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## FROM ENCYCLOPÆDIA BRITANNICA TO WIKIPEDIA

### Generational differences in the perceived credibility of online encyclopedia information

*This study examined the perceived credibility of user-generated (i.e. Wikipedia) versus more expertly provided online encyclopedic information (i.e. Citizendium, and the online version of the Encyclopædia Britannica) across generations. Two large-scale surveys with embedded quasi-experiments were conducted: among 11–18-year-olds living at home and among adults 18 years and older. Results showed that although use of Wikipedia is common, many people (particularly adults) do not truly comprehend how Wikipedia operates in terms of information provision, and that while people trust Wikipedia as an information source, they express doubt about the appropriateness of doing so. A companion quasi-experiment found that both children and adults assess information to be more credible when it originates or appears to originate from Encyclopædia Britannica. In addition, children rated information from Wikipedia to be less believable when they viewed it on Wikipedia's site than when that same information appeared on either Citizendium's site or on Encyclopædia Britannica's site. Indeed, content originating from Wikipedia was perceived by children as least credible when it was shown on a Wikipedia page, yet the most credible when it was shown on the page of Encyclopædia Britannica. The practical and theoretical implications of these results are discussed.*

**Keywords** information credibility; social media; user-generated content; Wikipedia; Web 2.0

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A critical feature of the contemporary media environment is the ability of users to be both information consumers and information providers. Information sharing among individual users can take a number of forms, ranging from the pooling of information in myriad venues (e.g. Bizrate.com, Amazon product ratings) to broadcast models of various sizes (e.g. blogs and microblogging) to interactive information-sharing domains (e.g. online discussion groups).

One important venue in which collectively produced information has burgeoned in recent years is online encyclopedias such as Wikipedia, where anyone can anonymously contribute entries or edit those provided by others. Indeed, Wikipedia has risen in its short history to be among the 10 most popular web sites in the United States, with nearly 3.5 million entries (Alexa 2009). Given that all of the content in Wikipedia is provided by anonymous individuals with unknown degrees of topic expertise, there has been a great deal of concern regarding the *credibility* of this information, particularly compared with more established venues like Encyclopædia Britannica, or other online alternatives such as Citizendium where entries are user-contributed but vetted by experts prior to their acceptance.

In addition, there are indications that generational differences may exist that affect both the use of online encyclopedias and perceptions of their information credibility. For example, children and adults may approach Wikipedia and other online encyclopedias quite differently. While youth are heavy users of Wikipedia for schoolwork and other pursuits (Rainie & Tancer 2007), children may not be very well equipped to determine the credibility of information they find online due to their relatively limited cognitive and emotional development, lack of life experience, and reduced familiarity with the media apparatus (Metzger & Flanagin 2008). Adults, by contrast, are more able to rely on their experience with traditional and perhaps digital media, which is enhanced by their relatively greater emotional and cognitive development and their life experiences. Yet, they may lack the same level of immersion with digital media that could help them to effectively navigate information credibility issues online. Nonetheless, very little is currently known about how such generational differences influence perceptions of the credibility of online information.

To explore the perceived credibility of user-generated versus more expertly provided online encyclopedic information among different user populations, we conducted two large-scale surveys whose results are generalizable to the US population of Internet users. These surveys examined people's use of Wikipedia and knowledge about its method of information provision, as well as their perceptions of its credibility among, first, 11–18-year-old children living at home and, second, adults 18 years and older. The surveys also included quasi-experimental stimuli that exposed participants to content in the form of actual encyclopedia entries from each of three different online encyclopedia sources (Wikipedia, Citizendium, and the online version of the Encyclopædia Britannica), while varying their placement among the three sources. In other words, we compared

*actual* and *perceived* information sources, across the three online encyclopedia sites in order to see how the context of online encyclopedia information interacts with the actual content to affect people's credibility judgments. Together, results of the survey and quasi-experiment provide the most comprehensive assessment to date of credibility perceptions across a range of information provision models in online encyclopedias, spanning generations.

## User-generated content and information credibility in online encyclopedias

Until recently, the enormous cost and complexity involved in producing and disseminating information greatly limited the number of information providers, who generally had substantial investment in either the information itself or in the apparatus required to deliver it. Digital network technologies like the Internet and web, however, have substantially lowered the cost of information production and dissemination, thereby increasing the sheer amount of information and the number of information sources available.

Aided by these changes, there has been a dramatic rise in 'user-generated content' in recent years, where individuals are increasingly responsible not just for consuming, but also for producing, many of the information resources available online (see, e.g. Mathes 2004; Bruns 2008; Ochoa & Duval 2008). User-generated content leverages the potential contributions of a wide variety of users, each of whom may contribute value in some manner to collective endeavors. The essential premise is that, given efficient means of information sharing, collective benefits will emerge from aggregated individual contributions. In this manner, it is argued that networked tools and applications can 'replace the authoritative heft of traditional institutions with the surging wisdom of crowds' (Madden & Fox 2006, p. 2). In contrast to a static information delivery platform, then, the wide-scale user-generation of content treats the Internet as a dynamic collaborative environment in which diverse information, opinions, experiences, and skills can be aggregated to provide substantial informational resources.

