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Customer Engagement in Social Media Platforms: Findings from a Longitudinal Field Experiment

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Field Experiment

Two decades into the evolution of social media and its full-fledged use by businesses, two significant things are apparent. First, for most businesses in any industry, the use of social media is no longer optional. From generic and widely used platforms such as Facebook, Twitter, Instagram and LinkedIn to proprietary platforms that include firm-managed intranets, bulletin boards and online communities that are restricted to customers, social media platforms allow customers to engage with the firm and with each other in economically significant ways. Academic studies have shown that customers' participation in firm-managed social media platforms has significant financial benefits for the firm (Algesheimer et al. 2010; Manchanda, Packard and Pattabhiramaiah 2015; Kumar and Pansari 2016; Gill, Sridhar and Grewal 2017). The second significant aspect of social media lies in its continued effectiveness for businesses. It is clear that a critical challenge for the continued success of social media marketing programs is how to maintain customer engagement on social media platforms over time. Drawing customers to the platform through promotions and viral content is one thing. But once the novelty of the platform has worn off, the question of what should be done to encourage customers to keep coming back to the firm's social media platform looms large.

There has been considerable discussion in academic and practitioner circles about customer engagement in general (e.g., Brodie et al. 2011) and within social media in particular (e.g., Algesheimer, Dholakia and Herrmann 2005; Fournier and Lee 2009; Thompson and Sinha 2008). Despite these academic treatments, there is scant acknowledgment of the fact that sustaining customers' engagement in social media is a challenging and often vexatious problem, particularly as the platform matures and the initial gloss of newness wears out (Torkjazi, Rejaie,

and Willinger 2009).

For many customers, the initial thrill of forming new relationships and getting to know other members, learning the community's socialization rituals (Mathwick, Wiertz, and de Ruyter 2008), and sharing information that the community views as new and useful, wanes with time. With it, interest in continuing to participate and contribute also diminishes for many customers (Ducheneaut et al. 2007; Iriberry and Leroy 2007). However, some customers continue to remain longstanding, engaged and loyal participants contributing to a vibrant social media platform. In the current research, our goals lie in understanding what marketers can do to develop and maintain vibrant online communities.

Motivation for Studying Consumer Engagement in Online Communities

Customer engagement is a multidimensional construct and has multiple definitions in the marketing literature (Kumar and Pansari 2016) that are often context-specific. In this study, we restrict our definition of engagement to the context of online communities (OCs) or User Generated Content (UGC) platforms that stimulate users to contribute, evaluate and consume content online (Levina and Arriga 2014). These OCs could be a part of a wider platform (e.g. Facebook) or independently hosted shared-interest communities (e.g.stackoverflow.com for programmers and developers) or firm-hosted brand communities (e.g., the PlayStation platform that is owned and maintained by Sony or the Vocalpoint platform maintained by P&G). Users engage in these company-managed OCs through online interaction with the other users, by co-creating content and providing feedback to other users' content and activities. Studies suggest that the degree of engagement of consumers in OCs is greater when compared with traditional marketing techniques (Trusov et al 2009). Recent research suggests that OC participation increases the likelihood to help other users of the community (Thomson, Kim, and Smith 2015).

Research in marketing on online communities have mostly focused on the benefits of the OC for the firm. Studies have shown that the customer community participation could have an impact on customer behaviors (e.g. Algesheimer et. al. 2010), customer-firm relationship (e.g. Rishika et al 2012) and profitability (e.g. Manchanda, Packard, Pattabhiramiah 2015). In our work, we examine the psychological benefits of customer engagement in OCs. Researchers have shown that consumers turn online for various reasons including self-presentation, self-reflection, self-therapy, self-validation, and self-affirmation, among others (see Belk 2013; Toma and Hancock 2013). Further, researchers have suggested that self-affirmation can occur online through posts, tags, and comments either in OCs or blogs (Drenton 2012; Kitzman 2003; Dean 2010). In the present research, we examine how engagement in an OC, particularly on a self-relevant question and answer site, serves as a form of self-affirmation.

We first examine whether online engagement can provide a psychological benefit such as self-affirmation. Self-affirmation is defined as the process of increasing our attention to valued aspects of our self-concept such as personal values, relationships, and important personal characteristics (Sherman and Cohen 2006; Steele 1988). Engaging in self-affirmation serves as a way to bolster one's self-worth, particularly in response to a threat that is real or perceived (Sherman and Cohen 2006). In particular, we examine whether individuals change their online posting behavior in an OC after receiving a social comparison threat.

Our second research question examines whether power, as acquired in an online community, serves as an external form of self-affirmation and whether and how an individual who attains power in the OC changes their engagement in the OC. Since self-affirmation and perceptions of power are universal psychological signals widely available to OC participants, we expect our findings to provide social media marketers with useful actionable strategies to grow

the engagement of their OC participants.

Social Identity Theory, Threat, and Self-Affirmation

Social identity theory posits that people have a fundamental need to belong to groups and this has repercussions for their behavior (Tajfel 1972). Individuals categorize themselves based on various self-defining attributes or socially constructed categories (e.g., ethnicity, gender, professional role, parent, loyal customer, etc.). These categories or group memberships provide self-definition to the individual (Stets and Burke 2000). A consequence of identifying with a group is that members often make both inter-group (e.g,. gender: men vs. women) and intra-group (loyalty program member: high vs. low status) comparisons, which results in different behaviors across groups.

