Online Credibility and Digital Ethos:

Evaluating Computer–Mediated Communication

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Chapter 9
The Special Case of Youth and Digital Information Credibility

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ABSTRACT

The vast amount of information available online makes the origin of information, its quality, and its veracity less clear than ever before, shifting the burden on individual users to assess information credibility. Contemporary youth are a particularly important group to consider with regard to credibility issues because of the tension between their technical and social immersion with digital media, and their relatively limited development and life experience compared to adults (Metzger & Flanagin, 2008). Although children may be highly skilled in their use of digital media, they may be inhibited in terms of their ability to discern quality online information due to their level of cognitive and emotional development, personal experience, or familiarity with the media apparatus compared to adults. This chapter presents the findings of a large-scale survey of children in the U.S. ages 11-18 years examining young people's beliefs about the credibility of information available online, and the strategies they use to evaluate it. Findings from the study inform theoretical, practical, and policy considerations in relation to children's digital literacy skills concerning credibility evaluation.

YOUTH AND DIGITAL INFORMATION CREDIBILITY

With the sudden explosion of digital media content and information access devices in the last two decades, there is now more information available to more people from more sources than at any other time in human history. Most people in the developed world today have ready access to almost inconceivably vast information repositories that are increasingly portable, accessible, and interactive in both delivery and formation. One result of this contemporary media landscape is that there exists incredible opportunities for learning, social connection, and individual enhancement via the vast information resources made available by networked digital media.

However, information's origin, quality, and veracity are in many cases less clear than ever before, creating an unparalleled burden on individuals to find appropriate information and assess its meaning and relevance (Metzger & Flanagin, 2008). Access to the tremendous number and range of available sources makes accurately assessing information credibility extremely challenging and laborious. And existing research indicates that there may be reason to fear many individuals are not up to the task of credibility evaluation (Bennett, Maton, & Kervin, 2008; Kuiper & Volman, 2008; Metzger, 2007). Moreover, inaccurate credibility assessments can pose serious social, personal, educational, health, and financial risks (Metzger & Flanagin, 2008).

While this is true for all users of digital media, youth are a particularly intriguing group to consider with regard to information and source credibility, for several reasons. As Livingstone (2009) pointed out, children represent around one-fifth of the population in developed countries and studying the myriad ways that they combine multiple media, multitask, engage with each other online, and blur the boundaries between online and offline socialization could yield more insight into the future of media usage than studying adults alone. Not only is children's digital media use behavior indicative of future trends, it also signals a potentially different relation to information gathering and evaluation in the future. Therefore, it is important to understand children's online information evaluation today.

Children are also of interest due to the tension between their technical and social immersion with digital media and their relatively limited development and lived experience compared to adults (Eastin, 2008; Metzger & Flanagin, 2008). On one hand, as so-called "digital natives," children have grown up in an environment saturated with networked digital media technologies (Palfrey & Glasser, 2008; Prensky, 2001) and thus may be highly skilled in their use of those media to access, consume, and generate information. This

suggests that in light of their special relationship to digital tools, youth are especially well-positioned to successfully navigate the complex contemporary media environment. Indeed, forms of credibility evaluation that rely on information to be spread efficiently through social networks suggest some intriguing advantages for younger populations, who are often more interconnected than adults (Jones & Fox, 2009; Lenhart, Purcell, Smith, & Zickurh, 2010). For example, some argue that older children are better able to embrace networked publics than are adults because adults tend to find the "shifts brought on by networked publics to be confusing and discomforting because they are more acutely aware of the ways in which their experiences with public life are changing" (boyd, 2011, p. 54).

On the other hand, youths can be viewed as limited in their cognitive and emotional development, life experiences, and familiarity with the media apparatus. Although children may be talented and comfortable users of technology, they may lack tools and abilities critical to effectively evaluate information (Eastin, 2008; Rowlands et al., 2008). For example, children have fewer benchmarks than adults to compare against information they find online or to discern the relative reputational cues across sources. In addition, children may not have the same level of experience with, or knowledge about, media institutions, which can make it difficult for them to understand differences in editorial standards across various media channels and outlets (e.g., traditional news media sources versus news blogs) compared to adults who grew up in a world with fewer channels and less media convergence (Metzger & Flanagin, 2008). More generally, some youths may not be as critical of digital media or particular online information sources as adults because these media are not "new" to young people who cannot remember a time without them, and thus they do not apply the same level of skepticism toward digital media as do adults. Finally, many children, and especially very young children, often require assistance from

adults to even retrieve information, let alone assess its credibility (Solomon, 1993). Some even argue that information retrieval systems, because they require complicated queries when searching for information, are not well suited to children and often yield "inappropriate results in a format unsuitable for children" (van der Sluis & van Dijk, 2010, p. 9), which may further impede youth from evaluating information adequately.

Although a significant amount of research has explored credibility assessment in the context of digital media with populations over the age of 18 (e.g., Chen & Rieh, 2009; Flanagin & Metzger, 2000, 2007; Fogg, 2003; Hargittai, Fullerton, Menchen-Trevino, & Thomas, 2010; Metzger, Flanagin, & Medders, 2010), there is a paucity of work focused specifically on children of any age. This is surprising, given contemporary youth's unique relationship to media technology. For example, youths are more likely than adults to turn to digital media first when researching a topic for school or personal use; they are more likely to read news on the Internet than in a printed newspaper; and they are more likely to use online social networking tools to meet friends and to find information (Lenhart et al., 2010). Moreover, children's relationship to digital media may impact their approach to learning and research (Ito et al., 2009; Prensky, 2001). As the first generation to grow up with the Internet, young people are comfortable collaborating and sharing information via digital networks, and do so "in ways that allow them to act quickly and without top-down direction" (Rainie, 2006, p. 7). Additionally, the interactivity afforded by networked digital media allows children to play roles of both information source and receiver simultaneously as they critique, alter, remix, and share content in an almost conversational manner using digital tools (Tapscott, 1997). These experiences likely have profound implications for how children both construct and evaluate credibility online.

