

## FULL PAPER

**User-generated opinion: How reader reactions and source reputation influence the effects of online news**

**Nutzergenerierte Meinung: Zum Einfluss von Leserreaktionen und Quellenangaben auf die Verarbeitung von Online-Nachrichten**

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### User-generated opinion: How reader reactions and source reputation influence the effects of online news

#### Nutzergenerierte Meinung: Zum Einfluss von Leserreaktionen und Quellenangaben auf die Verarbeitung von Online-Nachrichten

*Stephan Winter, Nicole C. Krämer & Yuhua (Jake) Liang*

#### In memory of Jake Liang

On August 11, 2017, Dr. Yuhua (Jake) Liang passed away after battling cancer for 10 months. Jake received his Ph.D. from Michigan State University and was an Assistant Professor of Communication at Chapman University, California. At age 37, he had published more than 20 peer-reviewed journal articles and was a rising star in the fields of persuasion and human-computer interaction. Jake was an inspiring and exceptional researcher, colleague, and friend – he will be greatly missed.

**Abstract:** On contemporary online news sites, readers are simultaneously exposed to journalistic articles and social reactions toward these messages. Two online experiments ( $N = 252$ ) addressed whether negative user reactions can attenuate the persuasive influence of the main article, and whether these effects depend on the reputation of the original source. Results showed a selective consideration of user-generated content: Readers took into account comments with high argument quality and ratings of a credible website but did not follow others' opinions if the comments merely contained subjective evaluations. On less reputable websites, user reactions were less influential. Findings are discussed with regard to the interplay of multiple sources.

**Keywords:** Online news, user-generated content, source credibility, reader comments

**Zusammenfassung:** Auf Online-Nachrichtenseiten sind neben den ursprünglichen Artikeln schon während der Rezeption soziale Bewertungen aus dem Mit-Publikum zu sehen. In zwei Online-Experimenten ( $N = 252$ ) wurde untersucht, inwieweit negative Nutzerreaktionen die persuasive Wirkung der Ursprungstexte abschwächen und ob dieser Effekt von der Reputation der Quelle abhängt. Die Ergebnisse zeigen eine selektive Berücksichtigung der nutzergenerierten Inhalte: Leser orientierten sich an Kommentaren mit hoher Argumentqualität und aggregierten Bewertungen auf der Webseite einer renommierten Quelle, ließen sich jedoch nicht von rein subjektiven Äußerungen beeinflussen. Bei weniger renommierten Quellen konnte kein Effekt der Nutzerreaktionen nachgewiesen werden. Die Befunde werden mit Blick auf das Zusammenspiel verschiedener Online-Quellen diskutiert.

**Schlagwörter:** Online-Nachrichten, Nutzerbewertungen, Quellenglaubwürdigkeit, Leserkommentare

**Acknowledgments:** The authors are grateful to Joseph B. Walther for his helpful suggestions and valuable feedback to this work.

## 1. Introduction

Reading news articles has become an increasingly social and interactive process. On online news sites, users have the opportunity to express their opinions on various topics to other readers. For instance, they may write comments, give ratings, or recommend specific articles to others. Although readers of traditional newspapers have also been able to write letters to the editors or have discussed news topics with their family or acquaintances (Chaffee, 1986), the advent of participatory websites has led to a new dimension of reader participation and interpersonal communication about journalistic articles: Comments sections, ratings or recommendation systems have become common and widely used elements of current newspaper websites (Stroud, Scacco, & Curry, 2016; Weber, 2014). Reich (2011) argues that “no other forum has been so open, offering such an immediate and unedited access to any citizen wishing to express a view about specific news as it unfolds” (p. 113).

While this development can definitely be interpreted as an advancement with regard to user participation and opportunities of deliberation, there has been concern about the potentially low quality of reader discussions (Coe, Kenski, & Rains, 2014) or that the audience may turn to popular topics and opinions instead of scrutinizing the quality of arguments themselves. From the journalists’ point of view, considering reader reactions might be helpful to get direct feedback on their work or to adapt their agenda to the demands of the audience. On the other hand, journalists may experience a potentially uncomfortable situation since the audience can criticize their work and this criticism is directly visible to other readers (see Ziegele & Quiring, 2013, for an overview).

The goal of this research is to examine these phenomena of reader participation from the perspective of media effects and to investigate the question of how the visibility of online user reactions changes the way in which individual readers process given news articles. Walther, Tong, DeAndrea, Carr, and van der Heide (2011) described the patterns of information processing on participatory websites as a juxtaposition of multiple sources (e.g., the main article published by a journalistic source such as *The New York Times*, and social reactions toward this message published by other readers), which all might exert influence on readers’ information processing (Houston, Hansen, & Nisbett, 2011). The present research aims to analyze the effects that are elicited by these different factors – and their interplay – with regard to readers’ attitudes toward the topic of the article and their perceptions of public opinion as central outcomes of online news consumption. Specifically, the focus of this work rests upon a comparison of different types of reader reactions (textual comments with high or low level of argument quality and statistical ratings) and potential interactions of these social informa-

tion with the original source (investigating the question of how the credibility of the main source may transfer to statements of the community of this website). In doing so, we aim to extend prior work that has demonstrated the general persuasive effects of comment valence (e.g., Lee & Jang, 2010; von Sikorski & Hänel, 2016) by examining boundary conditions regarding the context in which social influence by other readers occurs and by providing a systematic overview of different representations of user opinions.

## 2. Multiple sources on participatory online news sites

Within the juxtaposition of various types of information visible on participatory websites, Walther and Jang (2012) distinguish between proprietor content, user-generated content, and aggregated user representations. Applied to the setting of online news sites, the proprietor content typically consists of a news story presented on the website of a news media organization. When the content receives comments, ratings or recommendations by other users, this results in the display of user-generated content in the comments section or the display of statistical aggregations of user opinions (such as the number of “likes” or star ratings, as can, for example, be found on the German news site *Focus Online*). Regarding the proprietor content, the information about the original source may play a prominent role since the huge diversity of online information, social networking sites, and news aggregators such as Google News particularly promote greater selectivity between sources than in the days of print media (Kang, Bae, Zhang, & Sundar, 2011). As a result, source cues (that are prominently visible on the aggregator sites as well as on the main website of the sources) have become an increasingly important factor which may change the effects of news stories and connected reader reactions. The following sections will present theoretical considerations and first empirical results on the effects of these factors and their potential interactions.

