

Six Patterns for Persuasion in Online Social Networks

G. Michael Weiksner¹, B.J. Fogg¹, Xingxin Liu¹

¹ Stanford University, 450 Serra Mall, Stanford, CA 94305
{weiksner, bjfogg, arielliu}@stanford.edu

Abstract. Social psychology research has shown that persuasion happens in predictable ways. To identify patterns of persuasion in online social networks, we studied Facebook as a persuasive technology. Using a Grounded Theory approach, we found and named six persuasion patterns. Four patterns that led to large-scale viral adoption—Provoke and Retaliate, Reveal and Compare, Expression, and Group Exchange—are native to Facebook. Two patterns—Competition and Deception—are adapted to Facebook. We describe these native and adapted patterns and offer psychological explanations for each. We conclude that persuasion in online social networks follows regular, observable patterns, and we suggest promising avenues for future research.

Keywords: Online Social Networks, Facebook, Persuasion, Social Psychology, Applications, Patterns, Persuasive Technology, Viral Growth, Captology.

1 Introduction

Social psychology research has shown that persuasion happens in predictable ways, with phenomena such as “foot in the door” [1], “boiling the frog” [2], and “escalation of commitment” [3]. One might also expect patterns of persuasion to exist in online social networks, but these patterns have yet to be shown or named. To identify patterns of persuasion in online social networks, we studied Facebook as a persuasive technology.¹ Through our research we identified six patterns that Facebook applications have used to spread from person to person on a mass scale. According to Compete.com, these applications are used by 16 million out of the 32 million monthly users of Facebook. [4]

Using a Grounded Theory approach [5], we examined the top 100 Facebook applications in terms of user engagement according to *Appsaholic*² on December 6, 2007. This approach creates and tests hypotheses about emergent patterns iteratively,³ and has been successfully used to study online communication. [6]

¹ Persuasive technology is defined as “interactive computing systems designed to change people’s attitudes and behaviors”. [7]

² Appsaholic is a Facebook application which tracks the daily active user rate and total user number of each Facebook application.

³ Grounded Theories should be judged on these four criteria: fit, relevance, workability and modifiability. For example: how well do the proposed patterns fit the applications on social

Based on this approach, we found six patterns of success. We then classified these patterns into a framework. The patterns can be either native to Facebook or adapted from other contexts. Native patterns are tightly integrated in Facebook Profile Pages and rely heavily on Facebook’s built-in Friend Selector and other functionality exposed by Facebook. (The Profile Page is a highly customizable page that individual users create to share their pictures, preferences, and other personal information. The Friend Selector is a small piece of a web page that allows users to select one or more friends from their social network by either clicking on a friend’s Profile Picture or typing part of a friend’s name.) In other words, the native patterns leverage special properties embedded in Facebook technology to achieve successful viral growth. In contrast, adapted patterns are not based primarily around Facebook’s exposed functionality. Although users remain on Facebook, their interactions follow patterns, often complex, which are adapted from other venues. Our classification is summarized in Table 1.

Table 1: Six Patterns of Persuasion

	I. Native Patterns		II. Adapted Patterns
	1. Individually Directed	2. Group Directed	
A. Take Action	1A. Provoke and Retaliate <i>X Me, Bless you, Kiss Me</i>	2A. Reveal and Compare <i>Likeness, Send HOTNESS</i>	IIA. Competition <i>Scrabulous, Jetman, achievement “levels”</i>
B. Create Object	1B. Self-expression <i>Graffiti, Hatching Eggs</i>	2B. Group Exchange <i>SuperWall, BumperSticker</i>	II B. Deceive <i>Fake Facebook buttons & install tabs</i>

networks? Do they “grab” attention? Do they explain variation in usage of applications on social networks? Can they be modified in light of new data?

2 Native Patterns

Native Patterns of persuasion rely heavily on functionality that Facebook provides. Within native patterns in Facebook, users can take actions or create objects that are either individually directed or group directed. We've named the patterns as follows:

Pattern 1A: *Provoke and Retaliate*

Pattern 1B: *Expression*

Pattern 2A: *Reveal and Compare*

Pattern 2B: *Group Exchange*

In the following paragraphs, we explain each pattern of persuasion and give examples of how these patterns work in successful Facebook applications.