Despite these realities, discussions of youth and digital media have often been somewhat simplistic, focusing for example on the popular generation gap caricature, which portrays children as either technologically adept compared to adults or as utterly vulnerable and defenseless (Greenfield, 2004). Such considerations miss the most important and enduring byproducts of heavy reliance on digital media: "Growing up digital" (Tapscott, 1997) means that more and more of the information that drives children's daily lives is provided, assembled, filtered, and presented by sources that are largely unknown to them, or known to them in nontraditional ways. Yet research has only begun to explore what this means for younger Internet users, who will be immersed in digital media for the entirety of their lives, and for those who endeavor to teach them the skills they need to evaluate digital sources.

In light of the complex relationship between youth and digital media, coupled with the lack of research on children's understanding of credibility, this chapter seeks to examine a series of fundamental and overarching research questions that explore how children ages 11-18 years old view information and source credibility online, including the extent to which they are aware of, and concerned about, the credibility of information they find online, and how believable they find various *types* of online information to be; the ways in which children evaluate the credibility of information online, as well as how they compare their skill at evaluating credibility compared to that of adults; and the extent that young people's credibility beliefs are influenced by individual differences, such as demographic characteristics, types of Internet usage or skill, and strategies they invoke for evaluating credibility.

To address these questions, we present data from a nationally representative, U.S.-based survey of children living at home, ages 11-18 years. We focus our interpretation of results on how children establish credibility when they evaluate information and sources online. To situate this exploration, we begin by examining young people's basic awareness of credibility as

a potential problem in the digital environment by asking how often they think about credibility when they are online, and how concerned are they about the credibility of information they find on the Internet?

Credibility Beliefs across Information Types

Although data on children's general beliefs about credibility are useful, young people's credibility beliefs may vary by the type of information they find. Research has shown that the degree to which adults believe information they find online varies by the type or topic of information for which they search and that assessments of credibility are related to the context under which one finds information (Flanagin & Metzger, 2007; Hargittai et al., 2009). People may put more or less rigor into credibility assessment depending on the type of information in question, and they may be more or less skeptical of information depending on its source. For example, people are less likely to find commercial information or information coming from special interest groups to be credible, presumably because they recognize these sources' strong potential for bias (Flanagin & Metzger, 2000, 2007). Yet, young Internet users, who might not have the same background knowledge or sufficient experience in discerning the underlying motivations of commercial or advocacy sources, may not experience this same skepticism.

Moreover, although the majority of research to date has focused on the credibility of static web sites (e.g., government web sites, ecommerce web sites, health and medical web sites, etc.), the current media environment is composed of a diversity of information alternatives, including user-generated information sources such as Wikipedia and news blogs that operate outside of traditional, top-down models of knowledge generation. As digital natives, young people may be simultaneously less aware of the potential credibility problems associated with user-generated

content, and more comfortable with information produced in this manner than adults, which is likely to impact how they evaluate user-generated information. To examine these issues, we ask: How believable do children find online information to be, and to what extent does this vary by the type of information they find?

Information Evaluation Strategies among Youth

Prior research on credibility specifically, and on decision-making more generally, suggests several cognitive processing strategies people use to evaluate information (e.g., Gigerenzer & Todd, 1999; Metzger, 2007; Scott & Bruce, 1995). People sometimes analyze information and its features carefully; other times they use a more holistic and intuitive approach based on their feelings; and sometimes they may draw upon other people in their social circle for advice and guidance. These three strategies, respectively called "analytic," "heuristic," and "social" information processing strategies, have been examined in terms of their impact on adults' credibility determinations (Metzger, Flanagin, & Medders, 2010), but very little research to date has investigated the use of these strategies among children (the only exception being Flanagin & Metzger, 2010). Given developmental and experiential differences between adults and children suggesting that children may differ from adults in terms of their information processing abilities when assessing the credibility of information online (Eastin, 2008), we examine the degree to which children may invoke similar or different strategies as adults by asking: What kinds of cognitive processing strategies do youth employ to evaluate the credibility of online information?

Predictors of Credibility Concerns and Beliefs

Past research on adults (Metzger et al., 2011) have indicated several factors that predict credibility

concerns and beliefs, which may be applicable to children's evaluations as well. For example, demographic and background characteristics, patterns of Internet use and skill, a variety of relevant personality traits, and various strategies for evaluating credibility are all likely to be important in explaining children's evaluation of online information credibility and yet have been largely unexplored in the research literature to date.

For example, previous research on credibility evaluation has paid scant attention to demographic and background factors, although there is reason to believe that children's information evaluation strategies and opportunities may vary developmentally across age (Eastin, 2008), income (van Dijk, 2006), or other demographic groupings such as cognitive or academic abilities. Indeed, although differences in access to, and processing of, online information have been found among people of different demographic backgrounds (Hargittai, 2002a), and among people with different levels of usage, experience, or skill with a medium (van Dijk, 2005), surprisingly little research has focused on what factors influence children's credibility judgments.

