The cognitive authority of user-generated health information in an online forum for girls and young women

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Purpose

This study examines the role of one particular online discussion forum as a potentially authoritative health information source for its users. The concept of cognitive authority is used as a starting point for understanding information evaluation in this context. The focus is placed on the types of information users seek for from this forum, the ways they assess the credibility of information obtained, and their views on the impact of this information.

Design

The empirical data were collected with a questionnaire survey from the users of a Finnish online forum for girls and young women (n=290). The data were analysed qualitatively with content analytic techniques and quantitatively by using descriptive analysis.

Findings

The forum was found to offer girls and young women the possibility to receive health information from peers. It was viewed as an appropriate source for experiential rather than factual health information and used to find information on sexuality, bodily functions, and diets, for example. Author-related cues, argumentation and tone, veracity, and verification were recognised as means to evaluate information credibility. Credibility evaluation was found to be to be linked with conceptions of the forum and the type of information sought. A share of the respondents recognized the information obtained to have influence on their thinking or behaviour.

Originality/value

Based on the findings, it can be argued that the members of the online forum—individually or collectively—can act as cognitive authorities for other users. The findings cannot be generalized beyond this online forum, to Finnish girls or young women, or even the users of the online forum. However, they provide insights into the ways young people evaluate user-generated information in a particular online setting and domain of knowledge and as such contribute to research on cognitive authority, credibility evaluation, and information literacy.

1 Introduction

Health communication is often understood as one-way information transmission from health authorities to patients (Johnson and Case, 2012). However, people construct their understanding of health issues with the help of a wide variety of information sources ranging from professional to non-professional sources, and from factual, clinical, and technical information to personal experiences and experiences of others (Yates, 2013). With the rise of social media, opportunities have increasingly emerged for people to reach outside their immediate surroundings to find and share information in online environments. While there has been a shift to the real-name web (Hogan, 2013), online environments that allow anonymity are still widely used (see Sharon and John, 2018). Anonymous forums can be particularly useful in obtaining and sharing information on delicate issues or things that are difficult to discuss with people in one's surroundings, such as sexual and mental health, substance use (Abbas and Agosto, 2013; Lenhart *et al.*, 2010), or gender identity (Pohjanen and Kortelainen, 2016).

Despite the benefits, there are indications that using social media to discuss health matters with others can also include negative influences on young people's health. For example, harmful behaviour can be normalized in an online community (see e.g., Dyson *et al.,* 2016). Moreover, concerns have been expressed about the lack of young people's abilities to assess information credibility (Nettleton *et al*., 2005; Fergie *et al*., 2012; Adams *et al*., 2006), and, consequently, their vulnerability to misleading or even harmful information (Cusack *et al*., 2017).

This study examines the role of one particular online discussion forum as a potentially authoritative health information source for its users. As such, the study can be placed within the body of research on information literacy which is seen as a set of contextual competencies dependent on the purpose and context in which the information is sought, used, and evaluated (Grafstein, 2017). Information literacy can be viewed to be shaped as people engage with information in different settings and develop ways of knowing what information and information sources are important and how to access and use them in acceptable ways in a particular context (Lloyd, 2017). In general, information literacy research has focused on the capabilities needed to interact with information whereas the closely related field of information behavior research has focused on the aspects and factors influencing behavior, information seeking in particular (Hepworth *et al.,* 2014). Health information behavior has to a large extent been investigated in relation to severe health conditions or among specific patient populations rather than as something taking place in the everyday lives of generally healthy people (Anker *et al.,* 2011, Johnson and Case, 2012). Information literacy research has focused on education

and work rather than everyday life (Martzoukou and Abdi, 2017) and its research in health settings is still scarce (Hirvonen, 2015).

In the present study, the attention is on a specific online forum and its users' conceptions on the information they seek for from this forum, the ways they assess the credibility of information obtained, and their views on the influence of this information. The concept of *cognitive authority* (Wilson, 1983) is used as a starting point for understanding information evaluation in this context. The study is connected to a larger research project *Cognitive Authorities in Everyday Health Information Environments of Young People* (CogAHealth) which examines the ways cognitive authority is constructed in different contexts of young people's lives, including both formal and informal contexts where young people learn about health. A discussion forum for girls and young women was selected as the context of the present study and the decision to focus on females was dictated by the selection of the particular forum (explained in more detail in sub-chapter 4.1 Context). The aim of this study is to increase understanding of an online forum as a potentially authoritative source for health information for its users.