2.1 Provoke and Retaliate (Pattern 1A)

Facebook applications that use the Provoke and Retaliate pattern allow one user to take action on another user (one of their Facebook “friends”). For example, users can throw snowballs at, kiss, hug, and poke other users. These applications gain persuasive power from the norm of reciprocity [8]. At times the reciprocity is emotionally positive, such as hugging, blessing, or kissing a “friend” on Facebook. The receiver of the gesture then has the social obligation to respond, following the norm of reciprocity.

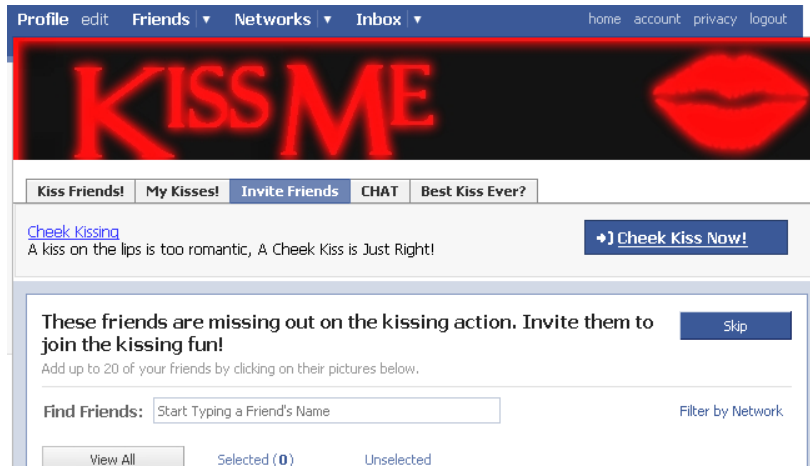
However, reciprocity can also play out in a negative way: revenge [9]. This negative aspect of reciprocity has led to a host of successful Facebook applications. In *Zombies*, one user bites another. In *WaterFight*, users seem to have escalating exchanges with water, ranging from splashing to water cannons. The same pattern holds true for *SnowBall Fight*, *Pillow Fight*, and dozens of other Facebook applications.

Thanks to Facebook's Social Graph (the term used to describe the social links among users), the norm of reciprocity becomes a powerful persuader online. Users can provoke each other and retaliate to those provocations.

Most of these applications began as perhaps the simplest possible design: a decorated invitation page. Exhibit 1 shows screenshots from *KissMe*, *Hugs*, *BlessYou*, and *X Me*. As the screenshots show, Provoke and Retaliate applications are simple. Users invite their friends to the snowball fight or to the zombie world by throwing an initial snowball or biting them. The reciprocity dynamic is then set into motion.

Cognitive dissonance [10] is a driver of engagement for applications that follow the Provoke and Retaliate pattern. Here's how the cognitive dissonance dynamic works in these Facebook applications. On the one hand, these applications have no clear instrumental purpose, a point which should be apparent to users immediately. On the other hand, a friend referred the user to the application, she freely installed it, and she even invited others to install it. To reduce the dissonance, a user concludes that this application must in fact be fun.

Exhibit 1: Screenshot of *KissMe*



2.2 Expression (Pattern 1B)

The next persuasive pattern we call the Expression pattern. Facebook applications that use the Expression pattern allow users to create artifacts for themselves or for another person. For example, some applications allow users to show off a pet they have created; others allow users to highlight their favorite music or bands. These artifacts appear on a user's Profile Page.

The psychological drive to create artifacts that express identity, opinions, and affiliations is not new [11], [12]. Facebook gives people a new way to express themselves, tapping into this fundamental human motivation. As a result of our drive to express ourselves, Facebook and many applications on Facebook succeed.