In addition to self-definition, provided by group membership, people have a fundamental need to maintain self-integrity and to be viewed as moral, competent, and valued (Sherman and Cohen 2006; Steele 1988). Self-worth is a strong motivator of human behavior. As such, individuals are motivated to protect themselves from psychological threats (Steele 1988; Steele and Liu 1983). When individuals feel psychologically threatened, they are motivated to engage in acts of self-affirmation so as to protect their self-concept, to view themselves as morally adequate, and to protect their self-integrity (Steele 1988). Psychological threats can take many forms such as threatening messages about health (Harris and Epton 2009; Harris, Mayle, Mabbott and Napper 2007), stereotype threat about gender quantitative ability (Spencer, Steele and Quinn 1999), race and intellectual ability (Cohen, Garcia, Apfel and Master 2006; Cohen et al., 2009), or threats to one's status or power. Self-affirmation, in response to threat, can occur in many ways including, but not limited to, purchasing products that confer status (Sivanathan and Pettit 2010), conspicuous consumption of products in the domain under threat (Gao et al., 2009),

updating one's Facebook page (Toma and Hancock 2013), choosing aesthetic products (Townsend and Sood 2012), and willing to pay more for self-assembled products, the so called "IKEA effect" (Mochon, Norton and Ariely 2012). These behaviors are reflective of "fluid compensation" of the self whereby individuals can self-affirm in non-threatened domains and restore their self-worth (Steele, 1988). In other words, threat in one domain can be dealt with through an affirmation in an unrelated domain.

In addition to the purchase or creation of products, researchers have studied how threat in a variety of domains can be alleviated by writing about valued attributes in unrelated domains. Martens et. al. (2006) found that the negative impact of stereotype threat on math performance was mitigated for women when they wrote about a valued personal attribute prior to exposure to the threat. Writing about important values has been shown to buffer people against subsequent threats to self-confidence (Gao et. al. 2009) and self-integrity (Sivanathan and Pettit 2010).

As such, a key aspect of a written affirmation is that it is self-generated content and tailored to tap into an individual's particularly valued identity. This aspect of an affirmation is especially relevant in an OC or another social media platform where individuals readily generate information, post content, or interact with others in domains which are of particular interest to them. Toma and Hancock (2013) explored how Facebook profiles serve as a self-affirmation venue and showed that users, after a threat to themselves, gravitate towards Facebook and change their posting and viewing behavior in order to affirm a threatened self. In their research, respondents were given negative (neutral) feedback on a public speaking performance and were then given a choice to browse their Facebook profile, among other activities. Results indicated that those who received negative feedback were almost twice as likely to choose to browse their

Facebook profile relative to those who were given neutral feedback which suggested that browsing on Facebook served as a non-conscious attempt to restore self-worth.

In our work, we explore how a self-threat differentially affects the individual's online community engagement as demonstrated by their posting behavior. Based on previous research, our proposal is that individuals' partake in online community engagement in a self-relevant domain in an effort to self-affirm. Further, we propose that when an individual's sense of self is threatened, they change their OC engagement behavior relative to those whose sense of self is not threatened. Specifically, individuals who face a threat to their sense of self increase their online posting behavior (a means to self-affirm) relative to individuals who do not face such a threat. Thus,

> *H1: Threatened individuals will increase their online posting behavior in an OC relative*
> *to non-threatened individuals.*

Previous research has manipulated self-affirmation by asking individuals to write about their personal attributes. In the case of OC forums, individuals can make a decision about whether or not they want to self-affirm by choosing whether or not to post or increase their community engagement. As such, individuals may differ in the degree to which they increase their online engagement in response to a threat. Prior research on self-affirmation has not examined what happens to behavior over time, after the individual has self-affirmed. In other words, is the effect of self-affirmation persistent or does it wane over time? Stated differently, are any changes in posting behavior after a threat temporary, or will they remain steady over time? From an OC perspective, increased posting behavior is beneficial to the health of the community because there will be increased community activity and engagement. However, the

value of such changes rests on the sustainability of engagement, and depreciates if individuals forget about the threatened identity and go back to their initial level of participation (potentially lower engagement). We explore this in our work and specifically examine how an external form of self-affirmation, namely power, can help extend OC engagement.

Power and Self-Affirmation

Inherent within all social groups (online and off-line) is a form of social hierarchy. This is demonstrated either through inter-group comparisons (e.g., professors vs. janitors) or intra-group comparisons (assistant professors vs. full professors). Research has shown that social hierarchy can serve as an incentive for individuals to try and attain higher positions within a group or organization (Magee and Galinsky 2008). Both material and psychological rewards often accompany higher rank and individuals are motivated to achieve them (Tannenbaum et. al. 1974). Additionally, researchers have proposed that those with higher rank are able to fulfill control-related needs such as autonomy (Deci and Ryan 1987; Porter 1962). In other words, they have control over their own decisions and behavior. In the organizational behavior literature, researchers have posited that the prospect of ascending a hierarchy serves as an effective incentive mechanism to get those in lower ranks to increase their effort toward accomplishing organizational goals.

Recent research has studied the impact of having status as an incentive to increase consumer engagement in online domains (Anderson, Huttenlocher, Kleinberg and Leskovec 2013; Goes, Guo and Lin 2016). For example, Goes and colleagues (2016) examined the effectiveness of incentive hierarchies through goal theory. These authors proposed that individuals in online communities view status ranks as goals and exhibit varying behaviors as

they approach or attain the goal associated with a particular rank. Using a popular online knowledge exchange (question-and-answer site), they found that as users were close to attaining a particular rank (i.e., their goal), they increased their effort (posted more questions) on the site. Immediately upon reaching a particular rank, they slowed down. Other researchers have found that feedback, in the form of comments to an initial post, from fellow group members of UGC sites increased the likelihood of re-posting behavior (Burke and Settles 2011; Joyce and Kraut 2006). For example, Joyce and Kraut (2006) found that the likelihood to repost by newcomers to an OC was increased if they received a response to their post, consistent with work by Patterson (1994) who suggested that getting a response likely keeps the conversation going which is manifested in reposting behavior.