### 2.1 User reactions

Compared to reading a printed newspaper article where only the journalist’s point of view is visible (Gunther, 1998), readers who are exposed to user-generated comments or ratings garner a direct impression of others’ opinions. Although newspaper readers may also get a sentiment of others’ potentially opposing views when discussing about the article, Lee and Jang (2010) name two important differences that are specific for the context of online news sites: “(a) exposure to both news and the audience’s reactions takes place simultaneously and (b) the boundary of (virtual) covievers is significantly expanded to entail much more diverse individuals” (p. 828).

Consistent with the notion that people tend to follow the opinions of others in ambiguous situations (Deutsch & Gerard, 1955), Web 2.0 research has shown that users pay attention to other-generated comments or ratings, for instance in the area of product reviews or online videos (e.g., Metzger, Flanagin, & Medders, 2010; Walther, DeAndrea, Kim, & Anthony, 2010). Regarding contradicting user reactions on news sites, it can thus be expected that readers perceive the visible

reactions as a representation of public opinion (Kim, 2015; Lee, 2012). Furthermore, it is likely that others' reactions can also have a direct influence on readers' own attitudes toward the topic (Von Sikorksi & Hänel, 2016; Walther et al., 2010) when processing the content. This effect may operate upon the heuristic that the majority is likely to be right (Chaiken, 1987) in the sense that recognizing others' negative evaluation may bias the processing of subsequent information in the direction of that feedback (Chaiken & Maheswaran, 1994). Beyond that, it is also conceivable that additional information or arguments that are included in the comments exert a persuasive influence under conditions of higher-effort processing if the quality of this content is high (Chaiken, 1987). Given these predictions with similar outcomes for information processing under high and lower effort, we posit the following general hypotheses:

*H1: Compared to those who only read the main article, readers who are exposed to negative user reactions perceive the public opinion on the topic as more discrepant from the article's position.*

*H2: Compared to those who only read the main article, readers who are exposed to negative user reactions report attitudes toward the topic more discrepant from the article's position.*

With regard to different types of user reactions, Lee and Jang (2010) distinguished between textual comments as exemplars which are based on the opinions of single users, and aggregate ratings as statistical information about larger proportions of the audience (e.g., the ratio of positive and negative evaluations of the article). The authors tested a moderating role of need for cognition (i.e., the tendency to enjoy complex thinking; Cacioppo & Petty, 1982) and hypothesized that individuals with higher need for cognition should consider the rating statistics more strongly than the less representative comments. However, this assumption was not supported by the data. Instead, their results only showed main effects of negative comments on the perception of public opinion and (albeit marginally) on readers' own attitudes while there were no such effects of negative ratings. The tendency for a general superiority of comments over ratings might be explained by exemplification theory (Zillmann & Brosius, 2000), which posits that vivid exemplars can outweigh base-rate information despite their lower level of representativeness (Lee & Jang, 2010). One further reason could be that comments are more specific since they include more information (for instance, on reasons for readers' disagreement). Therefore, we posit the following hypothesis as a further test of the pattern described above:

*H3: Negative comments have a stronger influence on readers' attitudes and perceptions of public opinion than negative ratings.*

While prior research mainly employed uniform patterns of comments, it has to be considered that there are many forms of user-generated statements on online news sites: Reader discussions vary dramatically with regard to the quality of comments (Ziegele & Quiring, 2013). In the public discussion, concerns about the questionable value of reader statements have been mentioned by journalists

and news media organizations (Reich, 2011). Comment quality may refer to the style of discourse (e.g., flaming or uncivil expressions) as well as to the arguments that are included by the authors. Regarding the former aspect, an experiment by Anderson, Brossard, Scheufele, Xenos, and Ladwig (2014) displayed uncivil or civil comments below a balanced article on nanotechnology: Results showed that readers' risk perceptions were more extreme (in the direction of their prior attitudes toward the topic) after being exposed to uncivil comments. As an extension of prior studies, this research focuses on the quality of the content that is produced by the comment authors. As prototypical patterns, we distinguish between comments that include relevant arguments regarding the topic of the article and merely subjective statements (which may indicate the same stance but do not back up their position with further arguments). Comments with relevant arguments can be seen as beneficial for the ideal of deliberation in the public online sphere (Papacharissi, 2002), while being persuaded by low-quality comments may be an undesirable effect of following the crowd. In the setting of Facebook, argumentative comments of negative valence tended to be more persuasive than subjective statements (Winter, Brückner, & Krämer, 2015). As mentioned above, models of information processing (Chaiken, 1987) posit that readers are persuaded to a stronger extent by high-quality arguments when they are in a mode of higher-effort processing. However, research by Park, Levine, Westerman, Orfgen, and Foregger (2007) also showed direct effects of argument quality under conditions of lower involvement. As readers of news sites are typically at least moderately interested in current events (Tewksbury, Hals, & Bibart, 2008), we test the following effect:

*H4: Comments with high argument quality have a stronger influence on readers' attitudes than comments with low argument quality.*

## 2.2 Interactions between source reputation and reader reactions

Besides the new opportunities of user participation, reading online news is also characterized by an almost unrestricted access to a huge diversity of news sources, which brings new attention to the question of how information about the source influences the way a specific article is evaluated. Traditional persuasion research has largely shown that messages ostensibly published by reputable sources are perceived as more credible and more persuasive (e.g., Hovland & Weiss, 1951; Greer, 2003). For the context of online news, Urban and Schweiger (2014) varied the journalistic quality of articles (for instance, with regard to impartiality) and the reputation of their source: Results showed that readers' quality evaluations were higher when the ostensible source was reputable, which showed a stronger impact than the actual variations in article quality.

