Power of Earned Advertising on Social Network Services:
A Case Study of Friend Tagging on Facebook

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Abstract

Social network services (SNSs) are now the primary advertising medium in terms of both reach and engagement. For both businesses and the SNS providers, it is crucial to find advertising methods that users perceive to be valuable. In this paper, we provide an empirical evidence for the role of different advertising methods on SNSs (i.e. earned vs. paid) on the subjective evaluation of the relative worth of advertising. In particular, we concentrate on the act of 'friend tagging' – the convention of tagging friends in a thread to a brand post – where users inadvertently engage in targeted and personalized brand advertising. Through survey analysis, we validate that users find earned advertising less irritating and more informative, entertaining, and credible than paid advertising. We further ask if brands can strategically craft their content to boost up friend tagging. Using the data collected from Facebook, we analyze what drives users to engage in friend tagging and find that content characteristics such as media attachments and posting times affect friend tagging frequency. We conclude that friend tagging is a powerful user-initiated solution for matching products with potential target audience.

Introduction

Social networking sites (SNS) today are an essential marketing platform for all businesses. Accounting for more than two billion users worldwide (Statista 2016), social media plays a vital role in how consumers discover, research, and share information about brands and products. Presence on social networking sites such as Facebook, Twitter and Instagram is no longer considered secondary but primary. Spending on social media marketing far exceeds the traditional marketing budgets, and it is expected to increase steadily in the following years (The CMO Survey 2014; Salesforce 2015).

As businesses aggressively utilize social media as a marketing platform, SNS users today are exposed to an unprecedented level of advertising from a myriad of sources. Everyday individuals face the challenge of finding items that best serve one's idiosyncratic interests among a large number of available items. It is increasingly important for marketers to understand what makes a lasting impression on consumers and formulate a salient advertising strategy that will break through this information overload.

In this paper, we focus on one particular behavior that has a great potential to act as the salient and cost-saving advertising channel, namely, friend tagging on Facebook. In recent years, Facebook users have adopted a social referral convention of tagging friends on a post thread in commercial brand pages, as illustrated in Figure 1(a). This friend tagging behavior effectively summons the friend to a brand post and thus inadvertently promotes the brand to her. Via friend tagging, users name the friends who are specifically likely to be interested in the content and voluntarily match them with brands (Sharma and Cosley 2015); as Jonah Berger puts it, "we are not going to tell a friend about a new pair of skis if we know the friend hates skiing" (Berger 2013). Over the past several years, friend tagging has become widespread; in our preliminary analysis, we found that for certain brands, comments with friend tags take up to 50% of all the comments on their pages.

In marketing jargon, friend tagging is one type of *earned advertising*, or the media activity related to a brand generated by consumers or journalists. In contrast, *paid advertising* is directly generated by the company or its agents. Examples of paid advertising include Facebook banner ads (Figure 1(c)) and sponsored displays, for which the advertising companies pay for space and time. Meanwhile, earned advertising is oftentimes a combined result of the public's efforts and the content that brands create. Wall sharing in Figure 1(b) is another example of earned advertising, where a user is exposed to a brand post shared by her Facebook friend. Consumers' posts, reviews, or conversations within online communities are all examples of earned advertising.

An interesting question to raise here is: how do users on social network services perceive earned advertising compared to paid advertising? Earned advertising and paid advertising complement each other with its own strengths; paid advertising has wide reach and control and earned advertising is credible and relevant. While marketing reports and literature suggest that earned advertisements are targeted (Berger 2013), genuine (Balter 2005), and trustworthy (Nielsen 2012), there is a lack of empirical evidence validating that earned ads deliver such values to users. How much value do users give to friend tagging on Facebook as a source of relevant information? Do they find greater value from information received through earned media than through paid media? We need to understand exactly what
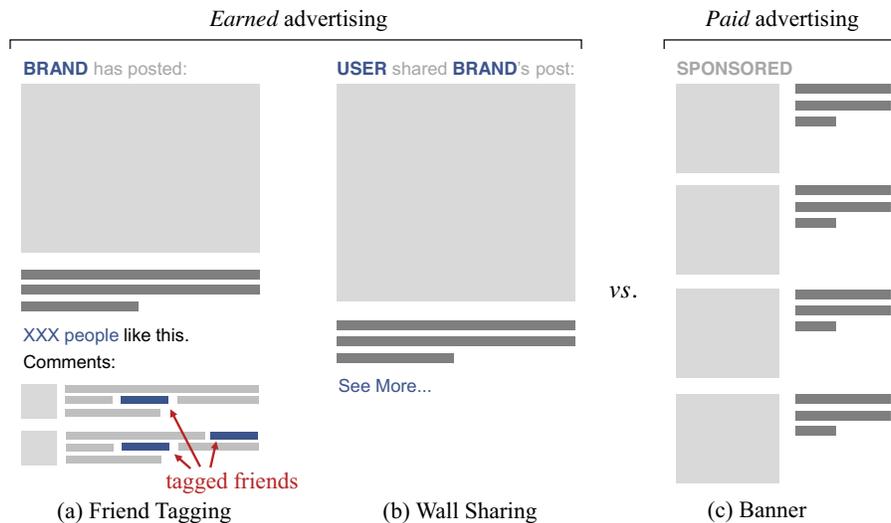
Figure 1: Advertising Methods on Facebook: (a) Friend tagging and (b) Wall sharing are examples of *earned advertising*, whereas (c) Banner is an example of *paid advertising*.

value an earned advertising strategy could bring to users before devising a marketing strategy.

