customer brand engagement is interpreted as the cognitive, emotional and behavioral activities associated with the brand during or related to focal consumer or brand interactions. In our study, we derive two customer brand engagement dimensions, including emotional engagement and cognitive engagement in mobile advergames. Because there has been a “conceptual fuzziness” persistent in the body of engagement research (Halverson & Graham, 2019), especially related to distinguishing between indicators of behavioral and cognitive engagements. Behaviors that can be observed are usually the access to cognitive process, which could lead to problems, therefore observations of cognitive and behavioral engagements might be easily confused. Halverson and Graham (2019) addressed this issue by removing behavioral engagement as a key indicator, while Beneliyahu et al. (2018) built a combined indicator known as “behavioral-cognitive engagement.” Our study postulates that the characteristics of mobile advergames (e.g., advergame integration, advergame difficulty) act as the antecedents of customer brand engagement, and the brand effectiveness (attitude and recognition) present the key consequences.

The popularization of advertising applications with characteristics of a game has driven a new move for advertising - advergames. Advergames are the gamification of advertising and gamification is rapidly emerging in a growing number of organizations for the sake of higher customer engagement. In spite of this momentum and the potential of combining gamification

into advertising, models are absent in the marketing research which elaborate upon the application of gamification in advertising for its effects on customers' attitudes toward brand via engagements. Thanks to the higher productivity and advancement of internet technologies, customers now have more choices about the way of and the place for killing time. As a result, companies have to come up with new ways to change their advertising strategies to better capture and sustain customers' attention. The advertising domain is usually characterized by strong innovation and complexity in implementing new ideas and creating new phenomena. Consequently, a large number of advertisers turned to advergames for brand communication, taking measures such as getting points, badges and free products by playing games or participating in competitions. Firms can also attract the users, enroll them into a community, encourage them to participate actively, to share with their friends and even introduce their own friends to the community. Therefore, gamification experiences that are especially appealing, dynamic and continuous with mobile advergames can help deliver a diverse array of advertising goals.

As the process of advergames is normally instilling messages about the product or brand into games, it motives the learning of information and joining or sustaining an action of the participants - in our case, engaging with advergames - since that is the gamification effects of advergames. As a result, stronger motivation behind players encourages them to engage in the activity and appreciate it as a fun experience. There are two main intrinsic motivation theories which can be used to interpret the psychological dimensions related to the participation or engagement behavior. The theory of "16 basic desires" was used to understand inherent human desires and the basis for collaborative engagement in business, offering useful tools to decipher and predict human behaviors, including order, power, independence, curiosity, acceptance, saving, idealism, honor, social contact, family, status, vengeance, romance, eating, physical activity and tranquility. Furthermore, the self-determinant theory (SDT) (Deci & Ryan, 1985) constructed a motivation model to examine the initiation and regulation of human behaviors. It identifies social and environmental factors influencing the will and engagement of an individual in the activity. Both psychological needs and cognition motivations are considered in this theory, elaborating on the needs for autonomy, competency, and relatedness. Therefore, one thing to be noted is that both theories model a strong link between the natural desires of people, and social facets and cognition. In the context of gamification for advertising, the behavioral attitude of players might get influenced when social needs and cognitive motivations are inherently mingled with "play."

2.7.3 Mediating effects of customer engagement

The key to success for advergaming is to understand how to maximally utilize technological trends while creating a gamer-engaging experience (Goh & Ping, 2014; Mirbagheri & Najmi, 2019; Yang et al., 2017). Engagements were studied as positive effects of gamification (Xu et al., 2017). Under the immersive environment of game playing, advergames engage users in an enjoyable way and entertain them to create a long time of engagements. These engagements offer a list of benefits, such as brand aware raising, brand memory enhancing or customer loyalty improving (Sreejesh & Anusree, 2017; Xu et al., 2017).

The current internet layout has evolved quickly, over the last ten years, a quick shift from online internet to mobile internet causes a change on how industry reaches their customers. A company wants to survive in the current communication environment, a change with an interactive two-way of company and consumer communications to mobile internet is need. From a blog of Harvard Business Review (2011), the principal analyst and CEO of Constellation Research, declared that engagement is an important way to let customers interact with company, which in turn, leads to firm success. Practitioners and researchers are convinced that engagement is a best way to allow customers to participate, which in turn, to interact with the companies. An issue is raised that engagement with consumers is generated by having a game to replace real experience.

Mobile advergames engage customers in multiple different ways such as free download, watching, sharing, experiencing or playing content offered by firms. Advergames let customers interact with firms' product, brand or other information through a video game. These games make customers very important persons who will be voluntarily participating and interacting with company's campaign, which in turn results in customer engagement. It is possible that marketing teams view customer engagement as a very specific point of focus. And the engagement definition should be added with cognitive and affective view. From the academic perspective, we have to admit that the concept of engagement has been examined from various fields. Some arguments centering around the cognitive dimension relevant to engagement, some considers engagement as an instinctively emotional form different from attention. A processing of advertisement even concerns subconsciousness and emotions. Additionally some views suggest that, engagement is a hybrid of audience synchrony and intensity (e.g., the cognitive attention and the emotional affect). In online marketing, researchers mentioned that advertisements should not be seen simply as interruption and repetition anymore, instead, more relevance and interaction should be focused. An

engagement model should integrate cognitive, affective and behavioral aspects should be used to build relations with customers. In this engagement model, it is necessary to connect consumers and brand emotionally. Additionally, engagement in that model has a close relation with the social context. Therefore, customer experience that encourages conversation is critical for the industry because such conversation will in turn affect how engaged the users are.

Hence, in our study, we applied cognitive engagement and emotional engagement in mobile context to examine the role of the features of advergames affecting advertising effectiveness. The concept of online customer engagement is related to the cognitive state of consumers and the environment. Customers engaging online are immensely absorbed in searching, understanding, examining and synopsizing the information they find in the online context. Unconsciously, the customers are inclined to gain a better understanding of the firm, brand and product. Previous research showed that a stronger feeling of brand loyalty will be increased when consumers are cognitively engaged (Howard & Sheth, 1969; Tyebjee, 1977). If a customer is cognitively involved, he/she will acquire much more knowledge about the brand (Shang et al., 2006). From the affective angle, online customer engagement can be expressed as satisfying the customers by active and effective presence to bond with customers emotionally. According to Dick and Basu's (1994) research, there is a possibility that a direct link between positive affective feelings and high level of customer loyalty. Scholars (Chaudhuri & Holbrook, 2001; Matzler et al., 2008) did find a positive connection between loyalty and affect.

Following the suggestion of A. Berger et al. (2018), in our study, we assume customer engagement as cognitive engagement, emotional engagement and assume that customer engagement bridges the paths from unique mobile advergames' features to affect advertising effectiveness. Cognitive engagement of mobile advergames experiences customers absorbed in the practice of understanding, playing the games unconsciously know more about the brand, product and company. This will be much more helpful to enhance the recognition of brand inserted in the game. Emotional engagement of mobile advergames can create consumer gratification which in turn emotionally bond customers with brand. This will enhance the customers' brand attitude when enjoying advergame play. So, the following hypotheses are proposed in our study:

H5-1: Emotional engagement of mobile advergames improves brand attitude.

H5-2: Cognitive engagement of mobile advergames increases brand recognition.

Instead of forced exposure possessed by general internet interstitial advertising (Edwards

et al., 2002; Wang & Chou, 2019) and product-embedding within commercial video games like IGA (Y. Kim & Leng, 2017), the brands and products are principal characteristics of advergames (Tina & Buckner, 2006) which almost completely integrate a brand or product into the entertainment context (Redondo, 2012; Wise et al., 2008). Compared with general internet advertising, this integration of advergames works better as it seizes consumers' attention and could result in hours of engagement (Cicchirillo & Mabry, 2016). This integration of advertising and games can interact customers with brand and transfer the positive attitudes to players, which has effects on both attention and attitude towards brand inserted in games.

Advergame, as a form of branded entertainment, is the videogame designed around a brand. In a detail, advergames execute from a simple existing, well-known videogame with the purpose of featuring the brand in the videogame to create more elaborated online experiences with the branded product. In this situation, advergaming is a branded entertainment representing a smallest but fastest growing marketing effort. The advancements of internet technology contributes to the surge of brands, and the advergames as a part of advertising strategies has been utilized to engage youngsters who are increasingly shifting from traditional physical media to online interactive media.

As noted earlier, in contrast to other forms of placing advertising in traditional forms, in advergames, a video game is included as a part of advergaming execution represented as a unique branded entertainment form for sponsoring brand, making the game a kind of brand information (Deal, 2005). This creation of entertaining elements in advertising enables a mixed way of brand messaging. By merging advertiser control existing in conventional advertising within an entertainment communication context, the distinctive features of advergames boast great potential in conveying the advertising information engagingly with significantly lower cost compared with conventional channels. Additionally, advergames are a direct form of brand advertising instead of other branded entertainment forms, which justify the conceptualization of the attitude toward the game as a type of attitude toward the advertising, and this has been extensively investigated by advertising researchers (Brown & Stayman, 1992). Looking back at these studies, most research revealed that the interest in attitude toward advertising is theoretically related to attitude about the brand. Accordingly, the possible variations in the well-established relationship, namely, in the strength between attitude toward advertising and attitude toward the brand are of theoretical significance for studying the effects of advergame integration on influencing attitude toward brand inserted in it. The connection between attitude toward advertising and that toward brand has formed in

substantial established advertising models (e.g., MacKenzie & Lutz, 1989), but specified interactive forms that mediate the connection between attitude toward advertising and that toward the brand in advergame context have not yet got sufficient attention. Such knowledge should be leveraged to identify the modes of interactive advertising such as advergames to investigate the attributes of advergames in influencing this engaging advertising form. If insights from these specific production features can improve the effectiveness of this engaging advertising form, more strategical advertising insights can be got.

The study of advergame integration can be seen as the research development on advertising congruency or connection. Only a few studies have addressed impact of integrating entertaining content with the embedded brand, particular for advergames. In traditional advertising context, positive connection between television shows and the modes of product placement on brand evaluations has been found (Russell, 2002). In M. Lee and Faber's (2007) study, they proposed the significant role of placing products in games, the congruity of games context and advertising which the degree of the product category should relate to the content of the game, and moreover, a positive relationship between the congruity of embedded brands and the game content and brand memory (represented by brand recall) was examined in their study. Accordingly, the rigorous examples that product placement in games can be done for advergames, indicating the advergame integration can effectively affect brand effectiveness from both affective and cognitive aspects. An advergame, containing only one brand, does not need any other resources to process or respond to other subjects in this context. This offers more opportunities to detail the relation between the game and brand, and more cognitive resources can be used to process this special connection. In turn, a more effective consistency or thematic connection between game and brand memory or brand attitude will be formed.

In traditional advertising study, the results of product placement in movies or TV showed that congruency and thematic connections of brand and media capture plentiful effects. The mental model and motor activities in advergames may differ from traditional advertising forms because of the interactive nature of advergames (Nicovich, 2005). Specifically, viewing a movie or television program much more likes a passive activity, the degree of attentions on playing advergames are different from the mere viewing in traditional advertising. Thus, brand placement (brand integrating in videogame) in advergames may be more favorable, but not as much memorable, because the primary focus may be put on game playing instead of the processing of brand. Only additional cognitive resources can be used in processing brand messages inserted in advergames (Grigorovici & Constantin, 2004). However, empirical

research related to gaming and advertising revealed low brand recall for brand placements in video games (Chaney et al., 2004), yet quite a lot of advergame studies specifically unveil higher brand recall (Tina & Buckner, 2006). Online or console games and advergames have different memory effects, which could be one of the potentially interesting distinctions for different branded entertainment executions.

From the perspective of advertising persuasion, the link of a brand and the game content imposes positive impacts on persuasion because of the game playfulness. In a study by Shamdasani et al. (2001), banner ads placed on websites highly relevant to the product result in better attitude toward the ads. As a result, the more positive attitude toward the brand which may create a higher purchase intention was induced. In traditional advertising study, brand placement in television program elicits more favorable attitudes in related placements (Russell, 2002). Based on that, we assume that the positive effects of connections between advertising brand and related video games will extend to the advergames context.

Previous advertising research shows us that the thematic connection can bring effective advertising effectiveness, however, the relationship between specific attitudes seems scant. The examination of the relationship between attitude toward the video games and attitude toward brand inserted in advergames offers a space for filling this research gap. The models in examining the relationships between attitude toward advertising and attitude toward brand provide the most support to use dual mediation in explaining these relationships, in which attitude toward advertising both directly by attitude toward ad brands and through an indirect connection via brand cognition with attitude toward brand was found (Brown & Stayman, 1992; Lutz et al., 1983). Elaboration likelihood model (ELM) of persuasion was provided as the theoretical ground in explaining the relationship between attitude toward advertising and that toward brand, where their direct connection was explained by results from information processing via peripheral path of the ELM, and the indirect relationship by affecting brand cognition which in turn impacts attitude toward the brand was explained by the central path of ELM (Miniard et al., 1990). Advergames present a unique chance for scholars to examine the various dynamics of the relationship between attitude toward advertising and that toward brand in the branded entertainment. The easy manipulation feature of games can adjust the changes in customers attitudes. Prior studies supported that the positive attitudes triggered by exposing to the advertising transform to positive attitudes toward the brands through conditioning procedures (Allen & Janiszewski, 1989). This specific mechanism, referred as direct affect transfer (J. Kim et al., 1996), concerns attitude conditioning through the transfer of positive impact brought about by exposure to a conditioned stimulus (i.e., advergame) and

to an unconditioned one (i.e., the brand). Attitude of advergames can be conditioned cognitively, because player's attitudes towards brand are triggered by compelling visual images in video games cognitively and directly. This mechanism makes sense in considering the exposure to brand information engaged by both cognitive and emotional processes because game playing is intertwined with human information processing system.

Players infer a brand from the messages they receive from the advergame and transfer the positive emotions triggered by the game to the brand. The characteristics of advergames make the conditioning of attitude easier for people, which will reinforce the connection between attitude toward the game and that toward the brand. In addition, the advergames characteristics make it difficult to engage in limited procedures that diminish this connection. Advergames integration, the thematic link between game and brand can be such a mechanism. To process information in advergames, information needs to be encoded from game playing into the working memory of brand which will be stored as a long-term memory, retrievable in the future when consumers want to evaluate and make decisions (Lang, 2006). Human memory is conceptualized as a complete network. The attributes of objects and beliefs indicate that the messages acquired in advergames are kept in interconnected nodes. Lang (2006) proposed that the strength and number of connections between the nodes containing the information from a media message determine how well the message becomes stored in memory and, ultimately, how easily it can be retrieved.

Additionally, beside information processing for the ad and brand, attitudes are also stored in the related network (Roskos-Ewoldsen, 2002). Therefore, the evaluative experience of game playing in the advergames and attitudes toward advergames are represented as interconnected nodes in associative memory network. As noted above, brand attitude conditioning concerns systematically matching advertising information (i.e., advergames) with existing information (game play) to the brand. The game reinforces this pairing, leading to stronger associations in memory between the attitude toward the game and that toward the brand. Thus, a closer thematic association between the advergame and the brand consolidates the pairing between the game and brand, creating a stronger link between conditioned brand attitude and attitude toward the game in people's associative memory networks. This pattern of attitude conditioning is more prominent in the connection between attitude toward game and that toward brand. This is because that advergames have stronger thematic association with brands. In a nutshell, the following research hypotheses are designed for this study.

H6-1: Advergame integration will facilitate emotional engagement in mobile context.

H6-2: Advergame integration will facilitate cognitive engagement in mobile context.

According to the theories of LC4MP and DDA, when game difficulty is over the optimally challenging point, not enough cognitive resources can be allocated to handle advertising messages and game play frustration will occur. These outcomes will prevent both cognitive and emotional engagement of mobile advergames.

Game difficulty is a critical and difficult factor for the setting of advergames. Game difficulty level of players advances with continuous game playing. However, advergame developers often use pre-defined curves to manipulate game difficulty level. In contrast to static difficulty, dynamic difficulty adjustment (DDA) capable of predicting players' future state might be the right direction for advergames difficulty design. First, game players vary largely in experiences, skills, learning state, hence, the diversity among players is large. To the same game difficult levels, different players will react differently. Second, for an individual player, the preferred difficulty level is constantly changing with individual experience culminating and skill increasing. Based on that the degree of game failure frustration is different among the players who lose the first attempt to a level versus those who are defeated after multiple failures. DDA exhibits diversity in the adjustment of difficulty according to the given current difficulty. The proper game difficulty adjustment makes a level easier for the discouraged player, which helps achieve an optimal benefit.

Hence, it is necessary to set the optimal difficulty level according to the features of a specific player, for example, current experience state, skill level, emotional status (Gilleade et al., 2005; Sweetser & Wyeth, 2005), which will satisfy the general players. If the players are asked to choose the static difficulty levels by themselves, they might get overwhelmed or worn out since it is possible that they fail to find the right level to their skills (Koster, 2013). Furthermore, players could be irritated if they need to frequently select the difficulty level and their playing experience gets interrupted (J. Chen, 2007). To deal with this, DDA mechanism has been investigated in a growing number of studies related to computer games. The application of DDA in utilizing mobile advergames' characteristics for optimal advertising effectiveness offers a number of insights. If possible, automatically adjusting game difficulty level to enable game player's playing experience tailored to the individual characteristics can satisfy game players from frustration. The cases in supporting the crucial importance of game difficult level were revealed in a substantial related research. For instance, the "challenge function" developed by using heuristics (e.g., time to complete a task and rate of successful shots) to map a given game state into a value that specifies the difficulty felt by a user. To understand the best strategies in a fighting game, Andrade et al. (2005) and Spronck et al. (2006) employed dynamic difficulty strategies to choose the suboptimal actions to match the

players' performance when necessary and to modify the probability of success or failure rate on a rule-based approach.

As noted in a study by Pagulayan et al. (2002), the affective experience is the computer game's paramount evaluation factor affected by the environment of the game, but not from the user's performance. Previous research related to video games revealed that the standard of performance-based usability methods may not be enough to review gaming experience and affective aspects of game should also be examined. Mandryk and Atkins (2007) looked at the emotional experience as the key measure of game playing and used fuzzy physiological approach to determine the underlying affective states related games to game play in an off-line manner. Recently, the concept of "Affective Gaming" was put forward, as an echo of the game emotional research trend. Gilleade and Allanson (2003) and Sykes and Brown (2003) have focused on the affective factors of computer games in design and adaptation. Game players can play for various motives, among which, as an intrinsic motivation, affective factor still takes the important role. Deriving satisfaction for game players, the emotional effects, in completing difficult tasks, considerable attention should be put on the difficulty level even players have been defeated for several times. However, for excellent players it is appropriate to adjust the game difficulty level according to their current state. The affective state of a player is crucial for game playing experience, when applying the DDA mechanism, both players' performance and affective state information should be considered.

In order to meaningfully enhance engagement, video games (Connolly et al., 2012; Gee, 2007) and gamification (Hamari et al., 2014) as promoting emotional effects have been observed in a number of studies. In the ideal game setting, players can be satisfied to enjoy advergame playing. The focus within an advergame also should be easy at the beginning and get difficult progressively to meet game players' skill developing. Players are encouraged to learn, and accumulating playing experiences and increasing play skills is a process of exploring and contemplating the virtual world in the game. Underlying a clear reward setting, advergames players need to reach the set goal. This makes sense for information process, which also becomes intrinsic to advergame play. As McGonigal (2011) observed: "In a good computer or video game you're always playing on the very edge of your skill level, always on the brink of falling off. When you do fall off, you feel the urge to climb back on. That's because there is virtually nothing as engaging as this state of working at the very limits of your ability" Game playing has attracted game players' attention in ways that get players continuously excited for hours, or even weeks. Players constantly improve their skills and knowledge as long as they continue to play. Among game's studies, scholars try to improve

play experience based on interrelated principles of challenge, skills, engagement and immersion. In this context, engagement and learning are needed to keep players moving forward in the game. The development of entertainment games has induced a lot of benefits in players' engagement and learning. Integrating advertising and video games, utilizing playing characteristics into the mental state was referred to by Csikszentmihalyi (1990) as the "flow." It is a state of mind featuring focused attention and greater fun during intrinsically interesting activities.

Flow research using higher skills in demanding tasks leads to profound concentration, assimilation, or immersion. The flow is also associated with learning, skill development, academic results, and creative accomplishment in an occupation. In a game-based advertising context, specifically, advergames as a marketing gamification strategy become more and more common to invoke customer engagement. Studies related to game technologies bring about flow experiences and take the potential to affect customer engagement (Barzilai & Blau, 2014; Hung et al., 2015; Sabourin & Lester, 2013), even if there are no empirical research to identify prominent association between game difficulty and customer engagement in advergames context. Therefore, investigating the characteristics of mobile advergames resulting in customer engagement is essential in academic and practical developments. Specifically, which conditions are theoretically regarded as fundamental to players' flow experience, to what extent do such conditions result in higher engagement and immersion, and to what extent are conditions for flow and the engagement or immersion may be generated in relation to learning through mobile advergames.

The subjective experience of flow, according to Csikszentmihalyi (1990)'s theory, is strengthened by certain experiential conditions or properties of the task. These conditions depend on the meet of high level of a player's skill and a significant challenge. A more comprehensive explanation revealed that an activity should be neither too easy, nor impossibly difficult and achieving the success is doable with sincere and concerted effort. Typically, in the balanced condition where the challenge meets the skill, individuals stretch their skills to their limits in pursuit of a challenging goal. However, when the higher challenge is over the combined skill, anxiety will be resulted which considers the various combinations of challenges and skills in predicting distinct psychological states: apathy (low challenge vs low skill), relaxation (high skill vs low challenge), flow (high challenge vs high skill), and anxiety (high challenge vs low skill).

H7-1: Over optimally challenging point, game difficulty will prevent emotional engagement in mobile context.

H7-2: Over optimally challenging point, game difficulty will prevent cognitive engagement in mobile context.

2.7.4 Proposed research model

Put together, through the above review of the literature and the conceptualization of mobile advergames' features, customer engagement, and brand effectiveness, a deep inductive meaning association between them are designed. The theories and conceptualizations drawn from marketing and IS field, as well as social sciences and some exploratory research, provide a rich and multifaceted basis for forming our research framework, one is that describes the associations between mobile advergames' features and brand effectiveness via customer engagement.

Hence, the proposed relationships between advergame difficulty, advergame integration and brand effectiveness via customer engagement are presented in the following Figure 2.1.

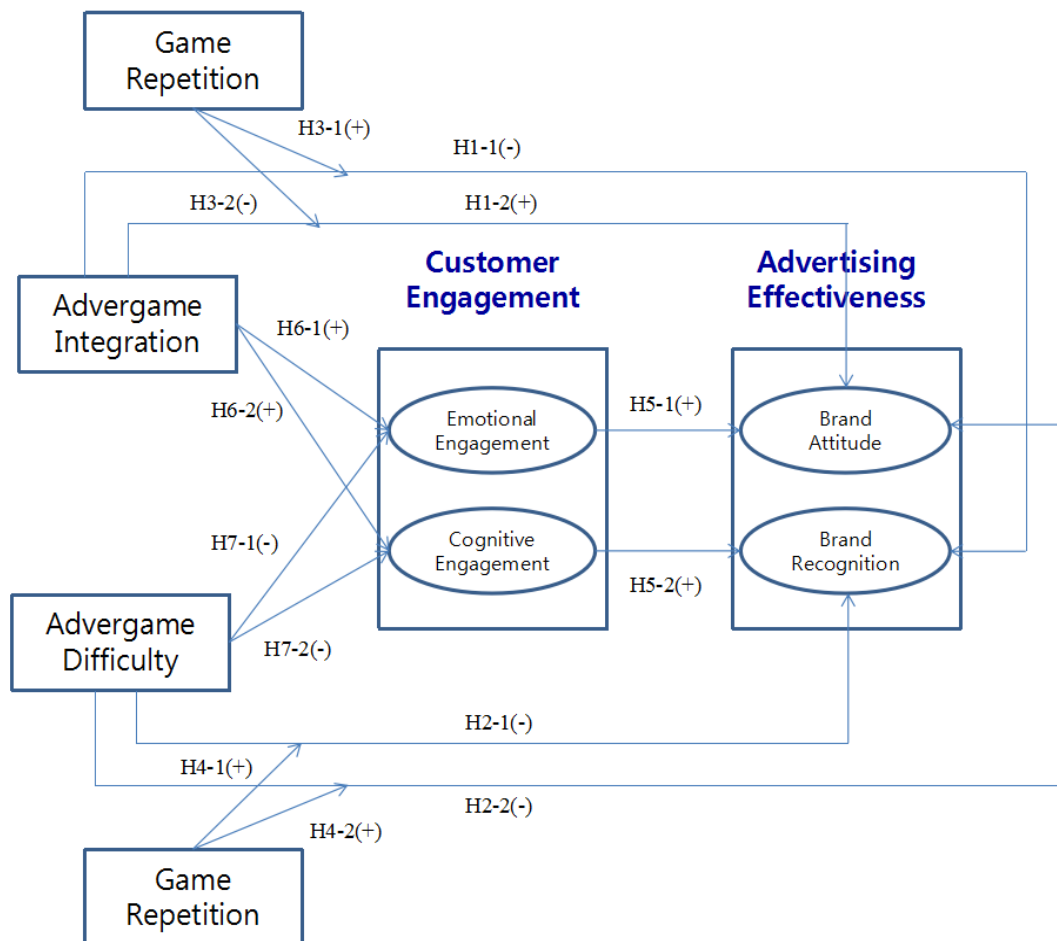


Figure 2.1 Research framework

Figure 2.1 suggests the research framework in our study that helps explain the key variables and their relations for analysis built on how the characteristics of mobile

advergames influence advertising effectiveness via customer engagement. The conceptualization research framework is used throughout our whole research.