2 Literature review

2.1 The concept of cognitive authority

Wilson (1983) coined the concept of *cognitive authority* to refer to the kind of authority an information source can possess that influences individuals' thoughts and that they recognize as proper. According to Wilson (1983), people develop their understanding of the world based on, firstly, first-hand experience and, secondly, on what is learned second-hand from others. Wilson (1983, 15) stated that the "authority's influence on us is thought proper because he is thought credible, worthy of belief"; cognitive authorities are the information sources, people or texts, that influence people's thoughts and are deemed credible. According to Wilson (1983), cognitive authority differs from both administrative authority and from the overall influence different information sources can have. Commercials, for example, may have influence on thoughts but they are rarely seen as *proper* information sources. Moreover, cognitive authority has to involve a relationship between at least two people: someone has to recognize the authority for it to exist. This way it differs from being an expert; one can be an expert, but not a cognitive authority, without the recognition of another person (Wilson 1983). A source can have plenty or a little of cognitive authority, and it is relative to the sphere of interest. It can be found in books, instruments, organization, institutions, and people (Wilson, 1983).

Wilson (1983) points out that people are typically recognised as cognitive authorities at least in the sphere of their own experience. Overall, the questions of cognitive authority focus on the ways people recognise information sources as competent, trustworthy, and capable of influencing thinking and decision-making (Savolainen, 2007).

Wilson (1983) listed a number of external tests for cognitive authority including the *author* ("[w]e can trust a text if it is the work of an individual or group of individuals whom we can trust" p. 166), *reputation of a text* ("reputation among those we recognize as having cognitive authority in the appropriate sphere" p. 167), the *recency of the text* ("when present reputation is unknown"---"the newer is the better" p. 167), the *publication history* ("a publishing house can acquire a kind of cognitive authority", "a single journal can have the same kind of authority", p.168), the *document type* (for example "a standard reference work that is repeatedly revised may be thought as an institution in its own right" (p. 169), and *the intrinsic plausibility of a text* ("if it seems eminently sensible", "an awareness of a text's contents as plausible or implausible" in connection to "our own beliefs", p.169).

In the turn of the 20th century, Fritch and Cromwell (2002) provided an alternative set of criteria to be considered when accrediting cognitive authority in *online environments*: (1) *author competence and trustworthiness* including author identity and credentials, (2) *document validity* including factual accuracy of information, information presentation and format, and organizational or institutional identity and authority, (3) *overt affiliation with an organization, institution, or individual* including advertisements and links to organizational home pages or other resources, and (4) *covert affiliation with an organization, institution, or individual* including less obvious cues on affiliation.

2.2 Empirical studies on cognitive authority

The first empirical studies on cognitive authority focused on online information seeking and information evaluation and were conducted among scholars (Rieh and Belkin, 1998, 2000; Rieh, 2000, 2002). Rieh and Belkin (2000) found that information seekers made quality and authority judgments based on the *type of knowledge* (domain knowledge, system knowledge) and the *mode of acquisition* (first-hand, second hand), the *characteristics of sources* (URL domain, type and reputation of source, opinion of a single person or collective, author credentials), and the *characteristics of information objects* (type, title, content, organization, presentation, graphics,

functionality), as well as the *situational factors* (e.g., given task, time constraints), the *ranking in search output*, and the *general assumptions* on the information obtained (Rieh and Belkin 2000).

Studies taking a constructionist perspective on cognitive authority have focused on the discursive strategies used in constructing them (McKenzie, 2003; Doty, 2015; Neal and McKenzie, 2011). McKenzie (2003) considered "*cognitive authority not as accurate representations of preexisting beliefs or attitudes but, rather, as examples of everyday fact construction*' (McKenzie 2003, p. 263). She drew from Jordan's (1997) concept of 'authoritative knowledge' which acknowledges the role of a community in determining what forms of knowledge should be recognized as proper. Using interview data, she found that context-specific discursive techniques were used to enhance or undermine the cognitive authority of professional and peer information sources and identified three types of authority: biomedical, experiential, and individual (authority of the self) (McKenzie 2003). Neal *et al.* (2011) claimed that communities create the notion of cognitive authority through discourse (Jordan, 1997; Oliphant, 2009) and use the concept of 'communal cognitive authority' when referring to a community of Web users' retrieval habits. In their study on emerging adults' opinions of online mental health recourses, Neal *et al.* (2011) found that online discussion boards and social networking sites were seen as useful sources of peer-support but not as authoritative sources of educational information.

Neal and McKenzie (2011), based on their study on health blogs, stressed that the techniques used when evaluating information vary in different situations. The criteria for selecting a scientific journal, for example, differ from those applied in everyday situations. Lay people's descriptions of their experiences with a disease, for instance, may not meet traditional standards for authority, but can be considered as authoritative by someone trying to cope with a disease emotionally (Neal 2010; Neal and McKenzie, 2011).