While social hierarchies have been examined as an effective mechanism to increase participation in online forums, to the best of our knowledge, there has been no research that has examined power as a behavioral incentive. Power is a social construct and typically involves a relationship between two or more parties (Rucker & Dubois 2011). It is defined as the asymmetric control over valued resources in social relations (Thibaut and Kelley 1959; Keltner, Gurenfeld and Anderson 2003). While the construct of power has similar characteristics (ranking, influence, respect etc.) as status, the key differentiator is that those with power have control over resources that can be allocated to others. There is an inherent dependence between the two groups whereby individuals with low power depend on high power individuals to obtain rewards or avoid punishments. Power, however, is different from status. For example, in the domain of loyalty programs, individuals can achieve different status levels but have no control over whether or not others can move up the status ladder. With power, individuals have the ability (or choice) to control the resources of others (e.g., grant someone with more or less

resources). In an online domain, firms typically endow individuals with status badges (that have no monetary value) but few give power. Those who do give power do so in the form of the ability to moderate discussions.

States of power or powerlessness (actual or perceived) have been shown to have psychological repercussions and also to impact various behavioral outcomes (Rucker and Galinsky 2008, 2009; Rucker, Hu and Galinsky 2014; Sivanathan and Pettit 2010). Research has shown that those with power feel confident and optimistic while those who lack power feel doubtful and uncertain (Anderson and Galinsky 2006; Brinol et al., 2007). While power is typically seen in social relationships, several researchers have shown that power, as a construct, is chronically accessible and can be cognitively activated (Bargh, Raymond, Pryor and Strack 1995; Cen, Lee-Chai and Bargh 2001; Galinsky, Gruenfeld and Magee 2003). A variety of mechanisms have been used to activate power. For example, feelings of power or powerlessness and specific behaviors can be induced simply by asking people to imagine that they did or did not occupy positions of power, to write about a time when they felt powerful or through semantic priming (Galinsky et al., 2003; Rucker et al., 2011; Smith and Trope 2006). For example, Galinsky and colleagues (2003) found that episodic recall (asking people think about a time when they had or did not have power) affected participants' experienced state of power. Research has shown that high power individuals are more persuasive than low power individuals and are more confident about their views and opinions which leads them to elaborate less on persuasive messages (Brinol et. al. 2007; Festinger and Thibaut 1951; French, Raven and Cartwright 1959; Kelman 1958). Conversely, perceived lack of power may cause individuals to seek avenues to ameliorate the discrepancy.

In our work, we examine how perceptions of power serve as an external source of self-affirmation. Several researchers have proposed that states of low power can be construed as a self-threat which leads to varying behaviors (Dubois, Rucker and Galinsky, 2007; Rucker and Galinsky, 2008, 2009). Powerlessness is an aversive state that people generally try and avoid or seek to alleviate. Researchers have shown that individuals purchase and consume status products in an attempt to alleviate their sense of low power (Rucker and Galinsky 2008, 2009). It has been shown that individuals who are induced with low power spend more on status-related goods and also indicate a preference for status goods whose logos are conspicuously visible as a means to alleviate one's sense of powerlessness conspicuous consumption (Dubois, Rucker and Galinsky 2011; Rucker and Galinsky 2008, 2009).

The findings in all of this research have indicated that individuals induced with high power did not change their behavior (e.g., did not spend more for status goods or conspicuously consumed products) which may imply that high power reduces the aversive state that arises from having a low self-identity. In the same vein, we propose that the conferral of power can serve as an external form of self-affirmation that helps buffer one's sense of self and allows threatened individuals a chance to restore their self-worth. This has repercussions for OC engagement. If power serves as an external form of self-affirmation, threatened individuals should not feel compelled to increase their posting behavior relative to those who were not threatened. This occurs because individuals are already self-affirmed because of the conferral of power and do not feel the need to further self-affirm by increasing their posting behavior (power fulfills the desire to self-affirm). Further, threatened individuals who have not been endowed with high power (not externally self-affirmed) will increase their posting behavior as a means to self-affirm, relative to those endowed with power. Thus, we hypothesize:

H2: Power will moderate the effect of threat on online community engagement over time such that:

a. *Threatened individuals will decrease their posting behavior over time after being conferred with power relative to those who are not threatened.*

b. *Threatened individuals without power will increase their posting behavior over time relative to those with power.*

We test our hypotheses in a longitudinal, online, field study that is described below.

RESEARCH DESIGN

The broad purpose of this study is to understand drivers of online consumer engagement. More specifically, the goal of this study is twofold. It examines: 1) how consumer engagement (measured by number of posts) in an online discussion forum can serve as a vehicle for self-affirmation; and 2) the role of endowed power on consumer engagement. To isolate the effects in which we are interested, and to control for inherent biases (e.g., lack of anonymity, advertising blended with information, credibility of participant pool) within traditional online discussion forums, we conducted a randomized controlled field experiment where we created a restricted, online discussion forum (described below).

The Discussion Forum: www.Moms-Rock.com

For this study, we designed and created a new online discussion forum [www.moms-rock.com; described below] for women with at least one child under the age of 18 (i.e., moms) to have parenting-related discussions. According to Nielsen (2009), one-third of all bloggers are moms and older moms are one of the fastest growing demographics on Facebook, and younger

moms are 85% more likely to visit Facebook than the average user. As such, we chose this demographic because they are shown to be one of the most active and fastest growing demographics online (Schoenebeck 2013) which would lend to an engaging discussion forum.

The basic set-up of our discussion forum is similar to existing ones (e.g., babycenter.com; stackexchange.com/parenting) where participants can post parenting-related questions, answers, comments or vote on other participants' posts. Traditional discussion forums have inherent website characteristics (lack of participant anonymity, advertising blended with information, non-targeted participant base) that may affect how individuals behave and respond (Alexander and Tate 1999; DePaulo, Zuckerman and Rosenthal 2003; Sundar and Nass 2000, 2001). We purposefully designed our online forum to address these challenges and to control for potential biases in order to isolate the specific effects in which we are interested.

