IMPACT OF STATUS AND MEME CONTENT ON THE SPREAD OF MEMES IN VIRTUAL COMMUNITIES

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Abstract: *We examined the influence of meme consistency (vs. inconsistency) and intragroup status on the spread of memes in virtual communities. Prior research suggests that information consistent with the theme of the group is remembered better and that ideas threatening to the group identity are rejected. In addition, previous research shows that low-status group members mimic high-status members and communicate with them to seek information and approval. We analyzed social interactions among members of four online forums from January 1, 2010, to February 21, 2014. Contrary to our prediction, our results show that memes initiated by low-status members spread faster than memes started by high- or moderate-status members. In line with prior research, memes that were consistent with a forum theme were spread more frequently than inconsistent memes.*

Keywords: *status, influence, meme, norm, social network, computer-mediated communication.*

INTRODUCTION

In the investigation of culture, the memetic approach shifts focus from the individual to social interactions (Gabora, 1996), which in online communities involve participation in discussions resulting in information exchange. To describe these informational units, Dawkins coined the term "meme" and defined it as "a unit of cultural transmissions, or a unit of imitation" (Dawkins, 1976, p. 192). Others have defined memes as an instruction for behavior passed on through imitation (Blackmore, 1999), a "unit of cultural evolution and selection" (Wilkins, 1998, p. 56), and an informational pattern that can be copied from one brain to another (Heylighen, 1998).

The popular usage of the meme concept is synonymous with the spread of funny words or phrases or Internet pictures or videos. However, this definition is narrower than the original meaning of the word and therefore scholars have begun to use the term "Internet meme" defined as "a piece of culture, typically a joke, which gains influence through online transmission" (Davison, 2012, p. 122). Shifman (2013) defines Internet memes as "units of popular culture that are circulated, imitated, and transformed by Internet users, creating a shared cultural experience" (p. 367). Most investigations into memetic communication have focused on Internet memes to understand cultural trends and digital culture (Milner 2013a; Shifman, 2013), participation in communities (Milner, 2013b), and spreadability (Jenkins, Ford, & Green, 2013; Miltner, 2014; Shifman, 2012).

Although Internet memes have received more scholarly and public attention, a meme in its broader definition is any piece of information or practice that can be transmitted from one person to another (Gabora, 1996). When individuals encounter information through reading, listening, or observation, the information is transmitted from one person to another, leading to the transfer of information (Heylighen, 1997, 1998). Thus, manipulating and sharing a picture on the Internet and imitating the language of another user in a post are examples of information transmission and transfer. When these units of information are transferred from one individual to another, the meme can influence the behavior of the recipient (e.g., Adams & Dzokoto, 2007; Robles-Diaz-de-Leon, 2003); therefore, examining how memes spread can provide insights into how a culture evolves.

The process through which a meme is transferred from one person to another is key to understanding how the meme influences cultural evolution. Gabora (1996) proposed a theory of how memes evolve and spread. According to her, analyzing how a meme is used provides a way to investigate the concepts and by-products of the social interactions of a group. The theory provides a framework for investigating how memes are created, retained, and transmitted from one individual to another. When the meme is altered, either from transmission errors or recombination with existing ideas, variation occurs. Variation of informational patterns results in meme selection due to competition whereby memes that are not suitable in a particular context will fail to spread. The classic diffusion study by Ryan and Gross (1943) investigating the adoption of hybrid seed corn (i.e., a meme) showed the competition of ideas due to variation and the success of an idea that is more suited for a specific context. The idea of hybrid seed corn was a variation of and in competition with ordinary seed corn. Adoption of the hybrid seed corn was facilitated by informational campaigns and through observing the early adopters. In this framework, replication occurs when the concepts stored in the mind are transformed into an imitable state, such as behaviors or language. Gabora (1996) argued that the introduction of new information into a group

changes the relationship between the group and the meme and leads to the generation of new memes. For example, information about hybrid seed corn changed the farming practices of the community in the study by Ryan and Gross (1943), which led to the new practice of farming hybrid seed corn.

Heylighen (1998) proposed four stages that a meme goes through when it is transferred from one person to another: assimilation, retention, expression, and transmission. Assimilation of a meme involves noticing it, understanding it, and accepting it before it is integrated into memory. After successful assimilation, a meme has to be retained in memory. The uniqueness of the meme, frequency of presentation, authority of the source, how easy it is to express, consistency with norms of a culture, and its usefulness to an individual will influence its retention (Heylighen, 1997, 1998). Lastly, transmission involves expressing a meme retained in memory and it being copied by another individual. At each of these stages, a meme is subject to selection, whereby some memes may fail to be assimilated, retained, expressed, or transmitted. As shown by Bartlett (1932), individuals assimilate and remember information differently, which produces variations of the idea. Variations from either transmission errors or through recombination with other ideas can produce a new meme (although the point where a variation becomes a new meme is difficult to pinpoint). A meme that is successfully expressed and transmitted goes through the cycle again in another individual's brain.