This paper aims to provide an empirical evidence for the role of an advertising strategy on SNS (i.e. earned vs. paid) on the subjective evaluation of the relative worth or utility of advertising (i.e. advertising value) (Ducoffe 1995). To understand how users perceive different advertising channels on Facebook, we design and conduct a user survey and present the results in STUDY 1. We select five criteria - informativeness, entertainment, credibility, irritation, and self-brand congruity - developed in previous literature based on well-grounded theoretical frameworks (Ducoffe 1996; Taylor, Lewin, and Strutton 2011; Wang et al. 2002) to assess the value of paid and earned advertising on SNS. Results from the survey show that earned advertising, especially friend tagging, is more informative, entertaining, credible, and less irritating than paid advertising. Most importantly, user ratings confirm that earned ads better suit consumers' tastes and needs. Such information is extremely useful for businesses, for they can identify and reach the potential targets of their products and services.

Then, a critical follow-up question for businesses and social network service providers is: how do brands get people involved in earned advertising? Can they strategically craft their content to boost up consumer engagement? To understand how brands can "earn" the earned advertising, we analyze what drives users to engage in earned advertising on Facebook in STUDY 2. We collect posts from Facebook brand pages, and test a regression model on the posts to determine which content-driven characteristics affect friend tagging behavior of users. We examine the factors that previous work has identified to be influential as predictors that impact friend tagging behavior. Of these predictors we find that attachment of pictures or videos promotes friend tagging, as well as the time of posting. The results suggest that brands can strategically engineer their content to promote

active engagement of users in earned advertising.

The rest of the paper is organized as follows. In the following section we first review related literature of STUDY 1 and then present research hypotheses, methods, and results. The goal of STUDY 1 is to compare earned and paid advertising on SNS in terms of values they deliver to users. The next section follows up with STUDY 2 where we examine the characteristics of brand posts that drive users to engage in earned advertising on SNS. We review related work, describe our dataset, explain analysis methods, and present the outcome. Finally, we discuss the implications of our study with the summary of our findings, and conclude the paper.

STUDY 1: Do Users on SNS Perceive Earned Ads as More Valuable than Paid Ads?

The purpose of STUDY 1 is to validate a widely-held assumption that earned advertising provides more value to consumers than paid advertising. Prior studies showed that earned ads attract more attention from users than paid ads (Barreto 2013; Trattner and Kappe 2013). But does it mean that earned ads provide greater value than paid ads? Furthermore, do consumers find friend tagging to be the most valuable advertising method of the three advertising methods illustrated in Figure 1? To answer these questions, we design and conduct a survey asking users to evaluate the value of the three different advertising methods on Facebook. How do we define and measure the 'value' of advertising? In the following subsection, we review past literature related to advertising value and present the conceptual rationale behind our research hypotheses. Then we describe the survey procedure and present the results.

Related Literature & Hypotheses

Advertising value is defined as 'a subjective evaluation of the relative worth or utility of advertising to con-

sumers' (Ducoffe 1995). Researchers identified that advertising value affects *attitude towards advertising* and ultimately the *purchase intention* of consumers (Ducoffe 1996). Ducoffe, who first introduced the concept, originally identified four major factors that affect advertising value: consumers' perceived level of informativeness, entertainment, credibility, and irritation (Ducoffe 1995). He developed the survey scales and items to measure the advertising value perceived by users.

Ever since, in trying to understand the attitude towards advertising, researchers typically ask consumers about their perceptions of advertising with respect to the aforementioned four criteria. Follow-up studies extended and adopted Ducoffe's model in various online contexts to help understand advertising effectiveness, verifying the respective roles of these factors as important predictors of the value of advertising (Ducoffe and Curlo 2000; Schlosser, Shavitt, and Kanfer 1999; Wang et al. 2002).

A recent work extends Ducoffe's model to test the impact of these factors on the attitude towards advertising on social networks (Taylor, Lewin, and Strutton 2011) and introduces an addtional factor: self-brand congruence. Consumers frequently compare imagery associated with a brand with images they hold about themselves. This match between the brand's image and a consumer's self-concept is referred to as self-brand congruence (Taylor, Lewin, and Strutton 2011). We also adopt their model and use the scales and items used in this work, with a focus on comparing how user evaluations vary across different advertising methods. We hypothesize that users would find greater value from earned advertising than paid advertising, and greatest value from friend tagging among the three methods. We now explain each factor in detail and explain the rationale behind our hypotheses.

Informativeness and Entertainment Value   Perceived informativeness and perceived entertainment are the two content-driven characteristics that are positively related to attitude towards advertisements on SNS (Taylor, Lewin, and Strutton 2011). Informativeness refers to an advertisement's capacity to provide practical information in a timely manner. Entertainment value comes from the content's ability to satisfy basic consumer needs for enjoyment and emotional release. Contents that receive wide public attention, or earned advertising, are those that are particularly useful and enjoyable. Taking this into account, the audience of earned advertising would feel that the advertising is particularly informative and enjoyable. In case of friend tagging, a user selects exclusively the recipients who are likely to be interested in the content. This leads to the following set of hypotheses:

H1-a. Consumers find earned ads more *informative* than paid ads.

H1-b. Consumers find friend tagging most *informative*.

H2-a. Consumers find earned ads more *entertaining* than paid ads.

H2-b. Consumers find friend tagging most *entertaining*.