Accordingly, Mansour and Francke (2017) found that in a Facebook group, members viewed the group as an acceptable source of personal rather that professional knowledge. Drawing from a socio-cultural tradition, they conceptualized the cues to evaluate information credibility as cultural tools. These included the evaluation of language use and writing style, other members' experience, expertise, and similarity, and their own education. Other members were seen as cognitive authorities based on either their expertise or their experience. An important tool in the assessment of the latter was the similarity of the person to oneself (Mansour and Francke, 2017). In line with this idea, Savolainen (2007) noted that the intrinsic plausibility of information is not 'enough'; it may be rejected if the information is not compatible with the information seekers values and aspirations.

Moreover, cognitive authorities are not valued only for their stock of knowledge but also for their opinions (Savolainen, 2007).

Doty (2015) argued that evaluation of cognitive authority is a complex set of negotiations and the participatory tools of the internet seem to influence how authority is established. Moreover, cognitive authority can be understood as being practiced, rather than being a static feature of things. Huvila (2013) found that besides people, search as an approach and as an activity could serve as a cognitive authority. According to Huvila (2013), search engine use can be viewed as an approach of becoming informed and, on the other hand, the effort to perform the search activity considered as indication of the credibility of the results. Accordingly, Andersson (2017) established that Swedish teenagers framed "Googling" as fact-finding, as a neutral infrastructure, and as an authority.

2.3 Credibility evaluation of online health information

The concept of cognitive authority is closely linked with that of credibility. According to Wilson (1983), cognitive authorities are found *among* credible information sources, those that are "worthy of belief" (1983, p. 15). A key difference between the concepts has to do with *influence*: cognitive authorities "are among those who influence my thinking" (Wilson 1983, p. 14) and are viewed as *proper*. A source can be deemed credible even though it would not have any influence on one's thoughts (Wilson 1983). According to Wilson (1983), credibility has two main components: competence and trustworthiness.

A detailed review of the body of research on credibility evaluation is beyond the scope of this study. However, some observations on credibility evaluation in online environments are made based on previous research. Already more than a decade ago, Savolainen (2007) noted that networked information sources and news services provide new opportunities for the development of distributed credibility, that is, the critical comparison of information sources among like-minded people. In a similar vein, Lankes (2008) noticed a shift in credibility from "an authority-based approach to a reliability-based approach". Whereas traditional approaches to credibility emphasized authority in the way that trusted sources are used to determine a person's credibility judgments, with the reliability approach, people determine credibility by synthesizing multiple cues relevant to their credibility judgments. Metzger *et al.* (2010) argued that a model with a single authority seems to be changing to a model of multiple, distributed authorities. Based on focus group data with participants with heterogeneous features, they found that rather than systematically processing information, people

used cognitive heuristics when making judgements of information credibility online. Moreover, social- and group-based means were used to assess credibility, including social information pooling and personal opinion confirmation, for example (Metzger et al. 2010). Similarly, Jessen and Jørgensen (2012) suggested that the evaluations made by others may be used as key cues to determine the credibility and quality of information; 'trustees', such as teachers, parents, or members of an online network, may play an important role in assessing information. Arguably, validation by a trustworthy source can indicate knowledge and expertise whereas validation by the masses is associated with objectiveness and resistance to manipulation (Jucks and Thon 2017).

Jeon and Rieh (2014) as well as Fergie, Hilton, and Hunt (2016), focused on young people's strategies of evaluating user-generated content. Fergie *et al.* (2016) interviewed young adults and found that their assessment strategies included comparing multiple sources, evaluating the purpose of the content, and assessing the overall visual look of the source. These aligned with the heuristics identified by Metzger *et al.* (2010), including the comparison of the content to ensure consistency ('consistency'), identifying content appropriate for a specific context ('expectancy violation'), and recognizing recommendations ('endorsement'). Furthermore, Fergie *et al.* (2016) found that content generated by users and professionals were evaluated with different standards; user-generated content was not necessarily valued as 'facts' but as sources of opinion (Fergie *et al.* 2016).

Jeon and Rieh (2014) conducted a quasi-field study among students using a Q&A service. They found that credibility cues could be arranged to three categories: attitude, trustworthiness, and expertise. The attitude dimension included cues on the answerer's involvement and effort. For example, the effort that was invested to respond to a specific question and cues on the overall participation in the particular forum, such as having a profile picture and 'points' and 'levels' associated with high use of the forum. The trustworthiness dimension included judgements on the answerer's intention or decency. These were based on the style of the message (punctuation, wording, format, links, and general style) which was seen to determine the legitimacy of the answerer. By 'trolling' or joking, for example, the answerers could lose their credibility. Finally, the expertise dimension included evaluation of the perceived knowledge or experience of the answerer. Self-proclaimed expertise, providing a relevant answer, and congruence between the response and other users' answers were found to be cues with which expertise could be recognized. Moreover, system-generated cues based on social feedback were recognized. For instance, an answerer's profile information including previous questions that person had answered served as cues for expertise (Jeon and Rieh, 2014).