What remains open, so far, is whether source reputation not only changes the way in which the original article is processed but also the perceptions of the reader reactions. Given that initial credibility judgments tend to rely on heuristics (Metzger et al., 2010), it is conceivable that readers transfer the reputation of the source to the community and pay more attention to the opinions of readers of the

*New York Times* than those of a smaller regional newspaper. This argument leads to the assumption that user reactions are considered more strongly if the overall source site is reputable. Otherwise, if initial credibility judgments are negative, user reactions might not be processed as thoroughly (Metzger, 2007; Wathen & Burkell, 2002). On the other hand, it is not clear whether readers equate the reputation of a source with the reputation of those who post comments or give ratings on its site. Due to considerations on the high selectivity on the Internet (Kang et al., 2011), the interpretation of commenters could be independent from the evaluation of the source, as readers might presume that the commenters found the article incidentally by searching for the topic on a news aggregator. If recipients evaluate the source and its active audience as distinct, the mere presence of user reactions might enhance the perceived credibility of a source since an active community signals that the contents attracted considerable attention and are therefore likely to be interesting. Given these potentially opposing directions, we propose the following research question:

*RQ1: Does the effect of user reactions on readers' attitudes depend on the reputation of the news source?*

### 3. Method

In order to investigate these hypotheses and research questions, we conducted an online experiment in which participants read a journalistic online article. As an exemplary topic that is societally relevant but does not include a strongly involved and polarized audience (in the target group of students and young adults), the controversy on risks and benefits of genetically modified food was chosen. In a 2x4 between-subjects experiment, we systematically varied the reputation of the source (high vs. low) and the displayed user reactions (comments with high argument quality vs. comments with low argument quality vs. ratings vs. none). Participants were randomly assigned to one of the eight conditions.

#### 3.1 Sample

A sample of 185 participants (134 female) completed the online experiment. The link for the study was distributed via bulletin boards, mailing lists and forums on two large German universities. Students were offered course credit by means of a personal codeword. Additionally, the study was announced in social networking communities. The mean age was 25.24 years ( $SD = 7.61$ ). Due to the recruitment, most participants (83.8 %) were students and a smaller proportion of participants was employed (14.8 %).

#### 3.2 Materials and pilot test

Based on existing articles related to genetically modified food, we constructed news stories and comments as stimulus materials. The first article (headline: "Biotech Food: 'A Chance to Cure World Hunger'") consisted of 383 words and sum-

marized positive aspects of genetically modified food (e.g., faster crop adaptation and the invention of “Golden Rice” to help children). The second article (“Biotech Food: ‘Serious environmental risks’”, 342 words) referred to unforeseen health risks and the problem of patent monopolies. Furthermore, we created ostensible reader comments on the topic. Based on the intended manipulation, these comments aimed to differ in the dimensions of argument quality (high and low) and stance (pro and con). High-quality comments included a relevant argument to the debate (e.g., “The development of genetic food does not really solve the hunger problem, which lies in food distribution rather than production. Poverty and the inability to buy food are the real problems”). Low-quality comments expressed subjective support or refusal of Biotech food without further reasoning (e.g., “I’ve never bought Biotech food and I am not going to buy something like that. We should just forget about that. In my opinion, this is completely against nature.”). For every category (pro–high quality, pro–low quality, con–high quality, con–low quality), four comments with a length of two or three sentences were written.

**Sample and measures.** 46 participants (23 female; age:  $M = 23.37$ ;  $SD = 2.63$ ) rated the material in a pilot study. Half of the sample participants received the pro article and the other half the con article. Afterwards, participants read all 16 comments. With regard to the main article, participants evaluated the position of the article toward Biotech food (three items, e.g., positive – negative; 5-point scales, Cronbach’s  $\alpha = .96$ ). Additionally, they indicated on 7-point scales whether the text was comprehensible and interesting as well as whether they had difficulties reading the text and to what degree they evaluated the arguments as convincing. With regard to the comments, every statement was rated with the items “incompetent – competent”, “not trustworthy – trustworthy”, and “low argument quality – high argument quality”, using 7-point scales. Due to the high internal consistency ( $\alpha$  between .84 and .92), the items were summed.

**Results of pilot study.** As intended, the pro and con articles differed with regard to the evaluation of their position ( $F(1, 44) = 82.38$ ;  $p < .001$ ;  $\eta_p^2 = .65$ ). There were no significant differences concerning comprehensibility, argument quality and interestingness. As a minor difference, participants indicated fewer difficulties in reading the pro article ( $F(1, 44) = 4.37$ ;  $p = .042$ ;  $\eta_p^2 = .09$ ). With regard to the comments, there was a strong effect of the quality manipulation on participants’ perceptions of quality ( $F(1, 45) = 257.53$ ;  $p < .001$ ;  $\eta_p^2 = .85$ ). Due to the slightly better ratings for comprehensibility, we selected the pro article as news story for the main study. Correspondingly, we mainly selected comments which provided a negative evaluation of Biotech food.

### 3.3 Independent variables

The experiment used a 2(source) x 4 (user reactions) between-subjects design. With regard to the source, the article was either displayed in the design of the website of a German national quality newspaper (*Süddeutsche Zeitung*) or in the design of the website of a smaller regional newspaper from the Eastern part of Germany (*Lausitzer Rundschau*). In a short survey for a prior study (Winter & Krämer, 2014) in which 33 additional participants (22 female, age:  $M = 27.61$ ;

$SD = 7.98$ ) had rated the credibility of various sources (on a scale from 1 to 9), results showed a significant difference between the two sources ( $F(1, 32) = 61.07$ ;  $p < .001$ ;  $\eta_p^2 = .66$ ): The *Süddeutsche Zeitung* was evaluated as highly credible ( $M = 7.36$ ;  $SD = 1.71$ ), while the *Lausitzer Rundschau* received lower (but still moderate) scores ( $M = 4.91$ ;  $SD = 1.18$ ). We did not choose a tabloid source with very low ratings since it would be unrealistic that the main article (written in an elaborate style) would appear in such a setting.

The visible user reactions either consisted of comments with high argument quality, comments with low argument quality (presenting merely subjective evaluations), or a statistical rating summarizing the votes of the readership. In a fourth condition, no user reactions were shown. As mentioned above, the user reactions mainly contradicted the slant of the article. As a typical distribution, given that reader statements are frequently critical but unanimous opinion climates are rare and may seem unrealistic (Metzger et al., 2010; Ziegele, Breiner, & Quiring, 2014), three out of four comments were negative toward the topic, while one comment was positive (either all high-quality or all low-quality). In a similar ratio, the statistical rating displayed that 76 % of the users rated the article negatively and 24 % positively (see Figure 1).