Credibility   Credibility refers to the degree to which a consumer perceives claims made about the brand in an advertisement to be truthful and believable (MacKenzie and Lutz

1989). Researchers have found that consumers respond to authenticity; credibility is positively correlated with the consumers' attitudes towards advertising and purchase intention (Brackett and Carr 2001; Tsang, Ho, and Liang 2004). Credibility of an advertisement is mainly influenced by the credibility of the advertiser (i.e. brand) as well as the credibility of the advertising medium (i.e. message sender) (Choi and Rifon 2002; Haghirian, Madlberger, and Tanuskova 2005; Wathen and Burkell 2002). Message senders of earned advertising on SNS generally consists of friends and family who are regarded as more trustworthy than salespeople. Friend tagging, in particular, is a highly personal interaction which occurs among friendships built upon trust. Thus we propose following hypotheses:

H3-a. Consumers find earned ads more *credible* than paid ads.

H3-b. Consumers find friend tagging most *credible*.

Irritation   Previous studies have identified irritation as a major cause of negative attitude towards advertising (Bauer and Greyser 1968; Ducoffe 1996). Ducoffe claims that when advertising employs tactics that annoy, offend, insult, or are overly manipulative, consumers perceive advertisements as irritating or invasive (Ducoffe 1996). For instance, bombardment of boring, redundant banners irritates customers and cause banner blindness. Likewise, Li *et al.* claims that advertising causes irritation when it interferes with the users' goal-directed behavior on the internet (e.g. information searching, downloading resources) (Li, Edwards, and Lee 2002). The use of SNS is highly goal-directed (Taylor, Lewin, and Strutton 2011), and paid advertising methods like banners with explicitly commercial purposes may irritate consumers by interfering with their goal-directed behavior. In addition, a previous study found that banner advertisements increase perceived workload of users and hinder visual search (Burke et al. 2005). On the contrary, generally there is no commercial intention behind earned advertising, which would cause less irritation. Our hypotheses regarding irritation are:

H4-a. Consumers find earned ads less *irritating* than paid ads.

H4-b. Consumers find friend tagging least *irritating*.

Self-Brand Congruence   The value of an advertisement depends on its ability to help consumers find the brand that well matches their self-concept. Paid advertisements on the Web use personalized algorithms and find a relevant match between consumers and brands. We posit that earned advertisements shared through a user's social network is likely to be even more relevant and better matches the self-image of a consumer than paid advertisements, since it is based on personalized and targeted recommendation from friends or family who knows her tastes and preference. Friend tagging, in particular, is a highly personalized and targeted gesture. During friend tagging, users specifically select whom to share their information with unlike in other earned advertising methods where they broadcast the information to the unspecified group of people (e.g. wall sharing or retweets). This leads to the following hypotheses:

Subscale	Mean Rating (Std. Error)		
Items	Banners	Wall Sharing	Friend Tagging
Informativeness.	2.71 (0.066)	3.36 (0.054)	3.43 (0.055)
They are **convenient** source of product/service information.	2.62 (0.078)	3.32 (0.070)	3.42 (0.075)
They keep me **up to date**.	2.94 (0.083)	3.57 (0.065)	3.47 (0.070)
They are a **useful** source of product/service information.	2.57 (0.079)	3.21 (0.069)	3.40 (0.071)
Entertainment.	2.22 (0.063)	3.13 (0.065)	3.39 (0.066)
They are often **amusing**.	2.17 (0.071)	3.04 (0.076)	3.35 (0.079)
They are **fun** to watch or read.	2.15 (0.077)	3.18 (0.078)	3.51 (0.077)
They are clever and quite **interesting**.	2.35 (0.070)	3.16 (0.075)	3.32 (0.079)
Credibility.	2.53 (0.062)	2.97 (0.051)	3.16 (0.055)
They are **believable**.	2.50 (0.076)	3.01 (0.062)	3.24 (0.066)
They are **credible**.	2.53 (0.076)	2.97 (0.068)	3.19 (0.073)
They are **trustworthy**.	2.57 (0.085)	2.93 (0.070)	3.04 (0.071)
Irritation.	3.53 (0.077)	3.16 (0.074)	2.87 (0.072)
They are **distracting**.	3.60 (0.083)	3.21 (0.083)	2.93 (0.081)
They are **interfering**.	3.51 (0.087)	3.16 (0.081)	2.89 (0.079)
They are **invasive**.	3.47 (0.084)	3.12 (0.078)	2.78 (0.077)
Self-Brand Congruence.	2.61 (0.064)	2.97 (0.059)	3.44 (0.058)
Brands advertised through them **cater to people like me**.	2.45 (0.075)	2.94 (0.070)	3.49 (0.072)
Brands advertised through them are **consistent** with how I see myself.	2.56 (0.070)	2.85 (0.064)	3.25 (0.071)
The typical audience for brands advertised through them are very much like me.	2.82 (0.082)	3.13 (0.074)	3.60 (0.072)

Table 1: Survey questions and user evaluation of the three advertising methods (n=159)

H5-a. Consumers find greater *self-brand congruence* from earned ads than from paid ads.

H5-b. Consumers find greatest *self-brand congruence* from friend tagging.

Method

We conducted a two-week-long online survey[1] and assessed the perceived values of three advertising methods: friend tagging, wall sharing, and banners on Facebook. Our aim was to collect user evaluation of the advertising methods in terms of the five criteria: informativeness, entertainment, invasiveness, credibility, and self-brand congruence.