3 Research questions

This study examines an online forum users' perceptions of the forum as a source for health information and focuses on their views on the potential cognitive authority of this information. There is no consensus about the meaning of or relationship of the concepts of credibility and cognitive authority. In this empirical study, we take Wilson's (1983) ideas as a starting point and view credibility as the combination of competence and trustworthiness. Cognitive authorities, also in line with Wilson (1983), are understood as sources that are deemed credible and that influence one's thoughts.

The following research questions are asked:

RQ1: What kind of health information do girls and young women seek for from the online forum?

RQ2: How do they assess the credibility of this health information?

RQ3: What kind of influence do they think the information obtained has had?

4 Method

4.1 Context

A popular Finnish online forum called Demi (demi.fi) was chosen as the empirical context of this study. Based on the information provided in the forum, Demi is an open forum directed to Finnish girls. Besides a discussion forum, Demi includes editorial content and member pages where registered users can provide information on oneself and write a blog, for instance. At the time of this study, the forum included seven main sections: Discussions, Videos, Entertainment, Own life, Lifestyle, Trends, and Body. Demi is connected to a magazine with the same name but is freely accessible to anyone. To be able to post comments or create other content, however, one has to be a registered user. When registering, the users are asked to provide an email address and a telephone number for verification. A maximum of five usernames can be attached to one telephone number at a time. Registering is free-of-charge.

Guidelines for the forum use are outlined including prohibition of certain discussion topics such as self-harm and drug use. The discussions are moderated. Furthermore, the forum cooperates with professionals of different fields, and thus girls can occasionally discuss with, for example, police officers and youth workers in the forum (Demi, 2017). With around 500 000 sessions, 1 500 000 page

views, and 150 000 unique users weekly, Demi was the fourth most popular Finnish online discussion forum at the time of the data collection (TNS Metrics, 2017).

The Demi forum was chosen as the empirical setting of this study mainly because it is a popular forum directed specifically to young Finnish people. Another interesting feature in Demi is that it allows anonymous communication but also identification of other users through member profiles and restricted amount of usernames. Moreover, we did not want to select a forum with a focus on a specific health topic but rather the type of forum where any health-related matters could be discussed.

4.2 Data collection

The empirical data were collected by the second author with a questionnaire survey directed to the users of the Demi forum. With the permission of the forum's administrators, a link to the online survey was shared in the discussion forum in June 2016 and was open for one month. A description of the purpose of the study and anonymous processing of responses was included in the survey. Moreover, it was explained that the focus of the study is to examine the views of approximately 15 to 19-year-old girls and young women. The study complied with the Finnish research-ethical legislation and ethical principles of research in the humanities and social and behavioural sciences (National Advisory Board on Research Ethics, 2009). Moreover, the Association of Internet Researchers' ethics guidelines (2012) were considered since the data were collected through an online survey.

The questionnaire included three main themes: background information, the role of the Demi forum as a source of health information, and health information literacy. Findings on health information literacy are not covered in the present article. Year of birth, gender (female, male, other), and highest education (basic education, vocational upper secondary education, general upper secondary education, university of applied sciences, university) were asked to receive basic background information of the respondents.

The respondents were asked what kind of health topics they typically seek information on from the Demi forum with the following response options: a. diagnosed diseases (physical or mental), b. symptoms or undiagnosed diseases, c. medication and their effects, vaccinations, d. contacts with health care personnel, e.g., physician visits, e. sexual and reproductive health (STD's, birth control, periods, abortion, childbirth, masturbation etc.), f. exercise, g. nutrition/diet, h. substance use, i. bodily functions (what is normal and what is not), j. everyday health behaviour (e.g., dental hygiene

and other everyday routines that affect health), k. body image, l. other topics. The respondents could select several options. Further, they were asked how often they shared their experiences or information in the forum (often or quite often, occasionally, rarely or very rarely, never).

With an open-ended question, the respondents were asked why they sought health information particularly from the Demi discussion forum. They were also asked if they felt that the information obtained was credible (yes, no, don't know) and requested to mention two to five most important things they would pay attention to when evaluating the credibility of information found in the forum. Moreover, they were asked if they felt that they had received help for their problems from the forum (yes, no, don't know) and if the information had changed their health behaviour (yes, no, don't know) and if so, how. The concepts of health behaviour and body image were briefly defined before these questions were presented.