Many of the applications in this genre, like *Movies*, *Causes*, or *Cities I've Been*, require large databases of content. Other applications in this genre have significant functionality to help users create artifacts, like the art tools of *Graffiti* and *Scribbled Photos*. (See Exhibit 2 for an example of this genre.) What all applications in this genre share is that users can create expressive artifacts—whether lists of favorites or artifacts that are funny or artistic—which can be attractively displayed on a user's Profile Page.

Although Expression applications do not have a natural call to action, which doesn't lead to rapid viral growth like *Provoke* and *Retaliate* applications, they leverage the psychological principle of ingratiation [13] as another driver of user engagement. Many of the top applications, like *Graffiti*, were launched at the very beginning of the platform launch and tapped into a need among many users on Facebook for new outlets to express themselves.

Consistency [14] and conformity are both stronger drivers that make users return to Expression applications frequently after their first-time expressions. There were initially only 66 applications in May 2007 and then only a few hundred in the coming weeks. All the while, millions of Facebook users were trying out the early applications. Those applications got exposure and were adopted. Once people adopted

these applications and had created artifacts, they are unlikely to remove those applications. They had created artifacts of value (investment), and they had already made a commitment to the application (consistency).

Exhibit 2: Sample artifact created by the Graffiti App for a Profile Box



2.3 Reveal and Compare (Pattern 2A)

Another persuasion pattern on Facebook is a dynamic we call Reveal and Compare. These applications allow users to take actions (as Provoke and Retaliate applications do), but these actions are group-directed (as are applications in Group Exchange, the next category.) Reveal and Compare applications successfully persuade users through factors including reciprocity [15], cognitive dissonance [10], and the need to belong and social validation [16].

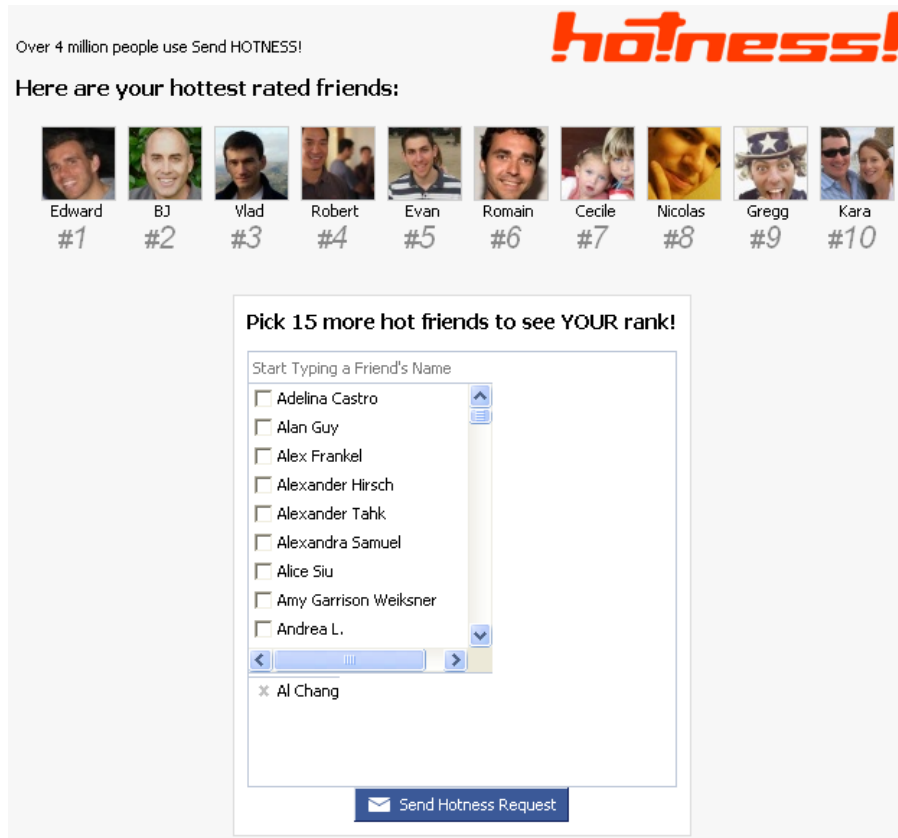
As with other categories, the Reveal and Compare applications on Facebook leverage similar persuasion dynamics. In this case, when using a Reveal and Compare application, a user needs to compare groups of friends to reveal who is more attractive, to find out who shares which hobbies, or to match single friends. And the final comparison results are decided by the whole user group. Comparisons are framed in two typical ways: (1) to rank order a list of related items as *Likeness* and (2) to make an either/or decision between two friends on a provocative topic like *Compare People*. Please see Exhibit 3 for examples of the Reveal and Compare pattern.

