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Determinants and consequences of Facebook feature use

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Abstract
Despite explosive growth in the number of Facebook users, little research has investigated the use of different Facebook features. Thus, this study explored what motivates people to use various Facebook features as well as the social impact of using the website itself. Users with experience in both social interaction and social game features offered by Facebook were invited to participate in a survey. Our proposed research model was evaluated using the partial least-squares (PLS) method. Results show that *social needs, enjoyment needs*, and *trend-following* significantly influence the use of the social interaction features on Facebook, while *immersion needs* and *achievement needs* significantly influence the use of social games associated with the website. Interestingly, we found that different clusters of individuals have different sets of motivations. Furthermore, both *social interaction features* and *social game features* have positive correlations with *social ties*.

Keywords
Facebook, motivation, social networking games, social networking sites, social ties

Introduction

Social networking sites (SNSs) have rapidly become an indispensable part of a modern industrialized lifestyle. Among the various SNSs, Facebook has been reported as the

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most popular (Alexa Internet Inc., 2013), with more than 655 million people using the website daily (Facebook.com, 2013). SNSs are social interaction platforms which allow users to develop and maintain interpersonal relationships. However, in order to extend the time that users stay on SNS websites, many social networks, including Facebook, have introduced an application program interface (API) that allows third-party software developers to create applications which can be embedded in SNS websites as features (Shih, 2009). Since Facebook announced its API in 2007, more than 9 million applications have been integrated into the website (Facebook.com, 2013). Therefore, Facebook currently serves not only as a social interaction platform, but includes software functionalities such as social games as well. In 2011, 12% of Facebook's revenue came from Zynga, a well-known provider of social game services (Bohn, 2012). There is also evidence to suggest that while individuals derive a high degree of satisfaction from using social interaction features, the entertainment value resulting from Facebook use leads to even higher levels of satisfaction (Yang and Lai, 2011). However, the rapidly changing nature of today's society means that current SNS user behavior may differ significantly from past behavior.

There has been much research into various topics related to the use of Facebook. Among these studies, user motivations and characteristics are widely discussed issues. For instance, a number of researchers have focused on the association between personality and Facebook use (e.g. Hall et al., 2014). Others have focused on identifying what drives individuals to use Facebook (e.g. Smock et al., 2011). However, most previous studies have focused on traditional Facebook use, and scant attention has been paid to what motivates users to use specific features (Smock et al., 2011). Smock et al. (2011) and Young (2011) targeted the use of various Facebook features but these studies did not consider social games. Other studies have focused on the motivations behind participation in social networking games (e.g. Lee et al., 2012; Shin and Shin, 2011), but did not compare the use of these games to the use of other features.

This current study investigated the use of different Facebook features and consequent social impacts. Based on relevant literature, this study proposes a research model which seeks to (a) identify users' motivation to use various Facebook features, (b) explore the relationship between social networking games (i.e. the game features of Facebook) and social interaction features, and (c) examine the influence of Facebook use on users' perceived social ties. It is expected to have better understanding on what drive individuals to use Facebook's social interaction features as well as game features, and the possible consequential social impact. Our results may also serve as a reference for developers of SNS features.

Literature review

SNSs

SNS refers to a network-based service that enables users to create public or semi-public profiles, edit personal friend lists, and view their own friend list or that of others (boyd and Ellison, 2008). The most notable feature of an SNS is that individuals can use it to establish relationships with people that they have not met face-to-face. SNSs also allow users to maintain and integrate their virtual social network with their real-life social circles

(boyd and Ellison, 2008). However, the nature of these sites is in flux. The majority of applications currently available on Facebook through third-party software developers are games, which introduce a strong element of entertainment to the website. Some Facebook users even join the network expressly to play these games (Yang and Lai, 2011).

Study of SNSs, particularly user motivation and behavior, is widespread. For instance, Sheldon (2008) examined the relationship between unwillingness-to-communicate and Facebook usage, while Ross et al. (2009) focused on the personalities and motivations of Facebook users. Despite conflicting findings related to user motivations, certain factors seem to be common. Some of these include social interaction needs (e.g. Cheung et al., 2011; Pempek et al., 2009; Sheldon, 2008), entertainment (e.g. Cheung et al., 2011; Raacke and Bonds-Raacke, 2008), and the passing of time (e.g. Lee et al., 2012; Sheldon, 2008).

However, all the aforementioned studies considered overall Facebook use. Yet, as Facebook becomes increasingly diverse, the explanatory power of previous findings becomes limited; specifically, earlier results are unable to identify what motivates users to try various types of features. As a result, Smock et al. (2011) advocated that future studies on Facebook user motivation and behavior pay attention to these unexplored topics.

The current study adopted this perspective by categorizing the features of Facebook into two broad groups. A feature is defined as "a technical tool on the site that enables activity on the part of the user" (Smock et al., 2011). The total number of features on Facebook is high and continually increasing; therefore, rather than treat each feature as an independent variable, this study focused on two categories of features: social interaction features and social game features. The former refers to features enabling users to interact with others; the latter describes embedded games designed to include many elements of social interaction.

Uses and gratifications

In the study of social media, uses and gratifications (U&G) is a framework that originated from communication research. The U&G describes the motivations behind use of a specific mass communication tool to meet specific needs as well as how fulfillment of those needs leads to continued use (Bryant and Miron, 2004). Gratifications associated with use of these tools may be utilitarian (e.g. interpersonal utility) or hedonic (e.g. entertainment).