Figure 1: Screen shot of the www.momsrock.com discussion forum developed for the study
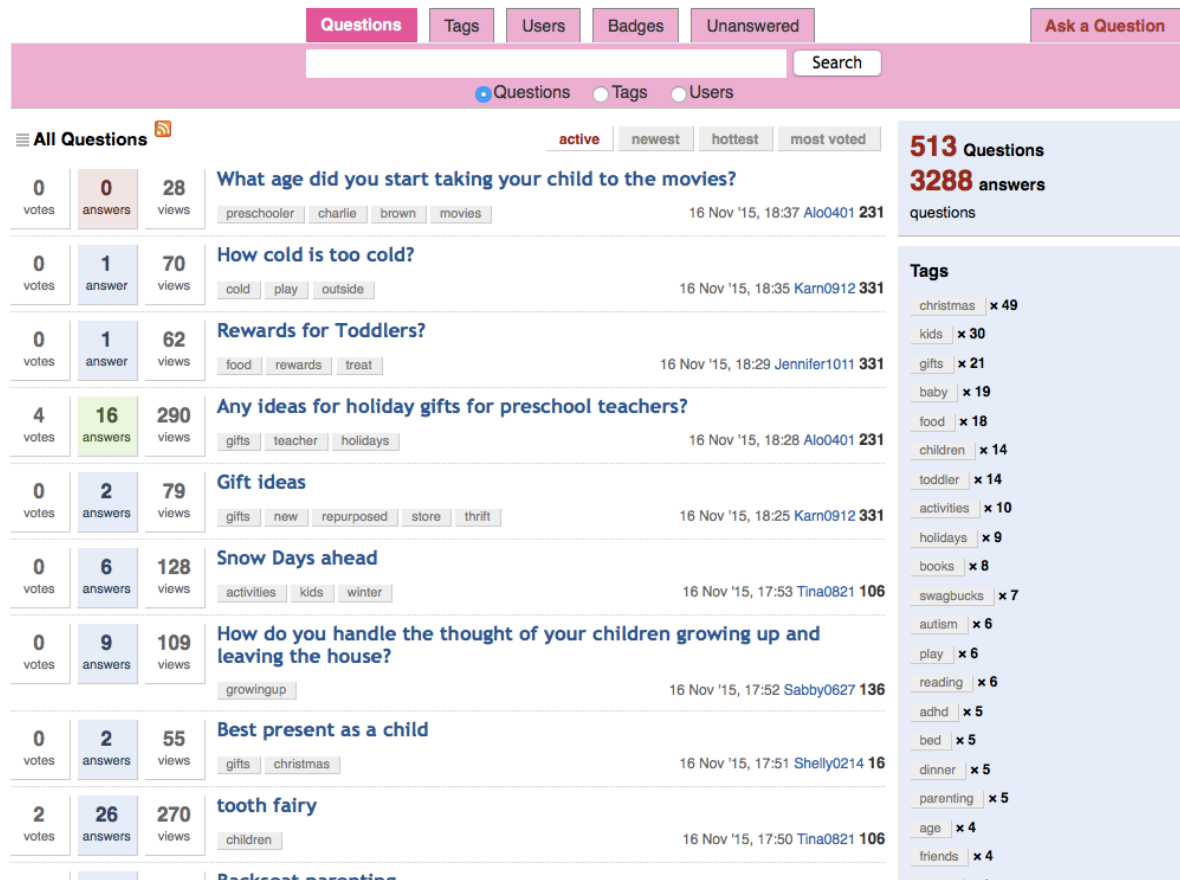
First, research has shown that the lack of online profile anonymity can lead individuals to alter their behavior or profiles (i.e., be deceptive) in order to present themselves in a more positive light (DePaulo, Zuckerman and Rosenthal 2003). Specific to the domain of parenting, Marwich (2012) found that in online discussion forums that lack anonymity, parents may not be entirely comfortable admitting failures or weaknesses which may lead to a biased discussion. In order to mitigate these effects, we created uniformity in respondents' screen names which were represented by the first name and month and day of birth (e.g., Leslie0306). By not including the birth year (estimate of age), last name or creation of more personalized screen names (e.g., supermom), we were able to control for biases and facilitate a community where participants could engage in open discussions. Second, traditional online sites are often inundated with

advertisements and the blending of advertising and information can bias responses and affect attention and depth/quality of responses (Alexander and Tate 1999). As such, our site was purely text-based and there were no images or advertisements visible that allowed individuals to focus on the task at hand. Finally, online discussion forums have a varying participant base and the participants may not necessarily represent the target demographic which raises questions about source credibility (Sundar and Nass 2000, 2001). Since we are interested in a very specific group of individuals (college-aged women with kids under the age of 18), a panel provider was used to recruit participants which ensured that all participants on the site matched the required profile. Additionally, the restricted nature of the randomized controlled field experiment facilitated data collection for specific psychological scales to measure individual heterogeneity, isolate the effects of key experimental interventions, and the capture of specific outcome variables. Finally, this design allowed us to examine longitudinal effects in online participation as data were collected in six sessions over a four week time frame.

Sessions

The study was conducted over six sessions and every session served a particular purpose in terms of experimental interventions, hypothesis testing and analysis. Each session was open for three days and there was a two day break between sessions so the researchers could capture the data and update the site for the next session. As such, data collection was conducted over a four-week time period. The sessions are described in detail below and summarized in Table 1 Using a panel provider, college-educated women with at least one child less than the age of 18 were invited to participate in the online discussion forum in exchange for monetary compensation.

