2377 People Like this Article: The Influence of Others' Decisions on Yours

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Abstract

How do people make decisions about their preferences? We examine how others' opinions affect one's decisions. In Experiment 1, we found that popular online news stories were not inherently interesting, suggesting that something other than the content of the stories was driving people's liking of the stories. In Experiments 2 and 3, we manipulated information about how previous readers rated the stories. Participants in Experiment 2 rated the same stories as more or less interesting depending on whether they were told that those stories were rated high or low by others. In Experiment 3, more participants preferred the stories that were actually less popular when they received pseudo-information that more people liked those stories. Taken together, our results suggest that others' decisions can greatly influence not only people's decisions but also their actual liking and opinions. Examining how people's decisions influence and are influenced by others' decisions can shed light on how trend, culture, and community develop.

Keywords: Social learning; trends; conformity; decision making; interestingness; preference; social networks

Introduction

Did you like this story? Which wine do you like? Many online sites ask this type of question to gather data on people's opinions. Through these collective opinions, some items become widely popular and trends emerge.

How do people make decisions about their preferences? Some stories and wines may be inherently better than others, and people may prefer those with higher quality. In many situations, however, the quality of the items may be similar, and people may make decisions based on what others think about the items, rather than the content of the items. Furthermore, other individuals' opinions may influence one's perception of the item.

In the present work, we examine how others' opinions affect one's decisions. One unique aspect of the present work is that we examine decision-making behavior in an online community. Better understanding of how people make decisions in online environments is important because many individuals now use community-based Web services, such as Digg and Delicious. These new technologies allow users to share information with other individuals (Glushko et al., 2008), and thus the opinions of others are readily available in online environments.

We use Digg (digg.com) as an example. In Digg, users submit the Uniform Resource Locators of Web stories they like. Other users can digg or bury the submitted stories to vote for or against the stories. Users cannot digg the same story twice. Each digg reflects a user's liking of a story, and the total number of diggs for a story represents the popularity of the story. Digg displays the total number of diggs associated with each story. Digg promotes a story to the front page once it gains a certain number of supporters within a certain timeframe, and the story becomes prominent. Through this process, some stories collect a large number of votes.

What drives people's voting behavior? Do they vote for stories based on the interestingness of the stories? Or do they vote for stories based on how many others already support the stories? Does the information about the number of supporters a story already has influence one's perception of the interestingness of the story? We address these questions.

The Influence of Others

People often rely on other individuals' decisions to make their own (e.g., Cialdini & Goldstein, 2004). People may conform to other people's decisions because of their desire to make correct decisions under uncertainty (Sherif, 1935). Alternatively, people may adopt other people's decisions due to their desire to be liked and to not appear deviant (Asch, 1951). Another possibility is that people simply imitate the behavior of others (e.g., Gureckis & Goldstone, 2006). Imitation can increase people's efficiency by allowing them to try out solutions that they would not have considered otherwise (Bandura, 1965). Frequently imitated solutions are usually useful, and thus people may develop the expectation that solutions selected by more people are the useful ones. Indeed, organizations tend to adopt changes that are adopted most frequently by other organizations (Kraatz, 1998). People develop culture by adopting others' innovations (Dennett, 1995).

Consistent with these previous findings from social influence research, Salganik, Dodds, and Watts (2006) found that whereas good music was always popular (i.e., downloaded by many) and bad music was always unpopular, the popularities of the pieces in between could vary depending on whether or not the number of downloads the pieces had was publicly available. In our previous computer simulation work, a model that assumed that users followed other users' decisions did a good job of accounting for the popularity of news stories in Digg (Sakamoto et al.,

2008). Although the previous studies of social influence show that people are influenced in their decisions to download music, vote for a story, adopt frequent solutions, etc., these studies do not address whether or not people's actual liking and opinions are changed. Social comparison theory proposes that people have a drive to compare their opinions with others (Festinger, 1954), but it does not consider how opinions are changed.