A meme's survival depends on how easily it can be transmitted from one brain to another (Blackmore, 1999, 2001). Memes that can be easily expressed will have a higher chance of surviving because spread depends on transforming the memory of the idea into a form that other individuals can imitate, such as speech, writing, or actions (Blackmore, 1999; Heylighen, 1998). In addition, memes that are similar to other known memes have a higher chance of spreading (Gabora, 1996). For example, the spread of the "anchor baby" meme (the idea that adult undocumented immigrants in the United States have children to gain legal status) can be attributed to the usage of a similar meme used in the 1980s and 1990s, namely the "anchor child" (the idea that children legally immigrate to the United States for the purpose of sponsoring family members), both of which have the same racist and anti-immigrant connotations (Ignatow & Williams, 2011). The examples of the hybrid seed corn usage (Ryan & Gross, 1943) and the "anchor baby" meme (Ignatow & Williams, 2011) show that the adoption and spread of memes is influenced by social factors and the context of the culture.

Social Identity Perspective

Although the characteristics of a meme contribute to how it spreads within a culture, the individuals and the dynamics of the group play roles in the spread of the meme as well. Social identity (Tajfel & Turner, 1979) and self-categorization (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987) theories, when combined into a social identity perspective, provide a unified theoretical framework from which to explain the relationship between social interactions and the spread of memes. According to the social identity perspective, individuals seek to gain or maintain a positive and distinct social identity (Tajfel & Turner, 1979). When group members define themselves in terms of the identity of the group, they depersonalize, or self-stereotype, in line with the group's prototypical norms (Turner et al., 1987). Because of this relationship between the group and the individual, group members are influenced by the norms of the group.

Group norms are attitudes, beliefs, and behaviors that are characteristic and distinctive to the group (Hogg & Reid, 2006). For new members, the norms, values, and prototypical qualities of the group are more readily accepted when individuals feel psychologically connected to the group (Livingstone, Haslam, Postmes, & Jetten, 2011). Greater identification with the group predicts greater adherence to the prototypical norms and values that reflect the group content (Reicher, Spears, & Haslam, 2010). Thus, the social identity approach provides a framework to study memes because the spread of memes is affected by the flow of influence (e.g., high status versus low status) in a group. Memes introduced by high-status members are more likely to be spread because low-status group members are seeking information and approval from higher-status in-group members (Dino, Reysen, & Branscombe, 2009). Further evidence for the conformity shown by low-status members is research showing that low-status members are likely to mimic higher status members (Cheng & Chartrand, 2003). In addition, individuals with high group identification are more likely to embrace and spread the ideas that are normative to the group (Reysen & Lloyd, 2012). Furthermore, previous studies (Bettencourt, Charlton, Dorr, & Hume, 2001; Jetten, Spears, & Postmes, 2004) have shown that group members engage in behaviors that improve or maintain the group's positive distinctiveness. As a result, group members are more likely to spread memes that highlight the uniqueness of the group.

Group Norms

For a group (or culture) to function, some rules must exist to achieve coherence in the group (Feldman, 1984). Group norms can also be described as a set of rules and expectations that apply to all group members and determine acceptable behavior (Postmes, Spears, & Cihangir, 2001). In online groups, the creators of virtual communities usually set out basic rules that every member must comply with in order to be accepted or to remain part of the group. Groups typically do not set or enforce norms for all types of situations (Shaw, 1981); however, some informal rules are enacted through how the individuals interact (Feldman, 1984). For example, introducing a political question in an entertainment discussion, although allowed by the formal rules, usually would be ignored or informally reprimanded.

Group norms are important in the maintenance of a group. Norms ensure the group's survival, facilitate prediction of how individuals will act in certain situations, promote positive social interaction (e.g., banning discussions of politics in an entertainment forum), and allow the group to project a distinct identity (Feldman, 1984). Individuals with high group identification are more likely to comply with norms that project the group's positive distinctiveness (Jetten, Spears, & Manstead, 1997). Concepts that are consistent with group norms are more likely to be used in social interactions between and among group members. For example, several studies have shown that information consistent with known stereotypes is remembered better than information that is inconsistent (e.g., A. E. Clark & Kashima, 2007; Kashima, 2000; Kashima, Lyons, & Clark, 2013). On the other hand, inconsistent concepts are less likely to be introduced to the group and are ignored when they are (e.g., some nonpolitical forums do not allow the discussion of politics). Whereas identification and in-group bias are more pronounced when the group is under threat (Tajfel & Turner, 1979), information that poses a threat to the group may be ignored by members as a way to prevent viewing the group as less positive and distinct. When the group is under threat, group

members tend to attempt to strengthen the in-group and show greater adherence to group norms, which are highly influential for directing the behavior of group members (Jetten, Postmes, & McAuliffe, 2002). Thus, concepts are adopted differently depending on the context of the group.