4.3 Data analysis

No specific criteria for rejecting incomplete or otherwise inapt questionnaires were set; all questionnaires with any answers were treated as completed and included in the sample. Although the questionnaire was originally directed to girls and women 15 to 19 years old, we made the decision to include all responses to the data set regardless of reported age or gender as our interest was in Demi forum users rather than a specific demographic group. The Demi forum is explicitly directed for girls, but the participation of women or boys and men is not prohibited.

Descriptive analyses included calculation of frequencies and percentages. In question-specific analysis all non-responses were excluded, and the percentages reported were calculated from the number of responses per question. Descriptive analyses were performed using the IBM Statistical Package for the Social Sciences Version 25.0 software and Microsoft Excel 2016.

The qualitative data were analyzed using content analytic techniques. An initial analysis was conducted by the second author for her master's thesis. However, the findings reported in this article are predominantly based on the first author's analysis. The analysis rounds were conducted independently by the first and second author. As the first analysis round had a somewhat different focus, there was no attempt to check the inter-coder reliability. The first analysis round served in building preunderstanding of the data.

A meaning unit, that is "the constellation of words or statements that relate to the same central meaning" (Graneheim and Lundman, 2004) was considered as the unit of analysis. The coding scheme was developed in a data-driven manner although earlier literature on the topic and the initial analysis by the second author informed the analysis. The analysis resulted in the formation of categories and sub-categories (see Table 1). Microsoft Excel 2016 was used to structure and code the qualitative data and to calculate frequencies for codes in each category to illustrate the findings.

[Table 1]

5 Findings

Altogether 290 responses were included in the data set. The respondents were predominantly female (n=285). Four respondents said they were male and one did not want to specify gender. The respondents' ages ranged from 11 (born in 2005) to 29 (born in 1987). The majority of them (55.5%, n=161) were from 16 to 19-year-olds (born 1997–2000) at the point of the data collection. Of the respondents, 29.3% (n=85) studied in or were graduated from basic education, 40.0% (n=116) a general track of upper secondary school, 23.4% (n=68) a vocational track of upper secondary school, and 7.2% (n=21) studied in or had graduated from higher education.

5.1 Demi as a health information source

According to the responses to the close-ended question, health information was sought from the Demi forum predominantly on issues concerning sexuality and sexual health (59.3%, n=172), bodily functions (56.6%, n=164), nutrition and diet (54.5%, n=158), and exercise (52.4%, n=152). Body image (48.4%, n=140), contacts with health care personnel (44.8%, n=130), symptoms and undiagnosed diseases (43.4%, n=126), diagnosed diseases (42.8%, n=124), and everyday health behaviour (39.0%, n=113) were also popular topics. Approximately one third of the respondents sought information on medications and vaccinations (28.6%, n=83). Substance use (14.5%, n=42) was the least popular of the given topics. Most respondents selected several options. Other topics mentioned in responses to the open-ended question include skin care, mental health, insomnia, and experiences of different health products. Several respondents wanted to highlight that they did not seek *information* from the Demi forum or other discussion forums. The experiences of others, in turn,

were frequently mentioned: *"I don't actually seek information from Demi. Sometimes I'm interested in people's experiences, sometimes I read the discussions to entertain myself."* [ID57]

Approximately one third (n=94, 32.4%) of the respondents reported to share personal information or experiences in the Demi forum occasionally and ten percent (n=30, 10.3%) to share this information often. One third (n=104, 35.9%) of the respondent shared personal information rarely or very rarely and one fifth (n=62, 21.4%) of the respondents never shared personal information.

The reasons for choosing Demi for a health information source were further asked with an open-ended question. The responses were categorized into five themes, namely, learning from peer experience, emotional support, the atmosphere and style of the forum, obtaining factual information, and other reasons (Table 2).

[Table 2]

The most prominent category that emerged from the analysis was *learning from peer experience*. The possibility to read about others' experiences, opinions, and problems were seen as key reasons for using the Demi forum as a source for information. Health is a popular topic in Demi, and the forum can be used to follow health related discussions. It offers the type of information that is not available in official health sites, for example, information about dealing with health care professionals and on individual experiences on symptoms.