U&G has been widely adopted in IS research, particularly for web-based applications (e.g. Fullwood et al., 2014; Huang and Hsieh, 2011; Lev-On, 2012). In recent years, researchers have investigated social media use. For instance, Fullwood et al. (2014) used the U&G to investigate associations between blogging motivations with gender, age, and personality, Cheung et al. (2011) examined values drawn from U&G that may influence students to use Facebook, and Xu et al. (2012) proposed a model based on U&G to explore the predictive value of utilitarian factors in SNS. Researchers have also adopted U&G in the study of online games. For example, Chang et al. (2006) combined U&G and innovation diffusion theory to explain why individuals chose to play a certain online game; and Wu et al. (2010) investigated the influence of media structure and various gratification needs associated with playing online games.

Gratification needs identified in prior SNS-related studies applying the U&G are as follows. Sheldon (2008) identified six motivations behind Facebook use: relationship maintenance, the passing of time, community building, entertainment, trend-following, and companionship. Smock et al. (2011) further suggested the following three gratification predictors: relaxation, entertainment, and social interaction. Finally, Xu et al. (2012) found four factors that influence SNS use: coordination, immediate access, affection, and leisure. Several studies focusing on the use of online games have also applied the U&G. Chang et al. (2006) found that passing time was the main factor motivating college students to play online games. Wu et al. (2010) later identified achievement, enjoyment, and social interaction as significant factors. Lastly, Huang and Hsieh (2011) indicated that entertainment was a good predictor of how loyal a user would remain to an online game.

As described above, Facebook was originally designed to develop and maintain interpersonal relationships but has since expanded to include functions such as entertainment and relaxation. Therefore, the U&G can be applied to evaluate Facebook use. This study adopted five gratification needs from previous work: interpersonal needs (Smock et al., 2011; Wu et al., 2010), enjoyment needs (Huang and Hsieh, 2011; Smock et al., 2011), immersion needs (Xu et al., 2012), achievement needs (Huang and Hsieh, 2011; Wu et al., 2010), and pursuit of fashion (Sheldon, 2008). Interpersonal need refers to using Facebook features to create and maintain interpersonal relationships. Enjoyment is defined as using Facebook features to pass time and experience pleasure. Pursuit of fashion refers to the desire to follow mainstream behavior and gain a sense of belonging to a group. Immersion refers to the escapist feeling gained from intense focus on a game. Achievement needs refer to the desire to win and out-perform others.

Hypotheses

Prior studies on Facebook and other SNSs predominantly agree that individuals primarily use these websites to satisfy their interpersonal needs. For example, Sheldon (2008) found that maintaining relationships among the primary reasons that individuals use Facebook. Pempek et al. (2009) also indicated that social interaction is the primary function of Facebook for most college students. In addition, some studies have argued that individuals are motivated to play online games partly due to social considerations (Yee, 2006). Jansz and Tanis (2007) also provided evidence that the desire for social interaction is significantly correlated with the amount of time that an individual spends playing online games. This leads to the following hypotheses:

H1a. Interpersonal needs drive individuals to use social interaction features of Facebook.
H1b. Interpersonal needs drive individuals to use game features on Facebook.

Enjoyment is a significant factor influencing interpersonal interaction. When Facebook only provided social interaction, individuals were found to satisfy their enjoyment needs through updating statuses and chatting with others (Raacke and Bonds-Raacke, 2008). More recently, Shin and Shin (2011) confirmed that individuals seek to satisfy hedonic demands by playing social networking games. Lee et al. (2012) also

suggested that passing time motivates individuals to play social networking games. Smock et al. (2011) further found that need for relaxation and entertainment are good predictors of time spent on Facebook, and Vázquez and Consalvo (2014) confirmed that a significant number of users perceive Facebook games as a relaxing pastime. Consequently, we posit that Facebook users can satisfy their enjoyment needs by using either interaction or game features. This leads to the following hypotheses.

H2a. Enjoyment needs drive individuals to use social interaction features on Facebook.
H2b. Enjoyment needs drive individuals to use game features on Facebook.

Flow theory defines immersion as the mental state of enjoyment that individuals reach when immersed in a specific activity (Csikszentmihalyi, 1975). In the context of online games, immersion needs refer to completely focusing one's mind on a game to escape the experience of negative emotions (Yee, 2006). Yee (2006) proposed the following factors as motivation for individuals to participate in massive multiplayer online role-playing games (MMORPG): to uncover things in the games that others do not know about, to create characters that are uniquely their own, and to escape the pressure of real life. Shieh and Cheng (2007) also reported that individuals feel more satisfied with online games that enable them to escape reality during game playing. Moreover, Choi et al. (2007) pointed out that it is easier to experience flow (a psychological state in which individuals feel entirely absorbed in their activity) and gain pleasure from participation in games with low task inter-dependency. In other words, individuals with immersion needs will tend to participate in online games that contain tasks that they can complete independently. The social games in Facebook generally present low task inter-dependency. Although the design of some games may include certain items or tasks that require help from friends to obtain or complete, the game vendors provide the option of purchasing items or completing tasks through cash payments. As confirmed by Shin and Shin (2011), flow experience or immersion impacts the intention to use social games. Although the games on Facebook are mostly low-skill and low-investment, it is possible for users to experience immersion through playing these games. A survey conducted by Haferkamp and Herbers (2012) revealed that entertainment, challenge, and escapism were the most important factors motivating users to play the browser game FarmVille (embedded in Facebook). Based on these arguments, this study posits that individuals with immersion needs will be inclined to play social games on Facebook. This leads to the following hypothesis:

H3. Immersion needs drive individuals to use game features on Facebook.