2.8 Summary

In this chapter, we developed the conceptual research framework for our study. Through the beginning of literature review of information integration and game difficulty, we identified the meanings and research gaps in the mobile advergames' research. Then, the identification of advergame integration and advergame difficulty in mobile context, and their relationships with brand effectiveness in both emotional and cognitive aspects are proposed. By doing so, a contingency effect of play repetition with considering time varying is used in our study to test the cross-level interaction in adjusting the relationships of mobile advergames' features (advergame integration and advergame difficulty) on influencing brand effectiveness.

Upon this, a conceptual research model is framed, proffering a range of antecedents and outcomes of advergames in mobile. Then, considering the engagement induced from gamification, we introduce customer engagement in both emotional and cognitive aspects. Finally, we close this chapter by introducing the mediating effects of customer engagement between advergame features and brand effectiveness.

In this chapter, we reviewed the research literature on advergame integration, advergame difficulty, advertising repetition and customer engagement, and uncover the most stringent research gaps in mobile advergames at the same time. Guided by the research purposes specified in Chapter 1, a number of key issues related to advergames in mobile have been approached. Research literature review shows that we should put more attention on the effects of advergame features, specifically, in the mobile context. Based on this, our study identifies the advergame integration and advergame difficulty, particularly, for advertising repetition, we exploit the effects of mobile advergames' replayability. As an encouraging notion, gamification is interactive, engaging, social and multidimensional. Studies of gamification and advertising, specifically for advergames, remain best exploratory. A better approach to explore and exploit advergames' features in mobile and develop measures to capture these concepts is the research gap in advergame literature and is urgent.

Chapter 3: Research Method

3.1 Introduction

This chapter derives decisions concerning the methodology referred to by Bryman (2016). And a detailed process of research to gain knowledge in this context given to each aspect of methodology is outlined. Taken together, this chapter details each methodology to deliver the study's objectives and offers a rational, strategic, and tactical process of research design. Firstly, following the study objectives and purpose, a paradigm instance is derived and contended in detail. Then, the procedure of data collection is outlined, focusing on the research measures creation and validation. The issue related to samples is addressed by describing the approach to sampling, response bias, and the characteristics of samples. Data analytic techniques are introduced in the last part. This chapter elaborates the elements of research method relevant to study validation with a Chinese-speaking sample. This chapter gives a detailed description of each aspect of instrument development, management and sampling.

The research paradigm, or a research world view, is a number of shared and interrelated assumptions within the research society among the researchers (Kuhn, 2012). Research framework is fundamental as the guide to find out research problems and provide principles and criteria for selecting suitable tools to conduct the investigation (Filstead, 1979). In the research paradigm, a set of philosophical assumptions consisting of the stances of positivism, post-positivism, critical realism, and constructivism correspond to the basic beliefs including ontology, epistemology and methodology. Ontology addresses the essence of reality, whereas epistemology deals with the relationships between researchers and the research (Creswell & Poth, 2016).

In accordance with the research purposes and research questions, in this context, the paradigmatic stance is derived by post-positivism. Positivism “traces its origins back to the great social theorists of the nineteenth century and especially to Auguste Comte and Emile Durkheim. The positivists seek to the facts or causes of social phenomena with little regard to the subjective states of individuals” (Bogdan et al., 1975). This study is rather than guided by a positivist agenda with seeking truth in causality. In positivism stance, a single truth is

assessed and examined with total objectivity regardless of the interrelation between researchers and the research. Social reality, according to the positivism assumptions, comprises objective facts which require researchers to accurately quantify and leverage statistics to examine causal relationships. However, positivism implementing with deductive inquiry to test the general law provides a place where replication and falsification principles are significant. Hence, the central point of customer engagement in mobile advergames steers the adequate paradigm toward a post-positivist approach.

Post-positivism as a product of positivism is similar to but still different from objective ontology and objective epistemology. In our study, objectivism and a modified epistemology from the objectivist perspective are adopted. For objective ontology, a belief of an objective reality exists, and this study aims at accurately representing this reality. According to Johnson and Duberley (2000), social structures are dynamic, contingent, and negotiated in nature, as well as individuals create the active role which they are apprehended. By deriving the post-positivism stance, we aim to apprehend the reality on the ontological and epistemological grounds with admitting that this study cannot be conducted perfectly because of the uncertainties of observations.

Post-positivism is connected to quantitative study and favors deductive research hypotheses testing with theory verification. While positivist assumes that researchers and the researched are two separate sides, this background was accepted by post-positivists who believe that the knowledge and value of individuals may affect the observation and this nature cannot be completely comprehended. In post-positivism, scientific and deductive hypotheses testing are still preferred, however, more structured and qualitative approaches made post-positivism more advanced than positivism. Put together, this study follows a series of logical steps, consistent with post-positivism, where methods are predominantly quantitative with use of qualitative data sometimes to inform an adjusting quantitative phase. Referred by Bryman (2016), deductivism also contains inductive components. Therefore, this study contains qualitative enquiry elements to assist a predominant quantitative focus with a longitudinal experiment design. Under measuring customer engagement, the core quantitative phases are complemented by a sequential approach in investigating the relationships between the characteristics of mobile advergames mainly consisting of replayability, advergame integration and advergame difficulty, and brand effects inserted in it.

3.2 Study setting

3.2.1 Advergames in mobile media

This research is placed against the larger context of mobile media, with a greater emphasis especially on a series of T tests conducted in WeChat platform (a popular mobile social media in China). Four types of game links operating in four undergraduate classes in a university in southwest China were conducted to test whether the manipulations of advergame integration and difficulty are successful. A total of 146 undergraduate students were selected to conduct these experiments between four groups (built via WeChat). Some research revealed the advantages of investigating customer engagement in mobile media. Firstly, the relationships between individuals and between individuals and brand can be fostered in mobile media by engaging in asynchronous and synchronous communications. Secondly, a fundamental premise of user-generated content (UGC) can be re-generated and developed in mobile media by various users in a sustained and collaborative way conveniently, which make mobile media extremely popular in a bigger term that covers different types of media content easily accessible and created by end users from text, audio to videos. The convenience of access among various users provides grounds by satisfying users' need to give out and get information. According to the above two reasons, in our experiment designs, four game links developed from two games (mobile advergame product from SanSide Co., Ltd: <http://demo.sanside.net/index.html>) were used. Game difficulty is dependent on time and characteristic adjusting. The detailed game descriptions are displayed in the Annexes. The interface of TianBing Ice Cream (天冰冰淇淋) is presented in Appended Figure 1.

Game instruction:

1. The player has 150 seconds (easy condition) to accumulate as many points as possible by horizontally/vertically matching 3 or more of the same icons;
2. The final total game point is determined by the player's highest daily score;
3. The player can earn at least 2 points by connecting three or more of the same icons in the game and the more connections the player is able to make, the more points he/she earns;
4. The player can earn double points by connecting 5 or more at the same icons and more points will be earned if 3 bomb icons are side-by-side connected horizontally/vertically;
5. Connection method: The player must slide the icons vertically or horizontally in order to connect identical icons. Additional icons will automatically be replenished in order to maintain a full screen. If through the course of replenishment, 3 or more of the same icons are

in a horizontal/vertical pattern, points will be earned automatically.

Prize settings:

1. First prize (awarded to one subject with the highest points in total): He/she will receive a ¥100 e-red packet;
2. Second prize (awarded to two subjects with the second and third highest points in total): They will each receive a ¥50 e-red packet;
3. Third prize (awarded to five subjects who ranged from the fourth to eighth highest points in total): they will each receive a ¥25 e-red packet.

The interface of SanQuan Rice Dumplings (三全汤圆) is illustrated in Appended Figure 2.

Game instruction:

1. The player has 120 seconds to accumulate as many points as possible by horizontally/vertically matching 3 or more of the same icons;
2. The final total game point is determined by the player's highest daily score;
3. Aim the launch ball by tapping the screen when game starts and try to earn as many points as possible by connecting the balls of the same color within the allotted time;
4. During game play, if the ball enters the cave, the game will be over;
5. More points will be earned if more of the same colored balls are connected. Randomly issued special balls earn more points and the bomb ball can clear up other colored balls in the area launched and the static ball can make a pause of 5 seconds.

Prize settings:

1. First prize (awarded to one subject with the highest points in total): He/she will receive a ¥100 e-red packet;
2. Second prize (awarded to two subjects with the second and third highest points in total): They will each receive a ¥50 e-red packet;
3. Third prize (awarded to five subjects who ranged from the fourth to eighth highest points in total): They will each receive a ¥25 e-red packet.

3.2.2 Data collection

This section takes into consideration of various stages of data collection in answering the research questions and testing the research hypotheses. Firstly, the research factors instruments were addressed, followed by the administrating approach and pre-test. A rigorous design process was employed, including a series of decisions on question content

(measurement selection, word typing and questions asked), the sequence, and the online form. With the above stages, re-examined steps ensure that the final instrument is rational and in tune.

What to ask in the questionnaire is closely related to measuring the sources of existing scales utilized and modified to explain the mobile advergame features (advergame integration, advergame difficulty) and customer engagement, as well as brand effectiveness. When adapting the current scales and creating new ones purposefully, according to Churchill and Iacobucci (2006) and Bryman (2016), precise and completed questions are cared. With these guides, each question underlying the focal factors in the online questionnaires is ensured to be explicit enough to avoid any misunderstanding from the respondents when measuring each facet of the research questions. In the online survey, closed questions were used. It is regarded as the most suitable method for self-administrated survey (Czaja & Blair, 2005). The following advantages such as the ease of information recording, ensuring response format homogeneity and saving analysis time are referred by Buckingham and Saunders (2004). To be more specific, 7-point Likert scales were anchoring in testing the strength and direction of mobile advergames' characteristic factors and customer engagement, as well as brand effectiveness.

Strictly speaking, Likert scales are ordinal, the extensive application of Likert scale for interval based analysis like regression analysis and factor analysis are highly relevant to our research context. The even and equal distance based on Likert scale is considered in the optimal prerequisite for self-administrated online surveys. We chose the 7-point scale for the following three reasons. Firstly, it is recommended to be used in factor analysis. Secondly, it is preferable to use an uneven number in these scales with the middle meaning a neutral position. This situation avoids encouraging respondents to develop a strong view about an issue which may force them to take sides (E. P. Cox, 1980; Czaja & Blair, 2005). And lastly, seven points are contended as a large number of points, which is appropriated to improve the reliability and validity. Anchoring Likert scales with one (1) is for "completely disagree" and seven (7) for "completely agree," these end-points are enough to distinguish the small differences in the responses (Czaja & Blair, 2005).

Question wording is the next important consideration regarding the well-designed questionnaire instrument. In consistency led research on survey design (Bryman, 2016; Churchill & Iacobucci, 2006; Czaja & Blair, 2005), any ambiguous questions, jargon, long terms, and too general questions should be taken with care to avoid the general risks of how questionnaire questions are put forward. Considering the above items, ambiguous or double-

barrelled questions and theoretical jargons are avoided in our online survey. Researchers (Buckingham & Saunders, 2004) argued that the advantage of reverse-coding existence is to allow the avoidance of response biases. However, in our study, we try to stay away from the reverse-coding items, because it tends to induce negative response and confuse respondents within the nine consecutive days of experiment. This will be the disadvantage of the item wordings in bringing opposite directions to outweigh the benefits.

Finally, the questionnaire questions translation from English to Chinese is another major element to ensure the validation of our study. According to Douglas and Craig (2006), in the process of questions translation, the equivalence should be ensured to control as much as possible the bias of instruments and items. With translation equivalence, the translated versions of questions should tell the same story across cultures. To ensure this, iterative team-based translation principles were used following the existing guidelines. The questionnaire was first translated from English to Chinese, then it was sent for judgement to a bilingual management researcher, a bilingual research professor, and a bilingual student. Each of them reviewed the translation and sent us their feedback, this iterative procedure was used until a satisfactory version was agreed. During this procedure, any ambiguity in the initial items, appropriateness and familiarity of the items are considered and solved, and kept consistent with Vandevijver and Tanzer (2004) most common sources of item bias.

In the introduction, the purpose and details of the survey were presented, with access to the participant information sheet. The survey was carried out in an order consistent with the common structure, in an effort to ensure the clarity of earlier items, directly related to the topic and narrow down from general to specific, and easy to intricate. The survey was conducted in nine consecutive days, an online survey link was sent to the four WeChat groups at 9:00 am each day. The instruments opened with questions about mobile advergames' features (advergame integration and advergame difficulty), then brand-related items were introduced, leading to brand engagement and brand effectiveness (both in affective and cognitive aspects). Then demographic questions were asked at the end of the survey. This is usually done to prevent the respondents from being intimidated.

The response rate is a common indicator used to evaluate the effectiveness of the surveys done virtually. Special attention should be given to making the survey as positive as possible. In line with the leading prior research (e.g., Oppenheim, 2000), multiple techniques to enhance the response rate are recommended in this study. An inviting and neat introductory paragraph was leading in the front of the questionnaire, with a detailed description on the study purpose, questionnaire content, collection, and response confidentiality. In

consideration of the visual aspect of response options, Likert scales were illustrated in a table. An incentive was provided in the pre-test with a red-packet (¥5) for each participant. During the nine-consecutive days, the final scores of each participant at the end of each day were automatically coded in the server background. Finally, according to the accumulation of the highest daily play score, the top eight players were rewarded with relative bonus. The details can be referred from the section of 3.2.1. It is necessary to provide an incentive regarding the length of questionnaire and experiment span, which could increase the response rates (Churchill & Iacobucci, 2006).

A web-based online survey which the respondents completed on their own was conducted for data acquisition. To be more specific, the data collection was conducted online through use of a “WenJuanxing” application. It also takes the “communication-based” characteristic, indicating that a “WeChat” group for online communication was utilized to access the online questionnaire link. Several reasons can reveal the advantages of using an online questionnaire. To begin with, the survey is regarded as the optimal way to collect data to examine theory, analyze the research relationships, and investigate concepts (Klassen & Jacobs, 2001). In particular, the key advantage of online survey is in collecting large sample size at relatively low cost by overcoming spatial and temporal limits with a more rapid and designed options. Additionally, the losing control by the researcher over the process, implying the lowering confidentiality issue, which balances the truthfulness issue which is a concern in lack of truthfulness of respondent. Secondly, a big concern about self-administration of online survey is the high non-response rate (Cook et al., 2000) which is significantly lower than other methods, and the coverage should also be considered. In this case, a much bigger flexibility in questionnaire design and administration, as well as data retrieval formats, are provided in the “WenJuanxing” application. In accordance with the development of smartphone, a large number of participants can be easily designed into the internet (say, in WeChat groups), and then accessed conveniently by sending them questionnaire links. Flexible online survey design and wide coverage ensure higher response rate and potential researcher control under the truthfulness of responses. Lastly, considering the response bias, when acquiring data about the Chinese-speaking sample, methodologies issue can rise in the online survey process. Through web-site survey, detailed instructions and relative incentives were offered to Chinese-speaking participants. Both translation equivalence and temporal equivalence can be carefully monitored. These ensure a relatively high and accurate response.

3.2.3 Pre-test

Even with a careful crafting instruments, necessary experiment conditions and other important issues should be detected again. In the perspective of psychometricians, once the items have been judged, modified, and trimmed, pre-test for a relevant group of people is in place (Haynes et al., 1995). For this step, we operated three times of T-test where we instruct the 146 participant students in four WeChat groups in order to test if there are any significant differences existing in the mobile advergames we have designed in integration and game difficulty.

The aims of pre-test rely on the followings. Firstly, to measure the time it took and to identify the prominent problems in the online survey questionnaire through the participants responding to the questionnaire after each experiment. Some participants even were invited to help identify the complex, ambiguous and jargon questions and reorganize the order of the sections in a more logical way. Additionally, the pre-test questionnaires were applied into the application of “WenJuanxing” to gain the final data, in order to make the participants experience the real survey conditions in advance. Secondly, to ensure the questionnaire is generating a list of questions to indicate the variance in the final stage and to initially assess means, internal coherence, differences, and relations between the items (Netemeyer et al., 2003). Lastly, considering the fitness of the sample composition, whether undergraduate students as the participants can be acceptable. Churchill and Iacobucci (2006) and Netemeyer et al. (2003) contended that the convenience of undergraduate students are acceptable to use and the age range of between 20-24 is a proper sample for the widely representative group.

In terms of carrying out the online questionnaire, the pre-test needs to maximally simulate the experiment conditions, that is, using the same tool and approach to address the same questions. In the pre-test, the insights into the way the questions are put forward, especially for the new customer engagement, are important. The wordiness and differences in the question items were checked again and eliminated in the confirmed version. A quick statistical analysis in composition of internal consistency, normality, purification, and skewness, as well as kurtosis, was done.

Finally, detailed experiment operations are conducted as follows: First, we instruct the 72 students in Classes 1 and 3 to play the easy level of the two advergames (A1 and B1), respectively. A corresponding online survey is issued immediately following the game play in order to gather the information on questions related to the advergame integration and game difficulty. Next, 37 students in Class 2 are instructed to play the difficult level of advergame

(A2) and an online survey is issued immediately following the game play in order to gather the information on questions related to game difficulty. Lastly, 37 students in Class 4 are instructed to play the difficult level of advergame (B2) and an online survey is issued immediately following the game in order to gather the information on questions related to game difficulty. Related participants demographic statistic results are summarized in Table 3.1.

Table 3.1 Demographic statistics

Class 1	Frequency	Percentage (%)	Class 2	Frequency	Percentage (%)
Gender			Gender		
Male	28	75.7	Male	25	67.6
Female	9	24.3	Female	12	32.4
Total	37	100	Total	37	100
Age			Age		
20	8	21.6	20	8	21.6
21	13	35.1	21	13	35.1
22	12	32.4	22	12	32.4
23	4	10.8	23	4	10.8
Total	37	100	Total	58	100
Class 3	Frequency	Percentage (%)	Class 4	Frequency	Percentage (%)
Gender			Gender		
Male	13	37.1	Male	24	64.9
Female	22	62.9	Female	13	35.1
Total	35	100	Total	37	100
Age			Age		
17/18	2	5.8	19	1	2.7
19	2	5.7	20	9	24.3
20	12	34.3	21	13	35.1
21	13	37.1	22	9	24.3
22	4	11.4	23	5	13.5
23/25	2	5.8			
Total	35	100	Total	37	100

Before analyzing the research sample features and relevant data, it is also necessary to check if there are any data that are not available or of invalid answers. After nine consecutive days of experiment, 750 responses have been obtained and a large number of missing data has been detected, which need a specific missing data analysis and treatment. To deal with data missing, the first is to understand the nature and patterns of the data missing. Traditional methods utilized in SPSS, i.e., MCAR (missing completely at random), MAR (missing at random), and NMAR (not missing at random) are commonly used in a wide range of research (Tabachnick et al., 2007). Other methods, such as the separate variance t-test and Little's test are also conducted to examine the type of missing data at hand, where the low calculated p-value means that the null hypotheses are not supported, which means a missing data pattern. The missing data rate was up to 28% in our study. This makes sense, because self-administrated online surveys tend to have more respondents who could not complete the

survey than face-to-face ones (Cook et al., 2000). Furthermore, if the questionnaire is too long, it will bore the respondents and lead to fatigue, both of which increase the dropout rate. Lastly, the individual confidentiality resulted from online back server might have scared off some respondents from the very beginning.

With regard to the basis of data missing structure, two steps of handling missing data have been conducted. According to Hair et al. (2003), each case could have a 10% cut-off for data that are absent, however, since a significant number of data missing is related to the demographic information, it is irrelevant in the data analysis and hypotheses testing, in our case, the cut-off rate for each case is 15%. After deletion of the missing data cases, through EM (Expectation Maximization) method performed from SPSS was operated. Several factors support to use this method to deal with the missing data, since (1) it allows specific rather than general distributions (Tabachnick et al., 2007), which is a potential issue in some variables; (2) much less bias is produced than other approaches (e.g., NMCAR); (3) the demographic data, in particular, the sensitive data could not be imputed, instead of that, N/A are marked in these situations; (4) comparing with other methods, the concern of reducing data variance can be avoided. The final samples of 348 valid responses demonstrate an overall 40% response rate, which indicates relative good participants' responses, considering the online context and the number of questions asked in the questionnaires.

Besides data missing, non-response bias and common method bias are also particularly important in the context of the robustness to the sampling and analyzing procedure. According to Armstrong and Overton (2018), late reply can almost be theoretically considered as not responding. In the comparison between early and late responses, a cut-off rate of the first and last 10 responses were selected for being utilized in the T-test analysis. The two groups had no significant differences in these variables on the sample characteristic measures. Since both independent and dependent variables came from the same source, the common method bias needs to be addressed (Campbell & Fiske, 1959). After formulating the research items as clearly, concisely and specifically as possible, the online survey was conducted in WeChat groups through sending the participants questionnaire links. Specifically, introduction in the front of online survey indicates that the questions do not have only one answer. Additionally, the design of the website based online survey enables respondents to check their responses for previous questions, so it is hard for respondents to stay artificially consistent, addressing the consistency motif and social desirability biases (Podsakoff et al., 2003). Hence, to test the common method bias, we finally use Harman's one-factor test (Podsakoff & Organ, 1986) with unrotated solution for the number of factors needed to

explain the variance in the variables in SPSS 22.0. Through using principal component analysis for the dependent and independent variables, the yielded factors with eigenvalues higher than 1.0, the major first factor explained 40% of the total variance. These tests showed that there was a key factor missing, which indicates no serious common method problem existed in our data.

3.2.4 Data analysis

The principal approaches to analyze data conducted in the research were constituted by T-tests and Multi-level Structural Equation Models (MSEM).

T-test is the statistical hypothesis test whose premise is that the data distribution should follow students' t-distribution under the null hypothesis where the population mean is equivalent to the sample mean. Generally speaking, the t-test can help decide whether the means of two groups of data vary largely. In 1876, t-distribution was first derived by Helmer and Lüroth (Pfanzagl & Sheynin, 1996; Sheynin, 1995). However, t-distribution was called the "Student's T distribution" from the publication in 1908 in English in the scientific journal by William Sealy Gosset, who used a pseudonym name of "Student." That is because his employers preferred their staffs to use pseudonym names (pen names) to publish scientific research articles instead of their real name, hence a pseudonym name of "Student" appeared to hide his real name.

The most frequently used t-tests are one-sample t-test, paired t-test, and independent sample t-test. The first one among these three is the statistical procedure to decide the sample observations from a process with a specific mean. For instance, one assembly line produces notebook computers with a weight supposed to be of two kilos. To verify whether this hypothesis is accurate or not, a notebook needs to be collected from the assembly line and weighed. The sample mean of five needs to be compared using this method. The paired sample t-test checks if the mean difference between two groups of samples is "0" with a statistical approach. In this situation, each subject in the sets is measured twice, which generates observation in pairs. Paired sample t-test is commonly used in case control study or repeated-measures designs. For example, when measuring how effective a corporate training is, the paired t-test can be used to measure the performance difference of the employees samples before and after the training program. The independent sample t-test is the procedure to examine the two mean values with a continuous, normally distributed data. This model tests the mean difference that distinguishes two different groups, is the between-subjects emphasized on two independent groups of observations.

Student's t-tests verify the null hypothesis such that whether the means of two populations equal or not, and strictly speaking, the test should be used in checking the hypotheses in which the variances of the two populations equal. The null hypothesis and the alternative hypothesis are the two types of hypotheses for t-tests. According to the alternative hypothesis, the means of sample group and population are different, while no difference exists based on the null hypothesis. In other words, the purpose of t-tests is to decide whether to reject the null hypothesis, in terms of the sample data. The alternative hypotheses can be determined in three ways considering how the questions are asked. The upper-tailed or lower-tailed, and the comparison of mean values are used for forming alternative hypotheses. Four types of alternative and null hypotheses are formally described: (1) null hypothesis represents that the true mean and sample mean is equal; (2) two tailed alternative hypothesis assumes that the true mean is equal to the sample mean; (3) upper-tailed alternative hypothesis means that the true is greater than the sample mean; and (4) lower-tailed alternative hypothesis means that the true mean is less than the sample mean. Accordingly, the mathematical representations of the null and alternative hypotheses are presented as follows:

$H_0: \mu = m_0$; $H_1: \mu \neq m_0$ (two-tailed); $H_1: \mu > m_0$ (upper-tailed); $H_1: \mu < m_0$ (lower-tailed).