Similarly, patterns of Internet usage, access, and past negative experiences with information obtained online are important sources of systematic variation in credibility beliefs among young adults (Hargittai et al., 2010). These patterns may also impact children's perceptions of credibility online by leading them to different types of information and by influencing their level of skepticism. Moreover, it is likely that parental mediation impacts young people's attitudes about, and evaluations of, digital media content in ways similar to how parental mediation is known to affect children's reactions to traditional media content such as television (e.g., Valkenberg, Krcmar, Peeters, & Marseille, 1999). More specifically, the extent to which parents control or restrict children's access to and use of the Internet (i.e., "restrictive mediation") and how often parents talk to their children about the credibility of information online (i.e.,

"informative mediation") is another individual difference that may affect children's credibility evaluations. Receiving formal instruction in evaluating the credibility of Internet information in a school setting may similarly affect young people's credibility perceptions.

In addition, several personality traits, including cognitive dispositions or "thinking styles" that have been shown to influence how adults approach information (Zhang, 2003), may also contribute to young people's credibility beliefs and practices. *Need for cognition*, for example, reflects the degree to which people engage in and enjoy thinking deeply about problems or information and, thus, are willing to exert effort to scrutinize information. *Flexible thinking* measures people's willingness to consider opinions different from their own, which might impact how children process contradictory or contrasting information when judging credibility online. *Faith in intuition* reflects a tendency to trust based on first impressions, instincts, and feelings. And, *social trust*, or the propensity to trust strangers, might also affect the degree to which young people are likely to find information provided by those they do not know online to be trustworthy.

Finally, different strategies or methods for evaluating credibility—that is, the *process* of evaluating information online—may also influence the assessments that young information consumers make. Research in adolescent decision making (Jacobs & Klaczynski, 2005) indicates that adolescents primarily approach information analytically or heuristically when making decisions and evaluations. Analytic processing involves effortful and deliberate consideration, whereas heuristic decisions are made more quickly, with less cognitive effort and scrutiny (Klaczynski, 2001). In addition, the strategy of relying on others to help make decisions may also be relevant online, and especially for youth, given their comfort with social media generally and the recent proliferation of information sources that enable people to see and benefit from each

other's experiences (Scott & Bruce, 1995). Given the Internet's vast capacity for social interaction, social approaches to credibility evaluation may thus be a particularly important means of processing digital information for young people (as well as for adults—see Metzger et al., 2010), who may use them in conjunction with or in place of heuristic and analytic means of information evaluation. The fourth research question of this study takes these various characteristics into account by asking: To what extent do demographic and background characteristics, patterns of Internet use and perceived skill, personality traits, and strategies for evaluating credibility affect young people's credibility beliefs?

Relative Skill in Credibility Evaluation

Research on cognition demonstrates that people tend to feel that they are less susceptible to negative influence than others are. This phenomenon is rooted in a cognitive process known as the "optimistic bias" (Weinstein, 1980), which is the tendency to see oneself as less likely than others to experience negative life events. Research on the notion of optimistic bias has examined its impact on the beliefs and behaviors of individuals in many contexts (e.g., Clarke et al., 2000; Weinstein, 1980, 1982), and has demonstrated the stability of this phenomenon across a wide range of demographic variables, including age, sex, and education (Weinstein, 1987). However, little research has focused on the occurrence of the optimistic bias in a digital media environment (for one exception, see Campbell, Greenauer, Macaluso, & End, 2007, who found evidence for optimistic bias on the part of college students across a variety of Internet-related events) and no research to date has examined credibility assessments with regard to this phenomenon.

Given that adolescents demonstrate a greater sense of invulnerability to negative events compared to adults (Alberts, Elkind, & Ginsberg, 2006; Elkind, 1967), the same psychological

processes underpinning the optimistic bias phenomenon might operate in the context of judging the credibility of information online. With regard to children's perceptions of their own ability to evaluate the credibility of information online, we sought to understand how children perceive their own skill at evaluating the credibility of information online compared to others by asking the final research question posed in this study, which is: How do children compare their own perceived skill at evaluating the credibility of information online to that of a "typical" Internet user?

Finally, we examined the extent of developmental differences in children's credibility beliefs and behaviors across all of the research questions posed above by analyzing the extent to which age differences exist in young people's concern about credibility, their credibility beliefs, and the strategies they use to evaluate credibility in the online context. The next section describes the methodology employed to examine each of the research questions.

METHOD

The small amount of empirical research on children and credibility is based almost exclusively on interviews and small, nonrepresentative samples of children and adolescents (e.g., Fidel et al., 1999; Hargittai et al., 2009; Large, 2004). To complement these studies, a large-scale probability-based survey of children in the U.S. with Internet access was conducted in order to be able to generalize the results to the larger population, which is only possible with a study of this magnitude. Indeed, these data comprise the most comprehensive information ever available concerning children's credibility evaluation processes.

Participants

The survey was fielded by the research firm Knowledge Networks to a probability-based panel of participants that is representative of children

with Internet access in the United States: 2,747 valid responses were obtained from young people between the ages of 11-18 years, with approximately 340 respondents for each age within the range. Responses were weighted to correct known demographic discrepancies between the U.S. population of Internet households and Knowledge Networks' online panel.[1]

Respondents consisted of 53% males and 47% females, with an average age of 14.33 (*SD* = 2.28). 75% were white; 9% were black, non-Hispanic; 12% were Hispanic; 0.4% were other, non-Hispanic; and 4% reported being mixed race, non-Hispanic. Household annual income ranged from less than $5,000 to more than $175,000, with an average income of between $60,000-$85,000. Most families (88%) had between 3 and 5 members living in the household, and the average number of children living at home was 2.25 (*SD* = 1.39). Participants came from all U.S. geographic areas: the Midwest (31%), Northeast (19%), South (28%), and West (23%).[3]

Materials

The survey instrument used in this study was generated through a multi-step, multi-method process. Initial survey topics were based on a review of past literature and existing surveys on information trust, credibility, and quality. To better understand cognitive and developmental issues relevant to youth information assessment and processing, experts in the fields of Developmental Psychology and Cognitive Psychology were recruited as project consultants, who provided feedback on a draft version of the questionnaire. A focus group was then conducted among children 11-18 years old to help refine survey terminology. Next, 40 children were recruited to undergo an hour-long face-to-face interview, in which they provided feedback on questionnaire content and operationalization of key variables, question wording, and general survey administration. This feedback was used to finalize the questionnaire and to ensure that children as young as 11 years could understand and respond to each of our questions appropriately. The survey was also pilot-tested before being launched in the field.