Thus, the present work is a psychological extension of the previous work. We predict that information about how many supporters a story already has will not only influence people's decisions to vote for a story but also change their actual preferences and opinions about the interestingness of the story. This will produce a robust positive feedback loop.

In contrast to the past studies analyzing people's natural behavior in online environments, we conduct controlled experiments using materials from real environments. In Experiment 1, we examine a possible role of interestingness of Digg news stories in people's decisions. In Experiment 2, we investigate the extent to which the previous ratings of others influence people's ratings on the interestingness of news stories. In Experiment 3, we examine the role that the existing number of supporters plays in people's preferences for news stories.

Experiment 1

In Experiment 1, we test the possibility that some news stories become widely popular in Digg because they are inherently interesting and everyone votes for these interesting stories. If this is the case, stories with more past diggs or supporters should be rated more interesting by new raters than stories that fewer people supported. We selected some news articles in Digg with varying number of supporters. We asked participants to rate how interesting they thought the articles were, withholding the information about the number of diggs associated with the stories.

Method

Participants Twenty-one Stevens Institute of Technology undergraduates completed the experiment.

Materials Ten news stories were selected randomly from Digg with four constraints: they were not about exceptional events (e.g., the US election, the plane landing on Hudson river near Manhattan), they were promoted to the front page, they were submitted to Digg two to four days ago, and they differed in the number of supporters. We used stories that were promoted to the front page because most stories that are not promoted only receive a few diggs, and the variability in the number of supporters would be low. Because activities tend to settle down after one day of submission, we used articles that had been in Digg for two to four days. The number of supporters associated with the news stories (and the number of days in Digg) were: 7321 (3), 2388 (4), 1961 (2), 1209 (3), 823 (3), 613 (3), 514 (3), 426 (4), 320 (2), 223 (2).

Design and Procedure Participants were asked to read ten brief online news stories and indicate how interesting they thought the stories were, using a 5-point scale. They indicated their responses by circling the appropriate value. Figure 1 displays two stories used in Experiment 1. Information about the number of supporters was not provided to the participants. The order of the stories was determined randomly.

Pentagon to build robot soldier that won't commit war crimes
telegraph.co.uk — The American military is planning to build robot soldiers that will not be able to commit war crimes like their human comrades in arms. The US Army and Navy have both hired experts in the ethics of building machines to prevent the creation of an amoral Terminator-style killing machine that murders indiscriminately.
extremely boring 1 2 3 4 5 extremely interesting

Harvard Team Unlocks Clues to Genes that Control Longevity
dailygalaxy.com — Harvard Medical School Researchers have used a single compound to increase the lifespan of obese mice, and found that the drug reversed nearly all of the changes in gene expression patterns found in mice on high calorie diets--some of which are associated with diabetes, heart disease, and other significant diseases related to obesity.
extremely boring 1 2 3 4 5 extremely interesting

Figure 1: Two of the ten news stories from Digg used in Experiment 1 are shown (Shipman, 2008; Daily Galaxy, 2008). Participants rated how interesting they thought the stories were.

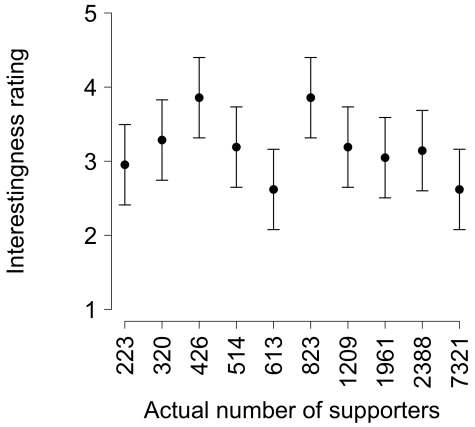

Figure 2: Participants' interestingness ratings in Experiment 1 are shown for each of the ten news stories. Actual number of supporters indicates the number of diggs for each story. Error bars represent the 95% confidence intervals (Loftus & Masson, 1994).