The assumptions and conditions of using t-tests are discussed in details below. Most test statistics are consistent with the form of $t = Z/s$, where Z and s are functions of the data, which are represented in the following mathematical form (3.1).

$$t = \frac{Z}{s} = \frac{\bar{X} - \mu}{\frac{\hat{\sigma}}{\sqrt{n}}} \quad (3.1)$$

Where $\bar{X}$ means sample mean from samples $X_1, X_2, \dots, X_n$, with sample size of n , s is the standard error of the mean, $\hat{\sigma}$ is the estimate of the standard deviation of the population, and μ is the population mean. Three assumptions in using t-tests should be considered: (1) sample X follows a normal distribution with mean μ and variance σ^2/n ; and (2) $s^2(n-1)/\sigma^2$ follows a χ^2 distribution with $n-1$ degrees of freedom. Here, s^2 should follow normal distribution and Z and s are independent. Moreover, the conditions of using t-tests should meet: (1) the means from compared populations should follow normal distribution, under a weak assumption, in large samples, the central limit theorem can be applied when the distributions of samples in each group are not normal distributed; (2) using Student's t-test, the compared populations should meet the equal variance; and (3) data from the compared populations should be sampled independently or be fully paired. If data from populations are

dependent or are partially paired, paired t-test is sub-optimal as the t- distribution is not followed, while the dependent (paired) t-test is sub-optimal as it discards the unpaired data.

SEM is fitted to test the causal research relations for multivariate data sets, and it has been contended as an appropriate analysis technique when used in investigating the multiple relationships of independent variables and dependent variables. Additionally, prior to hypotheses testing, the development and validation of customer engagement measures are allowed in confirmatory factor analysis (CFA). Therefore, utilizing SEM allows testing research hypotheses in the structural level and also makes it possible by encompassing measurement model for testing interdependence between the research factors. These are in accordance with the post-positivist studies by using SEM because of its ability to provide measurement and structural models. Firstly, in our study, the measurement models assessed by CFA were used to validate the measures of the focal research factors (e.g., advergame integration, game difficulty, customer engagement and brand effectiveness) prior to hypotheses testing. According to Gerbing and Anderson's (1988) guidelines, the CFA is the method aiming to check how fit a model is to check the matching of items and factors. The analysis of the correlation matrix is conducted in covariance-based SEM (CBSEM) to detect the singularity or multicollinearity between research factors. In combination with other fit indexes (CFI, TLI, & RMSEA), the Chi-square statistic is used to check how fit a model is. The Comparative Fit Index (CFI) is a choice index comparing the null hypothesis model and considers the sample size of the research. The Tucker Lewis Index (TLI) is another choice index which is in line with CFI with the indices from 0.00 to 1.00. The values over 0.90 indicate acceptable (Bentler, 1992), and the values over 0.95 indicate a desirable model (Hu & Bentler, 1999). The most considerable informative criteria of the root mean square error of approximation (RMSEA) with value under 0.08 suggests that the model is a sound fit. The Maximum Likelihood Estimation technique is a way to verify the research hypothesis. Following that, the squared multiple correlation (SMC) values are indicators for the dependent variables, indication of the fitness of using a linear function with a set of other variables to estimate each dependent variable.

Compared with traditional SEM, where latent variables and indicators are different and independent across units, multi-level SEM settings allow units to be embedded in clusters, which leads to intra-cluster dependence. Various methods for expanding SEM in these multi-level settings are analyzed. Developing separated models among clusters is used most frequently. The multi-level regression (or path) models are introduced in which response variables and explanatory variables are latent and measured by various indicators at different

levels. The so called Generalized Linear Latent and Mixed Modeling (GLLAMM) framework enables a series of models to be specified. In our study, to test the cross-level interaction of mobile advergames replayability, the sample of 146 undergraduate students were invited to take part in playing different difficult and integrated levels of advergames in 9 consecutive days to observe the variation of the relationships between focal research factors (e.g., advergame integration, difficulty associated with customer engagement, subsequently affecting brand effectiveness). The first level investigates the relationships of the focal research factors, and the second level illustrates the time developing impact on these focal research factors relationships.

The popularity of MSEM or multi-level modeling has aroused a striking feature in behavioral and social science. Even though developed independently for different purposes, among the various research dimensions, multi-level modeling takes important communalities. Consequently, multi-level regression (or path) modeling with the features of structuring hierarchical units, in which the subjects in level 1 nested in clusters in level 2, or may be nested in super clusters in level 3, is utilized in testing the second cross-level interaction of mobile repetition effect in our study.

When the latent factors cannot be completely measured and a set of items can be used to reflect the research construct, SEM models can be adequately chosen to measure the relationships between various variables. Factors, in SEM models, are interpreted as constructs, which are explained by measured items, inducing dependence among them. The relations between the factors and between factors and measurements are the investigation focus of the measurement model. However, when the factors in SEM are interpreted as unobserved heterogeneity in various levels, where lower-level units depend on higher-level units, MSEM should be adequately utilized. In which, random intercepts represent heterogeneity between clusters in the overall observation and random coefficients represent heterogeneity for relationships between explanatory variables. Importantly, MSEM as a synthesis of multilevel SEM, requires valid statistical inference with the units of observation form hierarchical nested clusters and latent variables being measured by a set of items or fallible instruments. In our study, we consider the focal research question: does convenient mobile repetition (second level) change the relationships between independent variables (e.g., mobile advergame integration, difficulty) and customer engagement, as well as brand effectiveness (first level)?

In MSEM, from the perspectives of sampling and multilevel, the option of approaching the cluster population is well specified. In terms of sampling, the stratified random sampling covering the interest of the population is more typical in epidemiological or demographic

research. From the sampling perspective, an important and primary feature of data is clustering. In the multilevel perspective, clustered data is interesting to parcel up variance in various levels, in which we can examine the predictors that explain variance in various levels. Here, data aggregation is an important approach to solve with-cluster centering and inclusion of cluster means.

Follow the post-positivist paradigmatic stance, this study presents the research methodology in the context of mobility. Data were collected through an online survey designed against pre-test and stringent guidelines in validating the survey process. Throughout this chapter, method equivalence and bias elements relevant to the study have been addressed.

3.3 Summary

In this chapter, the research methodology based on post-positivist paradigmatic is presented. We detailed the process of data collection, which is designed and administered online using WeChat, a Chinese popular social media, following strict guidelines referred from Cook et al. (2000) and Podsakoff et al. (2003). Then, a total of 146 undergraduates in southwestern China is presented as the research sample with the analytic techniques of T-test series and MSEM, and the analysis guidelines which should be followed are chosen. This chapter addressed the method equivalence and bias elements relevant to the study in Chinese-speaking sample with 348.

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Chapter 4: Measurement

4.1 Introduction

In this chapter, relevant scales are determined and checked for measuring the focal research factors with outlining the new measurements for advergame integration, advergame difficulty, and customer engagement, as well as brand effectiveness. The scale development and validating process are presented with the inception of the quantitative data analysis to throw light on the dimensionality and content validity of focal research factors. The calibration sample ($n = 348$) is used to check the reliability of the items, and after purifying the items, the discriminant and convergent validity are used to check the unidimensionality of the items.

4.2 Measurement of research factors

4.2.1 Measurement of advergame integration and difficulty

Unlike developed constructs such as customer engagement and brand effectiveness, the focal concepts of advergame integration, advergame difficulty necessitate the creation of dedicated scales, because no prior study has provided adequate and valid scales for them which could be used or adapted now. Details about how to develop and generate the valid and reliable scales for advergame integration and difficulty will be revealed in the following section.

In our study, we follow the views of Gerbing and Anderson (1988) to generate the relevant scale development paradigm, in addition, the methods used to test the psychometric properties are detailed on each point. Two advantages of developing scales for new concepts of advergame integration and difficulty are that: (1) Anderson and Gerbing's paradigm is extensively applied in marketing research, resulting in a great volume production of construct scales which are still being used, both in the area of relationship marketing, branding and service marketing (e.g., Brakus et al., 2009) and (2) this approach was initiated by Churchill (1979), which is endorsed in scaling literature outside marketing with applying into much wider literature.

4.2.2 Domain specification and measurement items generation

The specification of the domain concepts of research variables was first conducted in our scale development paradigm. This study adopts and modifies the definitions of research factors from existent research and clarifies their dimensions. After specifying the domain existent research focused on mobile advergames and advergames, a pool of items for each research variables were developed. The dimensions of research variables observed by research measurements are what the literature calls latent variables that cannot be directly measured. In other words, research items are required to tap into these dimensions to operationalize and measure the latent constructs (research variables).

The focal research variables each were adapted with multi-item scales, because no single item can be sufficient to measure a construct. Beside, assessing the psychometric properties of a single measure (using one item) is particularly difficult, according to Paul (1979), the reliability of research scales is enhanced by using multi-item scales. Hence, to fill the purpose of this study, an iterative process of revisiting the literature on advergame integration, advergame difficulty and customer engagement was presented. Referred to previous studies, relevant items for each research factors were developed and adopted, and then, served; and as long as possible, an initial pool of relevant measure items is summarized. Especially, regarding the paucity of items on measuring mobile advergame features (e.g., integration and difficulty), few items could be directly selected from existing research, and most of them need to be developed.

Following sections present the item development process in item generation and trimming. To echo what was discussed in Chapter 2, a detailed presentation of research measurements for each research variables' generating process is introduced with semi-structural interviews with undergraduate students' participation.

4.2.3 Qualitative analysis: interviews of undergraduates

Both quantitative and qualitative methods are commonly used in the scale development process, especially when there is few specific theory available for a research construct. In our study, item generation and trimming process are combined with literature review and interviews with undergraduate participants who are experienced with prior mobile advergames campaign. This practice can ensure the higher reliability of research scale generation than any other one-single method, and it has been vastly used in the prior scale development research (Brakus et al., 2009; Freling et al., 2011; Sharma & Chan, 2011).

Applying qualitative analysis in our study to develop research items is advantageous in the following two folds: firstly, the validation of conceptual dimensionality and specification can be reconfirmed; secondly, a more relevant pool of items can be exactly extracted. Carefully selecting participants who are experienced offer precise insight into the phenomenon, and proof by fact, previous research in marketing or organization has broadly adopted in-depth semi-structured interviews for generating items (e.g., Brakus et al., 2009; Freling et al., 2011; Seiders et al., 2007). However, not all scale development research has been critical to adopt qualitative methods, and even that some criticism has been got. Nevertheless, our exploratory study on investigating effects of mobile advergames features on influencing brand effectiveness via customer engagement is a context of the embryonic nature of the scale development. In this context, the process of qualitative analysis for scale developing is necessary compared with the larger backgrounds where a large number of scales already exist for the construct.

Based on above discussion, we select 25 undergraduates who have the prior experiences of taking part in mobile advergames campaign to complete our interviews. Experienced participants can provide more detailed insights into construct dimensionality and specification, and according to Creswell and Poth's (2016) suggestion, 20 to 30 interviews are advocated until the research saturation will be reached. Regarding our research sample size of 146, 25 random selected experienced participants were relatively sufficient to satisfy the conditions of conducting the research interviews.

Informants were recruited by two main criteria: their experience on participating advergame campaign and the gender ratio. Gender has been considered as a most focal factor in impacting the effectiveness of advergames play, and given the nature of our study, it is very important to invite experienced users to complete our research interviews. Informants were invited by using WeChat (a popular social media in China as already mentioned). The interviews are conducted during 15-20 minutes in Chinese. To ensure the reality, a video-based meeting was conducted for respondents in WeChat. Semi-structured qualitative interviews according to Kvale's (1996) approach were then processed. The open-ended elicitation procedure was applied to make sure that the construct definition created by the author was in line with the features of mobile advergames and customer engagement. All interviews were recorded for the data traceability, and can be re-created with a consistent source format for qualitative data. And 156 single-spaced A4 pages of interview texts were recorded for analysis. Due to the page limitation, we selected customer engagement as the example to present the interview content. Customer engagement in our study was divided by

cognitive and emotional engagements and the measurements provide a deep meaning for this research variable supported by the interview contents and analysis. For the anonymity of participants, nicknames are used throughout the entire research. A summary of three representative records were represented in the following.

Cognitive aspect of customer engagement is prominent in our research which has been defined as the mental states that customers experience regarding the focal object of the participants' engagement. This means that engaged participants are actively mentally involved. In the context of mobile advergames, informants pointed out that a vast of time has been spent on playing advergames, one of the interviewees expressed that:

"It depends on how much time you want to play the advergames..., how much time you will potentially spend on rethinking the contents of advergame."

In exploration of the customer cognitive engagement relevant to mobile advergames, the informants' experiences revealed that this perspective could be further divided into two parts: attention and absorption. The former as the ability to interact with mobile advergames cognitively is furthered by another informant's comment expressed as "an engagement of the mind." The interviews show that time spending on playing advergames takes space in the mind, despite the attention span is relatively short. Mobile advergames playing for some participants (e.g., the invited informants) occurs with a relatively high frequency, this time participants' attention is deeply grabbed and sustained. While absorption is a further step than dedicating attention, which is operationalized as detaching oneself in interacting with mobile advergames. One of the informants expressed as:

"When I go to play with mobile casual advergames, it takes me several hours to play, even if I feel stupid and get mad at myself. Because I always got some excited when I know I am competing with others to achieve more game points, so I even put some more hours on playing it..., I could stop it when I really want to, but time has gone!"

This may seem like some extreme situation of advergame play absorption, some participants sometimes show that they confront difficulty to detach themselves from casual advergames playing. It is reflected by the playfulness and entertainment of advergames which induce a high absorption for some participants.

The aspect of affective engagement as the semantic particularity has been further investigated and unveiled as a strong affective element of participants' experience with mobile advergames playing. The questionnaire about affective engagement asks participants about their feelings of mobile advergames playing. Most of the participants expressed that they are enjoying the mobile advergames, such as stating that they feel happy, well, and proud.

Based on Hollebeek (2011)'s research, through the aesthetic of the game design image, the content of advergame, bringing participants with happiness, good feeling, is a strong emotional bond similar to what is expressed by relationship quality. Brand engagement is particularly associated with ideas of "liking" or "caring." Even nuanced positive/negative affect dimension of engagement can be harmful in that it disrupts participants' decision-making ability.

By capturing the overall and sustaining emotions of participants, these emotions can be different sorts with restricting affective sub-dimensions of passion and fun. The former, which reflects how excited the participant is about the mobile advergames within his/her interest, is explicit in being derived by repeated advergames replaying. One participant showed that being enthusiastic about the mobile advergames is liking to play it with every spare time. "Being engaged with it, is telling others that I will spend time playing it and, make my own decision to purchase the branded product." Another participant expressed the enthusiasm related to the feeling of repeatedly interacting with these advergames in considering the competition with other players. "I like to play these games, and my friends are also likely to play the games at the same time. In this case, I will spend more spare time or efforts to play it to achieve more points." Enjoyment could indicate participants' happiness and feeling-well from advergames playing. As a relatively more contemplated form of affective engagement, advergame is less active but takes deeper and more repeated feelings of enjoyment and pleasure. Another participant expressed his satisfaction as a clarification that "it is a pleasure, it's a nice added value." One more participant shows the pleasure as "the advergames always are fun for me, something is really about gourmandise."

4.2.4 Data screening and measures purification

Taking into account the participants' interview data, field, as well as methodological biases, after statistical analysis, those research items which are with particular low representative scores were deleted. Advice on redundancy and semantic similarity of research factor dimension and wordings was also taking into consideration. To summarize, a total of four items for advergame integration and four items for advergame difficulty were developed by ourselves, and four items for cognitive engagement and three items for affective engagement, respectively, adapted from existent research (A. Berger et al., 2018) were adjusted for our research context. Finally, for brand effectiveness, four research items adapted from Daems et al. (2019) and Rifon et al. (2014) research were adjusted for brand recognition indicating cognitive brand effectiveness, while other three research items adapted from Yang et al.'s

(2017) research for affective brand effectiveness were developed in our study.

The related items for our research, generated from the interview data and literature review are presented in Appended Table 1. The major research sources were presented and this pool of research items were subsequently conducted in the prior tests with analyzing the difficulty and integration levels following the related reliability and validity. Additionally, data screening is the essential step to get ready for data analysis for research to get familiar with data and detect potential issues. Normality checks and descriptive statistics of all measures are conducted.

Before the above 9-consecutive-days of experiment, a pre-test of advergame difficulty and integration levels for these two types of mobile advergames (天冰冰淇淋 (TianBing Ice Cream) vs 汤圆总动员 (SanQuan Rice Dumplings)) was done, where the advergame of “汤圆总动员” (SanQuan Rice Dumplings) represents the higher integrated type in which the shape of characters is highly similar to the characters of the rice dumpling, while the advergame of “天冰冰淇淋” (TianBing Ice Cream) represents the lower integrated type which can be easily recognized as an ice cream advertising. Reliability, as well as validity analysis results are summarized in Appended Table 1.

An illustrative research item for advergame integration is that “During gameplay, I can clearly see the related product or brand.” and for advergame difficulty is that “During gameplay, I feel time pressure to achieve more points.” Research measurements for cognitive and affective customer engagement were adapted from the existent research (A. Berger et al., 2018), while brand effectiveness consists of brand recognition and brand attitude were adapted from Daems et al. (2019), Rifon et al. (2014) and Yang et al.’s (2017) research.

4.2.5 Reliability test and factor analysis

An effective approach in ensuring the reliability of research instruments is computing the coefficients of Cronbach’s Alpha which examines the unidimensionality and internal reliability. In prior tests, the three aspects were tested with their reliability first, to accommodate the requirement of factor analysis. In our research, we used SPSS to conduct the exploratory factor analysis and reliability test. Result of reliability test for advergame difficulty presented in Table 4.1 where its Cronbach's Alpha is 0.857 which is greater than 0.7. This means the degree of internal consistency of advergame difficulty is well which shows a high reliability. As same, in Table 4.1, the value of Cronbach's Alpha is shown as 0.696 which is close to 0.7 which means the reliability of advergame integration is acceptable.

Table 4.1 Reliability test for advergame integration

Items	N	Mean	Std. Deviation	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Integration1	72	5.097	1.696	0.602	0.463	0.552	0.696
Integration2	72	5.069	1.771	0.268	0.106	0.762	
Integration3	72	4.847	1.633	0.499	0.279	0.621	
Integration4	72	4.958	1.699	0.585	0.503	0.563	

Note: integration means advergame integration.

The above results showed that the scale used in our study takes acceptable reliability which can be used to conduct the following analysis. The scale develop process is vigorous and the questionnaire distributed process has been carefully supervised by our researchers. Then, we believe the selection and results of these scales are appropriated.

EFA is the classical formal measurement model for observing the latent variables which are assumed at multi-dimensional levels. Based on executing correlation or covariance matrix between research items, latent factors are located underlying the convergent items. The latent variables are called research factors and the observed variables underlying relevant research factors take related factor loading. The overarching goal of EFA is to identify the latent research factors with assessing the relationships between the research or observed variables. EFA procedures have higher accuracy when each factor is represented with multiple research variables. Principal axis factor extraction and maximum likelihood method are generally recommended in EFA. The maximum likelihood method is advantageous in many ways as it enables researchers to calculate a large span of indices of the goodness of fit of the model, to check factor loadings for statistical significance, to examine links between factors, and to get the CIs. For the “principal” axis factoring (PAF), the first factor takes up the most common variance. The second one takes up the next most, and the other factors do this in the similar fashion. PAF is the best choice when the sample is the sole focus and there is no intention of generalizing the results beyond the sample.

Validity means whether the concept, conclusion or measurement is well-defined or accurately corresponding to the real world. Its importance in research depends on determining the test used to truly measure the idea or constructs. Compared with reliability, which tests the consistency of the measurements, validity is the extent to measure what is supposed to measure. For example, a scale that is 5 pounds off means adequate reliable, but not valid. Reliability is the condition of validity. The designed measurements can determine the validity, and validity is a relative concept. Various types of validity exist.

Construct validity consisting of convergent validity and determinant validity means the empirical and theoretical support for the interpretation of the construct. A measure of the

construct associated with the associated measures means convergent validity, while not associated with other measures means discriminant validity. Construct validity includes the statistical analysis of the internal structure and relationships between responses to various test items. Experiments designed to real causal role of the constructs contribute to construct validity evidence.

Relatively, as the non-statistical validity, content validity is “the systematic examination of the test content to determine whether it covers a representative sample of the behavior domain to be measured” (Anastasi & Urbina, 1997). For instance, the items covering all areas of intelligence means the adequate content validity. A subject matter expert (SME) who evaluates measure items is involved in the content validity. Additionally, the careful selection of measure items should be built into content validity (Anastasi & Urbina, 1997). Researchers noted that a panel of experts’ review to specify the test and select measure items should be improved in content validity.

Similar to content validity, face validity estimates the certain criterion, guaranteeing the actual measure phenomena. Face validity means the degree of the measures measuring what it is. The difference between face validity and content validity depends on a theoretical basis. Face validity related to if a test appears to be a good measure or not, while content validity is a test of assessing the measures with certain criterion on a theoretical basis. Face validity is being updated, as the past research could have been wrong before.

Other important types of validity are internal and external validity. Internal validity is inductive which is based on measures used, research setting, and the whole research design to test the causal relationships. A highly controlled condition which studies the effect of predictors influencing outcomes allows for high degree of internal validity. While external validity concerns the extent, whether the results can be held true for other cases (different times, peoples, and places). If the same research can be conducted in other cases, or be validly generalized, it means an adequate external validity. Confounding impacts interfering with internal validity include: (1) history, the specific events occurring in the research design; (2) maturation, external environmental factors, such as growing older, more tired, and hungrier; (3) testing effects which prior test influencing the secondary testing; (4) the changes of measurement tool and observers; (5) outlier, the extreme scores used in statistical analysis; (6) differential selection of respondents for comparison; (7) loss of observation with experimental mortality; and (8) interaction in multiple-groups and quasi-experimental designs in selection-maturation. Major factors jeopardizing external validity are: (1) interacting effects of tests by which the pre-test may influence the post-test; (2) interaction of the biases with experimental

variables; (3) reactive effects from the experimental variables applied into non-experimental settings; and (4) the effects of earlier treatments are not erasable, which induce multiple-treatment interference.

Prior to assess the validity of research factors, the fitness of EFA model for research data should be tested first. Kaiser-Meyer-Olkin (KMO) is used to measure the fitness of the data for factor analysis, which is between 0 and 1. With the test, sampling adequacy is measured for each variable in the model and for the complete model. The numbers of factors and of variables are the same in each factor analysis.

After the reliability test, we conducted EFA to confirm the validity of advergame difficulty and advergame integration. In this part, the lack of developed scales to refer these two variables, we first conduct one-factor EFA to ensure their validity, respectively. For advergame difficulty, as shown in Table 4.2 and Table 4.3, we can see the communalities are all over 0.4 and the cumulative variance is higher than 50%. And the Bartlett's test value is 285.277 ($p < 0.01$) which reached a significant level. This means it is suitable to conduct multi-factor EFA.

Table 4.2 KMO value and communalities for advergame difficulty

Factor	KMO Value	Items	Communalities
Advergame Difficulty	0.720	Difficulty1	0.689
		Difficulty2	0.680
		Difficulty3	0.770
		Difficulty4	0.687

Table 4.3 Total variance of advergame difficulty

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.161	54.014	54.014	2.161	54.014	54.014
2	0.900	22.491	76.506			
3	0.629	15.728	92.233			
4	0.311	7.767	100			

As well, results presented in Table 4.4 and Table 4.5, communalities of advergame integration are over than 0.4 and the cumulative variance is over than 50%. The Bartlett's test value is 66.622 ($p < 0.01$) which reached a significant level. This means it is suitable to conduct the following multi-factor EFA. In our EFA results, the factor loading underlying each research factor is higher than 0.5 and is higher than the factor loading index underlying the other factor. These ensure the convergent and discriminant validity of the research factors revealed in the EFA model.

Table 4.4 KMO value and communalities for advergame integration

Factor	KMO Value	Items	Communalities
Advergame Integration	0.696	Integration1	0.694
		Integration2	0.409
		Integration3	0.546
		Integration4	0.712

Table 4.5 Total variance of advergame integration

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.161	54.014	54.014			
2	0.900	22.491	76.506	2.161	54.014	54.014
3	0.629	15.728	92.233			
4	0.311	7.767	100			

In two-factor EFA, the KMO value is 0.789, and the Bartlett's test value is 213.443 ($p < 0.01$) which reached the significant level. And the item communalities are all higher than 0.4. These results present the acceptable condition in conducting EFA for advergame difficulty and advergame integration. In two-factor exploratory analysis, the principal component analysis is used to extract the factors which the eigenvalue should be greater than 1. The total explained variance in these EFA results is 63.194%, indicating a sufficient interpretation ability for this EFA. Related results summarized in Table 4.6, Table 4.7 and Table 4.8 give the evidence that the two factors have well validity.