### *The perceived credibility of user-generated content*

With the appearance of user-generated information, however, come special problems for determining information and source *credibility*, which is a multifaceted concept that refers to the believability of some information or source. Credibility is generally thought to be composed of two primary dimensions: trustworthiness and expertise (Hovland *et al.* 1953; Tseng & Fogg 1999; Wathen & Burkell 2002; Rieh & Danielson 2007; Hilligoss & Rieh 2008; Jensen 2008), both of which have objective and subjective components. Trustworthiness is a receiver judgment, based primarily on subjective factors. Expertise can also be subjectively

perceived, but includes relatively objective characteristics of the source or message as well (see Tseng & Fogg 1999; Metzger *et al.* 2003 for extended discussions of these points).

Determining credibility accurately has always been problematic (Metzger *et al.* 2003), but specific challenges accompany accurately determining the credibility of user-generated content in the digital media environment. For instance, knowledge about the source of the information is crucial for credibility assessment because it is the primary basis upon which credibility judgments rest, and is often a reliable signal of expertise. However, in the case of digital media and user-generated content, information about the source is often masked or entirely missing. In other instances, information about the source is provided, yet hard to interpret, such as when information is co-produced, repurposed from one site, channel, or application to another, or when information aggregators display information from multiple sources in a centralized location that may itself be perceived as the source. In such cases, judgments about information credibility can be hampered by ambiguity about the actual source(s) of the information.

#### *Wikipedia as a user-generated information source*

Wikipedia presents a host of problems in evaluating the credibility of user-generated content. Not only does Wikipedia completely lack reliable source cues about who provides its content to all but the most savvy and diligent users, thereby rendering information content providers largely anonymous, it is further confounded with a dubious reputation about the quality of its content. Thus, the main elements of credibility – trustworthiness and expertise – are difficult to assess in the Wikipedia environment. For example, the lack of author identification makes it difficult to determine whether information is biased, since users cannot know the motives for information provision, and the lack of cues about the expertise of contributors similarly inhibits users' capacity to determine the accuracy of information provided. Accordingly, some people are severely distrusting of Wikipedia due to the fact that its information is not produced or vetted by experts (Metzger *et al.* 2010).

Despite concerns that user-generated content may be less credible than its expert-produced counterpart, studies suggest that the actual differences in accuracy may not be particularly great. For example, research has shown that user-created entries in Wikipedia have been found to be about as accurate as well-regarded print encyclopedias like Encyclopædia Britannica (Giles 2005; Andrews 2007; Williams 2008), and entries from Wikipedia have been evaluated as credible, particularly by area experts (Chesney 2006). Nonetheless, a great deal is still unknown about the perceived credibility of online encyclopedias, using user- versus expert-produced information, especially across different user groups who bring different experiences and perspectives to bear.

The content of online encyclopedias can be viewed on a continuum ranging from user-generated to expert-vetted based on their models of information provision and content creation. As noted, Wikipedia resides at the end of the continuum toward user-generated content since anyone can anonymously contribute or alter information on the site. At the other extreme is Encyclopædia Britannica, whose information has been provided for nearly 250 years by recognized experts worldwide. More toward the middle of the range is Citizendium, the online encyclopedia founded by Wikipedia co-founder Larry Sanger, whose entries are provided by volunteers who are identified by their real names, and where entries are in turn confirmed by experts prior to being posted on the site.

The prevalence of anonymous, user-generated information on Wikipedia, which coexists with more traditional and hybrid models of information provision found on Encyclopædia Britannica and Citizendium, illustrates the complex environment in which Internet users seek and consume online information today. For the most part, past research has confronted these differences as matters of information *quality*, by examining the accuracy of entries based on accepted knowledge or compared with expert-vetted information (e.g. Giles 2005; Chesney 2006). Such studies assess information accuracy as an objective fact. However, use of, reliance on, and opinions about information credibility are often more a matter of subjective assessment, in that individuals' credibility perceptions may or may not align with information accuracy. For example, people may believe information that is not completely accurate or disbelieve information that is truthful. Thus, individuals' perceived credibility of encyclopedic information and encyclopedia sources must be assessed in order to fully understand people's contemporary information consumption preferences and behaviors. We therefore pose the following research questions:

- RQ1*: To what degree do people use Wikipedia, know about how information is generated within it, and perceive it to be a credible information resource?  
*RQ2*: How does the perceived credibility of information on Wikipedia compare to other online encyclopedias with different information provision models?