> *"I mainly seek for discussions on personal experiences on visits to the doctor. I am interested to know how they feel about the interactions with health care personnel, and information on these experiences or situations is rarely available from other sources than discussion forums. I'm also interested in people's personal experiences on diseases and their symptoms since the same disease can have different symptoms in different people."* [ID170]

Information obtained from the forum was viewed as reliable in offering experiential information: *"I feel it's reliable in certain matters because there are a lot of personal experiences."* [ID72] Moreover, the forum offers a place for *identification* for many of the girls and young women. Age was often mentioned with the experience of identification; the users wanted to know what other girls of the same age and situation in life think and have experienced:

"Easy to identify with other teen age girls with similar problems." [ID4]

"The people talking are often pretty much the same age and I can identify with them and maybe prepare myself for situations they have encountered." [ID133]

"Most forum users are women of the same age who are easily relatable. Majority of them respond matter-of-factly and feel they know how to offer help because they have likely had the same experience." [ID254]

Gender was brought up as an important issue: the forum is directed for girls and young women, and the respondents wished to receive information from representatives of their own gender. Especially older girls and women were seen as good information sources: *"Demi attracts crowds from many age groups and especially older people know a lot about things so you can easily get the information you need."* [ID45]

Factual information was mentioned more rarely in the responses. Again, several respondents wanted to emphasize that they do not seek for "information" from the forum. Rather, the credibility of information in the forum was often questioned, and it was mentioned that discussion forums are not suitable health information sources.

"I don't seek information from Demi. It is not a credible source." [ID57]

"I don't consider it to be a credible source when the users are teens and most of them don't even study anything that would give them expertise in the matter." [ID63]

"At most, I read what people write to entertain myself." [ID63]

In some responses, though, the users of Demi forum were described as credible source of information:

"I trust relatively much on Finnish young women's knowledge and ability to respond to and evaluate health related matters." [ID60]

"Some users know about things and possibly even study health care" [ID118]

The forum is also used "just for fun" or "randomly". Many of the respondents state that they do not usually actively seek for information, but happen to notice an interesting discussion by chance. A couple of the respondents note that they have come up with the discussions via Google search. Overall, the *popularity* of the forum appears to draw girls and young women to the discussions. Demi is described as wide, well-known, familiar, and safe forum. The forum has a great number of users,

and, according to the respondents, that connects to the fact that there is a lot of material available. The responses indicate that it is easy to seek, find, and receive information from Demi, and the information provided by other users is seen to be clear and matter-of-fact. The language used in the forum is viewed as understandable and common and the discussions open and direct and to have a positive feel to them. Furthermore, the threshold for asking questions was considered low; there are no questions that would be considered too odd.

The importance of anonymity was brought up in some of the responses: "*I'll head to Demi mainly if I need anonymous help*" [ID21]. Anonymously, one can ask delicate questions. *"There you can ask questions about illnesses etc. anonymously, and get answers from people who have gone through the same things"* [ID231]. However, as one respondent notes, Demi is not completely anonymous:

> "*Because in Demi there are usually same-aged young people in same situations. In Demi, people present themselves as nicks, so it's easier to filter reliable and unreliable messages, when compared to many other discussion forums where people are completely anonymous. For me, it's also familiar enough that I've learnt to know many of the nicks and ways of trolling so I trust demi to be a quite certain place to find information (in addition to other sites, of course).*" [ID267]

5.2 Evaluation of the credibility of information in the Demi forum

Nearly half (46.6%, n=135) of the respondents thought that the majority of information they receive from the Demi forum can be considered to be credible. Of the respondents, 40.0% (n=116) were unsure and 13.4% (n=39) thought that the information could usually not be deemed credible. The respondents were asked to name things that they would take into account when evaluating the credibility of the information obtained. The following main themes were drawn from the responses to the open-ended questions: 1. Author-related cues, 2. Argumentation and tone of the post, 3. Veracity and own prior knowledge, and 4. Verification (Table 3).

[Table 3]

Information on the author or user was brought up in many responses as a means to evaluate credibility. The person who provides information, the kind of background she has, if she has education on health, and the overall conception of the author were seen as important when evaluating the credibility of an author. Author-related matters included the nickname or the username of a post's author, and the history of the username.

> *"Sometimes I go and take a look at a user's profile and that also helps in making sure the information is credible. For example, a person can troll, bluff with his or her story, if the user has been created just a couple of minutes ago and the user has signed in only a couple of times. But it can also mean that the user doesn't want to use the original nick to share about it because it's a delicate subject, but speaking from experience, a new user usually means a troll."* [ID167]

Profile information was checked to see the previous posts the user has authored:

> *"It can also usually be seen from the replier's message history if they are all in or if their forum use concentrates on larking about and teasing others with trolling messages."* [ID78]

The age of the respondents was also mentioned in relation to credibility. Many respondents discerned that most Demi users are young, and were of the opinion that young age influences credibility since friends and their opinions are of great importance in this age. Several responses also indicated that it is important whether the person has first-hand experience on a matter or if she is forwarding information from a second-hand source. The respondents placed greater value on the opinions, comments, and notions of older and more experienced users.