Table 4.6 KMO value in two-factor EFA for advergame difficulty and integration

KMO Value	Items	Communalities
0.789	Integration1	0.683
	Integration2	0.453
	Integration3	0.566
	Integration4	0.709
	Difficulty1	0.668
	Difficulty2	0.722
	Difficulty3	0.762
	Difficulty4	0.691

Table 4.7 Total variance of advergame difficulty and integration in two-factor EFA

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.968	37.100	37.100	2.968	37.100	37.100	2.864	35.795	35.795
2	2.088	26.094	63.194	2.088	26.094	63.194	2.192	27.399	63.194
3	0.893	11.165	74.359						
4	0.641	8.012	82.372						
5	0.542	6.775	89.147						
6	0.363	4.538	93.685						
7	0.309	3.860	97.545						
8	0.196	2.455	100						

Table 4.8 Factor loading for advergame difficulty and integration in two-factor EFA

	Component	
	1	2
Integration1	-0.125	0.817
Integration2	0.141	0.683
Integration3	0.023	0.752
Integration4	-0.209	0.816
Difficulty1	0.817	-0.016
Difficulty2	0.819	-0.229
Difficulty3	0.872	0.050
Difficulty4	0.828	0.071

4.2.6 Prior test for advergame integration and difficulty condition

By operating four times of t-tests, we instructed the sampled 146 students in order to test if there are significant differences in advergame integration and game difficulty between the two types of advergames. Detailed operations are conducted as follows and related results are summarized in Appended Table 2.

① First, we instruct 72 students in two classes to play the easy level of the two advergames (A1 to Class 1 and B1 to Class 3), respectively. An online survey is issued immediately following the game in order to gather the information on questions related to advergame integration and game difficulty.

② Next, students in Class 2 are instructed to play the difficult level of advergame (A2) and an online survey is issued immediately following the game in order to gather the information on questions related to game difficulty.

③ Finally, students in Class 4 are instructed to play the difficult level of advergame (B2) and an online survey is issued immediately following the game to gain the information on questions relevant to game difficulty.

We operated independent t-test to confirm if significant difference exists in the degree of advergame integration between game type A1 and game type B1. As illustrated in Table 4.2, a significant difference is found between these two types of advergames in integration, which supports our experiment condition operation. Additionally, the independent t-tests are operated to test the difference of advergame difficulty between game types A1 and A2, as well as the difference of advergame difficulty between game types B1 and B2. The results shown in Appended Table 2 represent that significant differences of difficulty between advergames A1, A2 and advergames B1, B2 exist, which confirm the success of our experiment condition operation.

4.2.7 Multilevel confirmatory factor analysis

To check the dimensionality of research factors, four times of multilevel confirmatory factor analysis (MCFA) have been commonly used. When the research measures are established underlying theory for hypothesized factor loading patterns and an elaborated model has been described in previous studies, CFA is preferred to EFA. In CFA, the estimates of regression coefficients between observed variables and research constructs are calculated. The significant regression coefficients confirm the convergent validity of research constructs and the CFA must take good fit indices. Before hypotheses testing, the measurement models are conducted to specify the research constructs. Given the above EFA analysis results, we conducted advergame feature research factors (advergame difficulty and advergame integration) and customer engagement (affective and cognitive), as well as brand effectiveness (brand recognition and brand attitude) together in the MCFA model. Six dimensions through five-step which commonly performed in CFA assessed their validity: (1) model specification; (2) model identification; (3) model estimation; (4) model goodness of fit evaluation; (5) parameter estimates checking.

The model was first identified in measurement model, whereby values of the parameters are for further estimation or to be limited to one (1). Considering the latent normality discrepancies, maximum likelihood estimation is used as the estimation model because it is well adopted and has been contended as a robust method. Then after model estimation, goodness of fit indices of the CFA is assessed, which includes the Chi-square value, with taking into consideration of the CFI, TLI and RMSEA indices at the same time. These are very common indices for measurement model to check the fitness of CFA model and research data. Moreover, they are less sensitive to sample size than Chi-square indices and could tolerate complex model. When the values are above 0.90, it suggests a sound fit. If they are higher than 0.95, it is better (Hu & Bentler, 1999). The RMSEA is regarded as the most revealing criteria in covariance structure modelling where value of it below 0.08 means good fit.

Model re-specifications are repeatedly performed due to the possible poor model fit based on modification indices. It is common to use modification indices to re-specify the measurement model for CFA. As Gerbing and Hamilton (1996) contended that “most use of confirmatory factor analyses is, in actuality, partly exploratory and partly confirmatory in that the resultant model is derived in part from theory and in part from a re-specification based on the analysis of model fit.” In our study, modification indices were taken to eliminate

inessential or unrelated items. MCFA model was conducted in Mplus 8.0, and to ensure the invariance of construct validity of the focal research constructs, four times of MCFA based on the data derived from four types of experiment scenarios were conducted and related results were summarized from Table 4.9, Table 4.10, Table 4.11, Table 4.12 and Table 4.13.

Table 4.9 MCFA based on low integration and low difficult scenario

Measurement Items	Standardized Estimate	S.E.	Est./S.E.	Two-Tailed P-Value	CR	AVE
INTEG1	0.948	0.015	65.011	0.000	0.959	0.855
INTEG2	0.907	0.023	38.886	0.000		
INTEG3	0.927	0.020	46.508	0.000		
INTEG4	0.915	0.020	45.126	0.000		
DIFF1	0.920	0.018	50.760	0.000	0.963	0.866
DIFF2	0.924	0.020	47.029	0.000		
DIFF3	0.996	0.008	126.191	0.000		
DIFF4	0.879	0.027	32.329	0.000		
CE1	0.956	0.015	64.502	0.000	0.963	0.897
CE2	0.940	0.016	58.166	0.000		
CE3	0.945	0.015	61.665	0.000		
AE1	0.904	0.022	40.827	0.000		
AE2	0.903	0.024	37.847	0.000	0.954	0.837
AE3	0.915	0.022	41.017	0.000		
AE4	0.938	0.019	48.491	0.000		
BR1	0.961	0.011	84.327	0.000		
BR2	0.818	0.038	21.378	0.000	0.955	0.843
BR3	0.959	0.014	69.031	0.000		
BR4	0.926	0.019	49.866	0.000		
BA1	0.880	0.028	31.276	0.000		
BA2	0.929	0.021	44.861	0.000	0.922	0.797
BA3	0.869	0.031	28.398	0.000		

Note: INTEG means advergame integration; DIFF means advergame difficulty; CE means cognitive customer engagement; AE means affective customer engagement; BR means brand recognition; BA means brand attitude; CR means construct reliability; and AVE means average variance extracted values.

Table 4.10 MCFA based on high integration and low difficult scenario

Measurement Items	Standardized Estimate	S.E.	Est./S.E.	Two-Tailed P-Value	CR	AVE
INTEG1	0.785	0.056	14.091	0.000	0.959	0.855
INTEG2	0.703	0.072	9.833	0.000		
INTEG3	0.660	0.081	8.099	0.000		
INTEG4	0.839	0.046	18.160	0.000		
DIFF1	0.862	0.034	25.614	0.000	0.963	0.866
DIFF2	0.843	0.036	23.340	0.000		
DIFF3	0.786	0.045	17.309	0.000		
DIFF4	0.925	0.026	35.771	0.000		
CE1	0.906	0.028	32.040	0.000	0.963	0.897
CE2	0.803	0.041	19.526	0.000		
CE3	0.911	0.026	34.966	0.000		
AE1	0.896	0.025	36.378	0.000		
AE2	0.898	0.025	35.397	0.000	0.954	0.837
AE3	0.905	0.022	40.249	0.000		
AE4	0.929	0.018	51.765	0.000		
BR1	0.915	0.023	40.583	0.000	0.955	0.843

BR2	0.680	0.064	10.600	0.000		
BR3	0.937	0.019	50.225	0.000		
BR4	0.912	0.023	39.369	0.000		
BA1	0.916	0.022	42.477	0.000		
BA2	0.898	0.026	34.840	0.000	0.932	0.821
BA3	0.905	0.023	39.088	0.000		

Note: INTEG means advergame integration; DIFF means advergame difficulty; CE means cognitive customer engagement; AE means affective customer engagement; BR means brand recognition; BA means brand attitude; CR means construct reliability; and AVE means average variance extracted values.

Table 4.11 MCFA based on low integration and high difficult scenario

Measurement Items	Standardized Estimate	S.E.	Est./S.E.	Two-Tailed P-Value	CR	AVE
INTEG1	0.918	0.028	33.057	0.000		
INTEG2	0.543	0.112	4.855	0.000	0.874	0.643
INTEG3	0.813	0.046	17.674	0.000		
INTEG4	0.879	0.034	25.617	0.000		
DIFF1	0.963	0.019	49.418	0.000		
DIFF2	0.868	0.035	24.752	0.000	0.933	0.778
DIFF3	0.772	0.057	13.548	0.000		
DIFF4	0.913	0.027	33.388	0.000		
CE1	0.958	0.022	43.108	0.000		
CE2	0.859	0.045	18.884	0.000	0.910	0.773
CE3	0.814	0.053	15.335	0.000		
AE1	0.943	0.021	44.294	0.000		
AE2	0.850	0.039	21.645	0.000	0.929	0.766
AE3	0.881	0.032	27.213	0.000		
AE4	0.821	0.061	13.554	0.000		
BR1	0.940	0.019	50.671	0.000		
BR2	0.870	0.034	25.691	0.000	0.958	0.850
BR3	0.924	0.022	41.614	0.000		
BR4	0.951	0.017	56.876	0.000		
BA1	0.897	0.034	26.663	0.000		
BA2	0.904	0.027	33.302	0.000	0.942	0.843
BA3	0.953	0.017	55.303	0.000		

Note: INTEG means advergame integration; DIFF means advergame difficulty; CE means cognitive customer engagement; AE means affective customer engagement; BR means brand recognition; BA means brand attitude; CR means construct reliability; and AVE means average variance extracted values.

Table 4.12 MCFA based on high integration and high difficult scenario

Measurement Items	Standardized Estimate	S.E.	Est./S.E.	Two-Tailed P-Value	CR	AVE
INTEG1	0.926	0.026	35.721	0.000		
INTEG2	0.766	0.053	14.574	0.000	0.898	0.698
INTEG3	0.785	0.050	15.584	0.000		
INTEG4	0.835	0.043	19.641	0.000		
DIFF1	0.786	0.053	14.953	0.000		
DIFF2	0.765	0.051	14.937	0.000	0.887	0.666
DIFF3	0.970	0.030	32.074	0.000		
DIFF4	0.721	0.059	12.301	0.000		
CE1	0.874	0.037	23.758	0.000		
CE2	0.918	0.029	31.154	0.000	0.909	0.769
CE3	0.837	0.043	19.267	0.000		
AE1	0.923	0.022	41.316	0.000		
AE2	0.829	0.037	22.461	0.000	0.924	0.754
AE3	0.907	0.024	37.039	0.000		

AE4	0.809	0.041	19.566	0.000		
BR1	0.938	0.026	36.710	0.000		
BR2	0.731	0.054	13.492	0.000	0.884	0.657
BR3	0.742	0.057	13.069	0.000		
BR4	0.815	0.043	18.852	0.000		
BA1	0.929	0.019	49.004	0.000		
BA2	0.897	0.025	36.103	0.000	0.944	0.848
BA3	0.936	0.018	51.064	0.000		

Note: INTEG: Integration; DIFF: Difficulty; CE: Cognitive Engagement; AE: Emotional Engagement; BR: Brand Recognition; and BA: Brand Attitude.

Table 4.13 Goodness of fit indices about MCFAs

	Low Integration and Low Difficulty	High Integration and Low Difficulty	Low Integration and High Difficulty	High Integration and High Difficulty
Chi-Square Test of Model Fit/Degrees of freedom	1009.501/469	676.672/469	588.118/469	779.022/469
P value	0.000	0.000	0.000	0.000
RMSEA	0.113	0.068	0.062	0.083
CFI	0.787	0.874	0.900	0.820
TLI	0.770	0.864	0.892	0.805
SRMR (Within/Between)	0.033/0.071	0.028/0.067	0.046/0.078	0.015/0.053

Note: RMSEA means root mean square error of approximation; CFI means Comparative Fit Index; and TLI means Tucker Lewis Index.

From the above results presented from Table 4.9 to Table 4.13 about MCFAs, we can see that the goodness of fit indices of four MCFAs which are suggested by Andersson and Gyimóthy (2010), were fitted well with the analysis data. In details, the Chi-square values/Degrees of freedom (which are sensitive to sample size) are far less than 3.84, which indicates that the measurement models (four types of MCFA) are acceptable. Moreover, in combination with the CFIs, TLIs which are less influenced by sample size in comparison with Chi-square values and are widely used for the assessment of measurement model to evaluate its fitness, have the values are all above 0.7, indicating an acceptable good fit (Hu & Bentler, 1999).

The MCFA models are run with exogenous and endogenous variables, according to Andersson and Gyimóthy (2010). Underlying the acceptable guidelines for the fit of MCFAs, all the standardized values of the factor loadings are above 0.7 with t values are significant, which indicates the well convergent validity. In addition, the values of construct reliability (CR) are above 0.8 and the values of AVE are above 0.6, which ensure the well convergent validity of the focal research variables again. To confirm the discriminant validity of focal research variables, we calculate the square root values of AVE in comparison with inter-correlations of exogenous variables, and related results are summarized in Table 4.14, Table 4.15, Table 4.16, Table 4.17.

Table 4.14 Correlations of focal research variables and square root values of AVEs

	Integrati on	Difficulty	Cognitive Engagement	Affective Engagement	Brand Recognition	Brand Attitude
Integration	0.925					
Difficulty	0.181	0.931				
Cognitive Engagement	.696**	.231*	0.947			
Affective Engagement	.759**	0.089	.770**	0.915		
Brand Recognition	.722**	0.062	.665**	.830**	0.918	
Brand Attitude	.686**	0.105	.737**	.857**	.840**	0.893

Note: The square root of AVE for each variable is displayed on the diagonal of the matrix (in parentheses).

** Correlation is significant at the 0.01 level (2-tailed).

Table 4.15 Correlations of focal research variables and square root values of AVEs

	Integration	Difficulty	Cognitive Engagement	Affective Engagement	Brand Recognition	Brand Attitude
Integration	0.925					
Difficulty	.249*	0.931				
Cognitive Engagement	.517**	0.149	0.947			
Affective Engagement	.645**	0.054	.855**	0.915		
Brand Recognition	.677**	.213*	.651**	.641**	0.918	
Brand Attitude	.643**	0.157	.811**	.861**	.713**	0.906

Note: The square root of AVE for each variable is displayed on the diagonal of the matrix (in parentheses).

** Correlation is significant at the 0.01 level (2-tailed).

Table 4.16 Correlations of focal research variables and square root values of AVEs

	Integration	Difficulty	Cognitive Engagement	Affective Engagement	Brand Recognition	Brand Attitude
Integration	0.802					
Difficulty	.679**	0.882				
Cognitive Engagement	.781**	.706**	0.879			
Affective Engagement	.610**	.555**	.610**	0.875		
Brand Recognition	.870**	.697**	.813**	.543**	0.922	
Brand Attitude	.804**	.621**	.736**	.774**	.780**	0.918

Note: The square root of AVE for each variable is displayed on the diagonal of the matrix (in parentheses).

** Correlation is significant at the 0.01 level (2-tailed).

Table 4.17 Correlations of focal research variables and square root values of AVEs

	Integration	Difficulty	Cognitive Engagement	Affective Engagement	Brand Recognition	Brand Attitude
Integration	0.802					
Difficulty	.679**	0.882				
Cognitive Engame nt	.781**	.706**	0.879			

Affective Engagement	.610**	.555**	.610**	0.875		
Brand Recognition	.870**	.697**	.813**	.543**	0.922	
Brand Attitude	.804**	.621**	.736**	.774**	.780**	0.918

Note: The square root of AVE for each variable is displayed on the diagonal of the matrix (in parentheses).

** Correlation is significant at the 0.01 level (2-tailed).

For the focal research variables in our study, the constructs are internally in line with Cronbach's Alpha values of higher than 0.7, which is much higher than the cut-off point of 0.60 (Bagozzi & Yi, 1988). Additionally, as Hair et al. (2003) suggested that all square root values of AVEs are superior to the correlations among the latent variables, which indicate the measurement model achieving the discriminant validity.

4.3 Summary

In this chapter, we discussed the building of the reliable and valid measures of advergame integration and advergame difficulty in the first section. No prior research has provided reliable and valid scales for advergame features, especially for advergame integration and advergame difficulty. A series of steps following qualitative interviews and quantitative analysis to generate scales of advergame integration and advergame difficulty are operated. With the evidences from 25 interviews, and a series of steps in generating measure items ensured by content validity and construct validity with the help of academic experts and EFA, MCFA analysis, the measure items are purified and specified. For both goodness of fit indices and good measures of convergent, the discriminant validity is exhibited from four times of MCFA, which ensures each four measure items for advergame integration and advergame difficulty.

Finally, the scales of customer engagement and brand effectiveness correlated to each other with advergame integration and advergame difficulty were presented in correlation matrix of all research variables. The good AVE square root values represent the well discriminant validity of our research variables. The next chapter is about the research hypotheses testing related to our research framework, where the measure scales will be chosen and developed.

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Chapter 5: Hypotheses Testing

5.1 Introduction

In this chapter, to address the research questions, we adopted MSEM under developing the measures of focal research variables to test the relationships between antecedents (mobile advergame features: advergame integration and advergame difficulty) and brand effectiveness (brand attitude and brand recognition) via customer engagement. Followed by the statistics in terms of MSEMs, results show that our research hypotheses are partially supported. Regarding the four types of experiment scenarios, each MSEM was conducted in the first level with the features of mobile advergames influencing brand effectiveness via customer engagement, while the time varying by considering the play days was considered as cross-level interaction in the second level. In order to fully test our research hypotheses, according to the four different types of mobile advergame experiment scenarios, each MSEM was computed to assess the support of research hypotheses.

5.2 Research hypotheses testing

This section uses detailed MSEMs to test the research hypotheses and offer the detailed statistic results in reminding the support of the research hypotheses. The MSEM results are presented and the research hypotheses are verified under four experiment scenarios.

5.2.1 MSEM in the low integration and low difficulty condition

Maximum likelihood estimation and two level analysis type are used in MSEM to test the research hypotheses. Where in the first experiment condition, “天冰冰淇淋” (TianBing Ice Cream) represents the low integration and low difficulty experiment scenario, data was culled from the undergraduates in Class 1. Considering the research sample limit, statistics about goodness of fit indices of this model partly support the model fit in the adequate levels, in which a Chi-square value is 774.057 ($p = 0.000$) with degree of freedoms equaling to 219. Along with that, the CFI value is 0.812 and TLI value is 0.783, the RMSEA value is 0.016, and the SRMR(within/between) values are 0.093 and 0.042, respectively. Table 5.1 in the

following presents the test results of the research hypotheses in the low integration and low difficulty experiment scenario. Figure 5.1 presents the analysis results for this condition.

Table 5.1 MSEM test statistics in low integration and low difficulty experiment scenario

Low Integration and Low Difficulty	Standardized Estimate	S.E.	Est./S.E.	P-Value
H1-1: Advergame Integration --> Brand Recognition	0.838	0.147	5.710	0.000
H1-2: Advergame Integration --> Brand Attitude	0.129	0.129	1.005	0.315
H2-1: Advergame Difficulty --> Brand Recognition	-0.085	0.055	-1.553	0.120
H2-2: Advergame Difficulty --> Brand Attitude	0.005	0.036	0.147	0.884
H3-1: Interaction of Advergame Repetition and Advergame Integration --> Brand Recognition	-0.011	0.077	-0.146	0.884
H3-2: Interaction of Advergame Repetition and Advergame Integration --> Brand Attitude	0.032	0.053	0.607	0.544
H4-1: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Recognition	-0.040	0.031	-1.316	0.188
H4-2: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Attitude	0.021	0.025	0.841	0.401
H5-1: Emotional Engagement --> Brand Attitude	0.621	0.112	5.553	0.000
H6-1: Advergame Integration --> Emotional Engagement	1.062	0.099	10.750	0.000
H6-2: Advergame Integration --> Cognitive Engagement	1.023	0.118	8.686	0.000
H7-1: Advergame Difficulty --> Emotional Engagement	-0.059	0.050	-1.185	0.236
H7-2: Advergame Difficulty --> Cognitive Engagement	0.101	0.065	1.552	0.121

Note: bold figure means significant path.

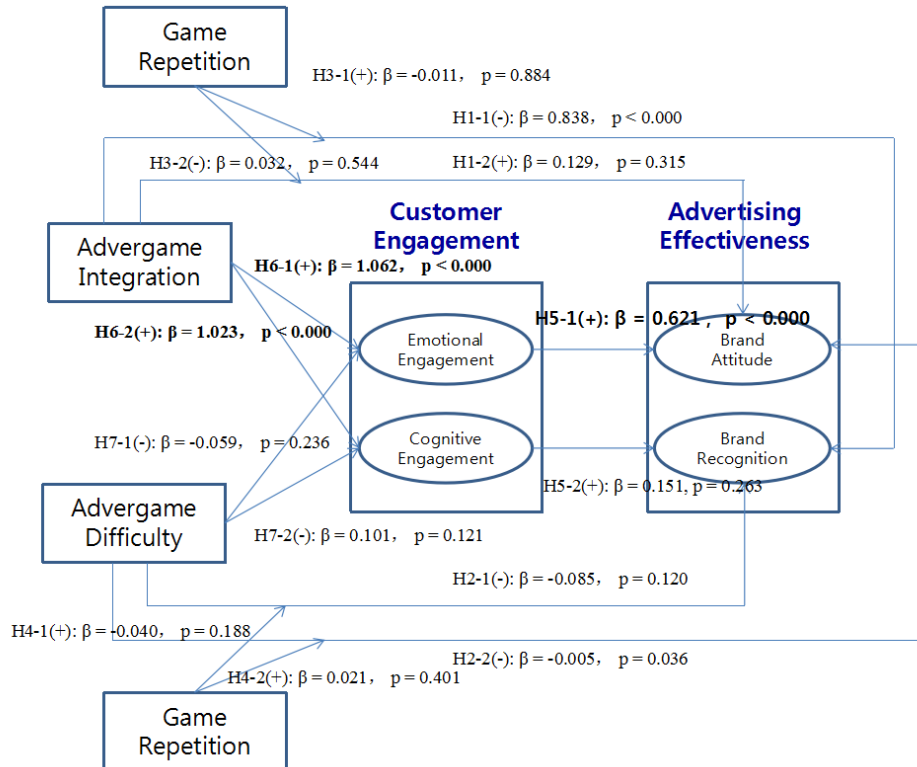


Figure 5.1 Research result for low integration and low difficulty condition

Note: bold paths mean support research hypotheses.

Although most of the research hypothesis directions are consistent with our research, yet, with difference, the estimates for the research hypotheses are largely insignificant. Specifically, H5-1, H6-1, and H6-2 were supported in low integration and low difficulty experiment scenario, to successfully account for the importance of advergame integration toward emotional and cognitive customer engagement, which in turn, improve the brand effectiveness from affective aspect in the mobile context.

5.2.2 MSEM in the high integration and low difficulty condition

Similarly, Maximum likelihood estimation and two level analysis type are used in MSEM to test the research hypotheses in the condition of high integration and low difficulty experiment scenario. Where in the second experiment condition, “三全汤圆” (SanQuan Rice Dumplings) represents the high integration and low difficulty experiment scenario, data was culled from the undergraduates in Class 3. Considering the research sample limit, statistics about goodness of fit indices of this model partly support the model fit in the adequate levels, in which the Chi-square value is 588.118 ($p=0.000$) with degree of freedoms equaling to 219. Along with that, the CFI value is 0.900 and the TLI value is 0.892, the RMSEA value is 0.062, and the SRMR (within/between) values are 0.046 and 0.078, respectively. The following Table 5.2 presents the test results in the high integration and low difficulty experiment scenario. Figure 5.2 presents the analysis results for this condition.

Table 5.2 MSEM test statistics in high integration and low difficulty experiment scenario

High Integration and Low Difficulty	Standard ized Estimate	S.E.	Est./ S.E.	P- Value
H1-1: Advergame Integration --> Brand Recognition	1.650	0.492	3.354	0.001
H1-2: Advergame Integration --> Brand Attitude	0.829	0.470	1.764	0.078
H2-1: Advergame Difficulty --> Brand Recognition	-0.100	0.132	-0.754	0.451
H2-2: Advergame Difficulty --> Brand Attitude	-0.064	0.123	-0.524	0.601
H3-1: Interaction of Advergame Repetition and Advergame Integration --> Brand Recognition	-0.477	0.296	-1.611	0.107
H3-2: Interaction of Advergame Repetition and Advergame Integration --> Brand Attitude	0.012	0.093	0.133	0.894
H4-1: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Recognition	0.091	0.172	0.528	0.597
H4-2: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Attitude	-0.089	0.079	-1.131	0.258
H5-1: Emotional Engagement --> Brand Attitude	0.387	0.298	1.301	0.193
H5-2: Cognitive Engagement --> Brand Recognition	-0.354	0.296	-1.195	0.232
H6-1: Advergame Integration --> Emotional Engagement	1.391	0.216	6.432	0.000
H6-2: Advergame Integration --> Cognitive Engagement	1.405	0.220	6.392	0.000
H7-1: Advergame Difficulty --> Emotional Engagement	-0.312	0.090	-3.475	0.001
H7-2: Advergame Difficulty --> Cognitive Engagement	-0.202	0.098	-2.073	0.003

Note: bold figure means significant path.