Among the needs and motivations that influence individuals to play online games, achievement is also important. That is, individuals generally continue playing online games because they want to attain a higher in-game level and additional symbols of wealth or status (Yee, 2006). Chang and Zhang (2008) indicated that gaining confidence and a sense of achievement can positively influence the attitudes of players toward a game. In a study of the online strategy game Travian (http://www.travian.tw), Klimmt et al. (2009) discovered that competitiveness is a major attraction of the game. Among

the social games embedded in Facebook, FarmVille presents a similar multi-level design in which players can grow a larger variety of crops and keep a greater variety of animals as they attain higher levels. Moreover, they can earn "farm coins" that can be used to improve the appearance of their farm. A number of social games on Facebook also allow users to assist their friends or play tricks on them; therefore, competition is implied within the game. A survey by Haferkamp and Herbers (2012) revealed that challenge is one of the important factors that motivates users to play FarmVille. As a result, this study infers that achievement needs may also influence the use of social game features. This leads to the following hypothesis:

H4. Achievement needs drive individuals to use game features on Facebook.

In addition to the aforementioned motivations and needs, individuals may also be influenced by the desire to be fashionable, that is, they may use certain online applications such as Facebook because they perceive it to be a popular trend or because celebrities are using it. For example, Sheldon (2008) indicated that some individuals use Facebook because they feel it makes them trendy in the eyes of their peers, and a study by Papacharissi and Mendelson (2011) supported this finding. In recent years, it has also been demonstrated that social interaction games on Facebook have become a fashionable trend. As a result, we infer that individuals motivated by the pursuit of fashion tend to use Facebook frequently, regardless of whether it is to interact with friends or play social interaction games. This leads to the following hypotheses:

H5a. The motivation of pursuit of fashion drives individuals to use social interaction features on Facebook.
H5b. The motivation of pursuit of fashion drives individuals to use game features on Facebook.

Finally, the concept of social ties is also considered in this study. Internet use can have a positive or negative impact on social capital (Ellison et al., 2007). Many researchers have considered computer-mediated communication to benefit individuals by increasing their community interaction, and social capital (Manago et al., 2012; Sheldon et al., 2011; Wellman et al., 2001; Young, 2011). The use of SNSs can assist individuals establish and maintain relationships, which in-turn leads to a strengthening of social ties (Ellison et al., 2007; Tufekci, 2008). Hsu et al. (2011) also provided evidence that using Facebook allows individuals to become better acquainted with distant friends. Even social games provided by Facebook can strengthen social ties due to their interactive design. Consequently, this study infers that using both social interaction features and social games can strengthen social ties. This leads to the following hypotheses:

H6a. Use of social interaction features on Facebook can enhance perceived social ties.
H6b. Use of game features on Facebook can enhance perceived social ties.

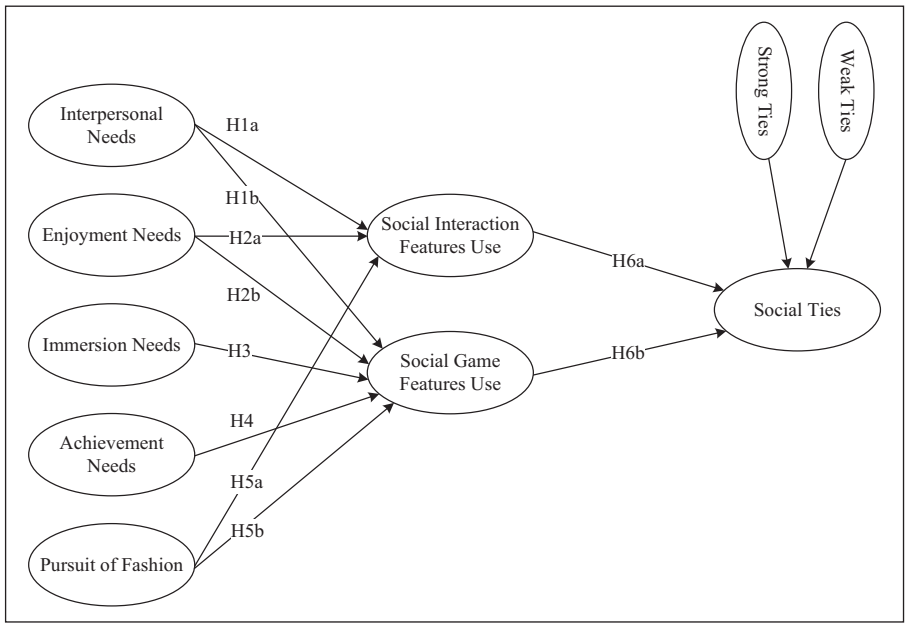

Figure 1. Research model.

Research design and methodology

Instrument design

The research model is shown in Figure 1. An online questionnaire based on this model was distributed to participants. For this, the scale items used were either adopted from prior studies or developed from the theoretical definitions of constructs. Specifically, items measuring interpersonal needs, enjoyment needs, and pursuit of fashion were developed based on prior Facebook studies (Ross et al., 2009; Sheldon, 2008), while items measuring immersion and achievement needs were modified from the studies of Yee (2006) and Klimmt et al. (2009) to fit the context of Facebook. Additionally, five items were used to assess use of social interaction features, and another five items were used to assess use of social game features. These 10 items were developed based on definitions of the constructs and the context of Facebook. Social ties were considered a formative composite variable comprising strong tie and weak tie indicators. Items measuring strong and weak ties were adopted from Ellison et al. (2007). These two dimensions were further utilized as indicators to form the upper-level construct of social ties. Respondents were asked to evaluate the extent to which they agreed with the statements presented in the questionnaire based on their experience using Facebook. We employed a five-point Likert-type scale ranging from 1 for "strongly disagree" to 5 for "strongly agree."