Measures

The survey measured credibility concern, including how often children think about the credibility of information they find online; the believability of various types of online information and the relative believability of different information delivery channels; strategies employed to evaluate the credibility of online information; Internet use, access, and past experiences; perceived Internet skill; and personality and demographic variables relevant to credibility evaluation. Throughout the survey, credibility was operationalized in terms of "believability," as suggested by past credibility literature (Fogg, 2003) and validated by the children who participated in the focus group and interviews. Details about the measures are presented with the survey results.

RESULTS

Credibility Concern

The first research question asked how often young people think about credibility, as well as how concerned they feel people should be about the credibility of information online. 79% of children said they think about whether they should believe information they find online "sometimes" or more often, and 71% said that people should be "somewhat" to "very" concerned about the believability of online information. Age did not matter much in these findings ($r_{thinkabout}$ = .01, p = .59; $r_{concern}$ = .05, $p < .01$), although 18 year olds felt people should be more concerned about the believability of online information than both 12 and 14 year olds ($F_{concern}$ = 2.51, df = 2, 2732, $p < .05$; post hoc tests showed differences at p

< .05). This may reflect a greater awareness of credibility problems with online information as children grow older.

Credibility Beliefs

Findings for the second research question posed in this study indicate that children found information on the web in general to be relatively believable, with 59% reporting that "some" information was believable and 30% reporting that "a lot" of the information found online was believable. There was also a significant tendency for perceived information believability to increase with age ($r = .10$, $p < .001$): 18 year olds found more of the information online to be credible than 11 through 14 year olds ($F = 4.28$, $df = 7, 2724$, $p < .001$; post hoc tests at $p < .05$).

Credibility by Information Type

Children were asked how likely they are to believe information on the Internet about a number of topics, including health or medical issues, news, something they may want to buy, entertainment information (e.g., about movies, musicians, celebrities, etc.), other people they meet online, and information they find for school papers or projects. Results show that children varied in their likelihood of believing information across these topics ($F = 928.64$, $df = 5, 8620$, $p < .001$, partial $\eta^2 = .35$). Specifically, children were on average most likely to believe information on the Internet about schoolwork, followed by news, then entertainment and health information (which children were equally likely to believe), commercial information, and information about people they meet online. Although there were minor age differences with these findings, the general pattern of findings endured regardless of age.[3] These results are generally consistent with what has been found for adults (Flanagin & Metzger, 2000, 2007).

Credibility Perceptions Across Media

Children were asked which medium, including the Internet, television, books, magazines, newspapers, radio, and someone they talk to in person, provides the most believable information. Consistent with past research (Flanagin & Metzger, 2000), differences emerged across channels depending on the type of information sought: When looking for health or medical information, 39% of children indicated that they would believe someone they talk to in person most, followed by the Internet (21%) and books (20%). Children felt that the most believable news information originated from television (54%), followed by newspapers (24%), and then the Internet (11%). Commercial information was best retrieved from the Internet (41%) or in person (33%), followed by television and magazines (10% each). The most believable entertainment information, according to children, can be found on the Internet (40%), then television (28%), then in magazines (11%). Lastly, 53% of children noted that the most believable information for school paper or projects can be found on the Internet, followed by books (34%), and then people they talk to in person (7%). Overall, children rated the Internet as the most believable source of information for schoolwork, entertainment, and commercial information, as well as second most believable for health information and third most believable for news information.

Some age differences emerged in children's indication of which channels they believe most for specific types of information.[4] Older kids tended to believe entertainment information from the Internet and newspapers more than younger kids, and entertainment information from books and the radio less than younger kids. Additionally, older children believed health information from the Internet, books, and magazines more than younger children, and health information from the radio less than younger kids. With news

information, older children believed the Internet, books, and magazines more than younger kids and in-person and radio sources less than them. For school-related information, older children believed books and magazines more than younger kids and in-person sources less than younger kids. Finally, the Internet and newspapers are seen as more credible channels for commercial information for older kids than for younger ones, while television was seen as a less credible source of commercial information by older versus younger children.

Children were next asked (on a 5-point scale where higher values signal greater levels) how much people *should* believe the information they find via particular media channels, including newspapers, television, and the Internet. Children indicated that newspapers should be believed the most ($M = 3.54$, $SD = .87$), followed by television ($M = 3.19$, $SD = .78$), and finally the Internet ($M = 2.94$, $SD = .67$), $F = 701.09$, $df = 2, 5526$, $p < .001$, partial $\eta^2 = .30$. There were significant but very small associations between age and feeling newspapers ($r = -.07$, $p < .001$) and the Internet ($r = .05$, $p < .05$) should be believed, but assessments of how much television should be believed ($r = .00$, $p = .99$) did not vary with children's age. When considered together with the findings above about credible sources by information type, it appears that in some ways children's own use of the Internet may exceed the extent to which they think others should rely on it for credible information.

Credibility of News Blogs and Wikipedia

Overall, kids do not find news blogs to be very credible. 79% say they are either "much less" or "somewhat less" believable than newspaper and television news. This does not vary by age ($r = .03$, $p = .29$). It should be noted, however, that many kids were unsure about the comparative credibility of blogs and mainstream news, with 37% of all kids answering "I don't know" about their relative credibility and 8% of the total sample indicating that they did not know what a blog is.