### 3.4 Measures

**Attitude toward the topic.** As a dependent variable, readers' attitude toward the topic was assessed after exposure to the online article. Participants indicated their agreement with five statements such as "Genetically modified food is a good way to cure world hunger", rated on a 7-point Likert scale between "strongly disagree" and "strongly agree". Items showed a high internal consistency ( $\alpha = .88$ ) and were averaged ( $M = 3.59$ ;  $SD = 1.37$ ).

**Perception of public opinion and media influence.** As an assessment of perceived public opinion, participants indicated the degree to which they think the general public would agree or disagree to the above statements ( $\alpha = .74$ ;  $M = 3.16$ ;  $SD = 0.94$ ; 7-point scales between "public would strongly disagree" and "public would strongly agree"; Lee & Jang, 2010). Furthermore, they were asked to estimate the percentage of the population that has a positive attitude toward Biotech food ( $M = 29.71$ ;  $SD = 14.90$ ). Three additional questions (e.g., "How much do you think will this article influence public opinion about the topic?" on a 7-point scale from "very little" to "very much") addressed the perception of media influence on others ( $\alpha = .73$ ;  $M = 3.56$ ;  $SD = 1.05$ ).

**Evaluation of the article.** A 7-point semantic differential with the item pairs "poorly written – well-written", "not useful – useful" and "dislike – like" measured readers' overall evaluations of the article ( $\alpha = .80$ ;  $M = 4.52$ ;  $SD = 1.04$ ). Further four items (on 7-point scales between "strongly disagree" and "strongly agree") measured whether participants rated the article as credible, whether arguments are of high quality, whether they trust the source of the article and whether they would recommend the text to others ( $\alpha = .84$ ;  $M = 4.04$ ;  $SD = 1.19$ ). The first two items which solely refer to the text and its quality were averaged as a measure of text credibility ( $\alpha = .82$ ;  $M = 4.34$ ;  $SD = 1.22$ ).

Figure 1. Examples of the stimulus material: Main article on the website of the low-reputation source with a statistical rating (left) and on the website of the high-reputation source with comments

**Gen-Food: Chance im Kampf gegen den Welthunger**

Forscher betonen positive Aspekte von gentechnisch veränderten Lebensmitteln

**Beurteilung anderer Leser:**  
 Hier stimmen! 25% positiv  
 Hier ablehnen! 75% negativ

Wie kann der Hunger in der Dritten Welt bekämpft und die Ernährung der Landwirtschaft gefördert werden? Diese Frage wird zwischen Ökologen und Bioethikern neuer Technologie heftig diskutiert. Aktuelle Statistiken zeigen, wie drängend das Problem ist: Nach Angaben der Vereinten Nationen leiden fast eine Milliarde Menschen auf der Welt an Hunger. Sind gentechnisch veränderte Lebensmittel eine mögliche Antwort auf den Hunger in der Welt oder ein Risiko für die Umwelt?

Genetisch veränderte Raps auf einem Ackerfeld. Foto: Peter Beyer/FAO, Bloomberg

Auf einer internationalen Tagung betonte ein renommierter Experte die Chancen, die mit Gen-Food verbunden sind. „Durch gentechnische Veränderungen kann eine schnellere Anpassung der Pflanzen bewirkt und damit der Ertrag auf biologischen Weg gesteigert werden, ohne dass auf Chemie zurückgegriffen werden muss“, sagt Paul Calver, Wissenschaftler der Universität Orléans. „Durch die Veränderung des Klimas mit einer Anstieg der Durchschnittstemperaturen und den steigenden Bevölkerungszuwachs in Afrika brauchen wir dringende eine schnelle Anpassung der Pflanzen an die neuen Gegebenheiten und eine Ertragssteigerung der Ernte.“

Obwohl Lebensmittelgenetiker zweifeln an diesem ist, sehen Kritiker Gen-Food nicht als richtigen Weg, um das Welt-Hunger-Problem zu lösen, da die Produktion und der Konsum von gentechnisch veränderten Lebensmitteln möglicherweise unvorhergesehenen Konsequenzen haben könnten. Das Londoner Amt für Wissenschaft und Technik konnte allerdings in einer aktuellen Studie keine Hinweise dafür finden, dass der Konsum tatsächlich schädliche Folgen hat.

Dabei glaubt Professor Calver, dass die Details über gentechnisch veränderte Lebensmittel durch politische und ideologische Vorurteile beeinflusst sei, die zum Beispiel durch die Angst vor der „großen, übermächtigen Wissenschaft“ oder durch romantische Vorstellungen über Herkömmliche Produktionen gestützt würden. In Abkehr von den Hochingen-Problemen, so Calver, wäre es unvernünftig, gentechnische Modifikationen aufgrund von Vorurteilen abzulehnen. „Jeder leidet die Gentechnik, aber der Klimawandel macht sie notwendig.“

**INFO: GEN-FOOD**  
 Gentechnisch veränderte Lebensmittel sind Lebensmittel, die aus gentechnisch veränderten Pflanzen, Tieren oder Organismen bestehen. Gentechnisch veränderte Organismen wurden gezielt durch gentechnische Methoden in ihrem Erbanlagen (DNA) verändert. Gen-Food kam erstmals in den frühen 1990er Jahren auf den Markt. Typische gentechnisch veränderte Lebensmittel sind Pflanzengewürze wie Sojabohnen, Mais, Raps und Baumwollsaat.

Ein Beispiel für eine vielversprechende Erfindung der Gen-Food-Industrie, die Neben Anpassung und Ertragssteigerung noch weitere Vorteile bringt, ist der Goldene Reis. Diese gentechnisch veränderte Pflanze wurde hergestellt, um Kindern zu helfen, die unter Vitamin-A-Mangel leiden. Bei der Herstellung der Pflanze wird in einer Synthese zweier Gene das Protein A Beta-Carotin codiert. Wenn diese Maßnahme Erfolg hat, könnte gentechnische Lebensmittel eine neue große Revolution anstoßen.