Table 1. Sample characteristics.

Demographic variable	Sample composition	Number ($N = 305$)	Percentage
Gender	Female	165	54.1%
	Male	140	45.9%
Age	16–25	204	66.9%
	26–35	96	31.5%
	36–	5	1.6%
Profession	Construction industry	4	1.3%
	Education	4	1.3%
	Finance and insurance	6	2.0%
	Public administration	3	1.0%
	Information	34	11.2%
	Military	3	1.0%
	Manufacturing	11	3.6%
	Student	182	59.7%
	Service industry	22	7.2%
	Unemployed	18	5.9%
	Others	18	5.9%
Internet uses per day	Less than 1 hour	7	2.3%
	1–3 hours	43	14.1%
	3–5 hours	91	29.8%
	5–7 hours	75	24.6%
	7–9 hours	33	10.8%
	More than 9 hours	56	18.4%
Facebook usage experience	Less than 6 month	31	10.2%
	Half year to 1 year	47	15.4%
	1–2 years	143	46.9%
	2–3 years	57	18.7%
	3–4 years	19	6.2%
	More than 4 years	8	2.6%
Facebook uses per day	Less than 1 hour	83	27.2%
	1–3 hours	132	43.3%
	3–5 hours	48	15.7%
	5–7 hours	26	8.5%
	7–9 hours	7	2.3%
	More than 9 hours	9	3.0%
Social game uses per day	Less than 1 hour	187	61.3%
	1–3 hours	83	27.2%
	3–5 hours	24	7.9%
	5–7 hours	8	2.6%
	7–9 hours	0	0.0%
	More than 9 hours	3	1.0%

Data collection

The initial version of the questionnaire was examined through a pre-test with 83 college students in Taiwan. Both the reliability and validity of the pre-test were well above the acceptable level, and feedback from the pre-test was used to refine the questionnaire (as Appendix 1) for the main research.

Formal survey data were collected from a virtual community which discusses Facebook-related issues on a bulletin board system in Taiwan. Users who had experience using both social interaction and social game features were invited to join the survey. In total, 335 responses were received, of which 305 were valid. Detailed demographic information related to the participants is shown in Table 1.

Results

Since our proposed model contains both formative and reflective indicators, the method of partial least-squares (PLS) was used to analyze data. PLS is a component-based analysis, which can handle latent constructs with either reflective or formative indicators. A PLS analytical procedure generally contains two steps: (a) measuring the reliability and validity of the measurement model and (b) examining the proposed model and hypotheses. SmartPLS version 2.0 was utilized in this study (Ringle et al., 2005), and the bootstrapping method was adopted with 100 iterations to assess the significance of paths in the proposed model.

Before examining reliability and validity, this study performed an exploratory factor analysis of the 10 items measuring Facebook feature use. Two factors with eigenvalues above 1 were extracted, which together accounted for 67.1% of the variance. The first factor accounted for 40.99% of the variance. Therefore, we confirmed that use of Facebook features can be divided into two categories: social interaction features and social game features. In addition, we applied an exploratory factor analysis to all 21 items measuring motivation. Five factors with eigenvalues above 1 were extracted, which accounted for 73.2% of the total variance, and the first factor accounted for 35.2%. These results confirmed our expectation that five separate factors influence Facebook use.

The Harmon one-factor test was also conducted (Podsakoff and Organ, 1986) to address the potential issue of common method variance. Nine factors with eigenvalues above 1 were extracted. These nine factors accounted for 72.4% of all variance, and the first factor accounted for 31.0%. Since nine factors were emerged as expected, and no single general factor accounted for most of the variance in this study, a common method variance was supposed inconsequential.

Reliability and validity

Reliability was measured using composite reliability (CR). As indicated in Table 2, all CR values were higher than 0.86, well above the 0.7 threshold suggested by Fornell and Larcker (1981). Thus, model reliability is considered adequate.

In terms of validity, both convergent and discriminant validity were measured. Fornell and Larcker (1981) suggested that, to ensure convergent validity, the following criteria

Table 2. Composite reliability and average variance extracted.

Scale dimensions	Items	Composite reliability	Average variance extracted
Interpersonal	4	0.867	0.621
Enjoyment	4	0.918	0.738
Immersion	5	0.894	0.628
Achievement	5	0.948	0.787
Pursuit of fashion	3	0.937	0.833
Social interaction feature use	5	0.900	0.643
Social game features use	5	0.937	0.788
Strong social ties	4	0.897	0.743
Weak social ties	4	0.913	0.723

Table 3. Correlations and square root of AVE values.

	Int	Enj	Imm	Ach	PoF	SIU	SGU	SST	WST
Int	**0.79**								
Enj	0.63	**0.86**							
Imm	0.23	0.24	**0.79**						
Ach	0.12	0.21	0.66	**0.89**					
PoF	0.34	0.39	0.40	0.30	**0.91**				
SIU	0.57	0.59	0.20	0.15	0.51	**0.80**			
SGU	0.16	0.23	0.64	0.66	0.30	0.21	**0.89**		
SST	0.40	0.43	0.27	0.13	0.49	0.57	0.25	**0.86**	
WST	0.51	0.57	0.31	0.23	0.52	0.58	0.19	0.48	**0.85**

Diagonal values in bold are square root of AVE and off-diagonal are correlation coefficient.

should be met: (a) all factor loadings in the proposed model should be significant and exceed 0.7, and (b) the average variance extracted (AVE) values for each construct should exceed 0.5. Analytical results indicated that all factor loadings in this study were above the 0.7 threshold, and the AVE values of all study constructs ranged from 0.621 to 0.833 (Table 2); thus, convergent validity was confirmed.