Table 1: Details of the Sessions

Session No.	Details	Respondents	Hypotheses tested	Experimental Intervention	Data Collected
1	Study qualification and scale measures (survey)	1590	N/A	N/A	Survey Data: psychological measures, demographic information, online activity, measures.
2	First interaction with discussion forum; establish baseline participation	439	N/A	N/A	Observational data: Participation on site.
3	Threat manipulation (threat / no threat)	308	H1	Threat Manipulation (threat / No Threat)	Observational data: Participation on site.
4	All respondents informed about possibility to get power in Session 5	220		N/A	Observational data: Participation on site.
5	Power manipulation (high/no)	174	H2	Power Manipulation (high / no)	Observational data: Participation on site.
6	Final participation and exit survey	147		N/A	Observational data & exit survey: Participation on site.

Session 1. This session served as a qualification for all future sessions while allowing us to capture psychological and demographic measures. In addition, respondents were asked to complete an anagram task (Mendelsohn and Griswold, 1964) and were told that results from the task would be used in later sessions. Respondents also generated their unique username (first name and month and day of birth (e.g., Leslie0306) and password during this session which would be used to log in to the moms-rock.com website. Those respondents (4%) who stated that they had no interest in participating in an online discussion forum about parenting were not invited back to participate in the subsequent sessions.

Session 2. This session served as our baseline measure of online engagement in the discussion forum. Respondents who qualified in Session 1 were sent an email by the panel provider and were invited to participate in the moms-rock.com website. In the invitation email and also on the main login screen, respondents were encouraged to post questions, answers, comments and vote on other participants' posts.

Session 3. In this session we administered our first experimental manipulation which was a test of Hypothesis 1. Social comparison was operationalized using a threat. Respondents were randomly assigned to a threat/no threat condition, described below. Previous research on self-affirmation has shown that after a threat, individuals engage online by blogging (Belk, 2013), participating in discussion forums (Dean 2010; Kitzman 2003) or updating Facebook profiles (Toma and Hancock 2013) because these behaviors allow individuals to reinforce valued self-attributes. Additionally, research on self-affirmation has shown that individuals typically affirm their sense of self, often by writing about valued self attributes, in a domain which is unrelated to that in which they were threatened. As such, in our study, we gave individuals false feedback about their performance on the anagram task (completed in session 1) and randomly assigned

them to a threat/no threat condition. Individuals in the threat condition were told that they got significantly fewer anagrams correct compared to everyone else who completed the task. Those in the no threat condition were told that they got the same number of anagrams correct compared to everyone else who took the test. After receiving the threat/no threat intervention, respondents were then asked to continue to participate in the discussion forum.

Session 4. This served as an interim session where respondents were asked to continue participating on the site. Additionally, when they logged into the site, all respondents were told that in Session 5, they would have the opportunity to become a 'Super User' (high power) or stay a 'Basic User' (no power) on the site based on their participation thus far. This was done in order to ensure that all respondents, regardless of whether or not they were threatened, were given the same information that they would have an additional chance to attain power (external self-affirmation) in the next session.

Session 5. One of our focal constructs was to examine how power affected respondents' online engagement for content generation and feedback conferral. More specifically, could endowed power serve as an external and additional source of self-affirmation thereby affording individuals an opportunity to bolster their sense of self after a threat? When participants logged into the site they were randomly assigned to a high power or no power condition. Those in the high power condition were told that based on their participation on the site, thus far, they were assigned to the role of a 'Super User.' They were told that they were one of the most influential individuals on the site and were afforded additional benefits than the 'Basic User,' one of which was to nominate other basic users to become a super user or to award them a status badge. Respondents assigned to the no power condition were told they were 'Basic Users' and they did not have any

of the benefits that super users had. Post this, respondents' online participation was measured. Results from this session served as a direct test of Hypothesis 2.

Session 6. This was the last session of the experimental study. Upon logging in, respondents were asked to continue participating in the discussion forum. Upon logging out of the discussion forum, there were asked to fill out a short exit survey which captured psychological scales, additional demographic information and also provided users an opportunity to rate their experience with the discussion forum. Participants were debriefed on the purpose of the study.

Data and Measures

Survey data. In Session 1 and Session 6, respondents were asked to fill out a survey which captured several psychological measures (e.g., need for status, social comparison orientation), basic demographic variables (e.g., age, income), measures of their online presence (e.g., do you participate in online forums) and general interest in participating in an online discussion forum related to parenting. In Session 6, they were asked additional questions about their experience on the website.

Observational data. In Sessions 2-6, we captured several measures of actual behavior on the site. These included the login/logout date and time, online engagement (number of questions, answers, comments, and up or down votes).

Manipulation Checks

Threat. In a pre-test, after completing the anagram task and receiving false feedback (that was used in the study), respondents were asked how they felt (1 = very bad, 7 = very good) and how they felt they performed relative to others (1 = much worse, 7 = much better). Results indicated

that those in the threat condition reported feeling worse relative to those in the no threat condition (M_{Threat} = 3.1, $M_{\text{No-Threat}}$ = 5.0, $t(61)$ = 5.65, p < .01). Additional, those who were threatened felt that they performed significantly worse than those who were not threatened (M_{Threat} = 4.32 vs. $M_{\text{No-Threat}}$ = 3.6, $t(61)$ = 1.92, p = .06).

Power. In a pre-test, respondents were asked how much power (1 = a lot less, 4 = the same, 7 = a lot more) they felt they had relative to a Basic (Super) user based on the condition to which they were assigned. Results indicated that those who were assigned to a super user condition indicated that they felt more power relative to those who were assigned to a basic user condition ($M_{\text{Super-User}}$ = 5.53, $M_{\text{Basic-User}}$ = 2.87, $t(61)$ = 7.61, p < .01).