Prof. Pflanz-Andreas, Professor für Lebensmittel, Ernährung und Politik an der Cornell Universität in New York, unterstützt diese Position. „Bevor die Gentechnologie Ertrag in der Landwirtschaft fördert, muss sie genteelt werden. Wir sollten uns aber in keinen darüber sein, dass es eine verlässliche Chance wäre, sie überhaupt nicht freizugeben.“

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**Looserkommentare (4)**

**Apher**  
 Die Überlegung von Gen-Food bei dem Hunger-Problem nicht wirklich, wenn es nicht bei der entsprechenden Nutzung von Nahrung (Produkten) kommen wird. Das heißt, es ist der entsprechende, nicht der genetische, Faktor ein Grund. 13.08.2011 um 10:57 Uhr

**Amade**  
 Ist denn die gentechnische Erzeugung von den neuen Lebensmitteln helfen. Wenn diese es ist, es ist ein neues Lebensmittel und Pflanzen. Abhängig von, es ist die DNA in einem Lebensmittel verändert. Die gesamte natürliche Lebensmittel. 13.08.2011 um 12:30 Uhr

**Koehn**  
 Wenn die neue Technologie helfen kann, Nahrung zu produzieren, bis es nicht sicherzustellen, wenn es nicht abgelehnt werden soll. Gentechnische Erträge die Heranzüchtung beschleunigen und damit einen Beitrag zur Lösung des Hungerproblems leisten. 13.08.2011 um 15:58 Uhr

**Schlotz**  
 Es ist nur ein wissenschaftlich argumentieren. Die Überlegung von gentechnischen Essen nicht wirklich genötigt werden. Es kommt also haben die, die Überlebensrisiko von Gen-Food auf sich zu lassen. 13.08.2011 um 17:01 Uhr

**Manipulation checks.** With the items from the pilot study, we assessed how participants evaluated the position of the article ( $\alpha = .91$ ) and the user reactions (comments:  $\alpha = .76$ , rating:  $\alpha = .94$ , with a further option if participants did not see the comments/rating). In the comment conditions, twelve items (McCroskey & Teven, 1999) on a 7-point semantic differential regarding competence (e.g., “unintelligent – intelligent”) and trustworthiness (e.g., “dishonest – honest”) measured participants’ evaluation of the commenters ( $\alpha = .85$ ).

**Reader characteristics.** Participants’ tendency to enjoy complex thinking was assessed with the German version of the need for cognition scale (Bless, Wänke, Bohner, Fellhauer, & Schwarz, 1994; Cacioppo & Petty, 1982 / 16 items on a 5-point scale between “strongly disagree” and “strongly agree”,  $\alpha = .85$ ;  $M = 3.62$ ;  $SD = 0.55$ ). Five original items (e.g., “I frequently think about the topic of Biotech food” / 7-point scale between “strongly disagree” and “strongly agree”) measured the personal relevance of the topic ( $\alpha = .86$ ;  $M = 2.68$ ;  $SD = 1.17$ ).

## 4. Results

### 4.1 Manipulation Checks and Final Sample

Participants who indicated that they had not read the comments or the ratings were excluded from further analyses. Furthermore, data from participants who had viewed the main stimulus for less than 20 seconds and one participant who – according to the codeword – filled out the questionnaire twice were removed. This resulted in a final sample size of 160 participants (72,5 % female, age:  $M = 25.41$ ;  $SD = 7.86$ ).<sup>1</sup> As intended, participants perceived the text’s position as more positive toward Biotech food ( $M = 3.89$ ;  $SD = 0.68$ ) than the position of the comments ( $M = 2.19$ ;  $SD = 0.58$ ;  $F(1, 78) = 230.53$ ;  $p < .001$ ;  $\eta_p^2 = .75$ ) and the rating ( $M = 2.13$ ;  $SD = 0.67$ ;  $F(1, 32) = 176.41$ ;  $p < .001$ ;  $\eta_p^2 = .85$ ). Participants who read the high-quality comments evaluated the commenters more positively ( $M = 4.54$ ;  $SD = 0.73$ ) than those who were exposed to low-quality comments ( $M = 4.11$ ;  $SD = 0.68$ ;  $F(1, 76) = 7.56$ ;  $p = .007$ ;  $\eta_p^2 = .09$ ).

1 To check whether the randomization procedure led to a balanced distribution of gender, education, and age, chi-square tests with condition and gender/education as well as an ANOVA for age were conducted. According to the findings, gender and education did not differ significantly, however, participants in the conditions with the low-reputation source ( $M = 27.64$ ;  $SD = 9.61$ ) were older than in those with the high-reputation source ( $M = 23.32$ ;  $SD = 4.97$ ;  $F(1, 157) = 12.89$ ;  $p < .001$ ;  $\eta_p^2 = .08$ ). Differences also appeared within the low-reputation conditions ( $F(3, 73) = 2.74$ ;  $p = .049$ ;  $\eta_p^2 = .10$ ) in that participants in the condition without user reactions were significantly older than those in the condition with high-quality ( $SE = 3.10$ ;  $p = .049$ ) and low-quality ( $SE = 3.07$ ;  $p = .019$ ; post-hoc tests (LSD)) comments, while there were no significant differences among the high-reputation conditions. To alleviate this potential problem, further analyses with age as an additional covariate were conducted. However, when interpreting the findings, it has to be noted that the distribution of prior attitudes may not have been balanced in the low-reputation conditions.

## 4.2 Hypothesis Tests

For initial tests, we conducted analyses of variance (ANOVA) with source reputation and user reactions as independent factors.

For the perception of public opinion, the ANOVA did not show significant main effects of source reputation ( $F(1, 152) = 0.87; p = .352; \eta_p^2 = .01$ ) and user reactions ( $F(3, 152) = 1.50; p = .217; \eta_p^2 = .03$ ) and no significant interaction ( $F(3, 152) = 0.08; p = .970; \eta_p^2 = .00$ ). Similarly, the perception of the article's influence on others and the estimated percentage of supporters of Biotech food remained unaffected by the manipulations ( $F < 1.28$ ). Therefore, H1, which posited that contradicting user reactions would influence perceptions of the opinion climate, is not supported.