Discriminant validity was also verified using AVE values. Fornell and Larcker (1981) recommended that the AVE value of each construct should be greater than the squared correction among other constructs in the model. As shown in Table 3, the square root of the AVE value in the diagonal for each construct was higher than the corresponding off-diagonal correlation coefficients. Thus, discriminant validity was also confirmed.

Since social ties were considered a formative construct in this study, we also examined its validity and reliability as Petter et al. (2007) suggested. Principal component analysis extracted two components, and each component had a significant item weight. Thus, the validity of the social ties construct was confirmed. Additionally, we used resultant variance inflation factor (VIF) statistic to ensure that multicollinearity was not present. As Diamantopoulos and Siguaw (2006) suggested VIF values for formative

measures should not exceed 3.6, the VIF values of all formative construct measures were between 1.21 and 2.65, which is within the acceptable level. As a result, reliability of the social ties construct was confirmed.

Clustering subjects into three clusters

To determine whether individuals who use social interaction features and social game features on Facebook differed in terms of the variables discussed, this study conducted a cluster analysis using Ward's (1963) method. The aggregation process indicated that dividing users into three clusters was the most appropriate for our study, and we obtained clusters of 117 subjects (Cluster 1), 99 subjects (Cluster 2), and 89 subjects (Cluster 3). We compared the means of participants within each cluster with the mean of all participants, and for all participants the means of interaction use and game use were 3.85 and 3.12, respectively. Clusters were named according to behavioral differences: "High Social Interaction and Low Game Participation" (Cluster 1; means 4.23 and 2.31, respectively), "High Social Interaction and High Game Participation" (Cluster 2; means 4.08 and 4.24, respectively), and "Moderate Social Interaction and Moderate Game Participation" (Cluster 3; means 3.10 and 2.93, respectively). There was no significant difference in terms of social interaction feature use between Clusters 1 and 2; however, the means of both clusters were significantly higher than that of Cluster 3. In addition, game participation for Cluster 1 was significantly lower than that for Cluster 3, which was in-turn significantly lower than for Cluster 2. The duration of Facebook usage was also significantly different among the three clusters: 1.78, 1.65, and 1.47 years for Clusters 1–3, respectively. Subsequently, we conducted Scheffe's post-hoc test on the three clusters to determine whether significant differences existed in terms of other factors.

Scheffe's post-hoc test revealed that the subjects in Cluster 1 and Cluster 2 did not differ significantly in terms of interpersonal needs, enjoyment needs, or and pursuit of fashion. However, these two groups scored significantly higher on interpersonal needs and pursuit of fashion than did the subjects in Cluster 3. Additionally, in terms of needs for immersion and achievement, the analysis indicated that the means for Cluster 2 were greater than those for Cluster 3, which were in-turn greater than those for Cluster 1. In terms of social ties, there was no significant difference between Clusters 1 and 2; however, both of these groups scored considerably higher than did Cluster 3 (Table 4).

Testing the hypotheses

PLS was used to examine the hypothesized paths of influence, and results are presented in Figure 2. To further explore the motivations of participants, the proposed model was examined using separate clustering data, and results are presented in Figures 3 to 5.

Our results supported H1a, that is, interpersonal needs likely have a significant influence on the use of social interaction features on Facebook. This result is consistent with the findings of Lampe et al. (2006), Sheldon (2008), and Pempek et al. (2009). Therefore, for a large portion of users, Facebook retains its original function of social interaction despite the addition of game features. However, H1b was not supported. Interpersonal needs did not propel individuals to use social game features on Facebook. Nonetheless,

Table 4. The variable means and MANOVA analysis for clusters.

	All subjects Mean	Cluster	Cluster mean	*F* ratio	*p*-value
Interpersonal needs	4.26*	1	4.40*	17.14	0.00*
		2	4.39*		
		3	3.94*		
Enjoyment needs	4.19*	1	4.32*	32.31	0.00*
		2	4.41*		
		3	3.77*		
Immersion needs	3.26*	1	2.83*	71.52	0.00*
		2	3.86*		
		3	3.15*		
Achievement needs	3.15*	1	2.62*	57.59	0.00*
		2	3.90*		
		3	3.01		
Pursuit for fashion	3.27*	1	3.32*	19.05	0.00*
		2	3.60*		
		3	2.86*		
Strong social tie	3.20*	1	3.23*	22.52	0.00*
		2	3.53*		
		3	2.79		
Weak social tie	3.79*	1	3.96*	18.32	0.00*
		2	3.94*		
		3	3.40*		

MANOVA: multivariate analysis of variance.
1: the mean of variables are compared to the median 3; 2: we conducted two MANOVA analyses, one for five needs, the other for two social ties, both of which are significant—the first *F* ratio is 21.797 with degree of freedom (10,598), and the second *F* ratio is 15.11 with degree of freedom (4604); 3: *significant at $p < 0.05$.

separate analysis of the three clusters yielded an interesting result: interpersonal needs are positively associated with the use of social game features in Clusters 1 and 2, but had a surprisingly negative effect (−0.268) in Cluster 3. In other words, participants in Clusters 1 and 2 use both social interaction features and social game features to satisfy their interpersonal needs. Conversely, participants with interpersonal needs in Cluster 3 tend to use the social interaction features of Facebook, and not the social game features of Facebook, to interact online.