The emphasis in past research on narrowly evaluating Wikipedia information in terms of its quality (or accuracy) focuses attention on *content* as the primary basis of information credibility evaluations, but this neglects other cues known to influence people's credibility perceptions. For example, research reveals additional factors beyond information quality that are critical in informing people's evaluation of trustworthiness and expertise (and therefore credibility), including source reputation, website genre, and site design (Tseng & Fogg 1999; Metzger *et al.* 2003; Flanagin & Metzger 2007).

It is therefore essential to consider the *context* of the information, which in the online environment is primarily manifest in the information venue, which is in turn composed of various features that influence users' credibility perceptions.

Warnick (2004), for example, argues that credibility judgments are made specific to the type or genre of web site, as other research has confirmed (Flanagin & Metzger 2007). In the case of Wikipedia, for instance, information may be judged on the basis of information consumers' perceptions of the credibility of the wiki model of user-generated information provision, and perhaps in comparison to other information provision models for encyclopedic information (like that of Encyclopædia Britannica and Citizendium, for instance). To date, however, assessments of online encyclopedic information quality have occurred independent of a consideration of the information context.

Content, in the form of information or message characteristics, and context, in the form of cues specific to a particular information venue, can interact in complex ways. For instance, information exhibiting elements shown to bolster perceived credibility can be denigrated when presented as if it originated from a low-credibility source. Similarly, low expertise sources can be elevated if information delivered by them is high in credibility. Past research on online encyclopedic information has never considered such potential interactions, focusing instead solely on information quality. Therefore, to address the role of information content, context, and their interaction, Research Question 3 asks:

*RQ3:* To what extent do people consider the informational *content* of encyclopedia entries (i.e. what they say) and the *context* of those entries (i.e. where the entry appears, for example, on Wikipedia, Encyclopædia Britannica, or Citizendium) in evaluating the credibility of online encyclopedic information?

## Generational differences in perceived information credibility

Although the nature of user-generated content generally, and Wikipedia specifically, poses new challenges for all users, children are a particularly intriguing group to consider with regard to online information credibility assessment because of the tension between their technical and social immersion with digital media, and their relatively limited development and lived experience compared with adults. On the one hand, those who have grown up in an environment saturated with networked digital information technologies may be highly skilled in their use of these media to access, consume, and generate information. Their special relationship to digital media greatly impacts the way they approach learning and research (Rainie 2006). There is also evidence that youth access an equal or greater proportion of information via digital media than do adults, suggesting that they may be more facile in using these tools to locate information compared with adults (Lenhart *et al.* 2005). As the first generation to grow up with interactive digital media, children today may be more comfortable with collaborating and sharing information, and

do so ‘in ways that allow them to act quickly and without top-down direction’ (Rainie 2006, p. 7).

This, of course, has profound implications for credibility construction and evaluation. The interactivity afforded by digital media has set up an expectation among many young people that they play roles of both information source and receiver simultaneously as they critique, alter, remix, and share content in an almost conversational manner using digital media (Rainie 2006). This suggests that in light of their special relationship to digital tools, children are especially well-positioned to navigate the complex media environment successfully.

On the other hand, many children are limited in terms of their cognitive and emotional development (Eastin 2008), life experience, and familiarity with the media apparatus (Harris 2008). This suggests that although youth may be talented and comfortable users of technology, they may lack critical tools and abilities that enable them to evaluate information effectively. Children’s relative lack of life experience, for instance, may put them at greater risk than adults for falsely accepting a source’s self-asserted credibility, since such assessments are based on accumulated personal experience, knowledge, source reputation, and examination of competing resources. In addition, children may not have the same level of experience with or knowledge about media institutions, including Wikipedia, which might make it more difficult for them to understand differences in editorial standards across various media outlets, compared with adults. As a consequence, some children may not have the same level of skepticism toward digital media as adults do, because these media are not seen as ‘new’ to younger users who cannot remember a time without them.

Despite these realities, examinations of children and digital media have often been somewhat crude, focusing, for example, on the popular generation gap caricature, where children are portrayed as technologically adept compared with adults. Such considerations fail to focus on what ‘growing up digital’ (Tapscott 1997) may mean for younger users who are not only immersed in digital media now but will be for the entirety of their lives. Indeed, no research to date compares these two populations in their credibility perceptions of online encyclopedias. Therefore, the following research question is proposed, which is an overarching complement to the preceding research questions, intended to focus on potential generational differences:

*RQ4:* Do generational differences exist between children and adult users, with regard to perceptions of online encyclopedia information credibility?

## Research design, method, and results

Data for this study come from two surveys of Internet users in the United States, one of which was administered to children and the other to adults. Both surveys

included questions regarding Wikipedia usage in general, which informed Research Questions 1 and 4, and also contained an embedded quasi-experiment, designed to assess specific differences among groups presented with experimental stimuli relevant to Research Questions 2–4.