Results and Discussion

All participants were included in the analyses. Our main interest is whether people give higher interestingness ratings for stories that are supported by more Digg users than those that are supported by fewer users.

Surprisingly, the correlation between the number of supporters and interestingness ratings was negative (r = -.47). As suggested in Figure 2, the mean interestingness

ratings of the three stories associated with most supporters (2.94), the four stories associated with moderate number of supporters (3.21), and the three stories associated with fewest supporters (3.37) did not differ significantly, $F(2, 40) = 2.37$, $p = .11$.

Although a sample of undergraduate students may not be representative of the Digg population, the negative correlation between the number of supporters and interestingness ratings is clearly inconsistent with the idea that some Digg stories are inherently interesting, and people are supporting these interesting stories. There is no reason to believe that the students and the Digg users have opposite interests. On the contrary, if a story becomes popular because it is inherently interesting and appealing to a wide audience, it should be interesting to the students as well as the Digg users.

The stories used in Experiment 1 were all popular stories that were promoted to the front page in Digg. The participants might have been familiar with some of the stories, which influenced their decisions. We deal with this issue in Experiment 2.

Experiment 2

The negative correlation between the story's interestingness and its popularity in Experiment 1 suggests that the inherent interestingness of stories is not the reason people vote for the stories. One possibility is that people are supporting stories that many others support (Sakamoto et al., 2008). In particular, it may be that people's perceptions of stories change according to the opinions of others. When people have no strong feeling about a story, they may rely on how others feel about the story to make their own judgment.

In Experiment 2, we examine how one's decisions are affected by previous opinions of others. As in Experiment 1, we chose some news articles from Digg and asked participants to rate how interesting they thought the articles were. Unlike Experiment 1, we presented pseudo-information about the average ratings of previous readers for some of the stories. For example, Figure 3 shows two stories we used in Experiment 2. The top story has a previous rating of 2. The bottom story has a previous rating of 4. We reversed the ratings for half of the participants. We want to know if this manipulation will cause participants to flip their interestingness ratings, which would suggest that their decisions are influenced by the ratings of others.

Method

Participants Ninety-eight (37 females and 61 males) members of an online community (https://www.mturk.com) completed the experiment in return for a nominal stipend. Their ages ranged from 16 to 59 (M = 32.5, SD = 10.9, Median = 30).

Materials Six news stories were selected randomly from Digg with the constraints that they (1) were not about exceptional events, (2) were not promoted to the front page, (3) were submitted to Digg one day ago, and (4) had between 3 and 5 supporters. For Experiment 2, we used stories that were not promoted to the front page to minimize the possibility raised in Experiment 1 that participants might be already familiar with the promoted stories.

Two sets of stories were created. For both sets, the first and second stories had no information about the average ratings of previous readers. In the low-high set, the previous rating of the third story was 2, the fourth was 4, the fifth was 2, and the sixth was 4. Figure 3 shows the third and fourth stories from the low-high set. The experimenter determined these values. For the high-low set, the ratings were reversed – the third story had the previous rating of 4, the fourth 2, the fifth 4, and the sixth 2. There were questions that gathered demographic information, such as gender and age, at the end of the experiment.

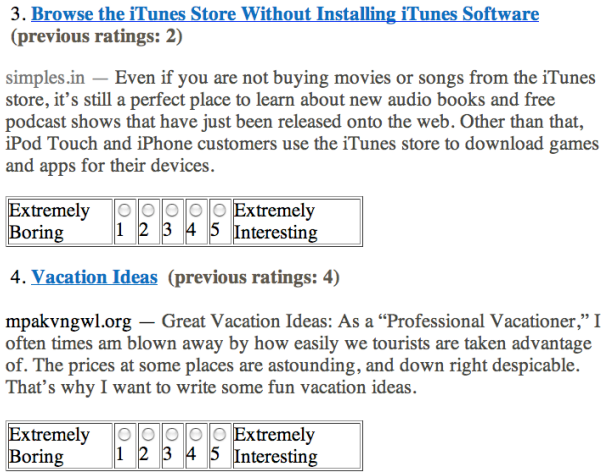

Figure 3: Two of the six news stories from Digg used in Experiment 2 are shown (Simple solutions, 2009; Mpak V, 2007). The third and the fourth stories had information about other people's previous ratings. Participants rated how interesting they thought the stories were.