H2a was supported by our results. That is, enjoyment needs are positively related to the use of social interaction features on Facebook. This result is consistent with the findings presented by Raacke and Bonds-Raacke (2008), Sheldon (2008), and Lee et al. (2012). Notably, however, enjoyment needs have no significant impact on the use of game features. Interestingly, while separately examining the clustering data, we further found that individuals with high game participation (Cluster 2) tend to fulfill their enjoyment needs through game play, whereas individuals with low game participation (Cluster 1) are inclined to fulfill their enjoyment needs through online social interaction. That is,

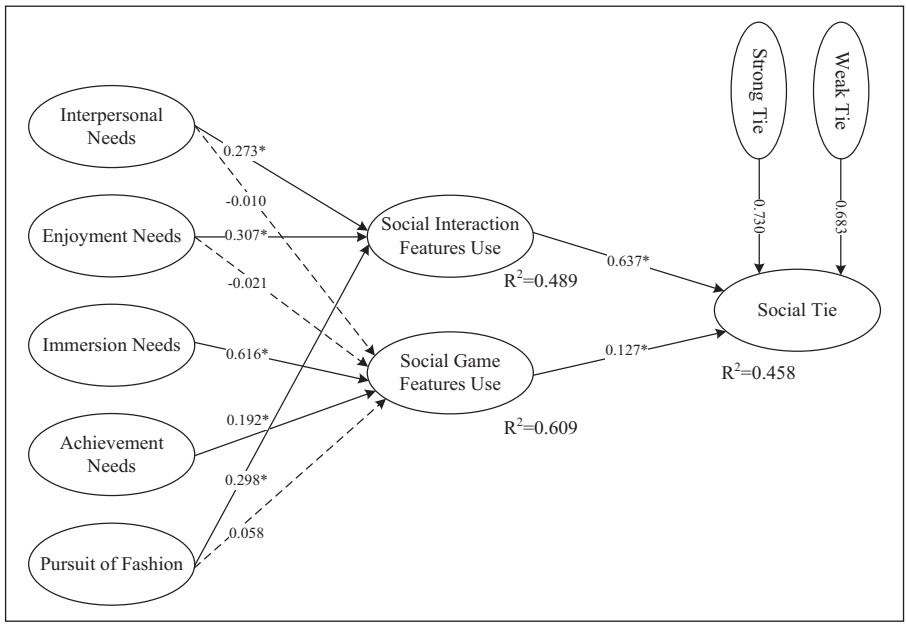

Figure 2. Analytical results of the all subjects.
*Significant at $p < .05$.

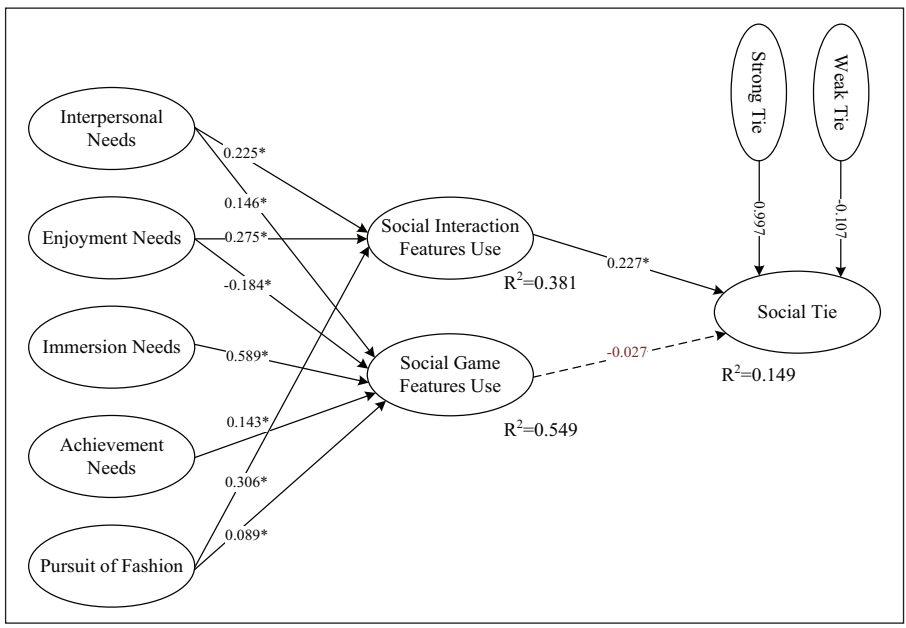

Figure 3. Analytical results of Cluster 1.
*Significant at $p < .05$.

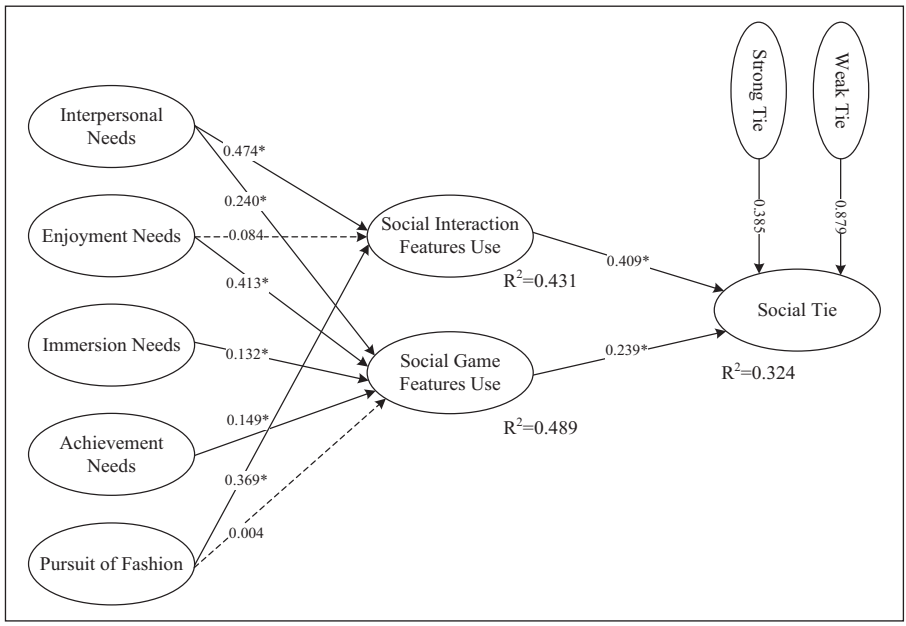

Figure 4. Analytical results of Cluster 2.
*Significant at $p < .05$.