In online forums, group members utilize computer-mediated communication, which can offer anonymity. The social identification model of deindividuation effects (SIDE; Spears, 1995) builds on deindividuation theory (Reicher, 1984) and self-categorization theory (Turner et al., 1987) to describe how anonymity and identifiability affect social interactions in a group. According to the SIDE model, anonymity influences group cohesiveness and the extent to which individuals are attached to the group, which increases the influence of group norms and, consequently, results in individuals defining themselves as part of the group (Postmes, Spears, & Lea, 1998). When group identity is salient, anonymity increases the norms' social influence (Postmes & Spears, 1998; Postmes, Spears, Sakhel, & Groot, 2001; Spears, Lea, & Lee, 1990). In addition, anonymity fosters closer relationship formation by reducing the risks associated with self-disclosure, allowing individuals to share more (Bargh & McKenna, 2004). When individuals disclose key aspects about themselves, it leads to the formation of closer relationships (Bargh, McKenna, & Fitzsimons, 2002; McKenna, Green, & Gleason, 2002) and they consider the relationship important to their identity (McKenna et al., 2002). Anonymity also allows individuals with culturally objectionable social identities (e.g., fringe political beliefs or homosexuality) to join groups, which impacts the individual's identification with the group and the influence of the group norms (McKenna & Bargh, 1998). In online forums where users are required to create accounts before they can post to discussions, a user assuming anonymity would be shielded only from being linked to his or her real-world identity. Thus, an individual is assessed by his or her contributions to the forum, which can be tracked for as long as the individual uses the same credentials. Most forums use the total number of posts by an individual to determine status. In addition, individuals gain credibility and a following depending on their interactions with other group members.

Research in online communities has shown that individuals tend to share more information than they would in face-to-face communication, a phenomenon known as the online disinhibition effect (Suler, 2004a, 2004b, 2005). In addition to anonymity, Barak, Boniel-Nissim, and Suler (2008) identified other factors contributing to disinhibition, such as invisibility from the use of text (see also Suler, 2004b), delayed reaction to a post, and the neutralization of status from the real world. Bagozzi and Dholakia (2002) presented a model of virtual community participation in which internalization (i.e., congruence of one's values with values of another group member) and identification (i.e., how individuals define themselves in terms of the group) were found to significantly predict participation. Building on the virtual community participation model, Dholakia, Bagozzi, and Pearo (2004) proposed a social influence model of consumer participation in virtual communities in which group norms and social identity were the key constructs and found that the norms of the group strongly influenced group intentions to participate in online communities. In anonymous online groups, norms are transmitted from members familiar with the norms to those less familiar, effectively influencing behavior (Postmes, Spears, Sakhel et al., 2001). Thus, memes that are consistent with group norms are more likely to spread.

The Present Study

The purpose of the present study was to examine the influence of meme consistency (vs. inconsistency) and intragroup status on meme spread. We examined the spread of memes used by group members in four online communities. Based on prior research showing that information consistent with the group is remembered better and that ideas that threaten the group's identity are rejected, we predicted that memes that are consistent with the group theme would spread faster than inconsistent memes. Additionally, based on prior research showing that low-status group members communicate with high-status members to seek approval (Dino et al., 2009; Reysen & Lloyd, 2012) and low-status members mimic high-status members more often (Cheng & Chartrand, 2003), we predicted that memes from high-status (vs. low- or moderate-status) group members would spread faster.

METHOD

We first describe some terms before proceeding. A forum is a collection of posts unified by a common topic. A post is an individual comment or question from a member of a forum. A thread is a series of posts related to a common specific topic within a forum, originating from a single post from a member of that forum. For example, within a forum on political issues, a member could comment on Obamacare (a post), and then others could post comments or questions based on that original post, creating a thread. We collected data posted from the first available public thread to February 21, 2014, but only analyzed the data from January 1, 2010, until February 21, 2014, because data collected before this date did not contain the memes of interest for this study (see the end of this section for more information on how memes were selected). We chose this particular end date for analysis because this was the last day of data collection. Below we distinguish between these two periods of time as the "data collection period" versus the "analysis period," respectively.