For readers' attitudes toward the topic, results showed an effect of source reputation which was slightly beyond the conventional level of significance ( $F(1, 152) = 3.60; p = .060; \eta_p^2 = .02$ ) and no main effect of user reactions ( $F(3, 152) = 1.38; p = .253; \eta_p^2 = .03$ ). Instead, a significant interaction between source reputation and user reactions ( $F(3, 152) = 3.27; p = .023; \eta_p^2 = .06$ ) emerged. An additional analysis of covariance (ANCOVA) including need for cognition, personal relevance, and participant's age showed a significant influence of the latter two variables<sup>2</sup> (in the direction that older people and those for whom the topic is personally relevant express more negative attitudes), while the interaction remained marginally significant ( $F(3, 148) = 2.31; p = .079; \eta_p^2 = .05$ ). According to the mean values (see Table 1), the main article tended to be more persuasive when it was attached to the high-reputation source. With regard to the user reactions, there were larger differences in the groups with the reputable source: While readers of the main article without user reactions expressed a positive attitude toward Biotech food (in line with the position of the text), attitudes were more negative when negative high-quality comments or a negative rating were shown. Comments with low argument quality, however, did not lead to a more negative attitude. As a further investigation of the interaction, we conducted separate ANOVAS for the subsamples of the high- and the low-reputation source. Results showed a significant main effect of user reactions for the reputable source ( $F(3, 78) = 3.04; p = .034; \eta_p^2 = .11$ ), but this effect did not occur among the participants who saw the article on the website of the low-reputation source ( $F(3, 74) = 1.68; p = .179; \eta_p^2 = .06$ )<sup>3</sup>. Here, the mean values show smaller differences between the groups (against expectations, the most negative mean value emerged in the group in which no negative user reactions were shown).

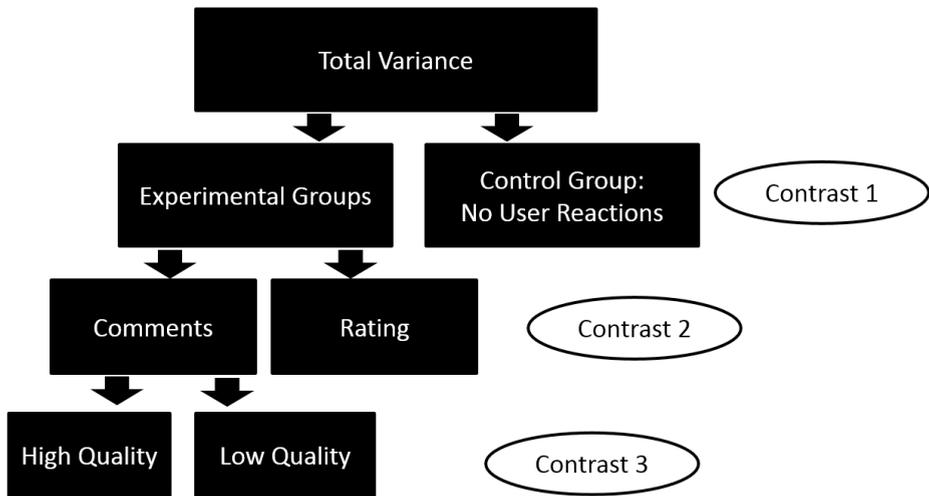
2 The ANCOVA showed significant effects of personal relevance ( $F(1, 148) = 18.28; p < .001; \eta_p^2 = .11$ ) and age ( $F(1, 148) = 4.831; p = .030; \eta_p^2 = .03$ ). While the interaction between source and user reactions remained marginally significant, the effect of source reputation was absent in the ANCOVA.

3 The same pattern of results emerged in the ANCOVA with personal relevance, need for cognition, and age as covariates.

**Table 1. Effects of source reputation and user reactions on readers' attitude toward the topic (Mean values and standard deviations)**

	High Reputation	Low Reputation	Total
No User Reactions	4.15 (1.24)	2.76 (1.54)	3.53 (1.54)
Rating	3.25 (1.45)	3.67 (1.57)	3.47 (1.51)
Low-Quality Comments	4.17 (1.16)	3.63 (0.95)	3.91 (1.09)
High-Quality Comments	3.39 (1.21)	3.31 (1.51)	3.35 (1.35)
Total	3.77 (1.31)	3.36 (1.43)	3.57 (1.38)

To address the effects of the different types of user reactions, we conducted contrast analyses (see Figure 2). As a test of H2, we compared the control group with the three experimental groups in which contradicting user reactions were displayed (contrast 1). In the second contrast, we compared the two groups which displayed textual comments with the statistical rating (H3), and in the third contrast, only high-quality and low-quality comments were included (H4).

**Figure 2. Overview of contrast analyses for the effects of user reactions**

In the whole sample, only the third contrast showed a significant difference ( $t(70.96) = 2.05$ ;  $p = .022$  (one-tailed))<sup>4</sup>. That is, comments with high argument quality were more persuasive than comments with low argument quality. For participants who read the article in connection with a high-reputation source, analyses showed significant differences for the first ( $t(78) = -1.74$ ;  $p = .043$  (one-tailed)) and the third contrast ( $t(78) = 1.97$ ;  $p = .026$  (one-tailed)), indicating that contradicting user reactions changed readers' attitudes in comparison to the con-

4 Due to a significant Levene test ( $p = .033$ ), values for the assumption of non-equal variances are reported.

trol group without user reactions, and particularly when comments were of higher quality. For the low-reputation source, analyses only detected a significant difference in the first contrast ( $t(74) = 2.05$ ;  $p = .044$ ), but according to the mean values (see above), this difference was opposite to the expectations of H2.

In summary, the expected pattern of H2 was only supported for the high-reputation source (RQ1). Since there were no differences in the second contrast between ratings and textual comments, H3 was not supported by the data. The significant differences between comments with low and high argument quality in the whole sample support H4.

In additional analyses, no significant effect on the overall evaluation of the text emerged. However, the perception of credibility was significantly affected by source reputation ( $F(1, 152) = 9.55$ ;  $p = .002$ ;  $\eta_p^2 = .06$ ). The same pattern emerged for the two-item-construct that solely referred to text credibility (Welch's  $F(1, 136.31) = 7.18$ ;  $p = .008$ ): The text was perceived as more credible when it was attached to the quality newspaper ( $M = 4.60$ ;  $SD = 1.00$ ) in comparison to the regional newspaper ( $M = 4.06$ ;  $SD = 1.44$ ).