Participant Recruitment We recruited participants for the survey from a major university online and off-line. We posted a recruitment notice on the university's Facebook page, on the student news portal site, and in cafeterias. As an incentive, we announced a raffle to win a $5 drink voucher for 20 participants. A total of 189 respondents completed the survey, of which 58% are male and 42% female. A majority were students (97%) in the age range of 18 to 23 (60%) or 24 to 29 (30%). Most logged into Facebook on a daily basis (89%), or at least three to four times a week (6%).

Questionnaire Construction We adapted the original questionnaire (Ducoffe 1996) to suit our study. Prior to distributing the final version, we administered a pilot survey on eight students and made sure that participants understood directions and questions clearly. We asked each participant if any part of the survey needed clarification. Based on their

feedback, we restructured the survey, corrected ambiguous expressions, and removed a few questions that seemed overly redundant. The final list of questions is listed in Table 1. The questionnaire consists of multi-item scales, where answers to a series of related questions (e.g., 'convenient', 'up to date', 'valuable') are combined to construct an estimate for an underlying variable (e.g., 'informative'). Participants were asked to rate the three methods by answering each question on a 5-point Likert scale (1–strongly disagree, 3–neutral, 5–strongly agree). We randomized the order of the questions to reduce the order effect.

Survey Process At the beginning of the survey, we informed the participants that 'the survey consists of questions regarding three different methods through which Facebook users are exposed to information about products/services'. Then we walked through each method with a detailed description and screenshots. These screenshots are real-life examples taken from Facebook aimed to help users bring their own experiences into mind. After the walkthrough, participants were asked to recall their own experience of each and make evaluations based on them. We further asked whether their friends have ever tagged them, as a part of screening process. A large number of respondents (89%) answered that they had been tagged before. By asking this question, we were confident the participants understood the differences among the three methods. We employed purposive sampling by screening those who had never been tagged before; in the end we limit our analysis to 159 participants who are familiar with the three advertising methods and make evaluations based on their personal experience. After making sure that the users have clearly understood the three methods, we asked the participants to rate the three methods.

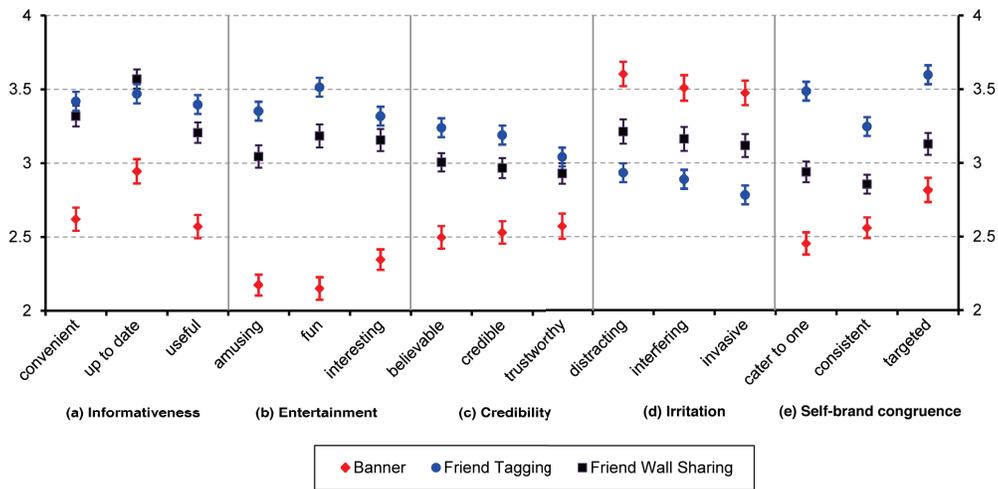---

[1] Survey Link. http://goo.gl/forms/Kedg4Cm98U

Figure 2: Error plot showing user assessment of the three advertising methods with respect to advertising value (n=159)

Results

ANOVA Results We first run one-way analysis of variance (ANOVA) to test whether there exists significant variation among the perceived values of three methods. Results of ANOVA are presented in Table 2. Note that in addition to running ANOVA on each subscale (averaged over items), we run the tests and compare the ratings for each item as well, since the individual items hold subtly different, although related, meanings (e.g. 'Convenient' and 'up to date' are both related to 'informativeness' but in different aspects).

ANOVA revealed significant differences for all subscales and items. The means and standard errors of users scores are shown in Table 1. For ease of comparison, we also present the error plots in Figure 2. Users perceived friend tagging to have the highest level of informativeness (except for 'up to date' construct), entertainment value, credibility, and self-brand congruence, while banner advertisements received the lowest ratings for these criteria. Likewise, friend tagging was perceived to be least irritating and banner ads the most irritating, in accordance with our expectation.

Post-Hoc Tukey's HSD Results While ANOVA results confirm that there are significant differences among the means of three methods, it does not tell you where the differences lie. We conduct post-hoc pair-wise multiple comparison using Tukey's Honest Significance Difference (HSD) test (Tukey 1949) as a follow-up to ANOVA, which specifically indicates which pair of groups exhibits statistical differences. Tukey's test is a conservative post-hoc procedure that is robust to nonnormality and extreme choices. It is widely used for determining the significant differences between group means in point-scale rating systems. Through Tukey's test we examine if users perceive earned advertisements as more valuable than paid advertisements and if friend tagging outperforms the rest.