Forum participants ($N = 129,947$) comprised individuals contributing to discussions in four publically accessible online forums. Two forums focused on topics related to entertainment: a special-interest area related to pop-culture media and a recreational motorcycling group. The other two forums focused on a variety of topics related to political issues (e.g., gun laws, immigration, health care). We used a web crawler to collect information from the forums, which led to differences in the quality of data collected because of communication errors or programming issues. After verification of the data collected, four forums were selected from a pool of forums to be analyzed. These forums contained primarily United States-based discussions, and the forums were categorized based on the content of the majority of topics posted. Forum 1, trekbbs.com, was categorized as entertainment and had 24,427 users and 11,931 threads during the data collection period. Forum 2, advrider.com, was also categorized as entertainment and had 69,058 users and 58,745 threads. Forum 3, straightdope.com, was categorized as political and had 9,940 users and 13,941 threads. Forum 4, defensivecarry.com, was also categorized as political and had 26,522 users and 62,473 threads. We captured all publicly available textual content posted to each forum. For each post, we recorded the user name and the date and time of the post. In addition, all posts were grouped by thread. The user who created the thread was classified as

the thread starter and the rest of the comments within the thread were treated as responses to the thread. The first mention of the meme in a thread was classified as the point of creation and this could occur at any point in the thread. Some forums had discussions from before the analysis period, and thus users who did not participate within this period were not included in our analysis. A total of 3,750,933 individual posts were collected from the four forums within the analysis period and, of those, 91,306 contained one of the memes we included in this study or its variants (e.g., potential misspellings; see the Appendix). See Table 1 for a summary of the forums investigated, including both the data collection and analysis periods. From this point, we only refer to data from the analysis period.

To determine the status or influence of participants, we calculated each individual's degree of centrality within each forum. To accomplish this, posts were divided into two categories: (a) original posts and (b) reply posts. Original posts were defined as any post that was the first post in a thread and, reply posts were defined as any post that was created in response to an original post. The status of in-degree and out-degree for each participant was then calculated automatically (via the SAS statistical package, Version 9.3) by counting original and reply posts. In-degree is a measure of incoming connections (i.e., replies by other individuals to one's original post) and out-degree is a measure of outgoing connections (i.e., posts of any kind made by an individual). Out-degree was calculated as the total of all posts (original or reply) created by an individual; in-degree was calculated as the number of replies by others to an original post created by that individual (see Freeman, 1977). In-degree and out-degree were then divided into the categories of high and low: High scores were those above the mean, and low scores were below the mean. Individuals with a high in-degree (i.e., a large number of people responding to a topic thread the participant started) and high out-degree (i.e., a large number of original or reply posts to other participants' threads) scores were classified as high status. Individuals with a high in-degree and a low out-degree or with a low in-degree and a high out-degree were classified as moderate status. Individuals with a low in-degree and low out-degree were classified as low status.

We selected 100 memes based on Google search trends in the United States from 2010 to 2014 that reflected entertainment (e.g., gangnam style, twerk, Cartman, thrift shop) and political

Table 1. Summary of Forums Studied and Data Collected.

Forum	Complete Forum Data (collected from beginning of forum to February 21, 2014)			Analysis Period Data (collected from January 1, 2010–February 21, 2014)			
	All Users	Threads	Posts	Active Users	Analyzed threads	Analyzed posts	Posts containing a meme
Entertainment							
trekbbs.com	24,427	11,931	903,152	6,792	11,742	715,056	8,158
advrider.com	69,058	58,745	2,740,588	67,577	37,311	2,005,278	19,797
Political							
straightdope.com	9,940	13,941	746,305	9,923	13,382	85,697	47,834
defensivecarry.com	26,522	62,473	1,607,552	26,519	37,183	944,902	15,517
Total	129,947	147,090	5,997,597	117,603	99,618	3,750,933	91,306

topics (e.g., Obamacare, Romneycare, socialist, sequestration). The categorization of memes for this study was based on their classification on the Google search trends lists, and the 100 memes were selected based on the frequency of usage in the four forums for the period analyzed (see the Appendix). Frequency of usage was calculated by counting any posts that contained any mention of these memes or their variants. There were 61,386 posts containing a political meme and 29,920 posts containing an entertainment meme across all forums. Usage of a meme was determined by performing case-insensitive searches for these memes and their variants in each post within the data. Meme usage was then coded as consistent or inconsistent for the forums (e.g., a political meme used in a political forum was consistent). The spread of a meme was defined as the proportion of posts containing the meme since the first mention of the meme within a forum (i.e., the number of posts containing the meme divided by the total number of posts) within each 30-day period. How fast a meme spread was defined as the change in the proportion of posts containing the particular meme across time, which was calculated automatically using SAS, Version 9.3.