Like the first category of Provoke and Retaliate applications, Reveal and Compare applications allow users to take actions on the other uses. Thus, Reveal and Compare applications also gain persuasive power from the norm of reciprocity and cognitive dissonance, as described previously.

Moreover, Reveal and Compare applications initiate interactions with an emphasis on interpersonal relationships. When using Facebook applications like *Send Hotness* and *Perfect Match*, users have to rank their friends and wait for friends' ranking of themselves to refine their own rankings in hotness or perfect matches. This persuasive pattern introduces the need to belong [17], [18] as additional engagement motivation because Reveal and Compare applications can effectively help to form and maintain active interpersonal relationships for users.

At the same time, Reveal and Compare applications also form a basis for social validation by the requirement of feedback and interaction. This social validation basis is especially efficient, as users have to rely on the reactions from their personal network to reveal their own attributes.

Exhibit 3: Screenshot of *Send Hotness*



2.4 Group Exchange (Pattern 2B)

The fourth native persuasive pattern in Facebook we call Group Exchange. Group Exchange applications allow users to create and share objects collectively. This genre includes *SuperWall*, *FunWall*, and *Quizzes*. The successful applications in this genre have both broad reach and high engagement. The Group Exchange pattern is successful in part because of the confluence of several powerful factors: impression management, reciprocity, social validation, and context variables like feedback and applause. We can examine each of these psychological factors in Group Exchange applications. (See Exhibit 5 for screenshots of *SuperWall* and *Quizzes*.)

Like Expression applications, Group Exchange applications allow users to create artifacts. But unlike Expression applications, these artifacts are created collectively.

Because these artifacts are created through public interactions, they can resemble a play. And much like Goffman's original performance analogy for impression management [19], the Facebook user is an actor shaped by the environment and audience trying to provide performance consistent with his or her goals. Impression management theorizes both that people are motivated to control how other see them and that they create their identities through interactions with others [20]. This theory aptly describes why users are so interested in Group Exchange applications like *SuperWall*.

Exhibit 4: Screenshot of *SuperWall*'s Profile Box

Forward!! - Write on Bill's FunWall

Josh Ziemann added this Video
November 14 9:54am



Forward!! - Write on Josh's FunWall

Jonathan Nowak added this Sketch
November 1 3:49pm



Forward!! - Write on Jonathan's FunWall

Group Exchange applications go beyond simple expression. Like Provoke and Retaliate applications, users can initiate an exchange with a friend. By the norm of reciprocity, the friend is likely to be motivated to respond.

Moreover, Group Exchange applications ask a community to contribute to and engage with the artifacts. The conversations that ensue crisscross from one Profile Page to another, leaving a trail of communications. Who posts on a user's wall and

what a user posts on other peoples' walls form a basis for social comparison and social validation. The Group Exchange pattern weaves together these various psychological dynamics in one simple user experience.

Perhaps most importantly, though, Group Exchange applications convey a sense of fun and lively community. In a real way, *SuperWall* (and the functionally similar *FunWall*) allows for many-to-many communication. The opportunity for feedback and interaction increases concerns about one's social appearance [21], [22], [23].

These psychological factors are mutually reinforcing. Reciprocity reinforces impression management, and vice versa, because they both tap the fundamental need to be liked. Feedback reinforces impression management. The cluster of interacting factors explains why Group Exchange applications have both broad reach and high engagement.