Nearly all kids (99%) had heard of Wikipedia, and the vast majority of them (84%) had used it to look up information. However, when asked to identify what Wikipedia is from a list of seven possibilities (e.g., whether it is an online encyclopedia where anyone can contribute information, a social networking site, a web site where you can play games, etc.), 9% admitted that they do not know what it is, and only 78% made the correct identification. Moreover, there was a small tendency for older kids (ages 16+) to more accurately understand what Wikipedia is.

Overall, children who understand what Wikipedia actually is find it to be fairly credible. Most believe information from Wikipedia at least "some" (43%) or "a lot" (28%). However, children were slightly more skeptical about how much other people should believe Wikipedia, with 23% saying it should be believed "a little bit," 49% saying it should be believed "some," and 20% saying it should be believed "a lot." Indeed, the extent to which children say people *should* believe Wikipedia ($M = 2.88$, $SD = .87$) is significantly lower than they report believing it themselves ($M = 3.04$, $SD = .93$; $t = 14.31$, $df = 2105$, $p < .001$). There was a significant but very small positive relationship between age and both how much children themselves believed ($r = .05$, $p = .04$) and how much they thought that people in general should believe ($r = .04$, $p = .04$) Wikipedia information.

Methods for Evaluating Credibility

Analyses for the third research question investigated children's strategies for evaluating the credibility of information online. Children were asked the extent to which they based their online credibility assessments on heuristic (e.g., by relying on their gut, making decisions based on feelings, making quick decisions), analytic (by carefully considering the information, double checking facts, gathering a lot of information, and considering all views), or social (by getting advice from others or asking for others' help)

criteria. Children reported that they used analytic techniques to carefully evaluate the credibility of information online "sometimes" to "often" (on a 5-point scale with higher values indicating higher levels; $M = 3.45$, $SD = .74$), whereas they used both social ($M = 2.92$, $SD = .71$) and heuristic ($M = 2.96$, $SD = .67$) methods comparatively less often ($F = 575.92$, df $= 2, 5554$, $p < .001$, partial $\eta^2 = .17$).

Although this pattern of using analytic methods most often, followed by heuristic and then social methods, was similar across all age groups, the frequency with which each strategy was used increased with age ($r_{heuristic} = .09$, $p < .001$; $r_{analytic} = .13$, $p < .001$, $r_{social} = .11$, $p < .001$). In other words, there was a general trend that older children reported applying all three methods of credibility evaluation more often than younger kids. Interestingly, these results do not comport with research on adults, who indicate that they often use heuristic methods of credibility evaluation (Metzger et al., 2010). Without further study, however, it is impossible to say whether this difference is due to true differences between kids and adults in their strategies for evaluating credibility, or to the specific question wording or research method used in these two studies (i.e., survey methods versus focus groups). Indeed, the question itself may have prompted kids to think about situations in which knowing the credibility of the information they sought was important, rather than considering how they evaluate credibility across the full range of information-seeking situations (e.g., the question asked how often they used analytic, heuristic, or social-based strategies when deciding *what to believe*, rather than simply asking how often each strategy is used while *looking at* information online).

Predictors of Credibility Concerns and Beliefs

The extent to which demographic and background characteristics, prior experiences with online infor-

mation and its evaluation, patterns of Internet use, personality traits, perceived skill, and strategies for evaluating credibility affect young people's (a) concerns about and (b) beliefs about credibility was investigated using stepwise multiple regression analysis. Measures for each of the predictor variables are discussed first, and are followed by the results of the regression analysis.

The *demographic and background characteristics* examined included children's sex, age, household income, race, and grades in school. Young people's *prior experiences with online information and its evaluation* included whether children had ever had a bad experience using some information they found online that turned out not to be credible, or whether they had ever heard of this happening to others. They were also asked whether they had ever received instruction in how to evaluate the credibility of information, how often their parents talk to them about whether to trust information on the Internet, and how many restrictions the parent of each child imposed in the home, which ranged from 0 (parents set no restrictions on child's use of the Internet) to 4 (parents place the computer in a certain location in the home, limit the sites their child can visit, limit the amount of time their child may go online, and use "other" control mechanisms).

Patterns of Internet use included how much time young people spend with the Internet (per week as well as the number of years they have used it) and their use of the Internet for specific activities (social networking, contributing information online, visiting virtual worlds, and using the web for commercial purposes).[5] Measures for the *personality traits* of need for cognition, flexible thinking, and faith in intuition were adapted from standard measures of these concepts (e.g., Epstein, Pacini, Denes-Raj, & Heiner, 1996; Kokis, MacPherson, Toplak, West, & Stanovich, 2002). The social trust items were taken directly, or adapted from, the General Social Survey (GSS). All measures were pilot tested to ensure that children could comprehend them easily.

Children's *perceived level of Internet skill* included self-assessments of technical skill, search skill, and knowledge of the latest online trends and features on a scale from 0-10, with the midpoint defined as being as skilled as a "typical Internet user" and the endpoints defined as being "much more[less] skilled than other Internet users." Skill was operationalized in this comparative fashion, rather than, as in past studies that advocate self-assessment, via an inventory of specific and demonstrable Internet skills (e.g., Hargattai, 2002b), since an underlying component of concerns and beliefs about credibility is self-efficacy relative to others. Indeed, Gasser, Cortesi, Malik, and Lee (2012) argue that self-assessment of skill is especially important for teachers and educational programs as it broadens the definition of what is considered a skill by users themselves rather than narrowly defining what constitutes skill from the perspective of researchers or teachers.