RESULTS

To examine the influence of intragroup status and consistency of memes on the spread of a meme, we conducted a repeated-measures ANOVA with intragroup status and meme consistency as independent variables and proportion of posts containing a meme within 30-day intervals as the dependent variable. Results showed group-consistent memes were used more often than group-inconsistent memes over time, Wilks' $\Lambda = .75$, $F(49, 328) = 3.85$, $p < .001$, $\eta_p2 = .01$. Memes introduced by low-status participants were used more often than those from moderate- or high-status individuals over time, Wilks' $\Lambda = .68$, $F(98, 656) = 2.06$, $p < .001$, $\eta_p2 = .01$. Pairwise contrasts revealed that memes initiated by low-status participants were used more than memes from both high-status, $F(1, 380) = 9.63$, $p = .002$, and moderate-status participants, $F(1, 380) = 7.41$, $p = .006$. There was no difference in the usage of memes introduced by individuals of moderate versus high status (see Figure 1). Furthermore, there was an interaction between intragroup status and meme consistency over time for thread starters, Wilks' $\Lambda = .65$, $F(98, 656) = 2.09$, $p < .001$, $\eta_p2 = 0.01$ (see Figure 2). These differences seem to be consistent across all four forums, with no significant differences, $F(3, 373) = 1.8$, $p = ns$, in the proportion of posts containing a meme within 30-day intervals due to the forum (see Figure 3).

DISCUSSION

The purpose of the present study was to investigate the impact of intragroup status and consistency on the spread of a meme. Our prediction that consistent memes would spread faster was supported. Memes that were consistent with the topic focus of the group were used more than inconsistent memes. However, our prediction that memes started by high-status group members would spread faster was not supported. Contrary to our hypothesis, memes introduced by low-status individuals spread faster than memes started by high-status individuals. Thus, the results showed that memes that were consistent (vs. inconsistent) with the group norms and memes initiated by low (vs. high or moderate) status group members spread faster.
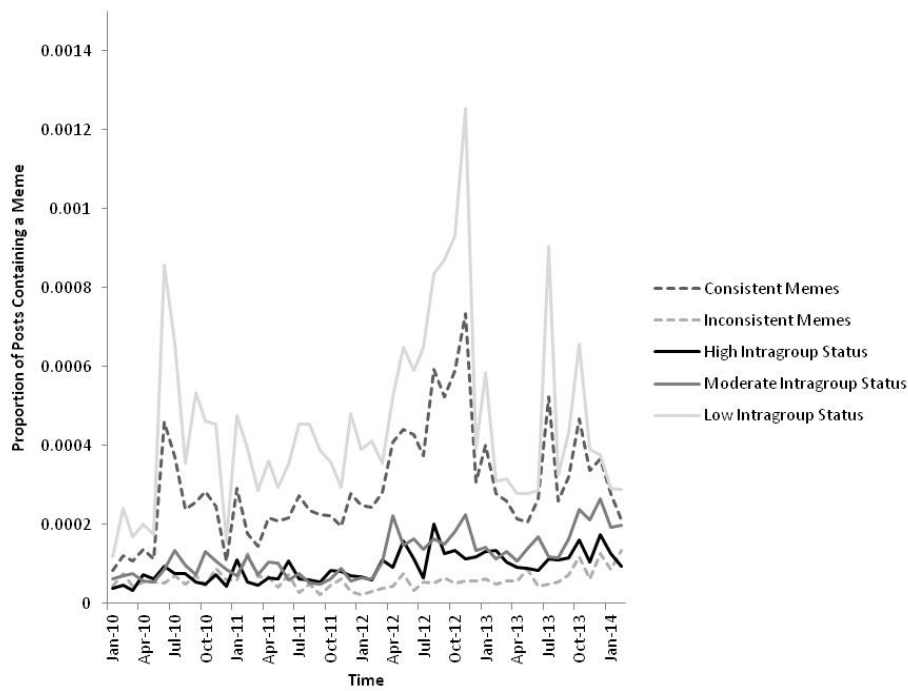
Figure 1. Proportion of posts containing a meme, for each group: consistent and inconsistent meme, and high vs. moderate vs. low intragroup status (see pp. 153-154 for an explanation of intragroup status). Values on the y-axis equal total number of posts containing a meme divided by total number of posts. Consistent memes agree with the content of the forum; inconsistent memes disagree with forum content.
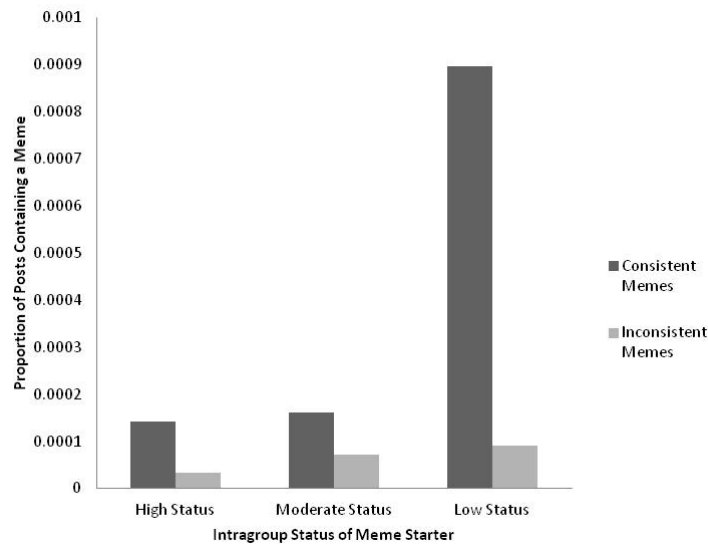