Design and Procedure One group of participants, the low-high group, completed the low-high set, and another group, the high-low group, completed the high-low set. If people's decisions are influenced by previous ratings, there will be an interaction between Group (low-high vs. high-low) and Story (3/5 and 4/6) – compared to the low-high group, the high-low group will rate the third and fifth stories more interesting relative to fourth and sixth. The first and second stories with no previous ratings were used to measure whether the two groups differ in their interests.

Participants completed Experiment 2 online. They were instructed to read six brief online news stories and indicate how interesting they think the stories were using a 5-point scale. Unlike Experiment 1, information about the previous ratings of others was presented to the participants for some stories as described previously.

Results and Discussion

All participants were included in the analyses. A two-way Analysis of Variance (ANOVA) on participants' interestingness ratings on the first and second stories, with Group (low-high vs. high-low) and Story (first vs. second) as independent variables revealed no significant effects ($F < 1$ on the two main effects and the interaction effect). The two groups seem to have similar interests.

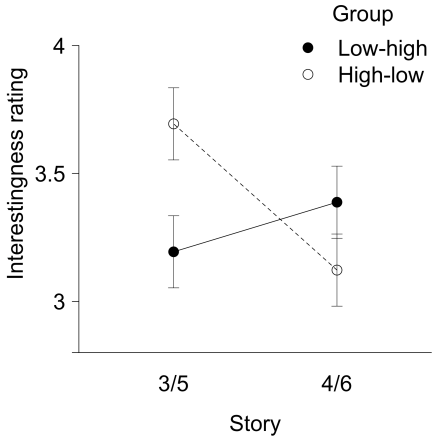

Figure 4: Participants' interestingness ratings in Experiment 2 are shown for stories 3/5 and 4/6. Stories 3/5 had previous ratings of 2 for the low-high group and previous ratings of 4 for the high-low group. Stories 4/6 had the reverse. Error bars represent the 95% confidence intervals (Loftus & Masson, 1994).

We are interested in an interaction between Group (low-high vs. high-low) and Story (3/5 and 4/6). For the purpose of analysis, we combined the ratings for the third and fifth stories (3/5) because they are the same type – low previous ratings for the low-high group, and high previous ratings for the high-low group. For the same reason, we combined the ratings for the fourth and sixth stories (4/5). We conducted a two-way ANOVA on participants' interestingness ratings on the 3/5 and 4/6 stories, with Group (low-high vs. high-low) and Story (3/5 and 4/6) as independent variables. As predicted, the interaction was significant, $F(1, 96) = 14.51$, $MSe = .49$, $p < .001$. As shown in Figure 4, whereas the low-high group rated stories 3/5 less interesting than stories 4/6 (3.19 vs. 3.39), the high-low group rated stories 3/5 more interesting than stories 4/6 (3.69 vs. 3.12). The main effect of Story approached significance, $F(1, 96) = 3.53$, $MSe = .49$, $p = .06$. The main effect of Group was not significant ($F < 1$).

As predicted, collapsing across Group and Story, the stories with previous ratings of 4 were rated significantly more interesting than the stories with previous ratings of 2 (3.54 vs. 3.16), $t(97) = 4.05$, $p < .001$. Thus, the participants gave lower ratings to the stories that had lower previous ratings and gave higher ratings to the stories that had higher previous ratings.

The results from Experiment 2 strongly suggest that people's decisions about the interestingness of stories are greatly influenced by the previous decisions of others. Stories were rated less interesting when we provided pseudo-information suggesting that they received low ratings from previous readers. The same stories were rated more interesting when we provided misinformation that suggested they received high previous ratings.