Of course, there is an inherent danger to self-appraisal of Internet skills as it may lead participants to shortchange or overvalue their abilities. However, the crucial comparison point for this study is children's perceptions of their own Internet skills (rather than their actual skills), and how those perceptions may affect credibility evaluation. Thus, to measure perceived Internet skill, participants were asked to "rate your ability to find what you are looking for on the Internet, compared to other Internet users;" to "rate your technical skill with the Internet (for example, fixing problems, changing computer settings, etc.), compared to other Internet users;" and to "rate your knowledge of the latest Internet trends and features, compared to other Internet users."

Finally, *information evaluation strategies* were measured in two ways. First, the question, "When you decide what to believe on the Internet, do you…[give careful thought to the information, rely on your gut feelings, ask for help from other people, etc.]" was used to gauge the extent to which analytic, heuristic, and social means of information evaluation were used by the respondents. Second,

respondents were asked the degree to which they focused more or less on certain credibility cues or web site elements while evaluating credibility online. Factor analysis showed that these various credibility cues reflect three strategies: evaluating credibility via expert confirmation (e.g., looking to see if information is from expert sources), via information quality (e.g., looking at the currency and completeness of the information), and via web site design (e.g., considering the site's appearance and navigability).

The results of the regression analyses used to examine the influence of the foregoing individual difference factors on credibility concern and credibility beliefs are included in Table 1, and are discussed in turn next.

Credibility Concern

Regression analysis showed that the type of strategies that young people use to evaluate credibility affect their concern about credibility and how often they think about credibility issues while seeking information online. Specifically, children who are more concerned about the credibility of Internet information tend to use a more analytic than heuristic approach when evaluating information and look to expert confirmation to evaluate credibility, but rely less on evaluating credibility by means of looking at the web site design. Kids' online experiences and education matter also: having had a bad experience or even hearing about others who have trusted bad information online, having parents talk to them about the trustworthiness of information found online, and having had formal instruction in credibility evaluation all contribute to greater overall concern about the credibility of information on the Internet and/or how often children think about credibility.

The ways in which children engage with the Internet and participate in content creation also mattered in their concerns about credibility. Specifically, those who use the Internet to immerse themselves in virtual worlds more often (includ-

Table 1. Results of stepwise multiple regression analyses predicting credibility concerns and beliefs

| | Concerns about Credibility | | | | | | Beliefs about Credibility | | | | | |
| | How concerned | | | How often think about credibility | | | How much is believable | | | How likely to believe | | |
Variable	B	SE B	β	B	SE B	β	B	SE B	β	B	SE B	β
Demographics												
Sex of child										.11	.04	.08**
Age of child										-.02	.01	-.07**
Income							.02	.01	.10***	.02	.01	.09***
Race (white or not)	-.13	.06	-.06*									
Grades in school												
Use, Access, Experience												
Years online	.03	.01	.07**									
Hours online												
Internet skill				.03	.01	.07*	.02	.01	.07*	.04	.01	.11***
Bad experience- self	.13	.06	.06*	.10	.05	.06*	-.08	.03	-.06*	-.09	.04	-.07**
Bad experience- news	.28	.06	.13***	.10	.05	.06*						
Social networking use												
Commercial use												
Virtual use				.06	.02	.08**	.03	.02	.06*	.05	.02	.07**
Info contribution use	-.11	.04	-.08**									
Talk with parents	.13	.03	.11***	.07	.02	.07**						
Credibility training				.17	.05	.09***						
Personality Traits												
Flexible thinking				.12	.05	.07*						
Faith in intuition										.08	.03	.07*
Need for cognition							-.09	.03	-.09***	-.09	.03	-.09**
Internet social trust	-.18	.04	-.12***				.20	.03	.22***	.15	.03	.15***
General social trust							.11	.03	.10***			
Evaluation Method												
Expert confirmation	.21	.04	.16***							.08	.03	.09*
Site design	-.10	.04	-.08**				.10	.02	.13***	.11	.03	.13***
Information quality										.08	.03	.10*
Analytic style	.24	.04	.17***	.23	.03	.21***						
Heuristic style	-.08	.04	-.05*	-.11	.03	-.09***	.05	.03	.05*	.13	.03	.13***
Social style												

Notes: Only significant results are shown. $F_{concern}$ = 25.53, df = 11, 1329, p < .001, adj R^2 = .17; $F_{thinkabout}$ = 24.82, df = 9, 1331, p < .001, adj R^2 = .14; $F_{muchbelieve}$ = 25.30, df = 9, 1329, p < .001, adj R^2 = .14; $F_{likelybelieve}$ = 25.89, df = 13, 1326, p < .001, adj R^2 = .20. *p < .05, **p < .01, ***p < .001

ing playing games such as World of Warcraft) and those who engage in content creation less actively show higher levels of concern about credibility. Also, kids who perceived themselves as more highly skilled and who had been online for a greater number of years thought more about or were more concerned about credibility. These results indicate that as children engage more, and more deeply, with the Internet, they may develop a healthy skepticism toward the believability of online information. This finding refutes fears that kids will become more accepting and less critical of Internet information as they deepen their experience and participation in online activities.

Only two traits, flexible thinking style and Internet social trust, emerged as significantly related to children's level of credibility concern. As kids are more flexible in considering information that runs counter to their own beliefs and are less trusting of others online, they express greater concern about credibility. Attending to contradictory data would naturally raise concern about whose view to trust, as would having little confidence in the trustworthiness of others online.

Interestingly, young people's demographic characteristics did not seem to matter much, with one exception: race made a very small contribution to users' concern about credibility. Children who reported themselves to be minorities expressed slightly greater concern about credibility than did white children, which may reflect subcultural differences found in many surveys for trust of all sorts among minority populations (Alesina & LaFerrara, 2002). It is noteworthy that, overall, age did not impact concern about credibility, despite the fact that older kids have more online experience and more life experience.