## 5. Follow-up study

While the results for the high-reputation source largely supported our hypotheses on attitude formation (in that negative user reactions and particularly comments with high argument quality attenuated the persuasive influence of news stories), the results for the low-reputation source were unexpected. As mentioned above, there was no main effect of the ANOVA concerning the effect of user reactions on readers' attitudes in the subsample of the low-reputation source, which could imply that user reactions are not influential if the overall website is less reputable. On the other hand, contrast analyses showed that readers in the control condition expressed a more negative attitude toward the topic (which does not follow the positive slant of the article) than readers who additionally saw negative user reactions. This counterintuitive finding might indicate a credence effect in that the mere presence of an active community might have enhanced the credibility of the whole site and therefore amplified the persuasive effect of the main article. However, due to the unexpected direction (and in light of the imbalanced distribution of age between the conditions with the low-reputation source which may have led to an uneven distribution of prior attitudes), this finding warrants replication. Therefore, we decided to conduct a follow-up study with a different low-reputation source in order to give a more substantiated answer to RQ 1.

### 5.1 Method

The basic structure, stimulus texts and all measures were adapted from Study 1. However, we chose a different newspaper to rule out the possibility that the observed pattern only occurred for this specific source. Based on our pretest data, we selected the *Main-Post*, a newspaper from Southern Germany, which received credibility values ( $M = 5.12$ ;  $SD = 1.02$ ) that were similarly moderate as for the selected lower-reputation source in Study 1.

**Independent variable.** As between-subjects factor, we varied the user reactions (comments with high argument quality vs. comments with low argument quality vs. statistical rating vs. none). Two further conditions with a different distribution of commenters' opinions (which were created for a further research project but collected in the same dataset) were not considered for this analysis.

**Sample.** A total of 105 participants (74.3 % female; age:  $M = 22.57$ ;  $SD = 5.23$ ) completed the online experiment. They were mainly recruited at a large German university (for course credit) or in online forums with the opportunity to win two 25 Euro gift cards. Most of the participants (92.4 %) were students.

**Measures.** As in Study 1, we measured readers' attitude toward the topic ( $\alpha = .90$ ;  $M = 3.67$ ;  $SD = 1.47$ ), their assessment of the public's attitudes ( $\alpha = .80$ ;  $M = 3.09$ ;  $SD = 1.04$ ), the estimated percentage of Biotech food supporters ( $M = 29.55$ ;  $SD = 15.74$ ) as well as the perceived influence of the article ( $\alpha = .72$ ;  $M = 3.50$ ;  $SD = 1.04$ ). Furthermore, participants indicated their overall evaluation of the article ( $\alpha = .87$ ;  $M = 4.53$ ;  $SD = 1.19$ ) and their perception of credibility ( $\alpha = .87$ ;  $M = 4.12$ ;  $SD = 1.27$ ). Additional measures included readers' need for cognition ( $\alpha = .86$ ;  $M = 3.46$ ;  $SD = 0.58$ ) and the perceived relevance of the topic ( $\alpha = .90$ ;  $M = 2.97$ ;  $SD = 1.47$ ).

## 5.2 Results

Participants who read the main article for less than 20 seconds or who indicated that they had not noticed the user reactions were excluded. This resulted in a sample size of 92 (age:  $M = 22.59$ ;  $SD = 5.53$ )<sup>5</sup>. The text was perceived as more positive toward genetically modified food ( $M = 3.84$ ;  $SD = 0.73$ ) than the comments ( $M = 2.10$ ;  $SD = 0.45$ ;  $F(1, 47) = 145.23$ ;  $p < .001$ ;  $\eta_p^2 = .76$ ) and the rating ( $M = 2.00$ ;  $SD = 0.87$ ;  $F(1, 19) = 69.91$ ;  $p < .001$ ;  $\eta_p^2 = .79$ ). Commenters were evaluated more positively ( $M = 4.70$ ;  $SD = 0.53$ ) when high-quality arguments were displayed ( $F(1, 46) = 30.86$ ;  $p < .001$ ;  $\eta_p^2 = .40$ ) than when comments included low-quality arguments ( $M = 3.70$ ,  $SD = 0.70$ ).

An ANOVA with user reactions as a fixed factor did not show significant effects on readers' attitude toward the topic ( $F(3, 88) = 0.37$ ;  $p = .777$ ;  $\eta_p^2 = .01$ ) and their perceptions of public opinion ( $F(3, 88) = 0.53$ ;  $p = .663$ ;  $\eta_p^2 = .02$ ). For a more specific analysis of the different types of user reactions, we conducted contrast analyses following the pattern of Study 1 (see Figure 2). However, results did not show significant differences in the impact on readers' attitudes. In summary, the results did not replicate the potential credence effect of the first study; rather, results suggest for RQ1 that user reactions are not influential on lower-reputation sites.

5 Randomization checks with chi-square tests and ANOVA showed that gender, education, and age did not differ significantly between the conditions. The pattern of results for the hypothesis tests did not change when including personal relevance, need for cognition, and age as covariates.

## 6. Discussion

The goal of this research was to examine how the visibility of (contradicting) user reactions influences the way in which recipients process news and to compare different types of these reactions (comments of high and low argument quality as well as statistical ratings). Furthermore, since the Internet particularly fosters selectivity between different news outlets, we examined whether the above mentioned patterns differ for high- and low-reputation sources.

Most importantly, an interaction effect of source reputation and user reactions affected readers' attitudes toward the topic. Further analyses in the subsamples showed a main effect of user reactions for the high-reputation but not for the less reputable source. According to contrast analyses for the whole sample, there was no general difference between participants who only read the main article and those who read further contradicting user reactions, but there was a significant difference between readers of low-quality and high-quality comments: That is, user comments with relevant arguments to the topic were effective in influencing other readers, while merely subjective comments (expressing the same opinion but without further reasoning) were not. In an extension of prior studies on reader comments (Anderson et al., 2014; Lee & Jang, 2010; von Sikorski & Hänelt, 2016), this clarifies the conditions under which user feedback can change the intended persuasive effect of the original message (Walther et al., 2010) and underlines the central role of argument quality (Park et al., 2007). According to additional moderation analyses with need for cognition, this effect was not more pronounced among people who enjoy complex thinking (Cacioppo & Petty, 1982) but also emerged among individuals with lower need for cognition<sup>6</sup>. This might suggest that the high-quality comments in the present manipulation are not strong enough to be particularly appealing for high-NFC individuals (see Winter et al., 2015). However, more research is needed to clarify whether this group might generally be skeptical to follow others' opinions