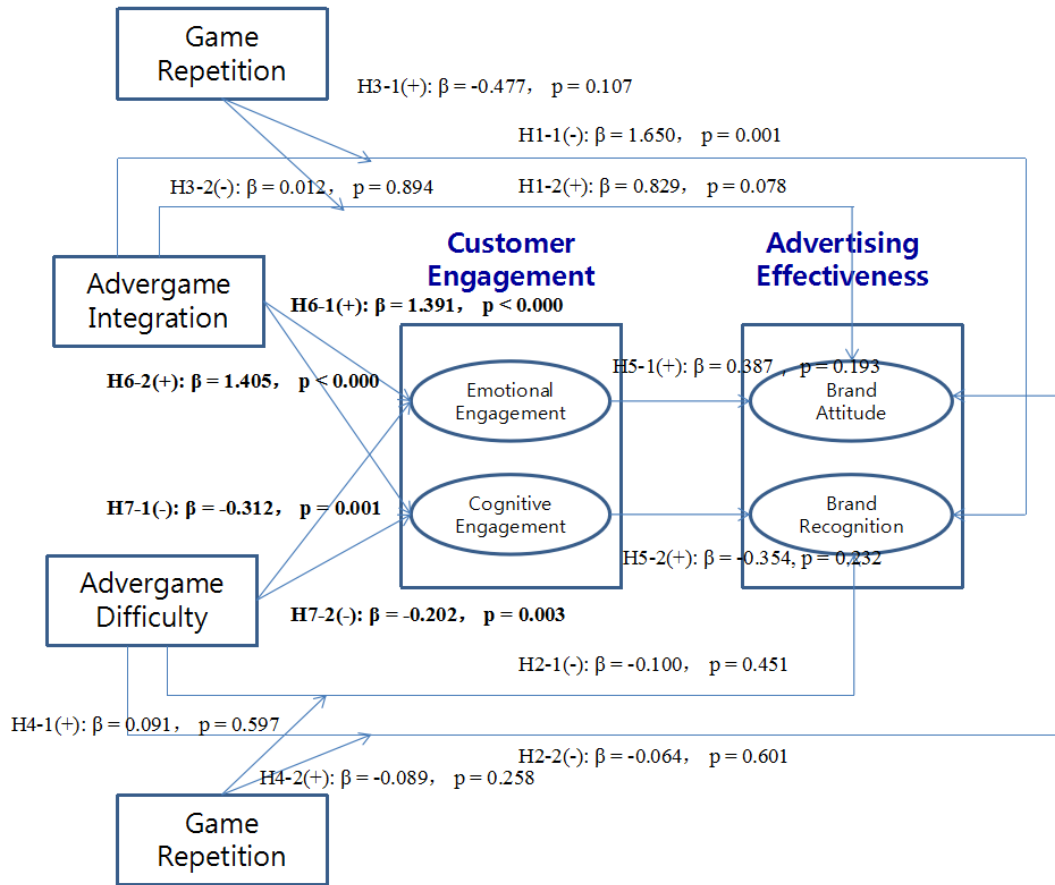


Figure 5.2 Research result for high integration and low difficulty condition

Note: bold paths mean support research hypotheses.

Contrastingly, in high integration and low difficulty experiment scenario, the majority of the research hypothesized relations were verified via the significant path estimates. With different, yet, H1-1 was rejected with the opposite research hypothesis direction, and H2-1 and H2-2 were rejected with insignificant path estimates. Particularly, H6 (both H6-1 and H6-2) and H7 (both H7-1 and H7-2) got supported by exhibiting significant values in the path estimations, where H6-1 and H6-2 are with $\beta = 1.391$ ($p = 0.000 < 0.01$) and $\beta = 1.405$ ($p = 0.000 < 0.01$), respectively, which successfully account for the effects of advergame integration on influencing customer engagement from both the emotional and cognitive aspects. As well as H7-1 and H7-2 are with $\beta = -0.312$ ($p = 0.001 < 0.01$) and $\beta = -0.202$ ($p = 0.003 < 0.01$), respectively, which successfully account negatively for the impact of advergame difficulty in affecting customer engagement in both the emotional and cognitive aspects. Additionally, that the main effect of advergame integration improves brand effectiveness from affective side was confirmed by the significant path estimate ($\beta = 0.829$, $p = 0.078 < 0.1$), presenting the evidence of advergame integration in improving brand attitude in the mobile context. However, advergame repetition, which is represented as play days in

our research, failed to achieve successful cross-level interaction effect in the second level in moderating the main effects of mobile features in affecting advergame brand effectiveness in both the affective and cognitive sides.

5.2.3 MSEM in the low integration and high difficulty condition

Following the above study, in low integration and high difficulty condition, through adjusting the amount of same features and game play time, we used the same “天冰冰淇淋” (TianBing Ice Cream) game in a higher difficult condition to conduct the experiment among the undergraduates in Class 2. Maximum likelihood estimation and two level analysis type are used in MSEM to test the research hypotheses in this condition. Also, considering the research sample limit, statistics about goodness of fit indices of this model partly support the model fit in the adequate levels, in which a Chi-square value is 391.283 ($p = 0.000$) with degree of freedoms equaling to 219. Along with that, the CFI value is 0.898 and the TLI value is 0.882, the RMSEA value is 0.109, and the SRMR (within/between) values are 0.079 and 0.082, respectively. The following Table 5.3 presents the test results of the research hypotheses in the low integration and high difficulty experiment scenario. Figure 5.3 presents the analysis results for this condition.

Table 5.3 MSEM test statistics in low integration and high difficulty experiment scenario

Low integration and High difficulty	Standardize d Estimate	S.E.	Est./ S.E.	P- Value
H1-1: Advergame Integration --> Brand Recognition	0.647	0.181	3.565	0.000
H1-2: Advergame Integration --> Brand Attitude	0.483	0.121	4.003	0.000
H2-1: Advergame Difficulty --> Brand Recognition	0.003	0.113	0.024	0.981
H2-2: Advergame Difficulty --> Brand Attitude	-0.012	0.091	-0.129	0.897
H3-1: Interaction of Advergame Repetition and Advergame Integration --> Brand Recognition	-0.083	0.115	-0.724	0.469
H3-2: Interaction of Advergame Repetition and Advergame Integration --> Brand Attitude	0.042	0.052	0.805	0.421
H4-1: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Recognition	0.020	0.057	0.353	0.724
H4-2: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Attitude	-0.128	0.069	-1.855	0.067
H5-1: Emotional Engagement --> Brand Attitude	0.510	0.093	5.463	0.000
H5-2: Cognitive Engagement --> Brand Recognition	0.310	0.188	1.645	0.100
H6-1: Advergame Integration --> Emotional Engagement	0.565	0.163	3.470	0.001
H6-2: Advergame Integration --> Cognitive Engagement	0.691	0.126	5.466	0.000
H7-1: Advergame Difficulty --> Emotional Engagement	0.123	0.146	0.838	0.402
H7-2: Advergame Difficulty --> Cognitive Engagement	0.327	0.117	2.803	0.005

Note: bold figure means significant path.

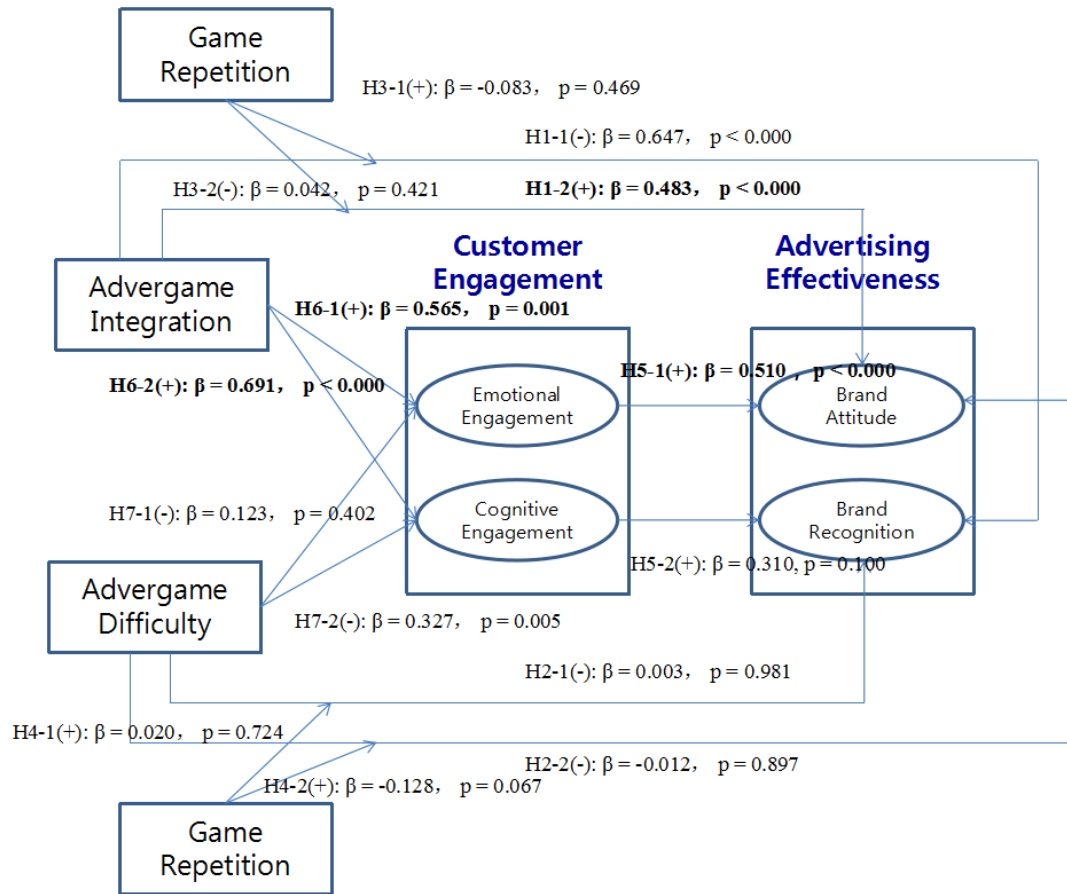


Figure 5.3 Research result for low integration and high difficulty condition

Note: bold paths mean support research hypotheses.

In comparison with the above two experiment scenarios, in low integration and high difficult condition, most of the research hypotheses were also verified via the significant path estimates. Yet, in a different way, advergame difficulty did not take more significant role in influencing brand effectiveness through customer engagement from both the affective and cognitive aspects. More specifically, H1-2, H5 (both H5-1 and H5-2) and H6 (both H6-1 and H6-2) were consistent with our research hypotheses both with directions and significance, where H1-2 got empirical support by exhibiting significant values in the path estimation ($\beta = 0.483$, $p = 0.000 < 0.01$). Moreover, H5 (both H5-1 and H5-2) by exhibiting significant values in the path estimations of $\beta = 0.510$, $p = 0.000 < 0.01$ and $\beta = 0.310$, $p = 0.100 < 0.1$, respectively, and H6 (both H6-1 and H6-2) by exhibiting significant values in the path estimations of $\beta = 0.565$, $p = 0.001 < 0.01$ and $\beta = 0.691$, $p = 0.000 < 0.01$, respectively, successfully account for the importance of advergame integration and advergame difficulty in influencing the brand effectiveness from both the affective and cognitive aspects in the mobile context.

5.2.4 MSEM in the high integration and high difficulty condition

Finally, by adjusting the difficulty of “三全汤圆” (SanQuan Rice Dumplings) game in the same features and playing time, data culled from the undergraduates in Class 4 were used to analyze the focal research hypotheses test. As the same, the maximum likelihood estimation and two level analysis type were used in MSEM to test the research hypotheses in the condition of high integration and high difficulty experiment scenario. Considering the research sample limit, statistics about goodness of fit indices of this model partly support the model fit in the adequate levels, in which the Chi-square value is 532.868 ($p = 0.000$) with degree of freedoms equaling to 219. Along with that, the CFI value is 0.833 and the TLI value is 0.807, the RMSEA value is 0.122, and the SRMR (within/between) values are 0.106 and 0.160, respectively. The following Table 5.4 presents the test results of the research hypotheses in the high integration and high difficulty experiment scenario. Figure 5.4 presents the analysis results for this condition.

Table 5.4 MSEM test statistics in high integration and high difficulty experiment scenario

High integration and High difficulty	Standardized Estimate	S.E.	Est./ S.E.	P-Value
H1-1: Advergame Integration --> Brand Recognition	0.416	0.140	2.964	0.003
H1-2: Advergame Integration --> Brand Attitude	0.364	0.115	3.177	0.001
H2-1: Advergame Difficulty --> Brand Recognition	-0.227	0.134	-1.692	0.091
H2-2: Advergame Difficulty --> Brand Attitude	-0.037	0.095	-0.39	0.697
H3-1: Interaction of Advergame Repetition and Advergame Integration --> Brand Recognition	0.177	0.090	1.973	0.049
H3-2: Interaction of Advergame Repetition and Advergame Integration --> Brand Attitude	0.019	0.047	0.412	0.680
H4-1: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Recognition	-0.074	0.067	-1.110	0.267
H4-2: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Attitude	0.070	0.052	1.340	0.180
H5-1: Emotional Engagement --> Brand Attitude	0.687	0.119	5.750	0.000
H5-2: Cognitive Engagement --> Brand Recognition	0.114	0.137	0.833	0.405
H6-1: Advergame Integration --> Emotional Engagement	0.757	0.100	7.572	0.000
H6-2: Advergame Integration --> Cognitive Engagement	0.628	0.103	6.064	0.000
H7-1: Advergame Difficulty --> Emotional Engagement	-0.368	0.113	-3.265	0.001
H7-2: Advergame Difficulty --> Cognitive Engagement	-0.208	0.118	-1.765	0.078

Note: bold figure means significant path.

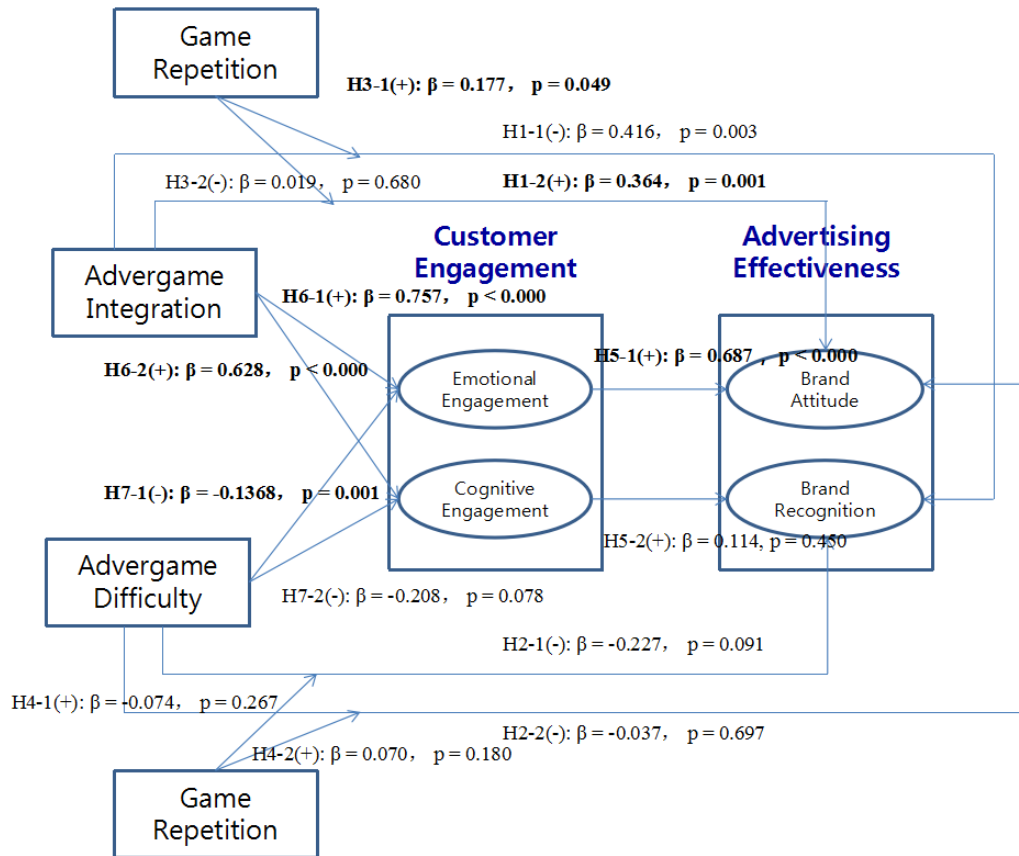


Figure 5.4 Research result for high integration and high difficulty condition

Note: bold paths mean support research hypotheses.

As well as in the condition of high integration and low difficulty experiment scenario, similar research results were got in the high integration and high difficulty experiment scenario. Most of research hypotheses were verified by the consistent direction and significant path estimates. Yet, with different, the role of advergame difficulty and cognitive engagement presented with less significant effects. More specifically, as shown in the above Table 5.4, H1-2, H2-1, H5-1, and H6 (both H6-1 and H6-2), and H7 (both H7-1 and H7-2) were consistent with our research hypotheses with both the hypothesized direction and the significance, where H1-2, H2-1 got empirical support by exhibiting significant path estimates of $\beta = 0.364$, $p = 0.001 < 0.01$ and $\beta = -0.227$, $p = 0.091 < 0.1$, H5-1 got empirical support by exhibiting significant path estimates of $\beta = 0.687$, $p = 0.000 < 0.01$, H6 (both H6-1 and H6-2) got empirical support by exhibiting significant path estimates of $\beta = 0.757$, $p = 0.000 < 0.01$ and $\beta = 0.628$, $p = 0.000 < 0.01$, and H7 (both H7-1 and H7-2) got empirical support by exhibiting significant path estimates of $\beta = -0.368$, $p = 0.001 < 0.01$ and $\beta = -0.208$, $p = 0.078 < 0.1$, respectively.

More specifically, H1-2, H5 (both H5-1 and H5-2), and H6 (both H6-1 and H6-2) were consistent with our research hypotheses with both directions and significance, where H1-2 got

empirical support by exhibiting significant values in the path estimation ($\beta = 0.483$, $p = 0.000 < 0.01$). Moreover, H5 (both H5-1 and H5-2) by exhibiting significant values in the path estimations of $\beta = 0.510$, $p = 0.000 < 0.01$ and $\beta = 0.310$, $p = 0.100 < 0.1$ and H6 (both H6-1 and H6-2) by exhibiting significant values in the path estimations of $\beta = 0.565$, $p = 0.001 < 0.01$ and $\beta = 0.691$, $p = 0.000 < 0.01$, respectively, successfully account for the importance of advergame integration and advergame difficulty in influencing the brand effectiveness from both the affective and cognitive aspects in the mobile context. Additionally, the advergame repetition represented as play days successfully achieves a significant effect ($\beta = 0.177$, $p = 0.049 < 0.05$) in positively adjusting the effect of advergame integration in improving the brand recognition in the mobile context. The above results largely confirm that the adjustment of mobile advergame features can affect brand effectiveness from both affective and cognitive aspects.

5.3 Summary

This chapter aimed to answer the research questions by testing the research hypotheses. After confirming the measures of our research focal variables, a series of MSEMs according to four types of experiment scenarios were conducted to investigate our research hypotheses. The structural models almost exhibit adequate model fit, and the significance of path estimations largely support our research assumptions. Partial support of research hypotheses, along with the scale developing, offers much substantial support in studying the effects of advergame integration and game difficult in the mobile context.

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Chapter 6: Discussion

6.1 Introduction

This chapter discusses the analysis results from the above chapter and follows the structure below. Firstly, according to the four types of compared experiment scenarios, mobile advergames features (advergame integration and game difficulty) influencing on brand effectiveness via customer engagement are discussed. The discussion addresses how advergame integration and game difficulty differently influence brand effectiveness based on the four types of experiment conditions (high vs low integration and high vs low difficulty). This part also illustrates the effect of customer engagement in bridging the mobile features affecting brand effectiveness in the mobile context.

Secondly, the cross-level interaction of game play repetition measured by play days in the second level based on the four types of experiment scenarios was discussed. Focusing on the cross-level interaction of advergame repetition in MSEM, this part offers a reminder of the importance of advertising repetition in influencing brand effectiveness in the mobile context. A detailed discussion from experiment design and analysis method for advergame repetition as the cross-level interaction was conducted.

6.2 Discussion of mobile advergame features

Analysis of research results according to MSEM based on the four types of experiment scenarios revealed the differences of mobile features on influencing brand effectiveness between high vs low integration and high vs low difficulty conditions. Effects of mobile advergame features influencing brand effectiveness strikingly increase ranging from low integration and low difficulty experiment scenario to high integration and high difficulty experiment scenario. As shown in Table 6.1, we can see that, in comparison with low integration and low difficulty condition ($\beta = 0.129$, $p = 0.315 > 0.1$), the effect of advergame integration improving brand attitude increased marginally significantly in high integration and low difficulty condition ($\beta = 0.829$, $p = 0.078 < 0.1$). These results support Affect Transfer Mechanism (Mallinckrodt & Mizerski, 2007), which contended that the fun and enjoyable

context can appeal positive attitude more likely. Additionally, in high difficulty condition, both in low and high integration experiment scenarios, the effects of advergame integration influencing brand attitude are significant. These results offer a robust evidence to support H1-2, in which higher advergame integration will improve brand attitude in the mobile context, but the interaction effect of advergame difficulty needs a more contemplation. A possible explanation for these results are that an appropriate difficulty condition which leads users into the optimal challenge situation may make them into the flow state. In the flow state, the fun and enjoyable effects which transferred from game playing will facilitate positive attitude toward the brands which has been well incorporated in the game.

Table 6.1 Comparing various effects of mobile features for brand effectiveness

Low Integration and Low Difficulty	Standardized Estimate	S.E.	Est./ S.E.	P- Value
H1-1: Advergame Integration -->Brand Recognition	0.838	0.147	5.710	0.000
H1-2: Advergame Integration -->Brand Attitude	0.129	0.129	1.005	0.315
H2-1: Advergame Difficulty -->Brand Recognition	-0.085	0.055	-1.553	0.120
H2-2: Advergame Difficulty --> Brand Attitude	0.005	0.036	0.147	0.884
High Integration and Low Difficulty	Standardized Estimate	S.E.	Est./ S.E.	P- Value
H1-1: Advergame Integration -->Brand Recognition	1.650	0.492	3.354	0.001
H1-2: Advergame Integration -->Brand Attitude	0.829	0.470	1.764	0.078
H2-1: Advergame Difficulty -->Brand Recognition	-0.100	0.132	-0.754	0.451
H2-2: Advergame Difficulty --> Brand Attitude	-0.064	0.123	-0.524	0.601
Low Integration and High Difficulty	Standardized Estimate	S.E.	Est./ S.E.	P- Value
H1-1: Advergame Integration -->Brand Recognition	0.647	0.181	3.565	0.000
H1-2: Advergame Integration -->Brand Attitude	0.483	0.121	4.003	0.000
H2-1: Advergame Difficulty -->Brand Recognition	0.003	0.113	0.024	0.981
H2-2: Advergame Difficulty --> Brand Attitude	-0.012	0.091	-0.129	0.897
High Integration and High Difficulty	Standardized Estimate	S.E.	Est./ S.E.	P- Value
H1-1: Advergame Integration -->Brand Recognition	0.416	0.140	2.964	0.003
H1-2: Advergame Integration -->Brand Attitude	0.364	0.115	3.177	0.001
H2-1: Advergame Difficulty -->Brand Recognition	-0.227	0.134	-1.692	0.091
H2-2: Advergame Difficulty --> Brand Attitude	-0.037	0.095	-0.39	0.697

For the effects of advergame difficulty, the results in Table 6.1 show that no significant effects influencing brand effectiveness exist in low difficulty condition. Whereas the hypothesis directions are almost consistent with our research model. Relatively, in high difficulty condition, marginal significant effect of advergame difficulty ($\beta = -0.227$, $p = 0.091 < 0.1$) decreasing brand recognition was found in the high integration and high difficulty experiment scenario. This result advocates our research assumption H2-1 which argues that when over the optimally challenging point, in difficulty game condition, higher advergame difficulty will result in lower brand recognition. As well as the various effects of advergame difficulty influencing brand effectiveness ranging among the four types of experiment

scenarios in consideration of advergame integration remind us that contemplating the interacting effects of advergame integration and advergame difficulty in mobile context is necessary. The above research results proffer a strong evidence in supporting DDA (Alexander et al., 2013) which asserts that high degree of game difficulty will induce frustration, and in turn, influence advertising effectiveness.