### *Questionnaire design and survey administration*

The survey instrument was generated through a multi-step, multi-method process. To gauge the clarity, comprehensiveness, and relevance of the questionnaire for youth audiences, a small-scale focus group was conducted among children. Questionnaire modifications were made based on this feedback. This was followed by detailed survey assessment among 40 adults and 40 additional children, each of whom underwent hour-long face-to-face interviews, in which they provided feedback on questionnaire content, question wording, and general survey administration. A version of the questionnaire that was modified based on this feedback was then pilot-tested among 183 undergraduate college students and revised one final time based on these results.

The surveys were administered online in 2009 by Knowledge Networks, a professional research firm, using a probability-based panel of households representative of the entire US population. Two separate samples were drawn for this survey: households with children living at home between 11 and 18 years of age were identified and a sample was drawn at random from among these active panel members. Each age cohort was roughly equally represented; 2,747 children completed the survey and qualified for analysis. In addition, 3,991 adult Internet users in the United States completed the survey and qualified for analysis. Participants completed the questionnaire in their own homes, at their convenience, thereby making their survey experience as naturalistic as possible. All data were weighted such that results reported here are generalizable to either all child or adult Internet users in the United States.

### *Questionnaire measures and survey results*

Survey items were created to gauge people's use of, knowledge about, and perceived credibility of Wikipedia. Results of the survey showed that 98.7 percent of children who completed the survey had heard of Wikipedia, versus 97.5 percent of adults, although 9 percent of children and 19 percent of adults admitted that they did not know what Wikipedia is. Child and adult respondents not correctly identifying that Wikipedia is 'an online encyclopedia where anyone can contribute information' from among seven options (including, e.g. that 'Wikipedia is...' a 'social networking site,' a 'company that sells books online,' or 'an online encyclopedia where only experts are allowed to contribute



information') were excluded from all further analyses: 78 percent of children and 68 percent of adults made the correct identification.

Children ( $\bar{X} = 2.95$ ,  $SD = 1.14$ ) and adults ( $\bar{X} = 2.88$ ,  $SD = 1.15$ ) did not differ on the frequency with which they retrieved information from Wikipedia,  $t(4552.45) = 1.94$ ,  $p = 0.052$ , as measured on a five-point scale ranging from 1 = 'never' to 5 = 'very often.' Children did tend to 'write or change information on some Wikipedia page' ( $\bar{X} = 1.17$ ,  $SD = 0.52$ ) slightly more than adults ( $\bar{X} = 1.12$ ,  $SD = 0.44$ ;  $t(4089.87) = 3.73$ ,  $p < 0.001$ ), although only 12 percent of children and 9 percent of adults indicated they had ever written or changed information in Wikipedia, and those who had done so predominantly reported doing this 'rarely' or 'sometimes.'

Respondents also indicated their perceived credibility of Wikipedia information overall by their response to the question 'How much do you believe information on Wikipedia?' and their assessment of the extent to which others should believe Wikipedia by the question 'In your opinion, how much *should* people believe information on Wikipedia?' Both items were assessed on a five-point scale ranging from 1 = 'not at all' to 5 = 'a whole lot.' Children ( $\bar{X} = 3.04$ ,  $SD = 0.93$ ) and adults ( $\bar{X} = 3.07$ ,  $SD = 0.80$ ) did not differ on the degree to which they believed information on Wikipedia,  $t(4178.26) = -1.16$ ,  $p = 0.25$ . By contrast, adults reported that other people should believe Wikipedia information ( $\bar{X} = 2.93$ ,  $SD = 0.75$ ) more so than children reported that other people should believe information on Wikipedia ( $\bar{X} = 2.88$ ,  $SD = 0.87$ ;  $t(4202.29) = -2.36$ ,  $p < 0.05$ ). Both children and adults indicated that others should believe Wikipedia information less than they themselves did.

### *Quasi-experimental method*

In order to simulate participants' web-browsing experiences, and to evaluate their reactions to specific web content, a quasi-experiment was included as part of the broader survey to a random sample of survey respondents. Each child or adult participant viewed a screenshot of one web page from one of three 'online encyclopedia[s] from the Internet,' followed by questions about the web page they had just viewed. The notable difference among the encyclopedias was the purported source of the information, reflected in the description that participants were given: they were instructed that they would see a picture of a web page from (a) 'the online encyclopedia *Wikipedia*, where anyone can add or change information at any time without giving their real names,' or from (b) 'the online encyclopedia *Citizendium*, where anyone can contribute entries, as long as they are identified by their real names and where all contributions are reviewed by experts before being accepted,' or from (c) the online version of '*Encyclopedia Britannica*, whose entries have been contributed by respected experts worldwide since 1768.' To ensure that participants in this study

understood these differences, they were asked to later identify from among several options which method of content authorship for entries was used by the encyclopedia they viewed. Those who did not correctly identify the method of selecting entries for the encyclopedia (39 percent of children and 43 percent of adults) were excluded from all further analyses. This resulted in a valid  $N = 183$  for children and  $N = 283$  for adults.