The results of Tukey's test are also presented in Table 2. The table shows differences between the mean ratings for each pair of advertising method. For all subscales and items, we find significant differences in the means between friend

tagging and banners (column ①) as well as between wall sharing and banners (column ②). It confirms our hypotheses that users perceive greater advertising value from earned advertising than from paid advertising. Thus, hypotheses H1-a, H2-a, H3-a, H4-a, and H5-a hold true.

To confirm our hypotheses that friend tagging provides greatest value to users among the three advertising methods, we need to find significant differences in the mean ratings between friend tagging and banners (column ①) as well as between friend tagging and wall sharing (column ③). The differences between friend tagging and banners are significant for all subscales and items. However, between friend tagging and wall sharing, not all differences are statistically significant. There was no significant difference in perceived informativeness. Likewise, the differences for some items related to credibility and entertainment values were not significant. Meanwhile, for all items regarding irritation and self-brand congruence, the differences were significant. Thus, hypotheses H4-b and H5-b hold true, while there is not enough evidence to support H1-b, H2-b, and H3-b.

STUDY 2: How Can Brands Encourage Users to Engage in Earned Advertising on SNS?

In the previous section, we show that users assess earned advertising to be more informative, entertaining, credible, targeted, and less irritating than paid. Then, how can brands maximize the earned advertising opportunity? In this section we examine content characteristics that drive users to engage in friend tagging on Facebook. Brands will be able to utilize this information to cultivate content that facilitates user participation in friend tagging and ultimately to find potential target audience to advertise their products or services.

Related Literature and Hypotheses

Past research regarding earned advertising or word-of-mouth mainly focuses on its impact and less on its causes (Berger and Milkman 2012). For brands to generate content that successfully motivates users to take part

Subscale & Items	ANOVA				Tukey's HSD			
	Sum of Squares	Mean Sum of Squares	F	p-val	① friend tagging - banners	② wall sharing - banners	③ wall sharing - friend tagging	
Informativeness	169.2	84.60	85.98	2e-16 ***	0.72 ***	0.65 ***	-0.06	(0.548)
convenient	67.8	33.89	33.98	1e-14 ***	0.80 ***	0.70 ***	-0.10	(0.607)
up to date	40.4	20.209	21.25	1e-09 ***	0.53 ***	0.63 ***	0.10	(0.593)
valuable	67.1	33.57	34.87	6e-15 ***	0.82 ***	0.64 ***	-0.19	(0.160)
Entertainment	404.9	202.45	196.9	2e-16 ***	1.17 ***	0.91 ***	-0.27 ***	(0.000)
amusing	133.9	66.93	65.93	2e-16 ***	1.17 ***	0.82 ***	-0.31 *	(0.011)
fun	181.1	90.54	85.04	2e-16 ***	1.36 ***	1.03 ***	-0.07 **	(0.008)
interesting	97.1	48.55	48.64	2e-16 ***	0.97 ***	0.81 ***	-0.16	(0.276)
Credibility	109.8	54.91	58.79	2e-16 ***	0.62 ***	0.43 ***	-0.19 **	(0.004)
believable	51.6	25.82	30.75	2e-13 ***	0.74 ***	0.51 ***	-0.23 *	(0.042)
credible	40.2	20.12	21.41	1e-09 ***	0.66 ***	0.44 ***	-0.22	(0.075)
trustworthy	21.5	10.756	10.51	3e-05 ***	0.47 ***	0.36 **	-0.11	(0.549)
Invasiveness	117.8	58.88	49.76	2e-16 ***	-0.66 ***	-0.36 ***	0.30 ***	(0.000)
distracting	40.6	20.298	16.83	8e-08 ***	-0.67 ***	-0.39 **	0.27 *	(0.043)
interfering	34.6	17.287	14.27	9e-07 ***	-0.62 ***	-0.35 **	0.27 *	(0.050)
irritating	43.0	21.482	18.88	1e-08 ***	-0.69 ***	-0.36 **	-0.34 **	(0.009)
Self-Brand Congruence	187.8	93.92	98.45	2e-16 ***	0.83 ***	0.36 ***	-0.47 ***	(0.000)
cater to one	95.7	47.86	50.97	2e-16 ***	1.03 ***	0.49 ***	-0.55 ***	(0.000)
consistent	42.5	21.264	25.37	3e-11 ***	0.68 ***	0.29 **	-0.39 ***	(0.000)
targeted	55.5	27.739	26.74	9e-12 ***	0.78 ***	0.31 **	-0.72 ***	(0.000)

Table 2: ANOVA and post-hoc Tukey's Honest Significant Difference (HSD) test results for each subscale and items
(***$p \leq 0.001$, **$p \leq 0.01$, *$p \leq 0.05$)

in earned advertising, it is as important to understand what makes online content viral as to understand how effective it is. Recent studies analyzed how content-based characteristics affect virality and social transmission. For example, Berger and Milkman analyze New York Times articles and examine which ones get most emailed (Berger and Milkman 2012). Guadagno *et al.* have looked at what makes videos go viral online (Guadagno et al. 2013). Others have examined the factors influencing the number of 'likes' and 'shares' on Facebook brand pages (Cvijikj and Michahelles 2013; De Vries, Gensler, and Leeflang 2012).

Our work is the first to examine virality with respect to friend tagging. We identify which brand posts gets personally recommended among friends on Facebook through tagging. Based on the conceptual framework introduced in previous studies (Cvijikj and Michahelles 2013; De Vries, Gensler, and Leeflang 2012; Fortin and Dholakia 2005), we hypothesize that content characteristics such as media type (i.e. texts, photos, or videos), hyperlinks, post time and position affect friend tagging behavior of users. These components are interrelated with the concept of vividness, interactivity, and prominence, which affect user's attitude towards advertising on the Web. We describe each concept in detail and explain how the concepts relate to our hypotheses.