3 Adapted Patterns

As described previously, our research identified a second class of persuasive patterns on Facebook. These patterns match closely what happens outside of Facebook, so we called them *Adapted Patterns*. In other words, applications that follow the adapted pattern take functionality that was designed for other contexts (e.g., desktop software, web sites, video game consoles, etc.) or techniques that were developed long before Facebook, and adapt them to the social context of Facebook. For example, many Facebook applications use leader boards and status levels to foster competition. Meanwhile, many applications include deceptive advertising such as fake buttons and navigational elements that are really paid promotions to install other applications.

3.1 Competition (Pattern IIA)

Competition is an adapted pattern we identified in our Facebook analysis. For example, several popular competitive games outside of Facebook have become popular on Facebook. Games like Scrabble, poker, and video games are adapted to the online social context. In this genre, *Scrabulous*, *Texas HoldEm*, and *JetMan* are all in the top 20 applications. (See Exhibit 5 for examples of this pattern.) Competition motivates engagement in two ways: (1) internally, by tapping a user's need for cognition, and (2) externally, by tapping a user's need for social status [24], [25].

The primary motivation for Competition applications is the same as the motivation for traditional games: the desire to satisfy the need for cognition [26], [27]. Individuals differ in cognitive motivation, and those who have high need for cognition enjoy cognitive activities and engage in them when given the chance. Since Facebook users often visit the site many times daily, games on Facebook offer a convenient way to satisfy this need.

Exhibit 5: Screenshot from *Texas Hold Em*



Facebook Competition is highly social. Users can easily invite friends to *Scrabulous*, they can play *Guess Who?* using information about common friends from Profile data, or play poker against real people (not bots or pseudonymous opponents). Identity warranting—proving that a person is who she says she is [28]—exists for the first time on a massive scale online on Facebook. Therefore, the motivation to achieve status and positive reputations on Facebook is higher than elsewhere online.

In addition to applications that fit in the Competition pattern, native applications increase engagement by creating the opportunity to compete for social status. In general, status attainment is a process whereby individuals mobilize and invest resources for returns in socioeconomic standings [29]. *Hugs*, *KissMe*, and *Bless You*, *Provoke* and *Retaliate* applications, have leader boards and achievement levels to grant status to users.

3.2 Deception (Pattern IIB)

The second adapted pattern is what we call Deception. Facebook applications that fit the Deception pattern have fake buttons and navigational elements that are really paid promotions to install other applications. Deception, “a deliberative attempt to mislead others” [30], has been of interest to researchers and practitioners for centuries [31]. Deception exploits and undermines the trust earned by Facebook to achieve the purposes—usually financial gain—of the application developers.

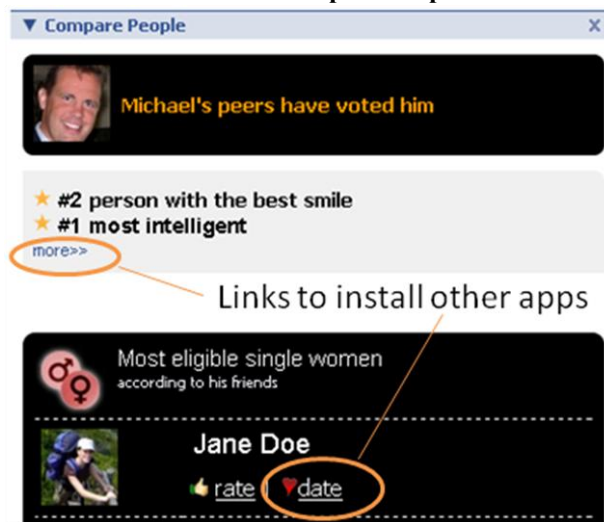
Unlike the other patterns, no top application is based purely on deception. But as a secondary element, deception is quite prevalent on Facebook. For example, the *Compare People* Profile Box is full of traps. Each of the text links (“Write a testimonial,” “Do you trust Jane?” and “Jane’s social profile” and even “Check your rankings”) is a call to install another application, not a link into *Compare People*. The developers of this application are misleading users to install these other applications. Other deceptive techniques include fake Facebook buttons, advertising embedded in content or navigation.