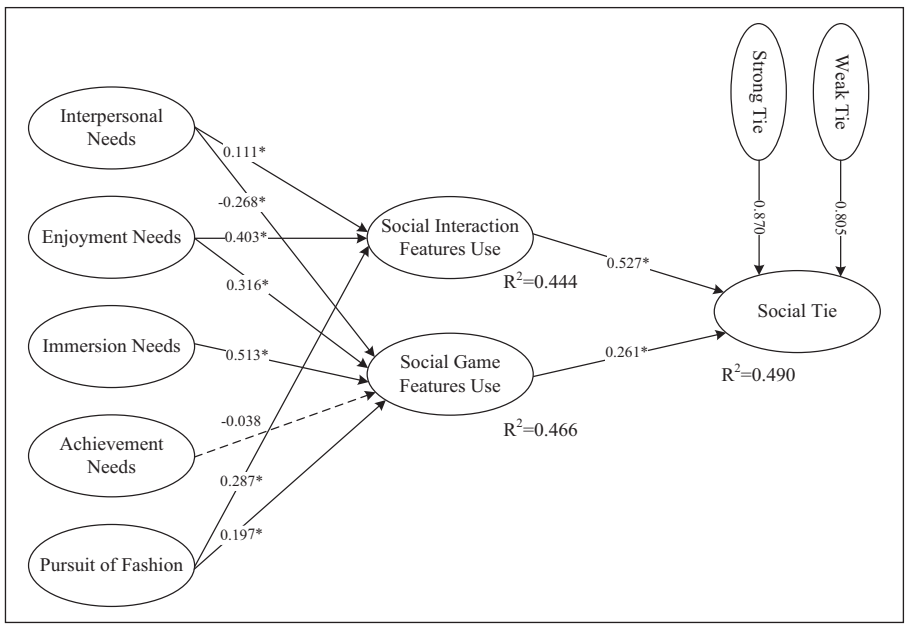

Figure 5. Analytical results of Cluster 3.
*Significant at $p < .05$.

some individuals in this study really enjoy in playing social games and indeed satisfy their enjoyment needs through it. Overall, the results indicate that, although Facebook provides both social interaction features and social game features, its principal function is still to facilitate social interaction. If individuals simply wish to use Facebook in order to pass the time, most of them are more inclined to browse the walls of their friends, post messages, videos, and pictures, or respond to content posted by others. As a result, H2b was not supported in this study.

As evidenced by previous studies, the need for immersion and achievement also significantly influence the use of social games (Klimmt et al., 2009; Yee, 2006). This study provides empirical evidence to corroborate earlier findings. However, the diverse results were found when separately examining the clustering data. Insignificant results between achievement needs and social game features use were found in Cluster 3. Since individuals in this cluster have relatively limited experience with Facebook use, we posit that they may be less competitive and thus find it difficult to satisfy achievement needs through social games. But generally, the results of the overall model indicated that individuals who frequently use social games embedded in Facebook immerse themselves in order to progress through levels faster than other users or to obtain better virtual objects. In other words, the need for immersion and achievement is positively correlated with the use of social games and therefore H3 and H4 are supported.

Our results also indicate that the pursuit of fashion is significantly correlated with the use of social interaction features on Facebook (H5a). However, we did not find a significant correlation between the pursuit of fashion and the use of social game features (H5b). We speculate that this resulted from the fact that the trend value of most games is relatively short-lived. Some individuals may join Facebook because they are motivated by the desire to participate in a social networking game, for example, the once popular "Happy Farm" game in Taiwan. However, the popularity of this game did not last. Cluster analysis also indicated that only individuals who do not play social games frequently (Cluster 1) and new entrants (Cluster 3) fulfill their need to follow trends through the use of social game features. Individuals who have played social games for a long time do not do so in order to be trendy. As a result, only H5a was supported in this study; H5b was not confirmed. In general, individuals who wish to follow trends join Facebook for the sake of engaging in social interaction rather than playing social games.

Finally, in terms how Facebook usage behavior influences social ties, the use of both social interaction features and social game features can exert a significant positive impact on the perceived social ties of individuals; therefore, H7a and H7b are supported. Although previous views regarding the relationship between internet use and individual social ties are somewhat diverse, the results of this study support the findings of Tufekci (2008) and Ellison et al. (2007), indicating that the use of SNSs is associated with stronger social ties. Moreover, the results of this study also showed that not only does the use of social interaction features on Facebook enhance social ties, but so does the use of social game features. Since the design of social games within Facebook incorporates the concept of social interaction, progression through the game requires interacting with friends. For example, friends can supply in-game items or assistance to each other by completing certain tasks and clicking posted game links. These actions all benefit social ties. However, considering the results of cluster analysis, the use of social game features

was not significantly correlated with social ties in Cluster 1. This could be due to the low frequency of game feature use for Cluster 1 subjects; that is, the strength between social game use and social ties depends on the frequency of game use. Indeed, in Clusters 2 and 3, the use of social game features was significantly correlated with social ties.