Figure 2. Interaction between meme consistency and intragroup status of the person who started the meme.
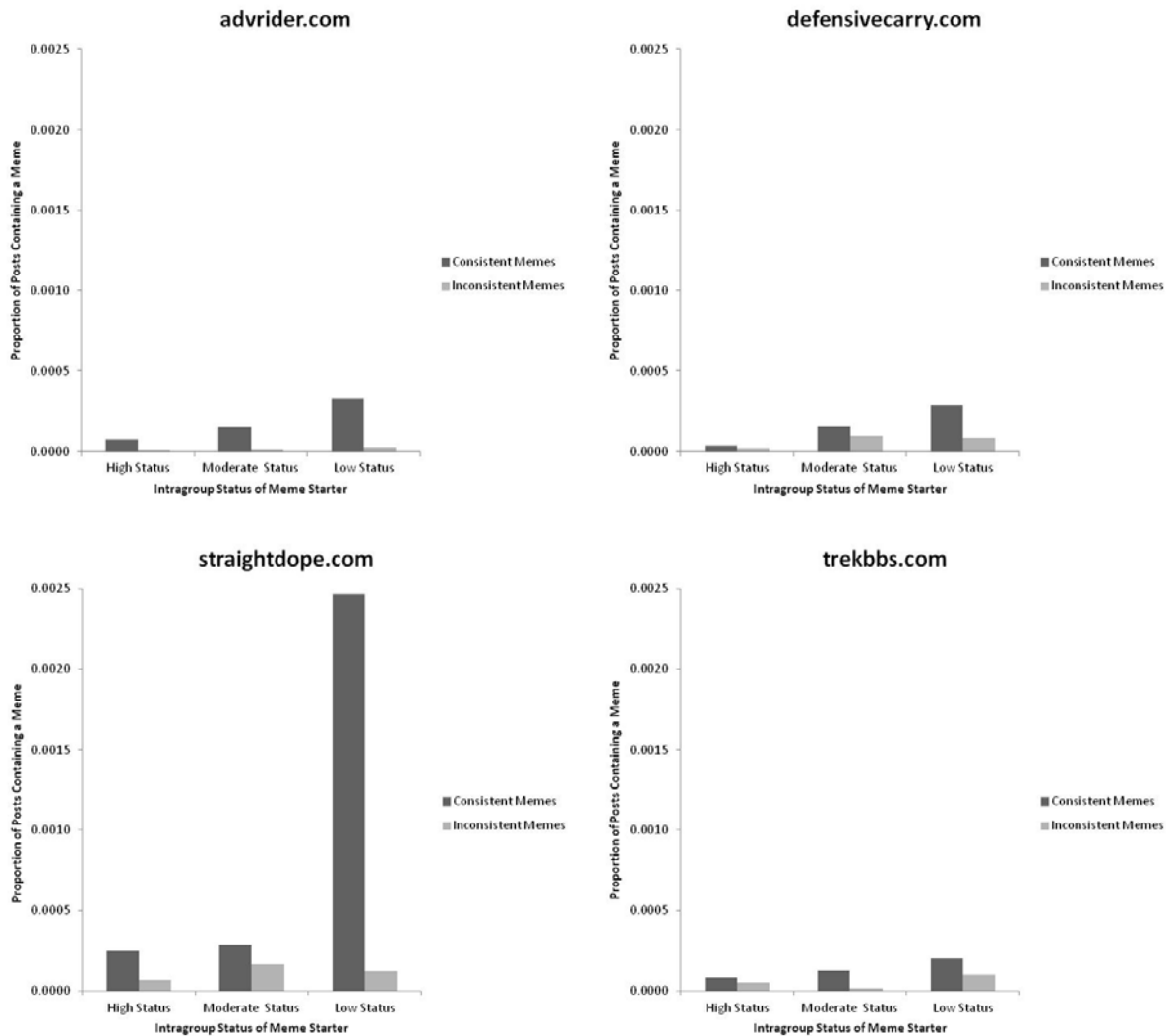
Figure 3. Interaction between meme consistency and intragroup status of the person who started the meme for each of the four forums.