Social Comparison Orientation. In order to assess respondents' level of social comparison orientation, Gibbons and Buunk's (1999) scale for social comparison was administered. Items (e.g., I often compare myself to my loved ones; I always like to know what others in a similar situation would do) were measured on a five-point scale (1 = strongly disagree, 5 = strongly agree). The items were highly correlated (alpha = .78) and were averaged to make a composite scale.

Need to Belong. In order to measure to what extent people felt a need to belong, a scale developed by Leary (2013) was administered. On a five-point scale (1 = strongly disagree, 5 = strongly agree), respondents were asked to respond to 10 items such as 'I want other people to accept me' and 'I have a strong need to belong' in order to assess their need to belong. Items were highly correlated (alpha = .80) and were averaged to create a composite scale.

Self Esteem. In order to capture state self-esteem, respondents had to fill out the Rosenberg Self-Esteem scale (Rosenberg, 1965). Respondents were asked to indicate to what extent they

agreed/disagreed (1 = strongly disagree, 4 = strongly agree) with 10 statements (e.g., I have a number of good qualities, I feel I do not have much to be proud of). The items were highly correlated (alpha = .73) and averaged to make a composite scale.

Perceived Status Disadvantage. Individuals reported their perceived status disadvantage (e.g., extent to which they believed others received more attention, had more status) on an eight-item, seven-point scale (1 = *not at all*, 7 = *very much*) adapted from Overbeck and Tansuwan (2010) and averaged into a composite score (alpha = .90).

RESULTS

Participants

Four hundred and thirty four female, college-educated, respondents (78.7% Caucasian) between the ages of 25-40 ($M = 35.67$), participated in this study. Participants had between one and five children ($M = 3.1$, $SD = 1$) In general, 72% of respondents indicated they participate in online discussion forums with 33% indicating that they participate in parenting-related discussion forums. One of the main ways of engaging in the forums is by posting questions and answers. Of our respondents, 45% indicated that they posted questions and 55% indicated they posted answers while engaging on these forums. Respondents were asked how interested they would be in participating in an online discussion forum about parenting (*1* = very uninterested and *7* = very interested) and on average respondents indicated a high level of interest ($M = 6.41$, $SD = .99$).

The effect of threat on online engagement

Hypothesis 1 stated that respondents who faced threat would have higher engagement (measured as the number of postings) relative to those respondents who did not face threat in order to self-affirm. Threat was manipulated in session 3. Past research has shown that after facing a threat, individuals are able to self-affirm by writing about valued self-attributes in an un-related domain (Steele, 1988). Specifically, in the domain of online behavior, posting on sites such as Facebook has been shown to help individuals self-affirm after a threat (Toma and Hancock 2013). In line with this, we found that after facing a threat (feedback of low performance on an anagram task), respondents were able to self-affirm by posting on the site. A two-sample t-test confirmed this hypothesis and results indicated that respondents under threat posted more than respondents under no threat ($M_{\text{threat}} = 4.16$ vs. $M_{\text{No Threat}} = 3.33$, $t(299) = 2.11$, $p = 0.02$). In line with self-affirmation theory, this suggests that as a means to recover from the threat and to affirm their sense of self, threatened individuals post more than those who are not threatened (and do not feel the need to self-affirm).

The moderating role of power

Hypothesis 2 predicted that power moderated the effect of threat on consumer engagement. Power was manipulated in Session 5. The consumer engagement outcome of interest is posting behavior. We measure the consumer engagement in the platform as the contributions of the users in the community as the volume of postings. These measures are primarily (non-negative) count processes.

Figure 2: Distribution of the posts across the conditions
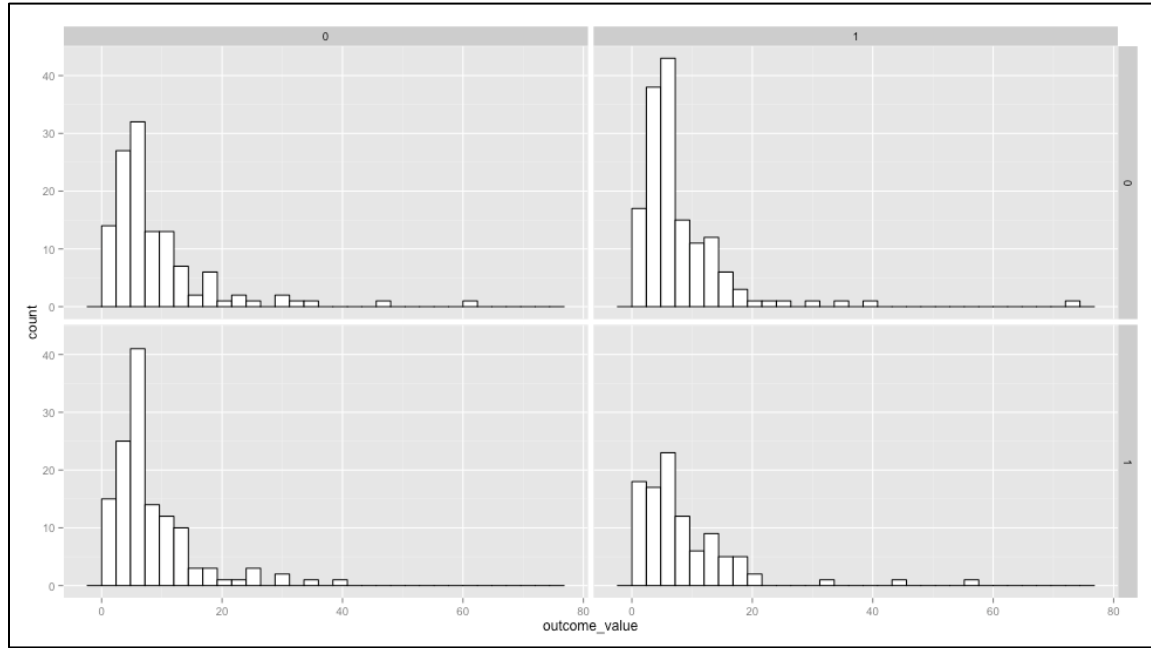
The natural regression model for these count observations is a Poisson Regression model The Poisson model assumes that the count process follows a Poisson distribution. This assumption is valid in our case. As depicted in the Figure 2 above the number of posts follows a Poisson distribution. The top two panel of the graph refers to the no-threat condition and the bottom panel refers to the threat condition. The left and right panels refers to the low and high power conditions, respectively. If the number of posts (content) generated by a user is assumed to be influenced by the interventions, then we can model the count of the content generated as a Poisson Random variable with a mean value $\lambda_i = \lambda_i(x_{i1}, \dots, x_{ik})$, where k refers to the number of factors affecting the count of the posts. This assumption on the data generating process (DGP) can be extended across multiple individuals with an additional assumption of the independently and identically distribution to represent a Poisson regression model.