Credibility Beliefs

While young people's concern about the credibility of information online seems to be driven to some extent by analytic processes of evaluating information, this is not the case for their actual

trust of online information, both in terms of the amount of information on the Internet they feel is credible and their likelihood of trusting information they personally find online.

Indeed, young people's beliefs about credibility appear to be more a function of heuristic processes, as evidenced by the fact that young people who rated online information as more credible tended to use a more heuristic, rather than analytic, approach to evaluating information online. Factors that consistently contribute to young people's actual credibility beliefs are evaluating information based on the web site's design and using heuristic credibility evaluation strategies, such as relying on gut feelings and making quick credibility judgments. Personality traits related to these heuristic strategies also contributed significantly to beliefs about credibility, whereby youth possessing lower need for cognition and higher faith in intuition thinking styles rated information on the Internet as more credible.

Although these results are not surprising in light of what is known from past research on adults that finds people's credibility evaluations are often based on cursory cues rather than thorough examination of online information (Metzger, 2007), the fact that heuristic processes figure so prominently in how much online information children find credible and how likely they are to believe the information they find online is a little disconcerting. This is particularly true for digital literacy advocates who stress the need for kids to apply critical thinking skills to Internet-based information due to the unique characteristics that make discerning credible from non-credible information especially complex and difficult (see Metzger, Flanagin, Eyal, Lemus, & McCann, 2003). Another personality trait that influenced young people's views of the credibility of online information was their trusting nature. Questions that tapped into the degree to which kids felt others could be trusted both generally and online were significant and positive predictors of how much of the information online they felt was believable.

Children's demographic characteristics mattered more for their actual beliefs about the credibility of online information than they did for their concern about credibility. Specifically, young people from families of higher income said they believed more information on the Internet, and both younger kids and girls were more likely to believe the information they find online compared to older kids and boys, respectively.[5] This could be due to differences in girls' and boys' Internet usage or experiences interacting with others online, and to the fact that older children are more likely to have had greater overall exposure to online information generally, and thus perhaps more experiences with bad information, as well as had more formal information literacy training than have younger children.

Indeed, the data show that Internet usage and experiences do also factor into kids' credibility beliefs. In particular, young people who rated themselves as more technically skilled felt Internet information was more credible, as did those who visit virtual worlds more often. Past negative experiences with false or non-credible information also mattered in that having such experiences led kids to say that less Internet information is believable and that they were less likely to believe the information they found online, as one would expect.

Relative Skill in Credibility Evaluation

The final research question sought to examine how young people perceive their own skill at determining the credibility of information online relative to other users. Results showed that, in comparison to a "typical Internet user," even the youngest children saw themselves as equally or slightly better on average in their ability to figure out which information is good and bad online (M = 3.47, SD = 1.37) and more likely to question information they find on the Internet (M = 3.55, SD = 1.47), both measured on 7-point scales where scores below the midpoint indicate a favorable

self vs. "typical user" comparison. Children also felt they were equally or slightly less likely than a typical Internet user to believe false information online (M = 4.61, sd = 1.44) on a 7-point scale where scores above the midpoint indicate a favorable self-other comparison. Interestingly, older kids were more likely than younger kids to report a favorable comparison to typical Internet users when it came to determining good from bad online content (r = -.11, p < .001), believing false information online (r = .15, p < .001), and questioning information they find (r = -.14, p < .001). These results suggest an optimistic bias in kids' perceptions of their own information literacy and credibility evaluation skills.

DISCUSSION

The study detailed in this chapter describes youth who have been using the Internet for much of their lives for a variety of purposes, and adds to the current state of knowledge on children's Internet use and their perceptions of online information credibility specifically. It challenges existing notions about children as information consumers and paints a portrait of how youth establish credibility when they evaluate online sources, which should serve as a springboard for further research.

The data demonstrate that children ages 11-18 show a healthy degree of concern for the believability of online information. They think about the credibility of information they find on the Internet and are fairly concerned about the credibility of online information overall. Interestingly, despite their concern for credibility, kids rely quite heavily on the Internet to find different types of information, they trust information on Wikipedia (even more than they say it should be trusted), and they view certain kinds of information (i.e., entertainment information, commercial information, and information for school projects) on the web as a more credible source of information than books, newspapers, and television.

Children also trust different forms of online information more or less depending on its type. For example, information used for school projects is seen as more believable than information from strangers they meet online. That said, children report an equal likelihood to believe entertainment and health information online, which implies potentially problematic outcomes since these types of information should ideally warrant different levels of skepticism.

As children get older, their Internet use increases both in scope and in time spent online. Older teens trust the Internet more as an information source than do younger kids, but think that people should be more concerned about the quality of information online than do younger children. This might indicate that as kids become more experienced with the Internet, they have a greater appreciation for the potential of deceptive information online as well as greater confidence in their ability to find credible information sources.

The findings pertaining to the methods or strategies by which young people evaluate the credibility of information online are particularly revealing and show that several demographic, usage, and personality characteristics significantly predict children's credibility concerns and perceptions. As mentioned in the results section, race played a minor role, such that nonwhite youth manifested greater concerns about credibility, perhaps reflecting known patterns of greater social skepticism among minorities. Kids who have had negative past experiences with online information, who have had training in credibility evaluation, and whose parents talk to them about the credibility of online information demonstrate a higher degree of apprehension and concern about online information. Children who perceive themselves as more skilled Internet users, who spend time immersed in digital worlds, and who have been using the Internet for longer also report a higher degree of concern for credibility, as do those who experience less social trust. Greater concern

about credibility was also linked to more analytic approaches to evaluating information online.