Studies investigating the transmission of stereotypes (e.g., A. E. Clark & Kashima, 2007; Kashima, 2000; Kashima et al., 2013; Kurz & Lyons, 2009; Lyons & Kashima, 2001, 2006) have shown that information that is consistent with known stereotypes is remembered better and therefore more likely to be passed on to others. In the context of online forums, discussion of topics that are not relevant to the forum typically is discouraged and, in some cases, violators are reprimanded. Furthermore, consistent with the SIDE model (Postmes et al., 1998), in-group members in relatively anonymous online communities adhere to in-group norms. The results of the present study support the notion that group-consistent information is likely to spread to other group members because the memes are consistent with the in-group norms. In addition, memes can provide background information about a topic. Background information (e.g., assumptions or facts) helps in the understanding of the discussion. In forums, memes can help provide background information (e.g., the use of the often negatively applied term "Obamacare" rather than "Patient Protection and Affordable Care Act" or "Affordable Care Act" can signal

opposition to the law) allowing others quick access to members' shared assumptions and knowledge. Providing background information helps individuals predict the response of others and to promote positive social interaction by avoiding misunderstanding, which can lead to hostility between group members. Memes that communicate background information about a topic provide utility, a predictor of the spread of memes (Heylighen, 1998), which is a possible explanation why memes consistent with the group spread faster than inconsistent memes.

The results of our study failed to support our prediction that high intragroup status would influence memes to spread faster. Memes started by low-status group members spread faster than memes started by moderate- or high-status members. A possible explanation of this finding comes from an analysis of the spread of the "anchor baby" meme investigated by Ignatow and Williams (2011). Their analysis showed that it was in use in 2003 in a few online sites targeting social and political conservative audiences and only gained prominent usage between 2007 and 2010. In his book *The Tipping Point*, Malcolm Gladwell (2000) attributed the spread of ideas to the principle of "the power of context," the idea that the spread of memes is influenced by the social context, whereby an idea can spread quickly in one context but not in another. For the "anchor baby" meme, the political context was suitable in that Senator Barack Obama, who has an African father and an American mother, was running for the presidency of the United States in 2007. In United States politics, race plays a big role in elections (Piston, 2010), and thus having an African-American candidate for the presidency made the context suitable for the spread of the meme. Another example is the history of hip-hop, from its roots as a black subculture in the 1970s to its widespread adoption by other communities in the United States as race relations changed (Kitwana, 2006). In other words, in certain contexts low-status group members may be more influential in starting popular memes than high-status members.

However, the lack of support for the prediction that high intragroup status results in a meme spreading faster may point to the credence of the status float phenomenon (Field, 1970), in which new ideas flow from low-status individuals to high-status individuals. According to Field, low-status individuals are more willing to try out new ideas that may not be mainstream. The ideas are then imitated between the low-status individuals until eventually they are incorporated into the mainstream. In line with the adoption of new ideas (e.g., fashion) as a means to achieve distinctiveness, the use of memes in forums may indicate the desire to stand out and achieve status. In online communities, high participation is a marker of leadership and social influence (Huffaker, 2010). Thus, low-status individuals may contribute more unique information to discussions in order to gain status, as compared to high-status individuals who already wield influence. Indeed, previous studies (e.g., Reysen, Lloyd, Katzarska-Miller, Lemker, & Foss, 2010) showed that communication from low-status members contained social presence cues signaling conformity to group norms and ingratiation to the group. Thus, low-status members are more likeable in the discussions because social presence cues have been shown to facilitate trust (Hassanein & Head, 2005). Memes from trustworthy sources are more likely to be spread (Heylighen, 1998), which may explain the finding that memes started by low-status members spread faster.

The findings of this study hold implications for those embarking on information dissemination campaigns. In order to ensure that information is spread quickly within a group, the information should be tailored in a way that is consistent with the group norms. Before disseminating the information, the norms of the group will need to be identified. Because of the differences in groups, information may need to be customized for each targeted group to gain

maximum exposure. Based on Gabora's (1996) theory on the spread of memes and Heylighen's (1998) model of how memes are transmitted from one individual to another, information to be disseminated also should be easy to remember and express. In addition, the information should capitalize on common knowledge and assumptions of the (group) culture to establish grounding, which is essential for successful communication (H. H. Clark & Brennan, 1991).

The finding that memes started by low-status individuals spread faster has implications on strategies for influencing the behaviors of a group. Although this finding requires further study, it suggests that targeting low-status members (instead of high-status members) as a starting point for disseminating new ideas may lead to quicker adoption. The idea that low-status members can influence high-status members to incorporate new ideas and effectively change the group norms is consistent with minority influence (Moscovici, 1976, 1980, 1985; Moscovici & Faucheux, 1972). In Grant and Patil's (2012) minority influence framework, adoption of a new norm can be achieved through the modeling of a new norm by minority group members. Thus, low-status group members can be agents of change for social change and consequently behavior of group members.