Vividness (Media Type: Text, Photos, or Videos) *Vividness*, or the degree of sensory richness (Steuer 1992), of brand posts increases with photos or animations. Past research has shown that the increased level of vividness generally lead to improved advertising effectiveness (Cho 1999),

more positive attitude towards websites (Coyle and Thorson 2001), and higher online engagement rate (Cvijikj and Michahelles 2013; De Vries, Gensler, and Leeflang 2012). Likewise, we posit that brand posts with photos or videos, compared to that of plain text, will stimulate higher level of user participation in friend tagging.

H6. Posts with *photos or videos* (higher level of vividness) will drive more friend tagging.

Interactivity (Hyperlinks) *Interactivity* is the two-way flow or communication between two entities (Liu and Shrum 2002). In the context of Facebook brand pages, a brand post that contains a hyperlink to websites induce more user actions. Thus, posts with hyperlinks are more interactive than posts that only contain text (Fortin and Dholakia 2005). Unlike vividness, interactivity does not always result in positive effects; depending on the context, interactivity showed positive (Cho 1999; Sicilia, Ruiz, and Munuera 2005), partially positive (Cvijikj and Michahelles 2013; De Vries, Gensler, and Leeflang 2012), or even negative (Coyle and Thorson 2001) effects on user attitudes and behavioral intentions in websites (Fortin and Dholakia 2005). In general, however, studies have shown that interactivity is a strong cue aiding the persuasive appeal of online content (Sundar and Kim 2005), leading to greater elaboration of the content and more favorable attitudes (Liu and Shrum 2009). Thus we hypothesize that interactive hyperlinks on brand posts would positively affect friend tagging.

H7. Posts with *hyperlinks* (higher level of interactiv-

ity) will drive more friend tagging.

Prominence (Post Position, Post Time) *Prominence* of a brand post is related to how noticeable the post is in its brand page. Posts on Facebook brand pages are positioned in a vertical layout, so that the most recent post is always positioned at the very top, making it easier for the fans to read (De Vries, Gensler, and Leeflang 2012; Rutz and Trusov 2011). We posit that the longer the post is displayed at the top of a brand page, the more likely for users to share the content with friends through tagging.

In the same vein, the time of posting is also related to prominence. Previous studies show that Facebook activities take place mostly on weekdays and during evenings (Cvijikj and Michahelles 2013; Golder, Wilkinson, and Huberman 2007). Thus, we posit that brand posts uploaded during *weekdays* and *peak hours* would drive more friend tagging (Cvijikj and Michahelles 2013).

- *H8-a.* Posts displayed longer *at the top* (higher level of prominence) will drive more friend tagging.
- *H8-b.* Posts uploaded on *weekdays* (higher level of prominence) will drive more friend tagging.
- *H8-c.* Posts uploaded during *peak hours* (higher level of prominence) will drive more friend tagging

Data Collection & Description

We collected posts uploaded by the top 10 brand pages[2] with the largest fan base on Facebook as of 2014. We limit our study to the retail brands to eliminate the effects of different brand categories (e.g. food, travel, finance). Using the Facebook Graph Application Programming Interface (API)[3], we collected all *public posts* uploaded by these brands from 2011 to the first half of 2014. The top 10 retail brands are listed in Table 3, along with the number of fans, posts, and comments. In total, we collected 26,436 posts with 8,383,850 comments.

For each *post*, we have the following metadata: time of upload, type of post (e.g. status, photo, video), message, hyperlink, and the total number of comments on the post. We also collected all the *comments* left on posts; for each *comment*, we have its time of upload, name and anonymized id of the person who wrote the comment, message, name(s) and anonymized id(s) of any friend(s) tagged in the comment, and the number of likes on a comment.

The maximum, median, and mean numbers of comments, as well as the total number of fans, from 2011 to 2014 (binned by the quarter) for each brand are plotted in Figure 3(a). One may expect to find an increase in the number of comments on posts as the number of fans grow. However, despite the continuous growth in the fanbase, the average number of comments per post remain relatively constant, if not decreasing over the years. Figure 3(b) shows the extent to which users engaged in friend tagging for brand posts over the past four years. For each post, we compute the percentage of comments with friend tags. The maximum, median, and mean percentages over the years are plotted in Fig-

Rank	Brand	Fans (M)	Posts	Comments
1	Walmart	32.9	4,675	3,453,871
2	Target	23.6	1,350	591,051
3	Macy's	14.7	1,185	230,981
4	Kohl's	11.3	3,047	465,836
5	Aeropostale	10.9	2,260	293,759
6	Forever 21	10.8	3,750	227,421
7	Old Navy	8.6	2,494	110,952
8	Best Buy	7.2	2,329	104,187
9	Shopper's Stop	6.5	2,160	49,459
10	GameStop	6.5	3,186	2,856,333

Table 3: Facebook brand page dataset description

ure 3(b). As shown in the figure, tagging in comments is becoming more widespread as years pass; we observe a rising trend in the percentage of tagged comments in most brands, with an exception of *Best Buy*. Overall, around 10% of the comments contained tags, which is non-negligible given the large number of comments on brand pages. For some brands (e.g. Aeropostale, Forever 21) tagging in comments has become an exceptionally common convention, accounting for nearly up to 50% of all the comments as of 2014, in terms of both median and average. The continued growth of friend tagging highlights the importance of understanding the phenomenon.