The content of the encyclopedia pages that subjects viewed originated from actual entries from each of these three online encyclopedias. In order to bolster stimulus generalizeability, entries on two different topics (global warming and homeopathy) were created. The main and most prominent portion of each entry was selected for use in the study. Although encyclopedia entries were edited very slightly to be of roughly the same length, the substantive content of the entries was not altered. These entries constituted the actual information *source* (i.e. the specific encyclopedia from which the entry came), which reflects any differences in *content* across the encyclopedias.

Each entry viewed by participants was also presented as if it originated from one of the three specific encyclopedias, by placing the full text of each entry on the web page of each of the various encyclopedias. However, the encyclopedia entry may have *actually* originated from any of the three encyclopedias, and not necessarily from the one participants believed to be the source through this manipulation. This, therefore constituted the information *placement*, which is reflective of differences in information *context*.

In this manner, 18 different page images were created, representing each possible combination of encyclopedia entry *topic* (global warming or homeopathy), original encyclopedia entry *source* (the actual source of the story, whether from Wikipedia, Citizendium, or Encyclopædia Britannica), and the *placement* of the encyclopedia entry (whether it appeared on the site of Wikipedia, Citizendium, or Encyclopædia Britannica). The two encyclopedia entry topics were collapsed in subsequent analyses, yielding a 3 (information *source*: Wikipedia, Citizendium, Encyclopædia Britannica) by 3 (information *placement*: Wikipedia, Citizendium, Encyclopædia Britannica) factorial design, with perceived credibility as the dependent measure.<sup>1</sup> In this manner, the experiment was designed to assess whether encyclopedia entries that *actually* originated from these various online sources were perceived differently among people with regard to their credibility, and whether it made a difference from which among the three online encyclopedias people *believed* the entry to have originated.

### *Quasi-experimental measures and results*

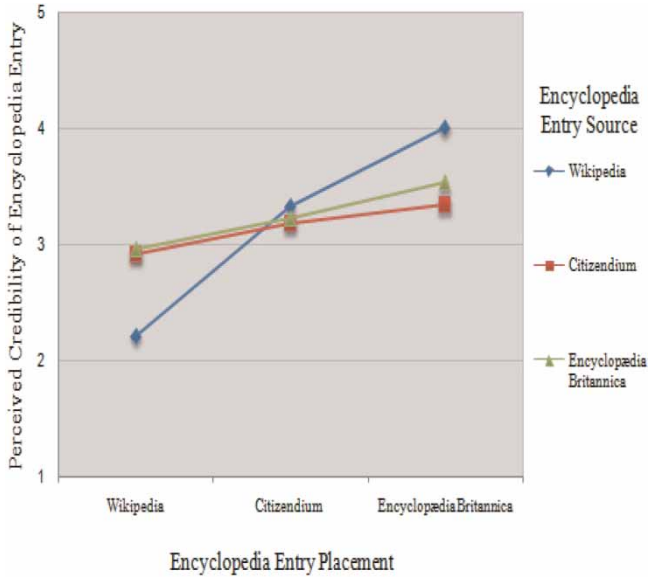
Following past research indicating that believability is the core dimension of credibility, the perceived credibility of the information in the encyclopedia entry viewed by subjects was assessed by the question 'How much do you

believe this information,' with response categories ranging from 1 = 'Not at all' to 5 = 'A whole lot' (adults:  $\bar{X} = 3.34$ ,  $SD = 0.89$ ; children:  $\bar{X} = 3.27$ ,  $SD = 0.90$ ).<sup>2</sup> Additionally, given its potential influence on perceived information credibility, a dichotomous measure of previous familiarity with the encyclopedia ('Were you familiar with this encyclopedia before today?') was used as a statistical control in all experimental analyses.

GLM (General Linear Model) analyses showed a main effect for entry placement among children,  $F(2, 172) = 15.58$ ,  $p < 0.001$ , *partial*  $\eta^2 = 0.15$ , with information appearing on Encyclopædia Britannica's page ( $\bar{X} = 3.63$ ,  $SE = 0.12$ ) and information appearing on Citizendium's page ( $\bar{X} = 3.34$ ,  $SE = 0.17$ ) assessed as significantly more credible ( $p < 0.001$ ) than information appearing on the Wikipedia page ( $\bar{X} = 2.63$ ,  $SE = 0.13$ ). Perceptions of the credibility of information appearing on the Encyclopædia Britannica and Citizendium sites did not differ from each other ( $p = 0.16$ ). There was no main effect for the encyclopedia source. Therefore, the actual original *source* of the encyclopedia entry was not important with regard to its perceived credibility, but the *placement* of the entry was critical to children's credibility evaluations.