Experiment 3

Taken together, the results from Experiments 1 and 2 demonstrate that popular stories are not inherently interesting and that people rely on others' opinions to make decisions about the interestingness of the stories. Although a widely supported story may not be inherently interesting, people may think that it is interesting because numerous people are voting for it. The results from Experiment 2 suggest that how you perceive the quality of an item may change depending on other people's opinions.

In Experiment 3, we examine people's preference. In many situations we select one choice over the others. For instance, we need to choose which restaurant to go to for lunch. Similarly, Digg users are supposed to vote for stories they like instead of rating how interesting they find the stories.

In Experiment 3, two-alternative forced-choice questions were used to measure how people's preference might be affected by the previous decisions of others. As in the previous two experiments, we selected some news articles from Digg. Unlike the previous experiments, we asked participants to decide which of the two articles they liked better. Figure 5 shows a two-alternative forced-choice question we used in Experiment 3. Many more people liked the top story better than the bottom story. This pseudo-information is the reverse of the actual popularity of the stories in Digg. Information about how many others liked the story was not presented for the other question. Thus we are replicating Experiments 1 and 2 using the preference measure rather than the interestingness rating.

Method

Participants Seventy-eight (37 females and 41 males) members of an online community (https://www.mturk.com) participated in return for a nominal stipend. Their ages ranged from 17 to 60 ($M = 32.6$, $SD = 12.2$, Median = 29.5).

Materials Four news stories were selected randomly from Digg as in Experiment 1. For Experiment 3, we used stories that were promoted to the front page so that the stories vary in the number of supporters.

Two two-alternative forced-choice questions were created. Figure 5 shows one of them, in which we suggested that 2377 people liked one story and 827 people liked the other story. This false information was the reverse of the actual number of supporters associated with the stories in Digg. For the other question, in which no information about the number of people who liked the stories was provided, 2304 Digg users liked one story and 666 users liked the

other. There were also questions that gathered demographic information, such as gender and age, at the end of the experiment.

Design and Procedure The design and procedure for Experiment 3 were identical to those of Experiment 2 except that people indicated which story they liked rather than indicating the interestingness rating. Furthermore, there was only one condition in Experiment 3.

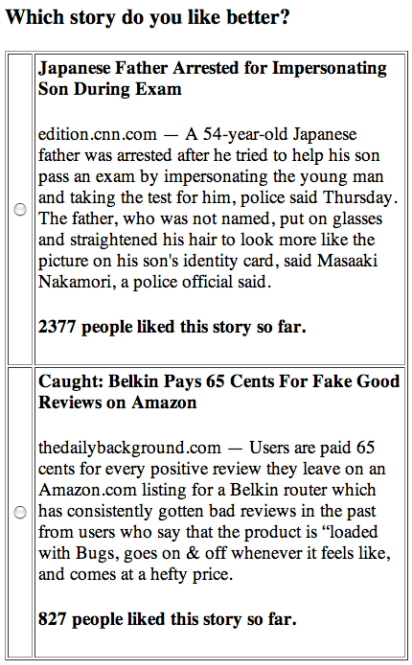

Figure 5: One of the two questions used in Experiment 3 is shown (the articles are Parsa, 2009 and Lah, 2009). Unlike Experiments 1 and 2, two-alternative forced-choice questions were used to measure how previous decisions of others might affect people's preference.

Results and Discussion

All participants were included in the analyses. Our main interest is whether the information about the number of supporters influences the participants' preference. Whereas 49 participants (63%) chose the story that they thought more people liked, 29 (37%) selected the story that they thought fewer people liked. As shown in Figure 6A, this pattern was the opposite of what was expected from the actual number of supporters in Digg (26% and 74%), $\chi^2(1, N = 78) = 55.79$, $p < .001$, suggesting that the information about the number of supporters played a major role in people's judgment about their own preference. This result replicates the finding of Experiment 2 using a different measure.