6.3 Discussion of customer engagement in mobile advergames

Verified drivers from mobile features, in our study focusing on advergame integration and advergame difficulty, inducing customer engagement in mobile advergame context, were confirmed. Customer engagement has been a hot topic for researchers, from brand or advertising (Algesheimer et al., 2005; Bagozzi & Dholakia, 2006; Laroche et al., 2012; Lin, 2007). Studies contended that games are engaging and motivating, and creating game-like motivation in a non-game context could motivate and engage people in a similar way. It confirms the fact that advergame integration and advergame difficulty can be the drivers of customer engagement in the mobile advergame context. This study largely follows flow experience, the research results through MSEMs show that advergame integration and advergame difficulty can both increase and decrease brand effectiveness significantly in high advergame integration condition via customer engagement, respectively.

In detail, as shown in Table 6.2, in integration situation, the effects of advergame integration facilitating emotional engagement and cognitive engagement were $\beta = 1.391$, $p = 0.000 < 0.01$ and $\beta = 1.405$, $p = 0.000 < 0.01$ versus $\beta = 0.757$, $p = 0.000 < 0.01$ and $\beta = 0.628$, $p = 0.000 < 0.01$, respectively. For advergame difficulty, in high integration experiment scenario, the effects of advergame difficulty preventing emotional and cognitive engagement were $\beta = -0.312$, $p = 0.001 < 0.01$ and $\beta = -0.202$, $p = 0.003 < 0.01$ versus $\beta = -0.368$, $p = 0.001 < 0.01$ and $\beta = -0.208$, $p = 0.078 < 0.1$, respectively. These findings correspond to and extend existing understanding of the roles of advergame integration and advergame difficulty on brand effectiveness (A. Berger et al., 2018; Catalán et al., 2019; Hernandez & Chapa, 2010; Mallinckrodt & Mizerski, 2007) in a major way.

Table 6.2 Comparing various effects of mobile features for customer engagement

Low Integration and Low Difficulty	Standardized Estimate	S.E.	Est./S.E.	P-Value
H5-1: Emotional Engagement --> Brand Attitude	0.621	0.112	5.553	0.000
H5-2: Cognitive Engagement --> Brand Recognition	0.115	0.103	1.119	0.263
H6-1: Advergame Integration --> Emotional Engagement	1.062	0.099	10.750	0.000

H6-2: Advergame Integration --> Cognitive Engagement	1.023	0.118	8.686	0.000
H7-1: Advergame Difficulty --> Emotional Engagement	-0.059	0.050	-1.185	0.236
H7-2: Advergame Difficulty --> Cognitive Engagement	0.101	0.065	1.552	0.121
High Integration and Low Difficulty	Standardize d Estimate	S.E.	Est./ S.E.	P- Value
H5-1: Emotional Engagement --> Brand Attitude	0.387	0.298	1.301	0.193
H5-2: Cognitive Engagement --> Brand Recognition	-0.354	0.296	-1.195	0.232
H6-1: Advergame Integration --> Emotional Engagement	1.391	0.216	6.432	0.000
H6-2: Advergame Integration --> Cognitive Engagement	1.405	0.220	6.392	0.000
H7-1: Advergame Difficulty --> Emotional Engagement	-0.312	0.090	-3.475	0.001
H7-2: Advergame Difficulty --> Cognitive Engagement	-0.202	0.098	-2.073	0.003
Low Integration and High Difficulty	Standardize d Estimate	S.E.	Est./ S.E.	P- Value
H5-1: Emotional Engagement --> Brand Attitude	0.510	0.093	5.463	0.000
H5-2: Cognitive Engagement --> Brand Recognition	0.310	0.188	1.645	0.100
H6-1: Advergame Integration --> Emotional Engagement	0.565	0.163	3.470	0.001
H6-2: Advergame Integration --> Cognitive Engagement	0.691	0.126	5.466	0.000
H7-1: Advergame Difficulty --> Emotional Engagement	0.123	0.146	0.838	0.402
H7-2: Advergame Difficulty --> Cognitive Engagement	0.327	0.117	2.803	0.005
High Integration and High Difficulty	Standardize d Estimate	S.E.	Est./ S.E.	P- Value
H5-1: Emotional Engagement --> Brand Attitude	0.687	0.119	5.750	0.000
H5-2: Cognitive Engagement --> Brand Recognition	0.114	0.137	0.833	0.405
H6-1: Advergame Integration --> Emotional Engagement	0.757	0.100	7.572	0.000
H6-2: Advergame Integration --> Cognitive Engagement	0.628	0.103	6.064	0.000
H7-1: Advergame Difficulty --> Emotional Engagement	-0.368	0.113	-3.265	0.001
H7-2: Advergame Difficulty --> Cognitive Engagement	-0.208	0.118	-1.765	0.078

6.4 Discussion of advergame repetition in mobile advergames

Eventually, to confirm the cross-level interacting effects of advergame repetition on advergames features influencing brand effectiveness, which addresses the third research question, we measured the game play days on the individual level (second level) to assess the dynamic relationships among the research variable relationships in the first level occurring in the 9 consecutive days. Elaborating on the dynamics, interplay of advergame repetition,

MSEMs conducted on the four types of experiment scenarios. However, contrasting with our research assumptions, the analysis results almost failed to exhibit significant cross-level interaction of advergame repetition on influencing the research variables relationship in the first level as presented in Table 6.3. More specifically, only in the high integration and high difficulty experiment scenario, a significant interaction of advergame repetition ($\beta = 0.177$, $p = 0.049 < 0.05$) in improving brand recognition when considering the effect of advergame integration is found.

Table 6.3 Results for cross-level interaction of advergame repetition

Low Integration and Low Difficulty	Standardize d Estimate	S.E.	Est./ S.E.	P- Value
H3-1: Interaction of Advergame Repetition and Advergame Integration --> Brand Recognition	-0.011	0.077	-0.146	0.884
H3-2: Interaction of Advergame Repetition and Advergame Integration --> Brand Attitude	0.032	0.053	0.607	0.544
H4-1: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Recognition	-0.040	0.031	-1.316	0.188
H4-2: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Attitude	0.021	0.025	0.841	0.401
High Integration and Low Difficulty	Standardize d Estimate	S.E.	Est./ S.E.	P- Value
H3-1: Interaction of Advergame Repetition and Advergame Integration --> Brand Recognition	-0.477	0.296	-1.611	0.107
H3-2: Interaction of Advergame Repetition and Advergame Integration --> Brand Attitude	0.012	0.093	0.133	0.894
H4-1: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Recognition	0.091	0.172	0.528	0.597
H4-2: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Attitude	-0.089	0.079	-1.131	0.258
Low Integration and High Difficulty	Standardize d Estimate	S.E.	Est./ S.E.	P- Value
H3-1: Interaction of Advergame Repetition and Advergame Integration --> Brand Recognition	-0.083	0.115	-0.724	0.469
H3-2: Interaction of Advergame Repetition and Advergame Integration --> Brand Attitude	0.042	0.052	0.805	0.421
H4-1: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Recognition	0.02	0.057	0.353	0.724
H4-2: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Attitude	-0.128	0.069	-1.855	0.067
High Integration and High Difficulty	Standardize d Estimate	S.E.	Est./ S.E.	P- Value
H3-1: Interaction of Advergame Repetition and Advergame Integration --> Brand Recognition	0.177	0.090	1.973	0.049
H3-2: Interaction of Advergame Repetition and Advergame Integration --> Brand Attitude	0.019	0.047	0.412	0.680
H4-1: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Recognition	-0.074	0.067	-1.110	0.267
H4-2: Interaction of Advergame Repetition and Advergame Difficulty --> Brand Attitude	0.07	0.052	1.340	0.180

The research results related to H3 and H4 have been proven to be more problematic than

other research hypotheses testings. Considering the casual nature of advergame, play times per day, after careful consideration, advergame repetition may be calibrated by another measure. Despite the research support for the importance of advertising repetition (Cauberghe & Pelsmacker, 2010; Y. Kim & Leng, 2017; Pechmann & Stewart, 1988; Roettl et al., 2016; Schmidt & Eisend, 2015), the research results failed to confirm the importance in improving brand effectiveness from affective and cognitive sides in the context of mobile advergames. Several potential explanations for these findings can be illustrated from the survey demographics, measure methods, and analysis approaches. Firstly, this study focused on undergraduates who have excellent skill in utilizing mobile technologies, replaying mobile advergame in consecutive days may not induce notable changes in their skills and play experiences which play an important role in influencing brand effectiveness. Secondly, as mentioned above, we measure advergame repetition using play day merely, however, another measure method, such as play times per day may be another effective or valid approach needing more future study. Finally, to ensure the validity of the analysis results of MSEM, larger research sample size applied in each experiment scenario is necessary.

6.5 Summary

This chapter aimed to interpret the analysis results according to four types of experiment scenarios (low integration and low difficulty, high integration and low difficulty, low integration and high difficulty, high integration and high difficulty), in order to discuss the research frame formed in Chapter 1 and its related research assumptions designed in Chapter 2. Corresponding to existent advergame research, the research results were discussed mindfully for studying advergames in the mobile context.

Conceptualization of mobile features including advergame integration and advergame difficulty extends and deepens existing research (Vashisht et al., 2019), which concludes game factors including brand prominence (prominent vs subtle), brand proximity (local vs peripheral), game-product congruence (low, moderate or high) or thematic relevance, mode of presentation (audio, video or audio-video) and game repetition, single player game vs multiple-players game, technical platform, 3D and 4D technology for general internet advergames. By adequately measuring advergames features in the mobile context, studying the effects of mobile advergames in influencing brand effectiveness is particularly innovative.

In terms of research assumptions, this research proffers large evidences in assessing the theoretical research model. Additionally, most of the research hypotheses got empirical

support based on the four types of compared experiment scenarios. Customer engagement is driven by emotional and cognitive aspects and it bridges the relationships between mobile features in influencing brand effectiveness. The recognition of advergame integration and advergame difficulty influencing brand effectiveness in both affective and cognitive aspects in a dynamic and longitudinal way is therefore an important endeavor to conclude implications based on individual and various experiment scenarios in both theoretical and practical ways.

The research results show that advergame integration indeed improves brand attitude in high integration condition, and advergame difficulty decreases brand recognition in high integration and high difficulty condition. Moreover, advergame integration and advergame difficulty improve emotional engagement and decrease cognitive engagement in high integration condition, respectively. These results imply that affective and cognitive brand effectiveness measured by brand attitude and brand recognition depends on the effective mobile advergame features via customer engagement. Lastly, a more calibrated approach in measuring advergame repetition to assess its effect on brand effectiveness in the context of mobile advergame offers an initial for future mobile advergame study.

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Chapter 7: Conclusion

7.1 Introduction and major conclusion

The current research set out to develop the mobile advergames' features as the valid approach to improve brand effectiveness in the mobile context. This thesis starts in exploring the advergame integration and advergame difficulty by showcasing the significance of advergame replay, identifying the bridging effects of customer engagement in both affective and cognitive aspects. A better approach by combining Affect Transfer Mechanism and LC4MP theory in consideration with flow experience theory was used to form our research model by extending relevant prior research views. Key advanced arguments here include combining advergame repetition in the longitudinal study to investigate the effects of mobile advergames' features in the four compared experiment scenarios. The critical MSEM analysis highlights the shortcomings of the extent research focused on cross-section data analysis methods and the advergame replay appeared as a potent new approach to address these research gaps. Put together, the cross-level interaction of advergame repetition in the 9 consecutive days in investigating the relationships between advergame features and brand effectiveness via customer engagement offers a more holistic, dynamic way to develop advergame research in the mobile context.

From multiple strands of advergame integration and game difficulty, this research advances the customer engagement as the valid approach to measure the mobile online participation. A conceptual research model built on forming the relationships between existent research related to advergame integration and advergame difficulty is used to design the research hypotheses. The research model presents advergame integration and advergame difficulty affecting brand effectiveness differently from affective and cognitive aspects, and an integration of multiple theoretical strands generates 14 research hypotheses.

A post-positivist methodological approach by mixing quantitative and qualitative data collection methods has been adopted. Four experiment scenarios covered a broad range for testing the experiment validity, which seems to adequately capture the validity of the research design. Prior to the research hypotheses test, a relatively strict scale development process has been provided with involving qualitative data. Finally, in the 9 consecutive days, 348 valid

data were collected and used to analyze the MSEM models according to the four types of experiment scenarios, respectively.

The majority of research hypotheses, except the cross-level interaction of advergame repetition, were empirically confirmed. The results revealed that mobile features which focused on advergame integration and advergame difficulty here have a powerful impact on brand effectiveness from affective and cognitive aspects. These results are almost identified through the four types of experiment scenarios, as ensured by the longitudinal experiment design.

The major conclusions of this thesis include:

This study investigated the advergame features in the mobile era with focusing on the mobile advergames, conceptualized the advergame integration and advergame difficulty as part of the customer engagement and their effects on the advertising (brand) effectiveness. The cross-level interacting effects of time-varying (advergame repetition) between individuals was reflected in our conceptual model. By considering both the affective and cognitive effects, we conducted the hypothesis tests from a sample of 146 undergraduates in total and developed four original measurement scales each for advergame integration and advergame difficulty from 25 qualitative interviews and quantitative factor analyses. The calibrated and validated measures of advergame integration and advergame difficulty were used to test the research hypotheses with 348 valid data collected from 9 consecutive days of experiment.

Multilevel structure equation models were used to test our research model in consideration of 2 * 2 four different experiment conditions, and the research hypotheses got largely supported. The results show that advergame integration almost improves brand attitude in three experimental conditions and facilitates customer engagement in all experiment conditions. Advergame difficulty in the condition of high integration presents a significant negative effects on influencing brand recognition and customer engagement, and advergame repetition in the condition of high difficulty takes a significant interacting effect.

This thesis has made both conceptual and empirical contributions. More specific theoretical contributions and implications are given below, together with the outlined research limitations and future research directions.

7.2 Theoretical contributions

Findings from this research offer significant contributions to the advergame research, specifically in several aspects in the mobile context.

Regarding Devika et al.'s research (2019), a lack of investigating how intrinsic characteristics of mobile advergame affecting the advertising effectiveness (here, measured by brand effectiveness) was benefited from a scattered and inconclusive research, resulting in an overlap which contributes to the transfer from general online advergame into the mobile era. Combining the Affect Transfer Mechanism, LC4MP theory and DDA theory, this study enhances the understanding of the advertising effects in mobile advergames. By proposing and empirically validating the research framework of how advergame features influencing brand effectiveness in the mobile context with time varying, a significant advance is granted to the existent research relevant to advergame research in relation to longitudinal study. We found that relationships between advergames features improving brand effectiveness in various experiment scenarios. Through these studies, precise insights from Affect Transfer Mechanism and LC4MP, DDA theories can be applied in investigating advergame's effectiveness. What the Affect Transfer theory (Mallinckrodt & Mizerski, 2007) contends that fun and enjoyable experience can spill over to non-gamification context was confirmed in the H1-2 and H6. Specifically, in high integration condition, that advergame integration takes important role in improving brand attitude and customer engagement was empirically confirmed by our research results. This contributes to theoretical applications in mobile advergame research. According to LC4MP (Lang, 2000), finite cognitive resource can be used for processing advertising, especially when emerging in a high engaging activity. More specifically, in difficult condition, LC4MP is essential for understanding the brand effectiveness in mobile advergame context. In high integration condition, our research results revealed that negative effects of advergame difficulty both influence brand effectiveness and customer engagement from affective and cognitive aspects, which offers another contribution in applying these theories to more general research context.

The second contribution is regarding how the customer engagement bridges the relationships between advergames' features and brand effectiveness in the mobile context. Customer engagement so far takes a deep research literature in marketing and organization field. In our study, customer engagement formed from marketing and other domains of social sciences was studied as emotional and cognitive engagements. The contributions of this research lie in that the explicit recognition of these two dimensions bridge advergames integration and advergame difficulty together in affecting brand effectiveness. This involves an initial or a need for more active mobile participation toward the management of brand relation in advergame research.

The third significant theoretical contribution concerns the methodological methods.

Cross-section data collecting and analysis have been overused in traditional advergame research. Integrating theories to form some novel research framework in consideration of time varying will provide new development of advertising research focused on advergame in mobile context. A dynamic application of theories incorporating into mobile advergame experiments provides a major contribution to existing research related to advergame study. It, as an echo of substantial research requirement for future dynamic study, provides a potent and exact application of advergame study.

7.3 Practical implications

Several valuable insights for online advertisers and marketers are provided from this research. How to use customer engagement as an active channel to enhance brand effectiveness in mobile advergames, how to understand mobile advergames' features to benefit brand effectiveness in advergames, and their interplay on the relational brand effects are critical for advertising managers. Dealing with these issues, this research directs managerial implications for online advertising strategies in the mobile era. This study gives points on how brand or advertising effectiveness can be successfully managed in the mobile advergame context.

Valuable guidelines for online advertising concerning the gamification in the mobile context can be used for reference. As referred by Affect Transfer Mechanism, enjoyable and fun experiences from gamification can be spilled over to non-gamification context. On this ground, more advertising strategies considering advergames' features should be implemented in mobile advergames. Several effective ways considering the intrinsic characters of advergames, here, focused on advergame integration and advergame difficulty and their interacting effects improving brand effectiveness, should be done to drive customer's engagement, which in turn improve brand effectiveness. For examples, increasing the degree of integration between advertising and casual games in consideration of optimal difficulty is a better strategy in improving the brand effectiveness from both affective and cognitive aspects. Moreover, considering the affective and cognitive aspects of customer engagement and advertising effects offers a much more dedicated way to improve advertising effects among a wide consumer population.

Specifically, mobile technology has been widely used among common people, this directly pertains to advertising and marketing communication and strategies for online advertisers and managers. Targeting young and female people who are argued as popular internet users, marketing managers can seek to adjust advergame difficulty to facilitate

customer engagement, and to set optimal degree of advergame integration to increase brand attitude. Through these ways, they can address the needs by interacting with customer engagement through setting optimal degrees of advergame difficulty and advergame integration. For instance, numerous fields such as commercial examples funded by Pepsi, 7 Up, NFL, and Burger King; political and military examples including “America Army” as a recruitment tool; and educational examples related to “edumarket gaming” or “edutainment” as an educational simulation, have been incorporating advertising into video games as their marketing strategies which successfully drive a world-wide fashion.

Regarding advergame repetition, consecutive game play days was measured in the second-level to assess its cross-level interaction for the longitudinal experiment design. Although its effects largely fail to influence the relationships between advergames' features and brand effectiveness in the first level, several research insights can be suggested to improve the marketing strategies on advertising. Repetition has got substantial research attention from traditional advertising research to online advergames (Burton et al., 2019; Cauberghe & Pelsmacker, 2010; Y. Kim & Leng, 2017), its pivotal effects on influencing advertising effectiveness has been sufficiently confirmed. With a pity of failing to design advergame repetition, online marketers or advertisers need to contemplate on the influence of advergames replay in mobile. Incorporating advertising into casual video games, how advertising repetition can be made the most advantage of them need a much deeper study. This offers an insight on how to control the days of advergame campaign to achieve best advertising effects.

7.4 Research limitation and future research directions

In spite of valuable contributions have been made in this study that bring to advergame literature in the mobile era, the current research is not without limitations, and further study may need to exploit the realm of advertising in gamification and mobile context. In our study, several limitations concerned the experiment design, the generalization of research results, as well as the limitation on measuring advergame repetition are summarized as follows, especially regarding the type of data collection, sample specifications, and focused industry.

The type of data collecting determined the first limitation in our study. Predominantly using quantitative data analysis through a longitudinal study according to the four types of experiment scenarios meant a further necessary adoption of a supportive qualitative analysis phase. The way of gaining depth into consumer's feeling about advergames' features in the

mobile context would complement the mainly quantitative analysis approach, and following in-depth interviews with the advergame campaign participators should be done. Moreover, our study based on customer self-reported data. In spite of the advantages of this type of data and method, further “organic data” in contrast to “designed data” as in this study should be expected. Organic data which has been flourished in social media studies (Kozinets, 2002; Kozinets et al., 2010) allow to capture actual reflections of participators.

The second shortcoming of this research was represented in the research sample. Undergraduate students were recruited to participate into these experiments. Due to the nature of this population, our research results could not be generalized to the general population. A large set of sample data can offset the risk of bias, but for MSEM, much more calibrated estimating processes need to be calculated. Application of the research sample and analysis results into generalization and the inability to estimate the responses bias need more efforts to alleviate these issues with multi-group experiment design and field study. Further research on avoiding these issues through methodological methods should also be considered by conducting in a larger sample size.

This study focusing on food industry by using two types of casual mobile games. To extend our research findings, more diverse genres of casual games should be considered to enhance its generalization. Diverse game genres may offer various interaction functionalities, the ability of effectively controlling the different brand effects in various game context may fit the advergames research requirements. Upon a number of different product industries to collect experiment or field data is encouraged in future study to statistically verify the different advergame effects in the mobile era. Including as many types of advergames genres as possible to explore their effects in the mobile context will keep the consistency of our research representation. Additionally, this study set the stage for exploring advergames' effects in mobile media with Chinese-speaking context, which is the extension of those main advergame research conducted in European and US, contributing to the advergame literature. However, more cross-cultural applicability of advergame investigations need to be done between individualistic and collective culture to proffer meaningful suggestions for developing the advergame research.

Further to continue this research is to reconsider the research conceptual framework. As mentioned above, not only the cross-level interaction of advergame repetition, but also the focal research variables, advergame integration and advergame difficulty take a notable interaction in influencing brand effectiveness in mobile advergame context. Necessarily, other antecedents and mediators should be considered in bridging the relationships between

advergames' features and brand effectiveness in combination with considering other research which has explored a plethora of possible connections between advergames' features and brand or advertising effects. Further research should seek to build other constructs and look into the benefits and costs on the impacts of brand effectiveness.

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Bibliography

- Agante, L., & Pascoal, A. (2019). How much is “too much” for a brand to use an advergame with children? *Journal of Product & Brand Management*, 28(2), 287-299.
- Alexander, J. T., Sear, J., & Oikonomou, A. (2013). An investigation of the effects of game difficulty on player enjoyment. *Entertainment Computing*, 4(1), 53-62.
- Algesheimer, R., Dholakia, U. M., & Herrmann, A. (2005). The social influence of brand community: Evidence from european car clubs. *Journal of Marketing*, 69(3), 19-34.
- Allen, C. T., & Janiszewski, C. A. (1989). Assessing the role of contingency awareness in attitudinal conditioning with implications for advertising research. *Journal of Marketing Research*, 26(1), 30-43.
- Anastasi, A., & Urbina, S. (Eds.). (1997). *Psychological testing*. Pearson Education.
- Andersson, C. E., & Gyimóthy, S. (2010). The service triad: modelling dialectic tensions in service encounters. *The Service Industries Journal*, 30(2), 265-280.
- Andrade, G., Ramalho, G., Santana, H., & Corruble, V. (2005, September 19-22). *Challenge-sensitive action selection: An application to game balancing*. IEEE/WIC/ACM International Conference on Intelligent Agent Technology, Compiègne, France.
- Arkes, H. R., Hackett, C., & Boehm, L. (1989). The generality of the relation between familiarity and judged validity. *Journal of Behavioral Decision Making*, 2(2), 81-94.
- Armstrong, J. S., & Overton, T. S. (2018). Estimating nonresponse bias in mail surveys. *Journal of Marketing Research*, 14(3), 396-402.
- Assael, H. (2005). A demographic and psychographic profile of heavy internet users and users by type of internet usage. *Journal of Advertising Research*, 45(1), 93-98.
- Bagozzi, R. P., & Dholakia, U. M. (2006). Antecedents and purchase consequences of customer participation in small group brand communities. *International Journal of Research in Marketing*, 23(1), 45-61.
- Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74-94.
- Baker, J., Levy, M., & Grewal, D. (1992). An experimental approach to making retail store environmental decisions. *Journal of Retailing*, 68(4), 445.
- Barzilai, S., & Blau, I. (2014). Scaffolding game-based learning: Impact on learning achievements, perceived learning, and game experiences. *Computers & Education*, 70, 65-79.
- Bellman, S., Kemp, A., Haddad, H., & Varan, D. (2014). The effectiveness of advergames compared to television commercials and interactive commercials featuring advergames. *Computers in Human Behavior*, 32, 276-283.
- Beneliyahu, A., Moore, D., Dorph, R., & Schunn, C. D. (2018). Investigating the multidimensionality of engagement: Affective, behavioral, and cognitive engagement across science activities and contexts. *Contemporary Educational Psychology*, 53, 87-105.
- Bentler, P. M. (1992). On the fit of models to covariances and methodology to the Bulletin. *Psychological Bulletin*, 112(3), 400-404.
- Berger, A., Schlager, T., Sprott, D. E., & Herrmann, A. (2018). Gamified interactions: Whether, when, and how games facilitate self-brand connections. *Journal of the Academy of Marketing Science*, 46(4), 652-673.