There was also a significant interaction effect between encyclopedia placement and encyclopedia source for children,  $F(4, 172) = 3.39$ ,  $p < 0.01$ , *partial*  $\eta^2 = 0.07$ , such that children judged information from Wikipedia to be *less* believable when they viewed it on Wikipedia's site ( $\bar{X} = 2.15$ ,  $SE = 0.22$ ) than when it appeared on either Citizendium's site ( $\bar{X} = 3.42$ ,  $SE = 0.29$ ,  $p < 0.01$ ) or on Encyclopædia Britannica's site ( $\bar{X} = 3.99$ ,  $SE = 0.21$ ,  $p < 0.001$ ). In this manner, content originating from Wikipedia was perceived as the *least* credible when it was shown on a Wikipedia page, yet the *most* credible when it was shown on the page of Encyclopædia Britannica. Put another way, the encyclopedia entries from Wikipedia were seen as significantly and progressively more believable as they migrated from Wikipedia to Citizendium to Encyclopædia Britannica. These results are illustrated in Figure 1.

For adults, there were two significant main effects (and no interaction effects): for encyclopedia entry placement ( $F(2, 269) = 10.22$ ,  $p < 0.001$ , *partial*  $\eta^2 = 0.07$ ) and encyclopedia entry source ( $F(2, 269) = 9.96$ ,  $p < 0.001$ , *partial*  $\eta^2 = 0.07$ ). Encyclopedia entries appearing on Encyclopædia Britannica's page ( $\bar{X} = 3.52$ ,  $SE = 0.12$ ) were perceived as more credible than those entries appearing on either Citizendium's page ( $\bar{X} = 3.11$ ,  $SE = 0.15$ ;  $p = 0.05$ ) or on Wikipedia's page ( $\bar{X} = 2.83$ ,  $SE = 0.11$ ;  $p < 0.001$ ). Entries appearing on Citizendium's page and those on Wikipedia's page were not viewed as different in their perceived credibility ( $p = 0.15$ ). In addition, encyclopedia entries that had actually originated from Citizendium ( $\bar{X} = 2.75$ ,  $SE = 0.11$ ) were perceived to be less credible than those that actually came from either Encyclopædia Britannica ( $\bar{X} = 3.41$ ,  $SE = 0.12$ ;  $p < 0.001$ ) or Wikipedia ( $\bar{X} = 3.30$ ,  $SE = 0.11$ ;  $p < 0.001$ ), whose entries were not perceived as different from one another in terms of their credibility ( $p = 0.50$ ).



**FIGURE 1** Interaction effect among children between encyclopedia entry placement and encyclopedia entry source.

To assess the relative perceived credibility of Wikipedia, Citizendium, and Encyclopædia Britannica directly, additional ANCOVA analyses were performed for children and adults only under conditions where encyclopedia source and placement aligned (i.e. when Wikipedia’s content was presented on Wikipedia’s page, Citizendium’s content appeared on Citizendium’s page, and Encyclopædia Britannica’s content appeared on Encyclopædia Britannica’s page). Once again, previous familiarity with the encyclopedia was statistically controlled. For children, results showed that entries from Wikipedia on Wikipedia’s site ( $\bar{X} = 2.21$ ,  $SD = 1.03$ ) were perceived as significantly less credible than both Citizendium entries on Citizendium ( $\bar{X} = 3.18$ ,  $SD = 0.75$ ;  $p < 0.05$ ) or Encyclopædia Britannica entries on the Encyclopædia Britannica site ( $\bar{X} = 3.53$ ,  $SD = 0.83$ ;  $p < 0.001$ ), which did not differ from each other ( $F(2,41) = 7.39$ ,  $p < 0.01$ ;  $partial \eta^2 = 0.27$ ). Results for adults were similar ( $F(2,75) = 6.60$ ,  $p < 0.01$ ;  $partial \eta^2 = 0.15$ ): Wikipedia entries ( $\bar{X} = 3.03$ ,  $SD = 1.12$ ;  $p < 0.001$ ) and Citizendium entries ( $\bar{X} = 2.50$ ,  $SD = 1.10$ ;  $p < 0.01$ ) were perceived as significantly less credible than Encyclopædia Britannica entries ( $\bar{X} = 3.95$ ,  $SD = 0.95$ ).

**Discussion**

Data from this study constitute the first systematic examination of the perceived credibility of online encyclopedic information (in contrast to information

accuracy), and offer unprecedented understanding about how people think about credibility in this venue today. Findings provide insight into how people view the credibility of user-generated content versus more established and/or vetted online information, and the factors that are particularly relevant in their evaluative processes. Because the results are generalizable to the entire US population of children and adult Internet users, findings from this study are representative of current public opinion and attitudes on these topics.

### *Perceptions of Wikipedia as an information source*

Recognition of Wikipedia was nearly universal among both children and adults, although understanding of precisely how it operates as a user-generated information provision venue was not, as evidenced by both children (9 percent) and adults (19 percent) admitting that although they recognized it, they did not actually know what Wikipedia was. Moreover, only 78 percent of children and 68 percent of adults were able to correctly identify that Wikipedia is an online encyclopedia relying on anonymous users to generate its content. This indicates that many people do not truly comprehend how Wikipedia operates and suggests the importance in empirical studies of verifying, rather than assuming, that they do.