Demographic and personality characteristics also played a role in how much web-based information children believe. Younger children reported believing more information online than did older kids. Females were more trusting than males, and children from wealthier backgrounds and who were more trusting of others believed more of the information available online. Usage and experience mattered too, as children who spent more time in virtual worlds and who rated themselves to be more skilled users overall believed more information, whereas those who had negative past experiences believed less information online to be credible. Perhaps most interestingly, certain credibility evaluation strategies were associated with credibility beliefs. Children who relied on heuristic methods of credibility assessment reported believing more information than children who reported relying on analytic methods and who had higher need for cognition. This suggests that curriculum to increase children's motivation and ability to engage in critical thinking may help to enhance skepticism toward online information, as manifested in employing more effortful means of information evaluation.

Collectively, the findings on belief of online information, concern for its credibility, and strategies used to assess its credibility indicate that as kids become more experienced with an online environment, they develop a greater concern for the credibility of online information, and employ a greater diversity of strategies when assessing it. This is an encouraging finding for media literacy advocates, and to some extent mitigates fears that kids become more accepting and less critical of online information as their usage increases.

However, not all of this study's findings were so encouraging. For instance, while children's concern about credibility appears to be largely driven by analytic credibility evaluation processes, those who find Internet information most credible

tend to rely on heuristic (hasty and feeling-based) processes to evaluate credibility. This, coupled with the fact that most children said that people should be concerned about the credibility of information online, suggests that while children take the issue of credibility seriously, they may not always act diligently when evaluating the information they find online. Moreover, children appear to overestimate their own skill levels and capacity to discern good information from bad information as compared to others. Such overconfidence is troubling, inasmuch as it might imply a correspondingly reduced level of vigilance or attention.

Findings from this study reveal a relationship between youth, the Internet, and credibility that is far more nuanced than most previous research has suggested. This study indicates that a combination of experience using the Internet over time and vital cohort-related changes in youth's cognitive development interact to promote a better awareness of general credibility concerns. This has implications for several domains, including education and the creation of media literacy curricula, children's use of the Internet, and digital media policy formulations. For example, based on our findings, online media literacy programs should emphasize a structured but graduated approach to guiding children's use of the Internet that stresses the accumulation of personal experience online, early parental involvement, and the sharing of positive and negative online experiences at an early age. Additionally, education efforts regarding credibility evaluation should be ongoing at the upper elementary, middle, and secondary education levels, and should stress the importance of critical thinking skills, including analytic methods of credibility assessment over heuristic ones.

Although these findings are generalizable to child Internet users in the U.S., limitations inherent in survey research still color our findings. For example, while our data appear to indicate overconfidence in kids' assessment of their ability to discern good and bad information, experimental designs may better reveal any biases that might result from this overconfidence. In addition, multiple methods would be useful to better capture the rich reality of children's web use and evaluation experiences in some instances, particularly those that are social in nature.

Ultimately, this study appears to underscore a reality we would hope for as citizens, Internet users, and parents: children are for the most part aware of the issues surrounding information veracity on the Internet. Thus, the best strategy to help children become more skillful consumers of information online would appear to be the adoption of a perspective that empowers them and capitalizes on their unique upbringing in an all-digital world. In a future in which the information that drives kids' lives is assembled, transmitted, shared, and processed digitally, children need to develop the skills necessary to navigate that information environment effectively. Perhaps the most encouraging conclusion from these data so far is that, for the most part, children seem to be making inroads toward that goal.

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KEY TERMS AND DEFINITIONS

Analytical Evaluation Strategy: Carefully considering the information, double checking facts, gathering a lot of information, and considering all views to evaluate information.

Credibility: The believability of information.

Digital Natives: People who were born during or after the introduction of digital technology.

Faith in Intuition: Reflects a tendency to trust based on first impressions, instincts, and feelings.

Flexible Thinking: Reflects people's willingness to consider opinions different from their own.

Heuristic Evaluation Strategy: Relying on gut instincts, making decisions based on feelings, making quick decisions to evaluate information.

Information Evaluation Strategies: The ways in which individuals evaluate information for its quality or credibility.

Need for Cognition: Reflects the degree to which people engage in and enjoy thinking deeply about problems or information.

Optimistic Bias: The tendency to see oneself as less likely than others to experience negative events.

Relative Internet Skill: The extent to which individuals believe themselves to be accomplished Internet users compared to an average Internet user.

ENDNOTES

1   First, a post-stratification adjustment using demographic distributions from the most recent U.S. Census Bureau's Current Population Survey data was used to balance errors due to panel recruitment methods and panel attrition. Demographic variables used for this weighting included gender, age, race, education, and Internet access. This weighting was applied before the selection of the sample was made for this study. In addition, a study-specific post-stratification weight was applied after data collection to adjust for the study's sample design and survey non-response. A weight was calculated for all qualified children to make them comparable to 13 to 18 year olds who have Internet access at home. Household income was also included as a weighting variable since education could not be included (i.e., most of the children in this age range have less than a high school education). The sample design effect for this weight is 1.58.

2   Data regarding household income and size were reported by parents of the children to the survey research firm, as part of their induction into the Knowledge Networks panel.

3   *F* test statistics for these tests are too cumbersome to report here but are available upon request. All tests were significant at $p < .001$. Post hoc tests ($p < .05$) showed that some of the older children did not distinguish between the believability of health and commercial information, and children of some ages did not distinguish between commercial and entertainment information.

4   As determined by cross-tabulations. All chi square tests were significant at $p < .05$ or $p < .001$.

5   These uses were derived from factor analyses of Internet usage data collected in another part of the survey. The usage data are not reported in full here due to space limitations.