- Berger, P. D., Lee, J., & Weinberg, B. D. (2006). Optimal cooperative advertising integration strategy for organizations adding a direct online channel. *Journal of the Operational Research Society*, 57(8), 920-927.
- Berlyne, D. E. (1970). Novelty, complexity, and hedonic value. *Perception & Psychophysics*, 8(5), 279-286.
- Bogdan, R., Taylor, S. J., & Taylor, S. S. (Eds.). (1975). *Introduction to qualitative research methods: A phenomenological approach to the social sciences*. Wiley-Interscience.
- Bornstein, R. F. (1989). Exposure and affect: Overview and meta-analysis of research, 1968–1987. *Psychological Bulletin*, 106(2), 265-289.
- Brakus, J. J., Schmitt, B. H., & Zarantonello, L. (2009). Brand experience: What is it? How is it measured? Does it affect loyalty? *Journal of Marketing*, 73(3), 52-68.
- Breidbach, C. F., Gummesson, E., Mele, C., Polese, F., Brodie, R. J., & Hollebeek, L. D. (2014). Beyond virtuality: from engagement platforms to engagement ecosystems. *Managing Service Quality*, 24(6), 592-611.
- Brodie, R. J., Hollebeek, L. D., Jurić, B., & Ilić, A. (2011). Customer engagement. *Journal of Service Research*, 14(3), 252-271.
- Brodie, R. J., Ilic, A., Juric, B., & Hollebeek, L. (2013). Consumer engagement in a virtual brand community: An exploratory analysis. *Journal of Business Research*, 66(1), 105-114.
- Brown, S. P., & Stayman, D. M. (1992). Antecedents and consequences of attitude toward the ad: A meta-analysis. *Journal of Consumer Research*, 19(1), 34-51.
- Bruner, G. C., & Kumar, A. (2000). Web commercials and advertising hierarchy-of-effects. *Journal of Advertising Research*, 40(1), 35-42.
- Bryman, A. (Ed.). (2016). *Social research methods*. Oxford University Press.
- Buckingham, A., & Saunders, P. (Eds.). (2004). *The survey methods workbook: From design to analysis*. Polity Press.
- Burton, J. L., Gollins, J., McNeely, L. E., & Walls, D. M. (2019). Revisiting the relationship between ad frequency and purchase intentions. *Journal of Advertising Research*, 59(1), 27-39.
- Çadırcı, T. O., & Gungor, A. S. (2019). Gap between mobile and online advergames: The possible effects of the optimal gaming experience-flow. In M. Pratika & O. D. Swati (Eds.), *Application of Gaming in New Media Marketing* (pp. 125-150). IGI Global.
- Calder, B. J., Malthouse, E. C., & Schaedel, U. (2009). An experimental study of the relationship between online engagement and advertising effectiveness. *Journal of Interactive Marketing*, 23(4), 321-331.
- Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, 56(2), 81.
- Catalán, S., Martínez, E., & Wallace, E. (2019). Analysing mobile advergaming effectiveness: the role of flow, game repetition and brand familiarity. *Journal of Product & Brand Management*, 28(4), 502-514.
- Cauberghe, V., & Pelsmacker, D. P. (2010). Advergames. *Journal of Advertising*, 39(1), 5-18.
- Çeltek, E. (2010). Mobile advergames in tourism marketing. *Journal of Vacation Marketing*, 16(4), 267-281.
- Chaney, I. M., Lin, K. H., & Chaney, J. (2004). The effect of billboards within the gaming environment. *Journal of Interactive Advertising*, 5(1), 37-45.
- Chaudhuri, A., & Holbrook, M. B. (2001). The chain of effects from brand trust and brand affect to brand performance: the role of brand loyalty. *Journal of Marketing*, 65(2), 81-93.
- Chen, J. (2007). Flow in games (and everything else). *Communications of the ACM*, 50(4), 31-34.
- Chen, J. M., Yang, X. J., & Smith, R. E. (2016). The effects of creativity on advertising wear-in and wear-out. *Journal of the Academy of Marketing Science*, 44(3), 334-349.

- Chou, T. J., & Ting, C. C. (2003). The role of flow experience in cyber-game addiction. *Cyberpsychological Behavior*, 6(6), 663-675.
- Christodoulides, G., Jevons, C., & Blackshaw, P. (2011). The voice of the consumer speaks forcefully in brand identity. *Journal of Advertising Research*, 51(1), 101-111.
- Churchill, G. A. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research*, 16(1), 64-73.
- Churchill, G. A., & Iacobucci, D. (Eds.). (2006). *Marketing research: methodological foundations*. Dryden Press.
- Cicchirillo, V., & Lin, J. S. (2011). Stop playing with your food: a comparison of for-profit and non-profit food-related advergames. *Journal of Advertising Research*, 51(3), 484-498.
- Cicchirillo, V., & Mabry, A. (2016). Advergaming and healthy eating involvement: How healthy eating inclinations impact processing of advergame content. *Internet Research*, 15(3), 778-782.
- Cline, T. W., & Kellaris, J. J. (2007). The influence of humor strength and humor—message relatedness on ad memorability: A dual process model. *Journal of Advertising*, 36(1), 55-67.
- Connolly, T. M., Boyle, E. A., MacArthur, E., Hainey, T., & Boyle, J. M. (2012). A systematic literature review of empirical evidence on computer games and serious games. *Computers & Education*, 59(2), 661-686.
- Constant, T., & Levieux, G. (2019, April 4-9). *Dynamic difficulty adjustment impact on players' confidence*. 2019 CHI Conference on Human Factors in Computing Systems, Glasgow, Scotland, UK.
- Cook, C., Heath, F., & Thompson, R. L. (2000). A meta-analysis of response rates in web- or internet-based surveys. *Educational and Psychological Measurement*, 60(6), 821-836.
- Cox, D. S., & Cox, A. D. (1988). What does familiarity breed? Complexity as a moderator of repetition effects in advertisement evaluation. *Journal of Consumer Research*, 15(1), 111-116.
- Cox, E. P. (1980). The optimal number of response alternatives for a scale: A review. *Journal of Marketing Research*, 17(4), 407-422.
- Creswell, J. W., & Poth, C. N. (Eds.). (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.
- Csikszentmihalyi, M. (1988). The flow experience and its significance for human psychology. *Optimal experience: Psychological Studies of Flow in Consciousness*, 2, 15-35.
- Csikszentmihalyi, M. (Ed.). (1990). *Flow: The psychology of optimal experience*. Harper & Row.
- Czaja, R., & Blair, J. (Eds.). (2005). *Designing surveys: A guide to decisions and procedures*. Pine Forge Press.
- Daems, K., Pelsmacker, D. P., & Moons, I. (2019). The effect of ad integration and interactivity on young teenagers' memory, brand attitude and personal data sharing. *Computers in Human Behavior*, 99, 245-259.
- Dahl, S., Eagle, L., & Báez, C. (2009). Analyzing advergames: active diversions or actually deception-An exploratory study of online advergames content. *Young Consumers*, 10(1), 46-59.
- Dardis, F., Schmierbach, M., Sherrick, B., & Luckman, B. (2019). How game difficulty and ad framing influence memory of in-game advertisements. *Journal of Consumer Marketing*, 36(1), 1-11.
- Deal, D. (2005, June). *The ability of branded online games to build brand equity*. DiGRA 2005 Conference: Changing Views—Worlds in Play, Vancouver, British Columbia, Canada.

- Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality*, 19(2), 109-134.
- Dessart, L., Veloutsou, C., & Morgan, T. A. (2015). Consumer engagement in online brand communities: a social media perspective. *Journal of Product & Brand Management*, 24(1), 28-42.
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011, September 9-15). *From game design elements to gamefulness: defining "gamification"*. The 15th International Academic MindTrek Conference: Envisioning Future Media Environments, Tampere, Finland.
- Dholakia, U. M., Bagozzi, R. P., & Pearo, L. K. (2004). A social influence model of consumer participation in network- and small-group-based virtual communities. *International Journal of Research in Marketing*, 21(3), 241-263.
- Dias, M., & Agante, L. (2011). Can advergames boost children's healthier eating habits? A comparison between healthy and non-healthy food. *Journal of Consumer Behaviour*, 10(3), 152-160.
- Dick, A. S., & Basu, K. (1994). Customer loyalty: toward an integrated conceptual framework. *Journal of the Academy of Marketing Science*, 22(2), 99-113.
- Dobrow, L. (2004). How to play games and influence people: Advergaming emerges as new ad option. *Media Daily News*, 15, 79-83.
- Douglas, S. P., & Craig, C. S. (2006). On improving the conceptual foundations of international marketing research. *Journal of International Marketing*, 14(1), 1-22.
- Ebbinghaus, H. (2013). Memory: a contribution to experimental psychology. *Ann Neurosci*, 20(4), 155-156.
- Edwards, S. M., Li, H., & Lee, J. H. (2002). Forced exposure and psychological reactance: Antecedents and consequences of the perceived intrusiveness of pop-up ads. *Journal of Advertising*, 31(3), 83-95.
- Engel, J. F., Kollat, D. T., & Blackwell, R. D. (Eds.). (1982). *Consumer behavior, the role of the consumers in marketing*. HRS Inc.
- Fattah, H., & Paul, P. (2002). Gaming gets serious: Market survey data on online gaming. *American Demographics*, 43, 98-101.
- Filstead, W. J. (Ed.). (1979). *Qualitative methods: A needed perspective in evaluation research*. Sage.
- Freling, T. H., Crosno, J. L., & Henard, D. H. (2011). Brand personality appeal: Conceptualization and empirical validation. *Journal of the Academy of Marketing Science*, 39(3), 392-406.
- Garnefeld, I., Iseke, A., & Krebs, A. (2012). Explicit incentives in online communities: Boon or bane? *International Journal of Electronic Commerce*, 17(1), 11-38.
- Gee, J. P. (Ed.). (2007). *Good video games+ good learning: Collected essays on video games, learning, and literacy*. Peter Lang Press.
- Gerbing, D. W., & Anderson, J. C. (1988). An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research*, 25(2), 186-192.
- Gerbing, D. W., & Hamilton, J. G. (1996). Viability of exploratory factor analysis as a precursor to confirmatory factor analysis. *Structural Equation Modeling: A Multidisciplinary Journal*, 3(1), 62-72.
- Gilleade, K., & Allanson, J. (2003, June 22-27). *A toolkit for exploring affective interface adaptation in videogames*. HCI International 2003, The Island of Grete, Greece.
- Gilleade, K., & Dix, A. (2004, June 3-5). *Using frustration in the design of adaptive videogames*. 2004 ACM SIGCHI International Conference on Advances in computer entertainment technology, Singapore.

- Gilleade, K., Dix, A., & Allanson, J. (2005, June 16-20). *Affective videogames and modes of affective gaming assist me, challenge me, emote me*. DiGRA 2005 Conference: Changing Views–Worlds in Play, Vancouver, British Columbia, Canada.
- Goh, K. Y., & Ping, J. (2014). Engaging consumers with advergames: An experimental evaluation of interactivity, fit and expectancy. *Journal of the Association for Information Systems*, 15(7), 388-421.
- Grigorovici, D. M., & Constantin, C. D. (2004). Experiencing interactive advertising beyond rich media. *Journal of Interactive Advertising*, 5(1), 22-36.
- Gross, M. L. (2010). Advergames and the effects of game-product congruity. *Computers in Human Behavior*, 26(6), 1259-1265.
- Hair, J. F., Bush, R. P., & Ortinau, D. J. (Eds.). (2003). *Marketing research: within a changing information environment*. McGraw-Hill.
- Halverson, L. R., & Graham, C. R. (2019). Learner engagement in blended learning environments: A conceptual framework. *Online Learning*, 23(2), 145-178.
- Ham, C. D., Yoon, G., & Nelson, M. R. (2016). The interplay of persuasion inference and flow experience in an entertaining food advergame. *Journal of Consumer Behaviour*, 15(3), 239-250.
- Hamari, J. (2013). Transforming homo economicus into homo ludens: A field experiment on gamification in a utilitarian peer-to-peer trading service. *Electronic Commerce Research and Applications*, 12(4), 236-245.
- Hamari, J. (2017). Do badges increase user activity? A field experiment on the effects of gamification. *Computers in Human Behavior*, 71, 469-478.
- Hamari, J., & Eranti, V. (2011, September 3-6). *Framework for designing and evaluating game achievements*. DiGRA 2011 Conference: Think Design PlayAt: Hilversum, Singapore.
- Hamari, J., Koivisto, J., & Sarsa, H. (2014, January 6-9). *Does gamification work? A literature review of empirical studies on gamification*. 2014 47th Hawaii International Conference on System Sciences, Waikoloa, HI, USA.
- Hasher, L., Goldstein, D., & Toppino, T. (1977). Frequency and the conference of referential validity. *Journal of Verbal Learning and Verbal Behavior*, 16(1), 107-112.
- Haynes, S. N., Richard, D. C. S., & Kubany, E. S. (1995). Content validity in psychological assessment: A functional approach to concepts and methods. *Psychological Assessment*, 7(3), 238-247.
- Heflin, D. T. A., & Haygood, R. C. (1985). Effects of scheduling on retention of advertising messages. *Journal of Advertising*, 14(2), 41-64.
- Hernandez, M. D., & Chapa, S. (2010). Adolescents, advergames and snack foods: Effects of positive affect and experience on memory and choice. *Journal of Marketing Communications*, 16(1), 59-68.
- Herrewijn, L., & Poels, K. (2013). Putting brands into play. *International Journal of Advertising*, 32(1), 17-44.
- Hoffman, D. L., & Novak, T. P. (2009). Flow online: Lessons learned and future prospects. *Journal of Interactive Marketing*, 23(1), 23-34.
- Holbrook, M. B., Chestnut, R. W., Oliva, T. A., & Greenleaf, E. A. (1984). Play as a consumption experience: The roles of emotions, performance, and personality in the enjoyment of games. *Journal of Consumer Research*, 11(2), 728-739.
- Hollebeek, L. (2011). Demystifying customer brand engagement: Exploring the loyalty nexus. *Journal of Marketing Management*, 27(7-8), 785-807.
- Hollebeek, L. (2011). Exploring customer brand engagement: Definition and themes. *Journal of Strategic Marketing*, 19(7), 555-573.

- Hollebeek, L., Leventhal, R. C., & Chen, T. (2014). Exploring positively-versus negatively-valenced brand engagement: A conceptual model. *Journal of Product & Brand Management*, 23(1), 62-74.
- Howard, J. A., & Sheth, J. N. (Eds.). (1969). *The theory of buyer behavior*. John Wiley.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55.
- Hung, C. Y., Sun, J. C. Y., & Yu, P. T. (2015). The benefits of a challenge: student motivation and flow experience in tablet-PC-game-based learning. *Interactive Learning Environments*, 23(2), 172-190.
- Huotari, K., & Hamari, J. (2012, October 3-5). *Defining gamification: A service marketing perspective*. The 16th International Academic MindTrek Conference Tampere, Finland.
- Jin, H. S., Suh, J., & Donovan, D. T. (2008). Salient effects of publicity in advertised brand recall and recognition: The list-strength paradigm. *Journal of Advertising*, 37(1), 45-57.
- Johar, G. V., & Roggeveen, A. L. (2007). Changing false beliefs from repeated advertising: The role of claim-refutation alignment. *Journal of Consumer Psychology*, 17(2), 118-127.
- Johnson, P., & Duberley, J. (Eds.). (2000). *Understanding management research: An introduction to epistemology*. Sage Publications.
- Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal*, 33(4), 692-724.
- Kent, R. J. (1993). Competitive versus noncompetitive clutter in television advertising. *Journal of Advertising Research*, 33(2), 40-47.
- Khang, H. K., Kim, J. K., & Kim, Y. J. (2013). Self-traits and motivations as antecedents of digital media flow and addiction: The Internet, mobile phones, and video games. *Computers in Human Behavior*, 29(6), 2416-2424.
- Kiili, K. (2005). Digital game-based learning: Towards an experiential gaming model. *The Internet and Higher Education*, 8(1), 13-24.
- Kim, J., Allen, C. T., & Kardes, F. R. (1996). An investigation of the mediational mechanisms underlying attitudinal conditioning. *Journal of Marketing Research*, 33(3), 318-328.
- Kim, J., Lee, J., Jo, S., Jung, J., & Kang, J. (2015). Magazine reading experience and advertising engagement. *Journalism & Mass Communication Quarterly*, 92(1), 179-198.
- Kim, Y., & Leng, H. K. (2017). Effectiveness of in-game advertisement: An examination of repetition effect, brand familiarity and the relationship between gaming skills and advertising execution. *Journal of Global Sport Management*, 2(1), 42-64.
- Klassen, R. D., & Jacobs, J. (2001). Experimental comparison of Web, electronic and mail survey technologies in operations management. *Journal of Operations Management*, 19(6), 713-728.
- Kohli, C. S., Harich, K. R., & Leuthesser, L. (2005). Creating brand identity: a study of evaluation of new brand names. *Journal of Business Research*, 58(11), 1506-1515.
- Koivisto, J., & Hamari, J. (2014). Demographic differences in perceived benefits from gamification. *Computers in Human Behavior*, 35, 179-188.
- Koo, D. M., & Ju, S. H. (2010). The interactional effects of atmospherics and perceptual curiosity on emotions and online shopping intention. *Computers in Human Behavior*, 26(3), 377-388.
- Koster, R. (Ed.). (2013). *Theory of fun for game design*. O'Reilly Media, Inc.
- Kozinets, R. V. (2002). The field behind the screen: Using netnography for marketing research in online communities. *Journal of Marketing Research*, 39(1), 61-72.
- Kozinets, R. V., De Valck, K., Wojnicki, A. C., & Wilner, S. J. S. (2010). Networked narratives: Understanding word-of-mouth marketing in online communities. *Journal of Marketing*, 74(2), 71-89.

- Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: how difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, 77(6), 1121-1134.
- Kuhn, T. S. (Ed.). (2012). *The structure of scientific revolutions*. University of Chicago Press.
- Kurilla, B. P., & Westerman, D. L. (2008). Processing fluency affects subjective claims of recollection. *Memory & Cognition*, 36(1), 82-92.
- Labroo, A. A., & Lee, A. Y. (2006). Between two brands: A goal fluency account of brand evaluation. *Journal of Marketing Research*, 43(3), 374-385.
- Lang, A. (2000). The limited capacity model of mediated message processing. *Journal of Communication*, 50(1), 46-70.
- Lang, A. (2006). Using the limited capacity model of motivated mediated message processing to design effective cancer communication messages. *Journal of Communication*, 56(1), 57-80.
- Laroche, M., Habibi, M. R., Richard, M. O., & Sankaranarayanan, R. (2012). The effects of social media based brand communities on brand community markers, value creation practices, brand trust and brand loyalty. *Computers in Human Behavior*, 28(5), 1755-1767.
- Lee, H., & Cho, C. H. (2017). An application of brand personality to advergames: The effect of company attributes on advergame personality. *Computers in Human Behavior*, 69, 235-245.
- Lee, M., & Faber, R. J. (2007). Effects of product placement in online games on brand memory: A perspective of the limited-capacity model of attention. *Journal of Advertising*, 36(4), 75-90.
- Lieberoth, A. (2015). Shallow gamification: Testing psychological effects of framing an activity as a game. *Games and Culture*, 10(3), 229-248.
- Lim, J. S., Ri, S. Y., Egan, B. D., & Biocca, F. A. (2015). The cross-platform synergies of digital video advertising: Implications for cross-media campaigns in television, Internet and mobile TV. *Computers in Human Behavior*, 48, 463-472.
- Lin, H. F. (2007). The role of online and offline features in sustaining virtual communities: an empirical study. *Internet Research*, 17(2), 119-138.
- Liu, C., Agrawal, P., Sarkar, N., & Chen, S. (2009). Dynamic difficulty adjustment in computer games through real-time anxiety-based affective feedback. *International Journal of Human-Computer Interaction*, 25(6), 506-529.
- Loureiro, S., & Ribeiro, L. (2011, March 6-9). *The effect of atmosphere on emotions and online shopping intention: Age differentiation*. Australian and New Zealand Marketing Academy Conference, Perth, Australia, Perth, Australia.
- Lutz, R. J., MacKenzie, S. B., & Belch, G. E. (1983). Attitude toward the ad as a mediator of advertising effectiveness: Determinants and consequences. *ACR North American Advances*, 10(1), 532-539.
- Lynch, J. J. G., & Srull, T. K. (1982). Memory and attentional factors in consumer choice: Concepts and research methods. *Journal of Consumer Research*, 9(1), 18-37.
- MacKenzie, S. B., & Lutz, R. J. (1989). An empirical examination of the structural antecedents of attitude toward the ad in an advertising pretesting context. *Journal of Marketing*, 53(2), 48-65.
- Mallinckrodt, V., & Mizerski, D. (2007). The effects of playing an advergame on young children's perceptions, preferences, and requests. *Journal of Advertising*, 36(2), 87-100.
- Mandryk, R. L., & Atkins, M. S. (2007). A fuzzy physiological approach for continuously modeling emotion during interaction with play technologies. *International Journal of Human-Computer Studies*, 65(4), 329-347.

- Martí-Parreño, J., Aldás-Manzano, J., Currás-Pérez, R., & Sánchez-García, I. (2013). Factors contributing brand attitude in advergames: Entertainment and irritation. *Journal of Brand Management*, 20(5), 374-388.
- Matzler, K., Grabner-Kräuter, S., & Bidmon, S. (2008). Risk aversion and brand loyalty: the mediating role of brand trust and brand affect. *Journal of Product & Brand Management*, 13(2), 524-533.
- McCoy, S., Everard, A., Galletta, D. F., & Moody, G. D. (2017). Here we go again! The impact of website ad repetition on recall, intrusiveness, attitudes, and site revisit intentions. *Information & Management*, 54(1), 14-24.
- McGonigal, J. (Ed.). (2011). *Reality is broken: Why games make us better and how they can change the world*. Penguin Book.
- McGuire, W. J. (1978). An information-processing model of advertising effectiveness. *Behavioral and Management Science in Marketing*, 15, 156-180.
- Mehrabian, A., & Russell, J. A. (Eds.). (1974). *An approach to environmental psychology*. MIT Press.
- Méndiz, N. A. (2010). Advergaming: Concepto, tipología, estrategia y evolución histórica. *Icono 14*, 8(1), 1697-8293.
- Miniard, P. W., Bhatla, S., & Rose, R. L. (1990). On the formation and relationship of ad and brand attitudes: An experimental and causal analysis. *Journal of Marketing Research*, 27(3), 290-303.
- Mirbagheri, S., & Najmi, M. (2019). Consumers' engagement with social media activation campaigns: Construct conceptualization and scale development. *Psychology & Marketing*, 36(4), 376-394.
- Mollen, A., & Wilson, H. (2010). Engagement, telepresence and interactivity in online consumer experience: Reconciling scholastic and managerial perspectives. *Journal of Business Research*, 63(9-10), 919-925.
- Moneta, G. B., & Csikszentmihalyi, M. (1996). The effect of perceived challenges and skills on the quality of subjective experience. *Journal of Personality and Social Psychology*, 64(2), 275-310.
- Muniz, A. M., & O'Guinn, T. C. (2001). Brand community. *Journal of Consumer Research*, 27(4), 412-432.
- Nah, F. F. H., Eschenbrenner, B., Zeng, Q., Telaprolu, V. R., & Sepehr, S. (2014). Flow in gaming: Literature synthesis and framework development. *International Journal of Information Systems and Management*, 1(1), 83-124.
- Nairn, A., & Fine, C. (2008). Who's messing with my mind? *International Journal of Advertising*, 27(3), 447-470.
- Nambisan, S. (2002). Complementary product integration by high-technology new ventures: The role of initial technology strategy. *Management Science*, 48(3), 382-398.
- Nelson, M. R., Yaros, R. A., & Keum, H. (2006). Examining the influence of telepresence on spectator and player processing of real and fictitious brands in a computer game. *Journal of Advertising*, 35(4), 87-99.
- Netemeyer, R. G., Bearden, W. O., & Sharma, S. (Eds.). (2003). *Scaling procedures: Issues and applications*. Sage Publications.
- Nicovich, S. G. (2005). The effect of involvement on Ad judgment in a video game environment. *Journal of Interactive Advertising*, 6(1), 29-39.
- Nordhielm, C. L. (2002). The influence of level of processing on advertising repetition effects. *Journal of Consumer Research*, 29(3), 371-382.
- Okazaki, S., & Yagüe, M. J. (2012). Responses to an advergaming campaign on a mobile social networking site: An initial research report. *Computers in Human Behavior*, 28(1), 78-86.