In the group of participants who read the article on the reputable website, results showed a stronger tendency for negative user reactions to attenuate the persuasive effect of the main article. Readers of the control group with no user reactions followed the positive position of the article, contradicting high-quality comments and a negative aggregate rating led to a more negative attitude. At the same time, readers remained unaffected by comments with low argument quality. This finding was not in line with our hypothesis which – based on exemplification theory (Zillmann & Brosius, 2000) and prior results by Lee and Jang (2010) – posited a superiority of comments as vivid exemplars over less concrete statistics. Rather, this result suggests that readers perceive user ratings of a credible website

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6 To test a potential moderation effect of need for cognition, we conducted an additional analysis with a regression including comment quality, NFC, and the interaction as predictors. However, both in Study 1 and 2, the interaction term was not significant. A marginal interaction ( $B = 1.17$ ,  $p = .087$ ) only emerged in the subsample of Study 1 with the high-reputation source, but in the tendency that lower NFC-individuals tended to be persuaded more strongly by the argumentative comments ( $t = -2.75$ ,  $p = .009$  for one standard deviation below the mean of NFC).

as a useful source (Metzger et al., 2010) and also engage in relatively thoughtful checking of the comments' quality.

For the lower-reputation source, a different pattern emerged: First, there were smaller differences between the different versions of user reactions – second, contrast analyses showed that readers who only read the positive article without negative user reactions expressed the most negative attitude toward the topic. This unexpected finding could have been the result of a credence effect in that seeing that people actively discuss topics might have made the whole site more credible. Thereby, the persuasive effect of the main article may have been enhanced through the user reactions. However, since there was no main effect and a rather small deviation, we aimed to replicate the finding with a different lower-reputation source and did not find this pattern in the follow-up study. These results lead to the interpretation that user reactions are predominantly influential if the overall site is credible (but not on lower-reputation sites). This is plausible insofar as a preliminary attribution of credibility can be seen as a prerequisite for further processing (Wathen & Burkell, 2002). Apparently, readers are quite selective in considering only user-generated content which is of high quality or represents a reputable community.

Besides the interaction effect with user reactions, source reputation also exerted a main effect on the perception of message credibility, which replicated prior findings (e.g., Greer, 2003) and underlines the importance of source information in the context of online journalism (Urban & Schweiger, 2014). The effect of source information on readers' attitudes, however, did not reach the conventional level of significance. Given that readers of online news typically have a general interest in current affairs (Tewksbury et al., 2008) but are not directly affected by most of the topics, the tendency of better evaluations for reputable sources would be consistent with notions that source information can bias the processing of subsequent arguments among moderately involved readers (Chaiken & Maheswaran, 1994).

With regard to the multiple sources framework (Walther & Jang, 2012), the effects of source reputation and reader reactions demonstrate that both the source of the original message and social reactions toward this message affect readers' attitudes when consuming online news. Perhaps most interestingly, these factors predominantly operate in interaction with each other, which indicates a complex interplay of classic news factors and social reactions. Concerning readers' perceptions of public opinion, however, results did not show any effects of the user reactions. This is surprising since comments and ratings (even though they are not representative) do provide some hints on how other people think about a specific topic (Lee & Jang, 2010). Perhaps participants (for whom the topic was not of high personal relevance) did not anticipate future discussions on the topic and were therefore less interested in gauging the opinion climate (Winter & Krämer, 2016). The current findings suggest that readers rather take these cues as (non-representative but helpful) additional information and include them in their attitude formation (which, basically, is an even stronger media effect).

As limitations of the present research, the highly educated sample, the use of only one exemplary topic (that may have specific characteristics that do not transfer to other topics), and the forced exposure setting might restrict its gener-

alizability. The one-sided news article that was shown as stimulus might represent a less common scenario (since most journalists would try to cover both sides of the debate, with the exception of opinion pieces) – this specific manipulation was chosen to test the effects of disagreement between journalists and commenters. As statistical ratings are less typical of news content than of product reviews, the manipulation may have appeared slightly artificial. Furthermore, the comments were more uniform than most of the diverse reader discussions that can be found online. Future research could address the distribution of the opinion climate within the comments or a potential negativity bias (do negative comments “count” more than positive statements? Is one negative comment enough to arouse readers’ doubt?) or the order of the comments (Is the quality of the first comment decisive for the attribution of credibility toward the community?). With regard to the source manipulation, we had chosen two newspapers that differ in reputation but also in the degree to which readers are familiar with them. Therefore, future studies may test whether popularity of and familiarity with the source or its reputation with regard to the standards of journalism are more important.

In terms of practical implications, the results might give cause for optimism with regard to Internet users’ skills of deliberation (at least with regard to readers with relatively high levels of education): They are likely to pay attention to other users if their voices appear to be credible but do not follow the crowd if the visible speakers only express subjective statements without reasoning. However, it could also happen that comments that appear as competent at first sight might not be as well-informed as it seems. The fact that readers perceived articles that were attached to a high-reputation source (even if the content is the same) as more credible, which has typically been conceptualized as a heuristic which is less concerned with the true merits of the article itself, can also be seen as reasonable since prior experiences with specific sources can be a helpful strategy when making sense of the abundant information on the Web. Ideally, this should not lead to the consequence that high-quality articles from low-reputation sources are disregarded from the beginning.

From the journalists’ point of view, their exclusive right to publish content is gone – and our results show that those voices out of the audience can indeed change the effects of their original messages. This might be undesirable at first sight – however, user reactions can also provide additional feedback to journalists and contain new ideas or suggestions for further stories and they can also foster deliberative discussions among readers. Due to worries about flaming or low-quality discussions, some news sites have closed their comment sections: While this might avoid the direct juxtaposition of contradicting comments, it also limits opportunities of reader retention and participation – as a result, users will probably discuss somewhere else. A more promising method might be to moderate reader discussions which is likely to lead to more comments with relevant arguments (see Stroud, Scacco, Muddiman, & Curry, 2015).

In summary, this research underscores that readers of online news sites include user reactions in terms of comments and ratings in their attitude formation and clarifies the conditions under which these effects occur: User reactions were particularly influential if the overall source is highly credible and if the content of the

comments include arguments that appear to be of high quality. Since user reactions were not decisive for readers' estimations of public opinion, this pattern is likely to be based on direct persuasive effects instead of indirect media influence. These findings provide insights into the interplay of multiple sources on participatory websites (Walther et al., 2011) and shows that the advent of user-generated content also leads to user-generated *opinions* which are less dependent on journalists.

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