Methods

To test the effects of post characteristics on friend tagging, we conduct an ordered-probit regression analysis based on the 26,436 brand posts on Facebook. We study the effects of vividness, interactivity, and prominence on the extent to which users engage in friend tagging.

Dependent Variable We select ordered-probit (Daykin and Moffatt 2002), a regression model for ordinal dependent variables, to overcome the issue of non-normality and sparsity. For each brand post, we count the number of comments with friend tags as a dependent variable. Our data is overdispersed with many zero-count posts. Thus, we transform our dependent count variable into an ordinal variable and run the ordered-probit analysis. The posts are non-normally distributed, where nearly a quarter of posts have zero friend tags. We categorize the posts as having no (0), little (1), moderate (2-6), or many (7-1,075) comments with tags. The groups are divided so that they are nearly equal-sized.

Independent Variables For each brand posts, we assigned the level of *vividness* (3 levels) and *interactivity* (2 levels) to test hypotheses H6 and H7. Posts with videos, photos, and text were assigned high, moderate, and low level of vividness, respectively. In terms of interactivity, posts including hyperlinks were associated with high level of interactivity while posts without any hyperlinks were low level of interactivity. Then for each post, we compute how long it was positioned *at the top* of a brand page to test whether *prominence* of a post affects friend tagging (Hypothesis H8-a). We compute the difference between the upload time of a post and that of its subsequent post, which signifies the

(a) Number of comments per post
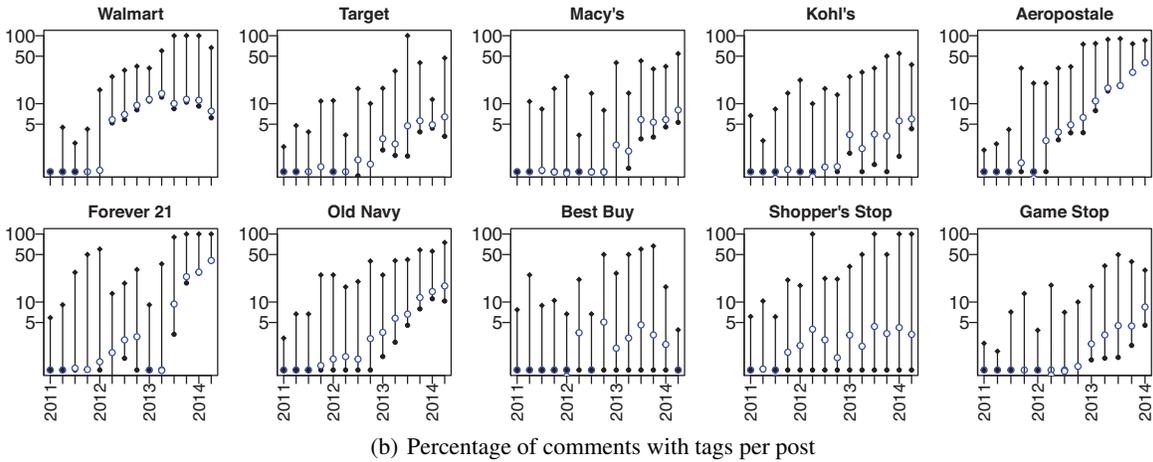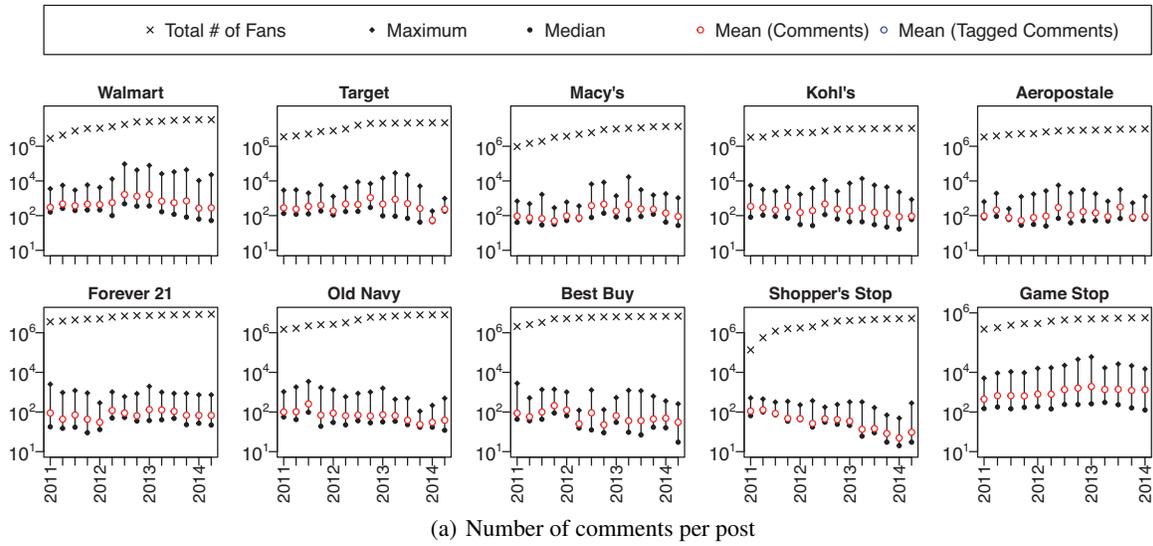

(b) Percentage of comments with tags per post

Figure 3: Volume of user comments on brand posts over 2011-2014

longevity of time a post was displayed at the top of a brand page. To test hypothesis H8-b, posts that are uploaded during the *weekdays* are assigned a value of 1 and the rest 0. In a similar manner, to test hypothesis H8-c, posts uploaded during the *peak hours* are assigned a value of 1 and the rest 0. Based on a previous study (Cvijikj and Michahelles 2013), we define the peak hours to be between 4pm and 4am, where most user activity occurs on brand pages.