We model the a Generalized Linear Model with Poisson distribution as

$$\ln(\lambda_i) = \mathbb{E}(Y_i)$$

$$= \beta_0 + \beta_1 Threat + \beta_2 Power + \beta_3 Time_t + \beta_4 Threat * Power$$

$$+ \beta_5 Threat * Time_t + \beta_6 Power * Time + \beta_7 Threat * Power * Time_t + \epsilon_i$$

Here *Threat* and *Power* refers to the threat and power interventions respectively with β_1 and β_2 capturing their respective coefficients. The main coefficient of interest for us is the three-way interaction effect of *Power*, *Threat*, and *Time* which is captured by β_7. This represents the effect of the first intervention of the *Threat* at different levels of *Power* at the different rounds (*Time*) during which the users participated in the online community. We also included the user specific random effect in order to control for user idiosyncrasies.

Confirming H2, we found that power negatively moderated the effect of threat on posting behaviors and this strengthens over time. In session 5, the first session where power was endowed, there was a decrease in posts ($b = -0.46$, $z = -2.07$, $p < 0.05$) and this intensified in the next time period ($b = -1.15$, $z = -4.79$, $p < 0.00$). In other words, threatened individuals who were endowed with high power reduced their postings indicating that power could serve as an external form of self-affirmation.

More specifically, those individuals who faced a threat and who were endowed with high power posted less on an average relative to individuals who were faced with threat and were not endowed with high power ($M_{\text{threat - high power}} = 2.0$ vs. $M_{\text{threat – no power}} = 3.53$, $t(73) = 2.67$, $p = 0.004$). This suggests that power may serve as an external source of self-affirmation and those individuals who are endowed with power, after a threat, will not increase their posts in order to self-affirm because there are already self-affirmed by acquiring power.

Additional Analyses

The results thus far suggest that threat and power do have an influence on the user participation. However, the interventions were in a particular round and the analyses do not assess the temporal evolution of participation nor does it account for possible spillovers in participation across the rounds. Moreover, there was attrition of users over the time period. Corresponding to this attrition of users, the participation also saw a downward trend. The following graph depicts the number of postings by the participants in each time period. This suggest that the active participation in term of aggregate posting decreased over time reflecting the attrition of the participants over time. Though the aggregate count decreased, for some participants the individual count increased. See Figure 3 below.

Figure 3: Distribution of consumer postings over time
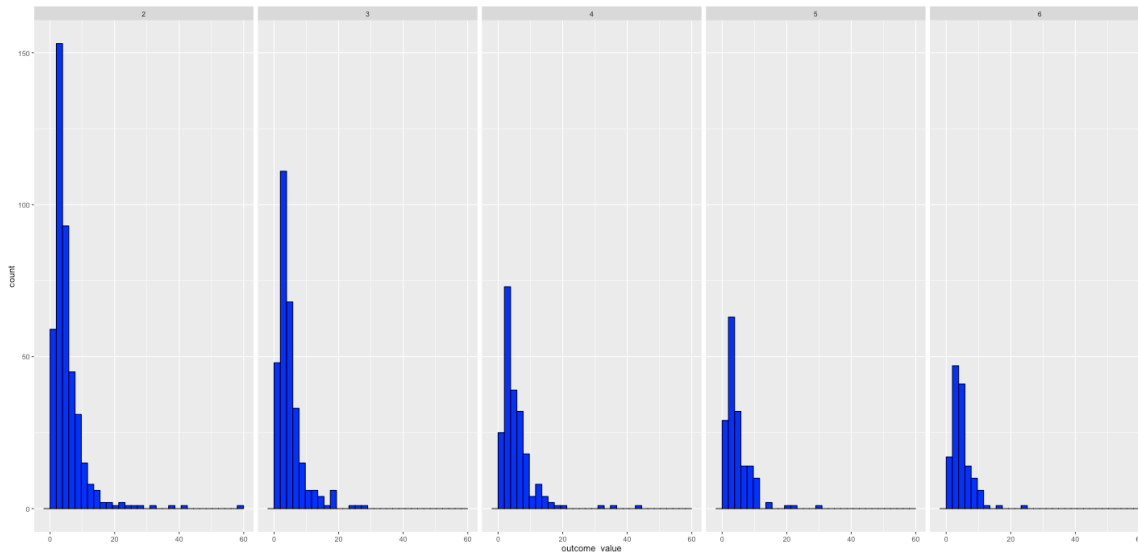

In order to examine the trajectory of the evolution of the participation rate by the users across the various rounds, we used Latent Class Analysis. We followed the procedure of Roeder, Lynch and Nagin (2000) for assessing the evolution of the user participation over time.

Specifically, we used a Zero Inflated Poisson Model of Latent Class Growth Analysis (implemented with Traj package in Stata).