> *"If the user has personal experience on the matter/doctor's word her comment is based on, or is the information from a friends dog's situation"* [ID25]

The general style of the post was seen as a way to evaluate its credibility. In addition, it was noted if other sources were cited (*"if sources are mentioned and what they are"* [ID35]*; "links to the sources"* [ID49]). Moreover, if a person had received confirmation from a health professional, the information was considered to be more credible. *"Diagnosis (has the user been to a doctor or is it a self-diagnosis)"* [ID53], "*Sources (what the doctor has said, for example)"* [ID176]. The mentioned style-related matters include the overall tone of the text, possible sarcasm, and matter-of-factness. *"I look at the writing style and the length of the text. I have believed that a person who is not serious would not be bothered to write a longer or proper text, probably."* [ID26]

Additionally, spelling and wording were mentioned as important in terms of credibility; the clarity of the text, the language and wording used, and the overall grammatical matters, such as spelling mistakes, the structure of the text, and the overall text quality were noted. Clarity and proper and adept language were seen to increase the credibility of a text. Overly exaggerated, overly humorous, and provocative posts were associated with trolling. *"The responses can "go over the top" knowingly so they are so-called trolls, some of the answers have sources, such as Duodecim's health library, and some are just guessing"* [ID144]; *"Different kinds of exaggerated expressions or overly humorous style often indicate that a person is messing with the people participating in the topic"* [ID78].

If the arguments are valid, the credibility is better as well. Precision, meticulousness, and versatility were also mentioned as credibility criteria. Moreover, it was evaluated whether the information was based on facts or feelings: *"Sources, if they are facts or intuition "I think that…""* [ID37]. Experiential information was seen to challenge credibility: *"The Demi users are not doctors or anything but instead they tell things based on their own experiences and that does not necessarily apply to everyone. Sometimes the users exaggerate or generalize, or purposefully spread false information, especially related to body image"* [ID169]. In some responses it was noted that the style and argumentation of a post serve as clues about its author: *"How the person appears based on her writing style, whether she uses facts, does she have sources"* [ID188].

The veracity of the post and the information it contains were seen as important evaluation criteria. Credibility was assessed by reasoning if something could really happen and if the matter sounds reasonable. Many of the respondents stated that they would rely on "common sense": *"Whether or not the issue sounds sensible, I use common sense and my own experiences"* [ID115]. One's own experiences and background information were seen as basis of evaluation of credibility. Additionally, the respondent's own health related education was mentioned, as well as the information reflected to that learned in training: *"if the information is at all in line with what I have learned elsewhere (I am a practical nurse and have worked in a hospital)"* [ID12]; *"I am studying to be a practical nurse so my own knowledge influences how I handle the trustworthiness of information"* [ID120].

Finally, information was verified by reflecting it to other sources and considering the response from other users: *"Usually the information can be proven credible if most of the commenters agree. If I can confirm the credibility of the information from other sources such as Wikipedia (although I know it's not a completely reliable source either)."* [ID183].

Information is reflected also to that found from other sources: "*At least I take what real information sources say about these things into account (e.g., Duodecim's the health library)*" [ID102].

Others' reactions to a post can also act as indicators for credibility. If most people agreed on a matter, the information was deemed to be more credible: *"I also evaluate information based on my personal knowledge and see what other forum users think."* [ID102]; *"if the claim is supported by one or more people in the discussion"* [ID133]; *"How many people say the same thing"* [ID135]; *"If several people agree on the issue. If the text has been written based on personal experience. If the text has a lot of likes"* [ID32].

5.3 Influence of information obtained

Nearly sixty percent (59.3%, n=172) of the respondents said they had received help to their problems from the Demi forum. Approximately one third (32.8%, n=95) were not sure, and 7.9% (n=23) said they had not received help from the forum. Of the respondents, 15.9% (n=46) thought that the information they received from the Demi forum had changed their health behaviour; 52.0% (n=151) responded negatively, and 32.1% (n=93) did not know. Responses (n=43) to the open-ended question on health behaviour change were categorized into three categories: 1. Health behaviour, 2. Overall lifestyle changes and increased knowledge, and 3. Mental and emotional health (Table 4).

[Table 4]

The first category**,** "health behavior"**,** was the largest and changes in diet and nutrition were mentioned most frequently. The respondents reported, for example, to have begun to eat more healthily in general, to have changed portion sizes *("I dare to eat a bit more"* [ID87]), and decreased the use of animal based products or started to follow a vegetarian or vegan diet. With regard to the use of specific food items, milk and sugar were mentioned: *"I, for example, drink less milk now that I found out through the forum that it's not as healthy as it's been thought to be"* [ID36]; *"I've cut drinking down milk to improve my skin"* [ID44]*; "I've started to rethink my relationship with milk"* [ID276]; *"I've received information about diets and for example got tips from Demi to break sugar addiction"* [ID2];*"I was first inspired to change my diet by Demi when there was a discussion on hidden sugars. I Googled more and soon cut the daily hot chocolates and sugary yogurts from my diet. I have also received many new vegan meal tips ☺"* [ID281].