- Oppenheim, A. N. (Ed.). (2000). *Questionnaire design, interviewing and attitude measurement*. Bloomsbury Publishing.
- Pagulayan, R. J., Keeker, K., Wixon, D., Romero, R. L., & Fuller, T. (2002). User-centered design in games. In R. J. Pagulayan & K. Keeker (Eds.), *The Human-Computer Interaction Handbook* (pp. 915-938). CRC Press.
- Pascoal, A. C. S. (2013). *Medium-short-term and repetition effects of advergames on children consumer behaviour* [Doctoral dissertation]. Nova School of Business and Economics.
- Paul, J. P. (1979). Reliability: A review of psychometric basics and recent marketing practices. *Journal of Marketing Research*, 16(1), 6-17.
- Pechmann, C., & Stewart, D. W. (1988). Advertising repetition: A critical review of wearin and wearout. *Current Issues and Research in Advertising*, 11(1), 285-329.
- Peters, S., & Leshner, G. (2013). Get in the game: The effects of game-product congruity and product placement proximity on game players' processing of brands embedded in advergames. *Journal of Advertising*, 42(2), 113-130.
- Pfanzagl, J., & Sheynin, O. (1996). Studies in the history of probability and statistics XLIV A forerunner of the t-distribution. *Biometrika*, 83(4), 891-898.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903.
- Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management*, 12(4), 531-544.
- Purswani, G. (2010). Advergames, their use and potential regulation. *Asia Pacific Public Relations Journal*, 11(7), 57-63.
- Qin, H., Rau, P. L. P., & Salvendy, G. (2010). Effects of different scenarios of game difficulty on player immersion. *Interacting with Computers*, 22(3), 230-239.
- Reber, R., & Unkelbach, C. (2010). The epistemic status of processing fluency as source for judgments of truth. *Review of Philosophy and sychology*, 1(4), 563-581.
- Redondo, I. (2012). The effectiveness of casual advergames on adolescents' brand attitudes. *European Journal of Marketing*, 46(11), 1671-1688.
- Reitz, A. R. (2012). *Online consumer engagement: Understanding the antecedents and outcomes* [Doctoral dissertation]. Colorado State University.
- Rifon, N. J., Elizabeth, T. Q., Paek, H. J., Weatherspoon, L. J., Kim, S. K., & Smreker, K. C. (2014). Age-dependent effects of food advergame brand integration and interactivity. *International Journal of Advertising*, 33(3), 475-508.
- Robert, D., & John, R. (1982). Store atmosphere: an environmental psychology approach. *Journal of Retailing*, 58(1), 34-57.
- Robson, K., Plangger, K., Kietzmann, J. H., McCarthy, I., & Pitt, L. (2015). Is it all a game? Understanding the principles of gamification. *Business Horizons*, 58(4), 411-420.
- Roettl, J., Waiguny, M., & Terlutter, R. (2016). The persuasive power of advergames: A content analysis focusing on persuasive mechanisms in advergames. *Australasian Marketing Journal*, 24(4), 275-287.
- Roskos-Ewoldsen, D. R. (2002). Attitude accessibility and persuasion: Review and a transactive model. *Annals of the International Communication Association*, 20(1), 185-225.
- Ruhi, U. (2016). Level up your strategy: Towards a descriptive framework for meaningful enterprise gamification. *Technology Innovation Management Review*, 5(8), 5-16.
- Russell, C. A. (2002). Investigating the effectiveness of product placements in television shows: The role of modality and plot connection congruence on brand memory and attitude. *Journal of Consumer Research*, 29(3), 306-318.

- Sabourin, J. L., & Lester, J. C. (2013). Affect and engagement in game-based learning environments. *IEEE Transactions on Affective Computing*, 5(1), 45-56.
- Salen, K., Tekinbaş, K. S., & Zimmerman, E. (Eds.). (2004). *Rules of play: Game design fundamentals*. MIT Press.
- Salo, J., & Karjaluoto, H. (2007). Mobile games as an advertising medium: Towards a new research agenda. *Innovative Marketing*, 3(1), 71-84.
- Santos, E., Gonzalo, R., & Gisbert, F. (2007). Advergames: Overview. *Information Technologies and Knowledge*, 1(3), 203-208.
- Sawhney, M., Verona, G., & Prandelli, E. (2005). Collaborating to create: The Internet as a platform for customer engagement in product innovation. *Journal of Interactive Marketing*, 19(4), 4-17.
- Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: a multi-sample study. *Journal of Organizational Behavior*, 25(3), 293-315.
- Schmidt, S., & Eisend, M. (2015). Advertising repetition: A meta-analysis on effective frequency in advertising. *Journal of Advertising*, 44(4), 415-428.
- Schneider, L. P., Systems, B., & Cornwell, T. B. (2005). Cashing in on crashes via brand placement in computer games. *International Journal of Advertising*, 24(3), 321-343.
- Seah, M. L., & Cairns, P. (2008). From immersion to addiction in videogames. *People and Computers XXII Culture, Creativity, Interaction*, 22, 55-63.
- Seiders, K., Voss, G. B., Godfrey, A. L., & Grewal, D. (2007). SERVCON: development and validation of a multidimensional service convenience scale. *Journal of the Academy of Marketing Science*, 35(1), 144-156.
- Shamdasani, P. N., Stanaland, A. J. S., & Tan, J. (2001). Location, location, location: Insights for advertising placement on the web. *Journal of Advertising Research*, 41(4), 7-21.
- Shang, R. A., Chen, Y. C., & Liao, H. J. (2006). The value of participation in virtual consumer communities on brand loyalty. *Internet Research*, 16(4), 398-418.
- Sharma, P., & Chan, R. Y. K. (2011). Counterfeit proneness: Conceptualisation and scale development. *Journal of Marketing Management*, 27(5), 602-626.
- Sheynin, O. (1995). Helmer's work in the theory of errors. *Archive for History of Exact Sciences*, 49(1), 73-104.
- Shliapnikov, M., & Meijer, T. (2014). *The use of advergames in creating online consumer engagement: A case study of LEGO* [Master's thesis]. Halmstad University.
- Siemens, J. C., Smith, S., Fisher, D., Thyroff, A., & Killian, G. (2015). Level up! The role of progress feedback type for encouraging intrinsic motivation and positive brand attitudes in public versus private gaming contexts. *Journal of Interactive Marketing*, 32, 1-12.
- Slade, L. A., & Rush, M. C. (1991). Achievement motivation and the dynamics of task difficulty choices. *Journal of Personality and Social Psychology*, 60(1), 165-172.
- Song, P. J., Xu, H., Techatassanasoontorn, A., & Zhang, C. (2011). The influence of product integration on online advertising effectiveness. *Electronic Commerce Research and Applications*, 10(3), 288-303.
- Spronck, P., Ponsen, M., Sprinkhuizen-Kuyper, I., & Postma, E. (2006). Adaptive game AI with dynamic scripting. *Machine Learning*, 63(3), 217-248.
- Sreejesh, S., & Anusree, M. R. (2017). Effects of cognition demand, mode of interactivity and brand anthropomorphism on gamers' brand attention and memory in advergames. *Computers in Human Behavior*, 70, 575-588.
- Sukoco, B. M., & Wu, W. Y. (2011). The effects of advergames on consumer telepresence and attitudes: A comparison of products with search and experience attributes. *Expert Systems with Applications*, 38(6), 7396-7406.

- Sweetser, P., & Wyeth, P. (2005). GameFlow: A model for evaluating player enjoyment in games. *Computers in Entertainment*, 3(3), 3-3.
- Sykes, J., & Brown, S. (2003, April 5-10). *Affective gaming: measuring emotion through the gamepad*. CHI'03 Extended Abstracts on Human Factors in Computing Systems, Florida, USA.
- Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (Eds.). (2007). *Using multivariate statistics*. Pearson Education.
- Tellis, G. J. (1997). Effective frequency: One exposure or three factors? *Journal of Advertising Research*, 23(5), 75-80.
- Terlutter, R., & Capella, M. L. (2013). The gamification of advertising: Analysis and research directions of In-Game advertising, advergames, and advertising in social network games. *Journal of Advertising*, 42(2), 95-112.
- Thompson, S. A., & Sinha, R. K. (2008). Brand communities and new product adoption: The influence and limits of oppositional loyalty. *Journal of Marketing*, 72(6), 65-80.
- Tina, W., & Buckner, K. (2006). Receptiveness of gamers to embedded brand messages in advergames. *Journal of Interactive Advertising*, 7(1), 3-32.
- Tran, G. A., & Strutton, D. (2013). What factors affect consumer acceptance of In-Game advertisements? *Journal of Advertising Research*, 53(4), 455-469.
- Tuten, T. L., & Ashley, C. (2016). Do social advergames affect brand attitudes and advocacy? *Journal of Marketing Communications*, 22(3), 236-255.
- Tyebjee, T. T. (1977). Choice time and conflict in consumer brand choice behavior. *Journal of Marketing Research*, 34, 133-137.
- Unkelbach, C., & Greifeneder, R. (2013). A general model of fluency effects in judgment and decision making. In C. Unkelbach & R. Greifeneder (Eds.), *The experience of thinking* (pp. 21-42). Psychology Press.
- Unkelbach, C., Koch, A., Silva, R. R., & Garcia-Marques, T. (2019). Truth by repetition: Explanations and implications. *Current Directions in Psychological Science*, 28(3), 247-253.
- Vandevijver, F., & Tanzer, N. K. (2004). Bias and equivalence in cross-cultural assessment: an overview. *European Review of Applied Psychology*, 54(2), 119-135.
- VanReijmersdal, E. A., Jansz, J., Peters, O., & VanNoort, G. (2010). The effects of interactive brand placements in online games on children's cognitive, affective, and conative brand responses. *Computers in Human Behavior*, 26(6), 1787-1794.
- VanReijmersdal, E. A., Rozendaal, E., & Buijzen, M. (2012). Effects of prominence, involvement, and persuasion knowledge on children's cognitive and affective responses to advergames. *Journal of Interactive Marketing*, 26(1), 33-42.
- VanReijmersdal, E. A., Rozendaal, E., & Buijzen, M. (2015). Boys' responses to the integration of advertising and entertaining content. *Young Consumers*, 16(3), 251-263.
- Vanwesenbeeck, I., Walrave, M., & Ponnet, K. (2017). Children and advergames: the role of product involvement, prior brand attitude, persuasion knowledge and game attitude in purchase intentions and changing attitudes. *International Journal of Advertising*, 36(4), 520-541.
- Vashisht, D., & Royne, M. B. (2016). Advergame speed influence and brand recall: The moderating effects of brand placement strength and gamers' persuasion knowledge. *Computers in Human Behavior*, 63, 162-169.
- Vashisht, D., Royne, M. B., & Sreejesh, S. (2019). What we know and need to know about the gamification of advertising. *European Journal of Marketing*, 53(4), 607-634.
- Vivek, S. D., Beatty, S. E., & Morgan, R. M. (2012). Customer engagement: Exploring customer relationships beyond purchase. *Journal of Marketing Theory and Practice*, 20(2), 122-146.

- Vuokko, P. (1997). The determinants of advertising repetition effects. In W. D. Wells (Ed.), *Measuring of Advertising Effectiveness* (pp. 26-28). Mahwah.
- Wang, S. J., & Chou, H. Y. (2019). Effects of game-product congruity on in-app interstitial advertising and the moderation of media-context factors. *Psychology & Marketing*, 36(3), 229-246.
- Webster, J., Trevino, L. K., & Ryan, L. (1993). The dimensionality and correlates of flow in human-computer interactions. *Computers in Human Behavior*, 9(4), 411-426.
- Wise, K., Bolls, P. D., Kim, H., Venkataraman, A., & Meyer, R. (2008). Enjoyment of advergames and brand attitudes. *Journal of Interactive Advertising*, 9(1), 27-36.
- Xu, F. F., Buhalis, D., & Weber, J. (2017). Serious games and the gamification of tourism. *Tourism Management*, 60, 244-256.
- Yang, Y., Asaad, Y., & Dwivedi, Y. (2017). Examining the impact of gamification on intention of engagement and brand attitude in the marketing context. *Computers in Human Behavior*, 73, 459-469.
- Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology*, 9(2), 1-27.
- Zarouali, B., Pieter, D. P., Ponnet, K., Walrave, M., Poels, K., Cauberghe, V., & Hudders, L. (2019). Considering children's advertising literacy from a methodological point of view: Past practices and future recommendations. *Journal of Current Issues & Research in Advertising*, 40(2), 196-213.
- Zohaib, M. (2018). Dynamic difficulty adjustment (DDA) in computer games: A review. *Advances in Human-Computer Interaction*, 25, 1-12.

Webliography

- Answers.com. (2007, February 19). *Results for telepresence*. Answers. Retrieved May 4, 2020, from <http://www.answers.com/topic/telepresence?cat5technology>
- Arkadium. (2004, November 13). *New study reveals that women over 40 who play online games spend far more time playing than male or teenage gamers*. Arkadium. Retrieved August 5, 2020, from http://www.arkadium.com/aol_study.html
- Chen, J., & Ringel, M. (2001, June 17). *Can advergaming be the future of interactive advertising?* KP Engineering. Retrieved August 5, 2020, from http://www.kpe.com/ourwork/viewpoints/viewpoints.advergaming_4_.shtml
- D5 Games. (2004, November 11). *Demographics of game players*. D5 Games. Retrieved May 4, 2020, from <http://www.d5games.net/advergames/demographics.php>
- Ernest, A. (2009, June 1). *The designer's notebook: Difficulty modes & DDA*. Gamasutra. Retrieved May 4, 2020, from https://www.gamasutra.com/view/feature/132061/the_designers_notebook_.php
- FreshGames. (2002, January 21). *Why advergames?* Freshgames. Retrieved February 12, 2022, from <http://www.freshgames.com/marketing/whyadvergases.php>
- Kvalve, S. (1996, May 14). *Inter views: An introduction to qualitative interviewing*. APA PsycNet. Retrieved February 12, 2022, from <https://psycnet.apa.org/record/1996-97829-000>
- Macklin, B. (2006, August 31). *The ethics of online marketing to kids*. EMarketer. Retrieved February 12, 2022, from www.emarketer.com//Article.asp?id=1004140
- Quaid, L. (2006, November 7). *Online "advergases" target kids: Study questions food industry's role in childhood obesity*. MSN. Retrieved February 3, 2022, from <http://www.msnbc.msn.com/id/13943214/>
- Skyworks. (2007, July 19). *Why games*. Advergame. Retrieved August 5, 2020, from <http://www.advergame.com/whygames>
- Technology, W. (2005, November 1). *More women play online games than men worldwide except in Asia*. Wi-Fi Technology News. Retrieved March 12, 2021 from <http://www.wi-fitechnology.com/displayarticle2212.html>
- WebResource. (2004, September 20). *What is advergaming?* Webresources. Retrieved March 18, 2021 from <http://www.webresource.com.au/content/?id=12>
- Williard, N. (2005, November 29). *Advergases: A commentary by Nancy Willard*. Net Family News. Retrieved March 12, 2021, from <http://www.netfamilynews.org/advergases.html>

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Annex A: Appended Tables and Figures

Appended Tables

Appended Table 1 Reliability test for advergame difficulty

Items	N	Mean	Std. Deviation	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Difficulty1	72	3.569	1.527	0.684	0.498	0.826	0.857
Difficulty2	72	3.583	1.536	0.691	0.535	0.823	
Difficulty3	72	4.111	1.716	0.764	0.614	0.791	
Difficulty4	72	4.139	1.673	0.672	0.521	0.831	

Note: difficulty means advergame difficulty.

Appended Table 2 T-test results in comparison of integration and difficulty conditions

	N	Mean	S. D	T	DF	P-value
Integration of A1(Class1)	37	4.132	1.293	-12.450	70	0
Integration of B1(Class3)	35	5.357	1.174			
Difficulty of A1(Class1)	37	3.993	1.316	-4.972	72	0
Difficulty of A2(Class2)	37	5.304	0.917			
Difficulty of B1(Class3)	35	3.700	1.392	-6.483	70	0
Difficulty of B2(Class4)	37	5.568	1.011			

Appended Figures



Appended Figure 1 The figure of mobile advergame for TianBing Ice Cream (天冰冰淇淋)



Appended Figure 2 The figure of mobile advergame for SanQuan Rice Dumplings (三全汤圆)

Annex B: Online Questionnaires

Class 1 for “天冰冰淇淋” (TianBing Ice Cream) (A1)

Dear Students,

Thank you very much for giving your precious time to complete this questionnaire. This questionnaire focuses on investigating the effects of the features of mobile advergames (advergame difficulty and integration, repetition). It will take 5 minutes to complete the questionnaire. The data collected from these questionnaires will be used only for our research, and will be kept anonymous and confidential. The participation in this survey is completely voluntary.

Advergame integration

Mostly disagreeable	Disagreeable	Slightly disagreeable	Neutral	Slightly agreeable	Agreeable	Mostly agreeable
1. During gameplay, I can clearly see the related product or brand.						
①	②	③	④	⑤	⑥	⑦
2. During gameplay, no invasion to game play is induced from advertising product or brand.						
①	②	③	④	⑤	⑥	⑦
3. The attributes of game background (shapes and tones) are well designed in relation to the advertising product or brand.						
①	②	③	④	⑤	⑥	⑦
4. After game play, I can recognize that this is an advertising campaign.						
①	②	③	④	⑤	⑥	⑦

Advergame difficulty

Mostly disagreeable	Disagreeable	Slightly disagreeable	Neutral	Slightly agreeable	Agreeable	Mostly agreeable
1. During gameplay, I feel time pressure to achieve more points.						
①	②	③	④	⑤	⑥	⑦
2. During gameplay, remaining time is a concern.						
①	②	③	④	⑤	⑥	⑦
3. During gameplay, I feel no sufficient time can be used to achieve more points.						
①	②	③	④	⑤	⑥	⑦
4. Playing this game to achieve more points is challenging.						
①	②	③	④	⑤	⑥	⑦

Demographics questions:

1. Gender:

A. Female B. Male

2. Age:

Class 2 for “天冰冰淇淋” (TianBing Ice Cream) (A2)

Dear Students,

Thank you very much for giving your precious time to complete this questionnaire again. Please take 5 minutes to complete the questionnaire about game A2. The data collected from these questionnaires will be used only for our research, and will be kept anonymous and confidential. The participation in this survey is completely voluntary.

<i>Advergame difficulty</i>						
Mostly disagreeable	Disagreeable	Slightly disagreeable	Neutral	Slightly agreeable	Agreeable	Mostly agreeable
1. During gameplay, I feel time pressure to achieve more points.						
①	②	③	④	⑤	⑥	⑦
2. During gameplay, remaining time is a concern.						
①	②	③	④	⑤	⑥	⑦
3. During gameplay, I feel no sufficient time can be used to achieve more points.						
①	②	③	④	⑤	⑥	⑦
4. Playing this game to achieve more points is challenging.						
①	②	③	④	⑤	⑥	⑦

Demographics questions:

1. Gender:

A. Female B. Male

2. Age:

Class 3 for “汤圆总动员” (SanQuan Rice Dumplings) (B1)

Dear Students,

Thank you very much for giving your precious time to complete this questionnaire. This questionnaire focuses on investigating the effects of the features of mobile advergames (advergame difficulty and integration, repetition). It will take 5 minutes to complete the questionnaire. The data collected from these questionnaires will be used only for our research, and will be kept anonymous and confidential. The participation in this survey is completely voluntary.

Advergame integration						
Mostly disagreeable	Disagreeable	Slightly disagreeable	Neutral	Slightly agreeable	Agreeable	Mostly agreeable
1. During gameplay, I can clearly see the related product or brand.						
①	②	③	④	⑤	⑥	⑦
2. During gameplay, no invasion to game play is induced from advertising product or brand.						
①	②	③	④	⑤	⑥	⑦
3. The attributes of game background (shapes and tones) are well designed in relation to the advertising product or brand.						
①	②	③	④	⑤	⑥	⑦
4. After game play, I can recognize that this is an advertising campaign.						
①	②	③	④	⑤	⑥	⑦

Advergame difficulty						
Mostly disagreeable	Disagreeable	Slightly disagreeable	Neutral	Slightly agreeable	Agreeable	Mostly agreeable
1. During gameplay, I feel time pressure to achieve more points.						
①	②	③	④	⑤	⑥	⑦
2. During gameplay, remaining time is a concern.						
①	②	③	④	⑤	⑥	⑦
3. During gameplay, I feel no sufficient time can be used to achieve more points.						
①	②	③	④	⑤	⑥	⑦
4. Playing this game to achieve more points is challenging.						
①	②	③	④	⑤	⑥	⑦

Demographics questions:

1. Gender:

A. Female B. Male

2. Age:

Class 4 for “汤圆总动员” (SanQuan Rice Dumplings) (B2)

Dear Students,

Thank you very much for giving your precious time to complete this questionnaire again. Please take 5 minutes to complete the questionnaire about game B2. The data collected from these questionnaires will be used only for our research, and will be kept anonymous and confidential. The participation in this survey is completely voluntary.

Advergame difficulty						
Mostly disagreeable	Disagreeable	Slightly disagreeable	Neutral	Slightly agreeable	Agreeable	Mostly agreeable
1. During gameplay, I feel time pressure to achieve more points.						
①	②	③	④	⑤	⑥	⑦
2. During gameplay, remaining time is a concern.						
①	②	③	④	⑤	⑥	⑦
3. During gameplay, I feel no sufficient time can be used to achieve more points.						
①	②	③	④	⑤	⑥	⑦
4. Playing this game to achieve more points is challenging.						
①	②	③	④	⑤	⑥	⑦

Demographics questions:

1. Gender:

A. Female B. Male

2. Age:

Questionnaires of experiment in 9 consecutive days

Then, we divide the 146 students from these two classes randomly into four chat groups on the on-line WeChat platform with a 2*2 factorial between-subjects experiment design: every experiment condition (easy/high integration; difficult/high integration; easy/low integration; difficult/low integration) with over 25 students grouped into one chat group. To encourage the participation, an incentive of ¥5 e-red packet is provided to each student. Throughout the 9 consecutive days of operation, each group was sent an online survey questionnaire on the second day. Related questionnaire is designed as follows:

Advergame integration

Mostly disagreeable	Disagreeable	Slightly disagreeable	Neutral	Slightly agreeable	Agreeable	Mostly agreeable
1. During gameplay, I can clearly see the related product or brand.						
①	②	③	④	⑤	⑥	⑦
2. During gameplay, no invasion to game play is induced from advertising product or brand.						
①	②	③	④	⑤	⑥	⑦
3. The attributes of game background (shapes and tones) are well designed in relation to the advertising product or brand.						
①	②	③	④	⑤	⑥	⑦
4. After game play, I can recognize that this is an advertising campaign.						
①	②	③	④	⑤	⑥	⑦

Advergame difficulty

Mostly disagreeable	Disagreeable	Slightly disagreeable	Neutral	Slightly agreeable	Agreeable	Mostly agreeable
1. During gameplay, I feel time pressure to achieve more points.						
①	②	③	④	⑤	⑥	⑦
2. During gameplay, remaining time is a concern.						
①	②	③	④	⑤	⑥	⑦
3. During gameplay, I feel no sufficient time can be used to achieve more points.						
①	②	③	④	⑤	⑥	⑦
4. Playing this game to achieve more points is challenging.						
①	②	③	④	⑤	⑥	⑦

Cognitive engagement

Mostly disagreeable	Disagreeable	Slightly disagreeable	Neutral	Slightly agreeable	Agreeable	Mostly agreeable
1. After gameplay, I can occasionally recall the game from memory.						
①	②	③	④	⑤	⑥	⑦
2. During gameplay and after the gameplay, I will think a lot about things related to this advertising brand or product (e.g., price and flavors).						
①	②	③	④	⑤	⑥	⑦
3. Playing the game can stimulate me to learn something about this advergame or the brand and product inserted in the game.						
①	②	③	④	⑤	⑥	⑦

Emotional engagement

Mostly disagreeable	Disagreeable	Slightly disagreeable	Neutral	Slightly agreeable	Agreeable	Mostly agreeable
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1. Playing this advergame leaves me with a positive attitude.						
①	②	③	④	⑤	⑥	⑦
2. Playing this advergame makes me feel some happiness.						
①	②	③	④	⑤	⑥	⑦
3. Playing this advergame makes me feel some type of good.						
①	②	③	④	⑤	⑥	⑦
4. Playing this advergame makes me feel some type of proud.						
①	②	③	④	⑤	⑥	⑦

Brand recognition

Mostly disagreeable	Disagreeable	Slightly disagreeable	Neutral	Slightly agreeable	Agreeable	Mostly agreeable
1. Playing this advergame makes me to know about the product brand.						
①	②	③	④	⑤	⑥	⑦
2. Playing this advergame makes me want to get some information related to this product brand.						
①	②	③	④	⑤	⑥	⑦
3. Playing this advergame, I feel like taking part in an advertising campaign related to this product brand.						
①	②	③	④	⑤	⑥	⑦
4. Playing this advergame, I recognize that a real product brand exists in life.						
①	②	③	④	⑤	⑥	⑦

Brand attitude

Mostly disagreeable	Disagreeable	Slightly disagreeable	Neutral	Slightly agreeable	Agreeable	Mostly agreeable
1. Playing this advergame, I feel positive about this product brand.						
①	②	③	④	⑤	⑥	⑦
2. Playing this advergame, I feel good about this product brand.						
①	②	③	④	⑤	⑥	⑦
3. Playing this advergame, make me want to support this product brand.						
①	②	③	④	⑤	⑥	⑦