The graph below depicts the overall evolution of the participation rate among the various groups over time. We selected the number of groups (or classes) based on BIC and AIC values. We found that the five-class model fit best. This number is in general agreement with the prior literature on social media participation which suggest that about two percent of the people contribute actively and about 80 percent are passive consumers of the content over time. In the Figure 4, below, the first group has about 1.7% participants posting actively in the initial rounds and their participation decreases over time. While for some of the other group such as group 1, the initial participation is not very high, but the manipulations lead to higher participation over time. This graph also agrees with the results of the previous analysis that depicts the increase in postings for some of the participants due to the threat in the second and third round and also the combined effect of threat and endowment of power in the latter rounds.

Figure 4: Evolution of Users (Latent Class Analysis)
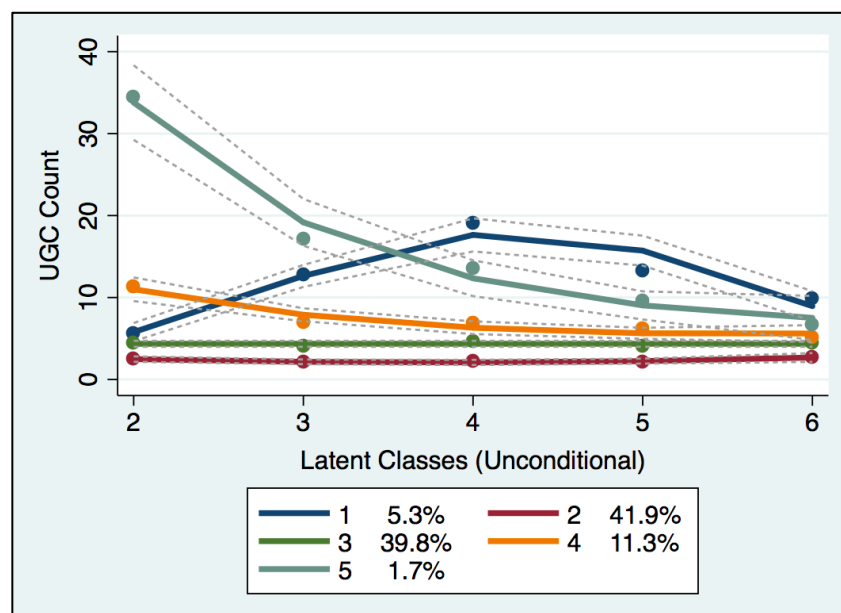
Discussion

Online Community vibrancy captures the growth of, engagement, and activity onOCs over time. We propose that a vibrant OC is one where users actively participate in the group (i.e., for stack: it entails both asking and answering questions, not just being a lurker), participate consistently and frequently over time and one where users are rewarded (e.g., receive badges in return for contributions) for their efforts. Engagement and participation by members is vital to the health, vibrancy, and sustainability of an online community. Ray, Kim, and Morris (2014) proposed that community engagement affected knowledge contribution and the former was derived from self-efficacy, identity verification and community identification. Past research on user participation has shown that variables such as self-identity verification, theory of planned behavior, self-efficacy, social learning and social norms affect both the quality and quantity of user participation (Ahn, Butler, Weng, and Webster, 2013; Ray, Kim, and Morris, 2014). Researchers have also shown that extrinsic rewards (e.g., financial incentives) increase user adoption and participation of OC's (Becker, Clement, and Schaedel, 2010). In our work, we examine how participating in OC can provide a venue to facilitate self-affirmation. Specifically, we look at how online posting behavior changes in response to social comparison, threatening feedback, in an unrelated domain. Crocker and Wolfe (2001) stated that in order to be self-affirming, the outlet has to be representative of one's self-worth. In our work, we focus on one's identity as a mother and give individuals a chance to self-affirm, measured by an increase in online posting, on a parenting question and answer site. Since individuals are motivated to maintain a positive self-worth (Tesser 1988) they will often engage in behaviors that provide them the means by which they can do so. Previous studies have measured self-affirmation in a

lab setting and are often limited to measuring self-affirmation at one point in time (see McQueen and Klein 2006 for a review).

We conduct a natural, longitudinal, online field experiment in order to examine community engagement over time. We found that in response to social comparison feedback in an unrelated domain, threatened participants increased their online posts relative to those who were not threatened. We wanted to examine whether these effects persisted over time. As such, we randomly endowed some individuals with high power and found varying effects on posting behavior. We found that power moderated the effect of threat on posting behavior. Our proposition is that power serves as a form of external self-affirmation whereby power helps participants validate their self-worth and as such they do not need to change their posting behavior (i.e., increase postings) as a means to self-affirm. Our results confirm this. It is important to note, however, that our analyses are restricted to certain time periods and there was attrition over time with regards to the participants. Since this is a natural experiment, this is not uncommon and is very representative of question and answer sites.

Our work has a number of significant managerial implications. Our results indicated that posting increases in response to a threat as a means of self-affirmation. Perhaps as firms design online communities, they can build in mechanisms which encourage online posting. While firms do not have to explicitly 'threaten' individuals, perhaps giving them feedback about their participation (e.g., number of posts, votes, likes etc.) in the online community, relative to other site members, could serve as a means to change posting behavior. Our results suggest that if a member is told they performed worse than others (i.e., post less than others), they will increase their number of posts. Additionally, firms need to carefully consider endowing a few members with 'power' – actual or perceived, in order to change behavior. We found that attaining power

reduces posting behavior because it serves as a means of self-affirmation. While power structures are beneficial as they can help with moderating the health of the community, those with power may not participate as much in the community. An alternative way to think about this is that those who have power may now serve a different role in the community. They may be more inclined to like someone's post, provide answers to questions, or vote on other people's postings. These are also metrics that can be used to measure community engagement. We did not examine these variables in our work and leave this to future research.

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