The ease and prevalence of deception on Facebook exposes some important psychological insights into the operation of Facebook applications. Social validation, deference to authority, and escalation of commitment all play roles in compliance to even deceptive actions. We discuss each psychological dynamic briefly below.

First, social validation plays a role in the Deception pattern. The invitation to install a deceptive application comes from a trusted and liked friend. Before users install the application, they may even be presented with the fact that many of their friends have installed the application. Based on social validation, people may decide how to respond based on the behaviors of others rather than making their own independent assessment [32], [33].

Many of the applications that use the Deception pattern are visually similar to the Facebook interface. In this way, through visual similarity, these applications gain authority [34], [35]. The specific buttons that are deceptive match typical Facebook buttons, and so it is unsurprising then that many users blindly click on fake Facebook buttons and navigation.

Exhibit 6: Compare People



Deception applications use simple navigation paths to escalate commitment [7]. The invitation coming from a user’s friend offers a simple choice: install the application to find out why your friend invited you or miss out. In order to install the

application, the user is again faced with the same choice again: invite friends or miss out. Upon reaching the Canvas Page after finally installing the application, the most deceptive applications have just a single call to action. This action is often paid-per-click advertisement. At this point, the user should be skeptical. But many click onwards in futile hope to recover their prior investment of their time.

3 Discussion

In this section we present the relative impact of the various persuasion patterns in Facebook, based on our analysis of the top 100 applications. We've excluded Deception as a pattern because it is not a primary pattern in Facebook. In addition, two applications in the top 100 (ranked in the mid-90s) were in foreign languages and were not coded. The results are in Table 2. We find three especially notable trends:

Table 2: User Behavior by Pattern in December 2007

	Provoke and Retaliate	Reveal and Compare	Expression	Group Exchange	Competition
Daily Users	5,441,000	8,096,000	5,005,000	11,095,000	2,231,000
Number of Applications	23	26	26	14	9
Users Per Application	236,561	311,379	192,502	792,479	247,929
Installs	83,796,774	142,029,363	99,355,250	84,386,158	15,913,200
Percent Active	0.065	0.057	0.05	0.131	0.14

1. ***A small number of Group Exchange applications reach many users and are highly engaging.*** Although only 14 applications in the top 100 are true Group Exchange applications, these 14 applications are used by 11 million people daily—the most of any category.
2. ***Reveal and Compare applications have a large reach but a low engagement.*** Reveal and Compare applications have been installed 142,000,000 times. However, only 5.7% of these users are active on any given day. This retention rate is the lowest of all the patterns.
3. ***Competition is highly engaging within a niche.*** Competition applications engage the highest percentage of their installed base: 14.0% are daily active users. However, they have the smallest total number (9) of applications of any pattern.

Our analysis of the top 100 Facebook applications in December 2007 shows that six patterns of persuasion account for the most successful applications on Facebook. In turn, these patterns can each be explained using psychological dynamics. Some patterns involve novel combinations of these dynamics that appear to be native to online social networks, whereas others are adapted patterns from other contexts. Interestingly, each pattern promotes different levels of adoption and engagement.

Other online social networks, like MySpace and LinkedIn, differ in important ways. For example, each network targets different user segments and may have different meanings to the connections between users and different ways to communicate. Even on Facebook, the composition of users is changing and new features are being launched regularly. Hence, the patterns that we identified may not work precisely as described here in other social networks. Even on Facebook, successful patterns may evolve as the platform itself evolves.

Still, this research shows that persuasion in online social networks follows regular, observable patterns. This conclusion has interesting implications. First, software developers can tap into these patterns to create applications that are more likely to succeed. That some applications succeed and others fail is not based on pure chance; success can be learned and replicated.

Next, this current research points to potential research opportunities. Future empirical work should elaborate on patterns found in the different online social networks and track how these patterns evolve. Future theoretical work should try to explain how differing context drives different persuasive patterns. Future experimental work should try to establish causal relationships within these patterns of persuasion through experiments. As online social networks continue to grow in size and relevance in society, researchers should exploit the opportunity that these networks afford.

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