Control Variables Friend tagging has become increasingly prevalent over the years as shown in Figure 3, so we add the year of posting as a control variable. Also, we control for the effect of brands, for unobserved characteristics of different brands may affect friend tagging behavior.

Results

Table 4 shows the result of the ordered-probit regression analysis. A positively signed coefficient implies an increase in the log of the odds ratio. The higher the values of these explanatory variables, the greater the tendency to engage in friend tagging. The converse is also true for the negatively signed coefficients. All variables but one, *weekday*, are statistically significant; the result confirms that vividness and prominence (at the top, peak hour) variables positively affect friend tagging. Incorporating photos and videos in posts encourages friend tagging. The longer the post stays at the top of a brand page, the more likely it is to get comments with friend tags, and uploading them during the peak hours generate more friend tagging than during the non-peak hours. Hypotheses H6, H8-a, and H8-c hold true. However, as opposed to our expectation (Hypothesis H7), interactivity negatively affects friend tagging. This is possibly because users are interested in recommending contents that are immediately visible, while further analysis is required to understand the exact cause. The results indicate that brands can boost up the user engagement in friend tagging by strategically engineering the viral features of contents.

Variables	Coefficients	Std. Error
vividness (pic/vid)	0.410 ***	0.059
interactivity (hyperlink)	-0.666 ***	0.061
prominence		
at the top	0.047 ***	0.002
weekday	-0.007	0.019
peak hour	0.037 **	0.018
N		26,436
AIC		44,411.27
Maximum likelihood pseudo-R^2		0.376

Table 4: Ordered-probit regression results
($***p \leq 0.001, **p \leq 0.01$)

Summary and Conclusion

Social network services (SNSs) are now the primary advertising medium in terms of both reach and engagement; Facebook, for example, is currently the world's largest SNS that boasts 1.35 billion monthly active users (Marcial 2014) and 3.1% market share of the overall online advertising market. However, if SNS is perceived as being overly commercialized, it risks negative consequences. For both businesses and the SNS sites themselves, it is thus crucial to find advertising methods that users perceive to be valuable.

In this paper, we assess the value and drivers of earned advertising on SNS, with a focus on friend tagging action, a constantly growing trend on Facebook. To date, little we know about how users perceive friend tagging and earned advertising method on SNS. The primary goal of STUDY 1 is to understand the consumers' attitude towards three different advertising strategies available on Facebook: friend tagging, wall sharing, and banners. We design and conduct a user survey and find that people consider earned ads (i.e. friend tagging, wall sharing) to be less irritating and more informative, entertaining, and credible than paid ads (i.e. banners). Furthermore, earned ads provided greater level of perceived congruence between brand image and self image compared to paid ads. In particular, users assessed 'friend tagging' to be the most credible and catering to their needs.

With such 'prosumers' on social network services playing both roles as an advertiser and a consumer, advertising is no longer just about one-way messaging. Brands need to carefully craft their content so that it can receive as much attention from the public as possible. The goal of STUDY 2 is to identify the potential driving forces of friend tagging. We collect posts on Facebook brand pages and examine the effect of content characteristics on friend tagging frequency using the ordered-probit regression test. We find that users tag their friends on posts with vivid visual materials such as photos and videos. Posts uploaded on peak hours attract people to engage in friend tagging. As such, we find that the type of content and the way they are displayed affect friend tagging behavior. Brands should take into consideration these insights in formulating content marketing strategy that enhances user participation in earned advertising.

This work provides insights useful not only for marketers, but also for service providers and researchers. We have shown that friend tagging outperforms other advertising methods in terms of item relevance. Service providers can exploit this fact in building targeting algorithms and establishing design recommendations for interfaces tuned for the user needs. For instance, this newly-evolved friend tagging behavior suggests the user needs of an additional feature on brand pages that enables users to easily make personalized recommendation to a selected friend (or a small group of selected friends), which is not yet supported in the current design of brand pages. Researchers have long been interested in studying how new conventions arise in complex social systems (e.g. emergence of retweet convention on Twitter (Kooti et al. 2012)). This paper explores how humans use and perceive this convention of friend tagging and furthers our understanding of the new online phenomenon.

In summary, we have shown that earned advertising, and friend tagging in particular, is a credible and effective advertising solution to connect users with relevant products. Although not discussed in the draft, friend tagging has a high response rate as well; 92% of the survey participants answered that they actually read or inspect the content recommended to them through friend tagging. Furthermore, 20% of the comments with friend tags that we collected received 'likes' from the recipients, implying that they were satisfied with the recommendation. The data shows that friend tagging successfully catches the attention of the recipients, while an expansive analysis is necessary to measure the true effectiveness of the method. Other important problems that remain unanswered include: does friend tagging affect users to become interested in brands (i.e. become fans), and if so, to what extent? Does friend tagging behavior differ across product types? We leave these questions as future study.

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