Conclusion

The main objective of this study was to understand what motivates individuals to use the social interaction features and social game features of Facebook. We also sought to elucidate effects that these features have on social perspective. We tested our hypotheses empirically, obtaining results that promote deeper understanding of current trends related to SNSs with both academic and practical implications.

Academically, this study makes the following major contributions. First, our results confirm that although the features of Facebook are increasingly diversifying, interpersonal needs remain a strong driver for Facebook use. Furthermore, needs identified by past online game-related studies were also found to have strong explanatory power for Facebook social game features use. Second, we found different motivations among different clusters of individuals. This study demonstrated that new users (Cluster 3) are inclined to use social interaction features to gain gratification. After a period of time, however, some individuals gain more gratification through game feature use (Cluster 2) while others (Cluster 1) continue to gain gratification through the use of social interaction features. Nonetheless, game features were found to satisfy the immersion and achievement needs of both clusters. In other words, the kind of gratification gained from Facebook may depend on the type of feature used. Over the long term, most individuals tend to view Facebook as an auxiliary tool of social behavior. Finally, the results of this study identified a positive correlation between Facebook use and social ties. By using Facebook, individuals can expand their personal social network and strengthen their relationships with friends.

In practice, enjoyment seems to be a major factor attracting SNS users. However, to ensure that the appeal of entertainment aspects persists over the long term, SNS developers should consider means of effectively converting game play into the use of social interaction features. For example, platform operators should encourage third-party game providers to include more social interaction features in their games. This will in-turn allow users to combine their real and virtual worlds. SNSs still retain their primary purpose as a tool for social interaction. Thus, platform designs must first consider social aspects and then, if possible, add entertaining elements to the foundation of social interaction. SNSs will only attract and retain users if they satisfy both social interaction needs and entertainment needs. Individuals who are concerned about the social impact of Facebook, such as social workers, should note that the use of social interaction features can enhance perceived social ties; however, the use of game features may not improve social ties among some groups of people.

Our results must be interpreted in the context of research limitations. For example, due to time and financial constraints, we were only able to conduct a cross-sectional study, and thus our results may only be applicable in the short term. As Facebook is constantly improving and introducing new features to retain current users, and as new SNSs,

such as Google+ are emerging, long-term observations of relevant trends are needed. Other factors, such as user annoyance over malware (present in some applications) and game-related spam on Facebook walls, also likely affects the behavior of SNS users and the number of individuals who use SNS applications. Thus, these issues also warrant further investigation. Furthermore, new features on Facebook allow for a wider range of functions, such as marketing and teaching. Future studies might shift away from a focus on social interaction and examine other uses of SNSs (e.g. fan pages for movie stars) and organizations (e.g. for brand promotion).

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Appendix 1

Questionnaire items

Construct	Measure
Interpersonal needs	
Int1	I think that using Facebook features can let me make new friends.
Int2	I think that using Facebook features can let me interact with my acquainted friends.
Int3	I think that using Facebook features can let me interact with people I know.
Int4	I think that using Facebook features can make me keep contact with my long-lost friends.
Enjoyment needs	
Enj1	When I feel boring, I use Facebook features to pass the time.
Enj2	Using Facebook features to interact with my friends gives me pleasure.
Enj3	The process of using Facebook features makes me feel enjoyable.
Enj4	Overall, using Facebook features makes me feel pleasant.
Immersion needs	
Imm1	I would like to find and know things that most other players don't know when playing social networking games in Facebook.
Imm2	I would like to create my own character, object or environment when playing social networking games in Facebook.
Imm3	I would like to customize the appearance of my own character when playing social networking games in Facebook.
Imm4	Using social networking games in Facebook makes me feel relaxed.
Imm5	Using social networking games in Facebook makes me avoid thinking about real-life problems when playing social networking games in Facebook.
Achievement needs	
Ach1	I would like to gain progress rapidly than others when playing social networking games in Facebook.
Ach2	I would like to accumulate in-game level, symbols of wealth, or status better than others when playing social networking games in Facebook.
Ach3	I would like to challenge and compete with others when playing social networking games in Facebook.
Ach4	I would like to gain better results than others when playing social networking games in Facebook.
Ach5	I would like to analyze the underlying rules and system when playing social networking games in Facebook in order to optimize character performance.
Pursuit of Fashion	
PoF1	Using Facebook features allows me to become trendy among my friends.
PoF2	I think that using Facebook features are cool.
PoF3	I think that using Facebook features are fashion.
Social interaction features use	
SIU1	I often use Facebook to post status, photo, or video.
SIU2	I often use Facebook to comment status, photo, or video posted by friends.
SIU3	I often use Facebook to interact with my friends.
SIU4	I often use Facebook to gain deeper understanding to the people I know.
SIU5	I often use Facebook to maintain my interpersonal relationship.

Appendix 1. (Continued)

Construct	Measure
Social game features use	
SGP1	I often use social networking games in Facebook.
SGP2	I use social networking games in Facebook regularly and daily.
SGP3	I often click the social networking game messages posted on my friend's wall.
SGP4	I used to search and play social networking games in Facebook.
SGP5	I used to recommend my friends to play specific social networking games with me in Facebook.
Strong social tie	
SST1	My friends in Facebook can give me guidance and support when I need it.
SST2	My friends in Facebook can advise me when I have to make a difficult decision.
SST3	My friends in Facebook can give me practical kinds of help.
SST4	I can count on my friends in Facebook for practical help in case of emergency.
Weak social tie	
WST1	I feel very close to my friends in Facebook.
WST2	My friends in Facebook understand me.
WST3	My friends in Facebook show that they care about me.
WST4	I feel that my friends in Facebook love me.