Nonetheless, among those who understood the nature of Wikipedia information provision, survey results indicate that people tend to find Wikipedia information to be fairly credible. Children and adults report that they look up information on Wikipedia in roughly equal measures, corresponding to the response scale midpoint ('sometimes'). They also perceive information on Wikipedia to be of roughly equal credibility, indicating that they believe Wikipedia information 'some.' However, there are indications that children are slightly more skeptical of Wikipedia information than adults are, as evidenced by the fact that children on average reported that others should believe information on Wikipedia slightly less than adults reported others should believe Wikipedia information. Children themselves had a slightly greater tendency to add or edit Wikipedia entries, though doing so for anyone was rare. It is important to note, however, that these differences were quite small, suggesting that children and adults behave more similarly than differently in these regard.

Both children and adults indicated that they think other people should believe information on Wikipedia less than they themselves report believing it, indicating a form of the 'optimistic bias' effect (Weinstein 1980), whereby people exhibit the tendency to see themselves as less likely than others to experience negative life events. In the current study, findings imply that people recognize that Wikipedia may not be entirely credible, and they therefore recommend that others should believe its content less than they do, suggesting they believe that they can navigate this potential limitation better than others. Research on optimistic bias has demonstrated its stability across a wide range of demographic variables, including age, sex, and education (Weinstein 1987), but little research

has focused on the occurrence of the optimistic bias in a digital media environment (for an exception, see Campbell *et al.* 2007), and no research has focused on optimistic biases in terms of credibility evaluation, which appears to be indicated by findings from this study. Additional research is required to confirm this relationship, perhaps through the theoretical lens of the '3rd person effect' (Davison 1983), where negative messages or influences are believed to have a greater effect on others than on oneself.

*The importance of information content and context, within and across generations*

Somewhat analogous to past research narrowly assessing information or message quality in online encyclopedias, a subset of the quasi-experimental findings enabled a direct test of the relative differences in perceived credibility of Wikipedia, Citizendium, and Encyclopædia Britannica. By comparing only the three instances where the information source and information placement aligned (i.e. where Wikipedia's content was presented on the Wikipedia page, etc.), it was clear that Encyclopædia Britannica as an information resource was perceived as providing information that is significantly more credible than either Citizendium or Wikipedia, both by adults and by children. This finding shows that when content from these three online sources is presented in its actual context, the more established and traditional source relying on experts to provide its content is perceived as more credible, at least across the entries examined here. It is unclear from this test, however, whether this difference is due to the information content (i.e. characteristics of the encyclopedia entry), the information context (e.g. the reputation of the encyclopedia entry provider), or both. The quasi-experiment, however, was designed to examine these possibilities.

There is evidence from the quasi-experiment that each of these factors is important, though to different populations and under different circumstances. For adults, the entry's informational content, which was produced by a particular encyclopedia, and the information placement (i.e. the entry's context) were both important in their credibility assessments, in roughly equal proportions (as evidenced by variance explained statistics). Regarding information content, adults found information originating from Encyclopædia Britannica and Wikipedia to be equally credible, and much more so than information from Citizendium. Thus, independent of its context, adults noted differences in the credibility of entries based on their informational content, and elevated the completely user-generated content of Wikipedia to the same level as information from Encyclopædia Britannica. Content from Citizendium, however, was not found to be as credible. Unlike adults, children did not distinguish information credibility differences based on which encyclopedia the information originated from, suggesting that perhaps adults are more attentive to credibility cues apparent in content or that such cues are simply not as important to children.

Future research should delve into specific differences in content more fully, in order to distinguish which content features were important to adults and perhaps to identify why such features appear to be less important to children. For instance, research has shown that information balance (the degree to which messages do or do not include arguments on both sides of a position) is a critical factor in perceptions of credibility, across a variety of topics (Kamins *et al.* 1989; Allen 1991; Block & Keller 1995; Keller & Lehmann 2008; Zhao & Capella 2008). Balance may be a particularly critical cue for online encyclopedia credibility, particularly with topics that are controversial or contentious (like global warming).

The context of the encyclopedia entry (i.e. the site on which it was placed) was a critical credibility cue to both adults and children. People of all ages assessed information as more credible when it appeared on the Encyclopædia Britannica page and less credible when it appeared on Wikipedia's page. In this way, people show strong evidence of attending carefully to the contextual clues surrounding information, aside from their consideration of content quality alone, when judging credibility. However, children rated information appearing on Citizendium as equally credible as information appearing on Encyclopædia Britannica, and adults rated information appearing on Citizendium as equally credible as information appearing on Wikipedia. Thus, whereas children assessed only the purely user-generated content as lowest in credibility, adults assessed only the purely traditional content as highest in credibility. Children's lack of faith in Wikipedia's credibility in the quasi-experiment is consistent with the survey finding that children felt people should be more cautious in believing information in Wikipedia than did adults.