There are limitations to consider when interpreting the results of this study. As noted earlier, there are other factors that influence the spread of a meme. For example, memes that elicit emotions (e.g., disgust; Heath, Bell, & Sternberg, 2001) are more likely to be remembered. Thus, other characteristics of the meme itself, beyond consistency to the focus of the group, may be better predictors of the spread of memes. Future research may include additional factors to examine the spread of memes. In addition, the categorization of memes is likely to bias the political category. Some entertainment memes could be classified as political memes in some contexts, and vice versa. Another limitation of this study is that our definition of a meme was narrower than suggested by theorists. We only included memes that were spelled in a particular way and their common misspellings. This definition fails to account for other forms of the meme that may be informationally equivalent. Future research may need to employ more sophisticated linguistics analysis tools to discern words and phrases communicating the same idea. In addition, future studies may need to include more categories for a more accurate categorization of the meme. For example, the political categories could be split into several categories such as right-wing or left-wing or the entertainment category split into music, movies, or television show. A more nuanced classification of memes should help determine the context in which the meme was used and allow better analysis of meme spread. Lastly, the present research is quasi-experimental. Future researchers may manipulate the posting of memes in online groups and observe the subsequent spread or lack of inclusion within various online groups.

To conclude, online Internet forums are an apt environment for researchers to examine intragroup processes. In the present study, memes that were consistent with the group and initiated by low-status members spread faster than memes that were inconsistent or started by high- or moderate-status members. Given the surprising result regarding status and adoption of memes, greater research examining the possible power of lower-status members is needed.

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Appendix

List of memes used

The memes (and variation in parentheses) included topics related to entertainment (presented first) and politics.
The memes were selected based on Google search trends in the United States from 2010 to 2014.

Meme (variation)	Category	Meme (variation)	Category
99 problems	entertainment	anchor baby	politics
adele	entertainment	barack obama (obama)	politics
adrian peterson	entertainment	big bird	politics
american idol	entertainment	big government	politics
born this way	entertainment	birther	politics
cartman	entertainment	boston marathon explosion (boston marathon)	politics
duck dynasty	entertainment	bunch of malarkey (malarkey)	politics
gangnam style (gangnam)	entertainment	cash for clunkers	politics
google+ (google plus)	entertainment	christian nation	politics
holy grail	entertainment	edward snowden (snowden)	politics
honey boo boo	entertainment	establishment	politics
house of cards	entertainment	evangelicals (evangelical)	politics
inception	entertainment	first amendment (1st amendment)	politics
instagram	entertainment	fukushima	politics
iphone	entertainment	gay marriage	politics
jennifer lawrence	entertainment	george zimmerman	politics
justin bieber (bieber)	entertainment	government shutdown	politics
kardashian	entertainment	gun control laws	politics
kate upton	entertainment	hurricane katrina (katrina)	politics
lean in	entertainment	hurricane sandy	politics
mark zuckerberg (zuckerberg)	entertainment	jodi arias (arias)	politics
michael phelps	entertainment	john kerry	politics
miley cyrus	entertainment	left wing (leftwing)	politics
minecraft	entertainment	legitimate rape	politics
myspace	entertainment	mandela (madiba)	politics
napster	entertainment	nate silver	politics
one direction	entertainment	national debt	politics
orange is the new black	entertainment	newtown (newtown shooting)	politics
paula deen	entertainment	obamacare (obama care)	politics
phil robertson	entertainment	osama bin laden (osama)	politics
royals	entertainment	paul ryan	politics
selfie	entertainment	pope francis	politics
sexting	entertainment	right wing (rightwing)	politics
shark tank	entertainment	romneycare (romney care)	politics
shuffling	entertainment	sarah palin	politics
steve jobs	entertainment	second amendment (2nd amendment)	politics
the bachelor	entertainment	sequestration	politics
the biggest loser	entertainment	single payer universal healthcare (single payer)	politics
the dougie (dougie)	entertainment	social security	politics
the hangover	entertainment	socialist (socialism)	politics
the hunger games	entertainment	taliban	politics
the knockout game (knockout game)	entertainment	tea party	politics
the wobble (wobble)	entertainment	ted cruz	politics
thrift shop	entertainment	ted kennedy	politics
titanic	entertainment	thirteenth amendment (13th amendment)	politics
titanium	entertainment	todd akin	politics
twerk (twerking)	entertainment	trayvon martin (trayvon)	politics
wrecking ball	entertainment	wendy davis	politics
47 percent	politics	wingnut (wing nut)	politics
affordable care act	politics	you didn't build that (you did not build that)	politics