For the question without the information about the number of supporters, 44 participants preferred the story that was actually supported by 2304 users in Digg, and 34 preferred the story that was actually supported by 666 users. Replicating the results from Experiment 1, the observed pattern of preference (56% and 44%) was significantly different from the pattern expected by the actual number of supporters (78% and 22%), $\chi^2(1, N = 78) = 20.09$, $p < .001$, as displayed in Figure 6B.

The results from Experiment 3 suggest that, like interestingness, the decisions of others can greatly affect one's preferences. People are not focusing exclusively on the content of the stories.

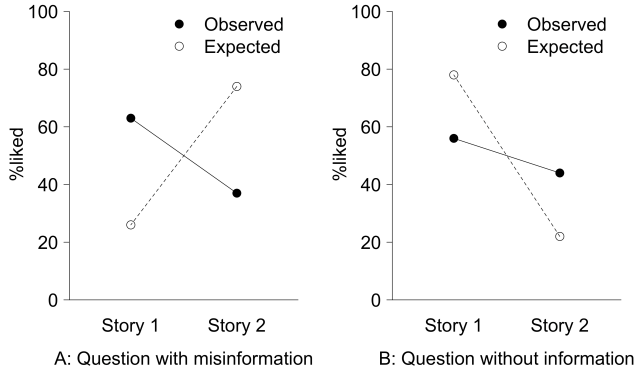

Figure 6: % of participants who liked the stories in Experiment 3 (observed) and % of participants expected from the actual number of supporters in Digg (expected) are shown for the question in which the pseudo-information about the number of supporters was given (A) and for the question in which the information about the number of supporters was not provided (B). For A, the pseudo-information said 2377 people liked story 1 and 827 people liked story 2. The actual numbers of diggs were reverse in Digg. For B, story 1 had 2304 diggs and story 2 had 666 diggs in Digg.

General Discussion

The current study examined how people's decisions and opinions are influenced by others' decisions. We found a negative correlation between the interestingness ratings and the popularity of the stories in Experiment 1. Participants in Experiment 2 gave stories lower interestingness ratings when they were misinformed that the stories were associated with low average ratings from previous readers. Interestingly, participants gave the same stories higher interestingness ratings when they were falsely informed that the previous ratings for those stories were high. In Experiment 3, more participants preferred the stories that were actually less popular in Digg when they were misinformed that more people liked those stories.

Taken together, our results demonstrate that people's liking of online news articles is not guided by the interestingness of the articles, but by the previous likings of others. Popular stories are not necessarily inherently interesting, and people rely on other people's opinions to make decisions. Although a widely supported story may not be inherently interesting, people may perceive it as interesting because many people like it. Our finding that

people prefer stories that are already popular is consistent with the principle of preferential attachment, which can characterize many social networks present in the real world (Barabási & Albert, 1999). Our work provides a psychological extension of previous work by showing that other people's opinions can actually change one's perception of an item. For instance, information about how many times a piece of music is previously downloaded may not only influences people's download decisions (Salganik et al., 2006), but also change their actual liking of the piece.

The interactions among people's decisions may play a major role in the emergence of trends. Many Websites allow people to share their opinions and learn from others. The collective opinions of a community can be more informative than the opinions of a few experts (cf. Surowiecki, 2004). Many people are attracted to online stores, such as eBay and Amazon, which provide information about collective preferences by listing the top selling items or the number of items available in stock. Furthermore, online shoppers can learn from other shoppers by consulting previous shoppers' ratings on products and their opinions about the products. Website users' interactions may also involve reciprocity (Sadlon et al., 2008). Users may purchase products from someone or vote for stories written by someone with the expectation that others will respond in kind. We are currently examining how some users follow *particular* others, and how influential individuals may emerge through this process of following.

While the present work used Digg as an example, our findings have broader relevance. When deciding where to eat lunch or which book to buy, information about other individuals' decisions is available. Crowding in a store indicates where everyone is going. The number of products left indicates which products people are buying. Although people may not be explicitly processing the information about others' choices, they may be unconsciously influenced by it. Examining how people's decisions influence and are influenced by others' decisions can shed light on how trend, culture, and community develop.

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