Attention to context in credibility assessments could signal a number of things that are difficult to disentangle. For example, differences stemming from the various encyclopedia venues could be indicative of perceived reputation, expertise, or notions about user-generated versus other information provision models. In all likelihood, each of these factors plays some role in the construction of individuals' schema about various information providers, as do site-specific factors like web design (Flanagin & Metzger 2007). Moreover, credibility evaluations are also a function of familiarity with any specific encyclopedia, although that was statistically controlled for in the analyses here.

The interaction effect between the encyclopedia context (i.e. on which encyclopedia the entry appeared) and information content (i.e. the source where the entry actually originated) among children suggests the complexity of the relationship among these factors. Encyclopedia entries from Wikipedia were seen as significantly more believable when children *thought they were actually* from Citizendium or Encyclopædia Britannica. On the one hand, this is consistent with the finding that children privilege information context as a credibility cue, in that the entry placement in this case was clearly important. On the other hand, this stands in opposition to the lack of a main effect among children

on information content that suggested that children do not attend strongly to information differences from various origins. Indeed, the interaction effect demonstrates that content matters also, but only as filtered through the context of the information. Characteristics of informational content in Wikipedia, in this case, are clearly of consequence: when children see the Wikipedia information in a different (more credible) context, it receives a credibility boost. The implication is that children let themselves find Wikipedia information to be credible, but only when its (non-credible) context is removed and replaced with a more 'acceptable' alternative.

This suggests an intriguing sort of social desirability effect, where internalized knowledge about what is and is not an acceptable or appropriate information source exists in tension with credibility cues gleaned from the content of the message. Adults do not appear to be prone to this same tension, relying as they do on both specific information content cues and information context cues, and not their interaction. Children, though, seem to experience a conflict between their schema about acceptable information sources and specific-content cues to which they attend, which may include the multiple perspectives represented in more highly user-generated content (such as that in Wikipedia entries), or merely stylistic cues. Because the nature and specifics of these cues are speculative, however, further research is required to discern these important differences.

Overall, contrary to claims that children may not understand the implications of user-generated and other forms of content provision, and therefore may not have the same level of skepticism toward online information as adults do, results of this study show that children appear to have a healthy appreciation for what Wikipedia is and how it operates. Indeed, not only are children better able to identify from among several options how Wikipedia operates, but they are also slightly more skeptical of its credibility compared with adults, as demonstrated by their assessment of the degree to which others should believe its information.

Nonetheless, there is also evidence that children, but not adults, find Wikipedia content to be even more credible than alternatives when it appears within a more traditional venue. Although it is unlikely that Wikipedia content would actually be presented under the banner of another encyclopedia, it is highly realistic to think that its freely available content could be presented in other online venues and formats, such as discussion groups, web pages, and blogs. In addition, website attributes such as design features and site complexity have been demonstrated to be powerful features in determining perceived credibility (Flanagin & Metzger 2007), and could also serve to bolster perceived credibility. Therefore, if information from Wikipedia were to appear in a sufficiently legitimate context, particularly one with an established and accepted reputation, findings from this study suggest that it would be highly credible to children.



## Conclusion

Despite the promise of social media in general and Wikipedia, in particular, to harness the ‘wisdom of the crowd,’ results from this study suggest that users are not ready to fully relinquish traditional models of information provision. Results indicate that adults’ perceptions of credibility are strongly anchored in the idea of expert-generated (or vetted) content, as shown by their apparent singular focus on the method of information provision. Young people’s credibility perceptions were also driven by similar processes, as they too preferred information from traditional experts and expert-vetted sources.

At the same time, however, younger users also found the user-generated content to be superior, but only when there were unaware that it had been user-generated. This suggests that a slow and subtle shift may be occurring in how people approach expert- versus user-generated content. It also leaves the question of how future generations who will likely be less steeped in traditional models of information provision, or less aware of distinctions between provision models, will perceive and accept information that appears to be increasingly provided by the very people who consume it.

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## Notes

- 1 Tests showed that for children there were no differences on the dependent measure between the two encyclopedia entry topics. For adults, although findings varied slightly by entry topic, topic did not interact with the independent variables and did not appear to modify the overall study results in any clear way. In addition, the specific topic of the encyclopedia entry was not of theoretical interest in the current study and its inclusion as a factor seemed to needlessly complicate the findings. Therefore, the two topics were collapsed for analyses in both samples.
- 2 From its inception, credibility has been defined as the *believability* of a speaker, message, or the interaction between the speaker and his or her message (Hovland *et al.* 1953; Tseng & Fogg 1999). Results of the pilot tests during the instrument development stage of the research showed that, particularly among the child respondents, believability was a clearer term than credibility. Thus, credibility was operationalized in terms of believability for both children and adults to ensure comparable data.

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