The category of overall changes in knowledge and lifestyle included increased awareness or knowledge on or changed attitudes towards health matters.

> "I've learned new things about life and health that I had never thought of before" [ID64]

> "I've learned more about healthy lifestyles." [ID110]

> "I've gained knowledge with which I can change my behaviour. For example, I have read about how many times a week one should go jogging or about good/healthy foods" [ID60].

In some of the responses, the mind set and attitudes of the forum were seen to influence overall lifestyle changes:

> "If I, for example, want to lose weight or eat better, I don't have the idea in my head any more that I'm not for example allowed to have treats and I have to exercise exactly this much and eat as healthily as possible (although there are a lot of these 'eating banana makes you fat' people in Demi too) but that I can and should give up and the most important thing is that you eat well and feel good, not how many calories the spinach soup of the day has. This is stressed in Demi a lot, on my opinion, and therefore the atmosphere is mostly good" [ID267].

The third category was labelled mental and emotional health. It included responses that pointed out ways in which the information on the forum had influenced the respondent's body image, help seeking, self-confidence, and recognition of emotions.

> "learned that there are so many different people (who like different things), but in the end we all feel the same every now and then. I have learned to be happier and more confident in my own skin. I eat how I feel is good for me and exercise how I like and rarely use intoxicants, and when I do, I know how to do so in moderation." [ID182]

> "My health behaviour has changed regarding how I deal with and understand mental disorders." [ID211]

> "The courage to seek help." [ID155]

Most of the changes that were described were considered positive. One respondent noted, however, that she had become more critical on her weight and nutrition, and does suffer from an eating disorder.

6 Discussion

The findings of this study indicate that the Demi forum offers girls and young women the possibility to identify with people with the same gender, age, life situation, thinking, and problems, and to receive health information from these others similar to oneself. The forum is seen as an appropriate source for experiential rather than factual information on health issues and, as such, used to find information on sexuality and sexual health, bodily functions, as well as about diet and exercise, for example. Based on the findings, the cues that are used to evaluate credibility, including author-related cues, argumentation and tone, veracity, and verification, seem to be connected to the type of information sought (Figure 1). Moreover, views on both the type of information that is sought for and the evaluation of its credibility seem to be tightly linked with conceptions of the forum and related community. A share of the respondents recognized the information obtained to have influence on their thinking or behaviour; nearly sixty percent of them had received help to their problems and sixteen percent thought that the information had influenced their health behaviour. Thus, the members of the online forum—individually or collectively—can act as cognitive authorities for other users.

[Figure 1]

In this study, sexuality and sexual health, bodily functions, nutrition and diet, and exercise were the most common topics of which information from the Demi forum was sought. Previous studies show that online sources are often used to obtain information on sensitive issues (Askola *et al*., 2010; Abbas and Agosto, 2013; Lenhart *et al.,* 2010; Pohjanen and Kortelainen 2016) and used by girls, in particular, to seek delicate health information (Lenhart *et al*., 2010). In anonymous online environments, people may express information needs that are not considered acceptable in their immediate surroundings. Based on the findings of this study, information on potentially delicate issues such as sexuality is sought from the forum, but it is also common to seek information on seemingly mundane topics such as experiences of different cosmetic products.

In accordance with Yates's (2013), the findings indicate that in addition to facts, people want to learn about other people's experiences on health matters. Savolainen (2011) found that dietary blogs were important sources of emotional support rather than factual information, Shahhossein *et al.* (2013)

that, overall, emotional needs were most significant information need category among girls and young women, and Neal *et al.* (2011) that online discussion boards and social networking sites were seen as useful sources of peer support but not as authoritative sources of educational information. In this study, emotional support was found to be important as well, but a distinction was made between emotional support and experiential information. Experiential information was seen to include experiences and opinions of others whereas emotional support was understood as more evident peer support such as responses to requests for help and solving problems together. It seems that some respondents prefer to take a passive role of 'a lurker' and to observe discussions rather than take part in them. Only approximately one third of the respondents shared personal information or experiences in the forum occasionally and ten percent shared this information often. One fifth of the respondents said to never share personal information. Active participation in the discussion is not required to benefit from the discussions and readers do not necessarily need to express their information needs explicitly; passive participants may read and benefit from the discussions of others.

In terms of credibility evaluation or criteria for cognitive authority, the findings of this study are in line with those of previous research (see Appendix 1). Yet, the categorization related to credibility cues were arranged in a different manner. In this study, credibility cues were organized into four main categories: author-related cues, argumentation and tone, veracity and one's own prior knowledge, and verification.

Author-related cues can be understood to be comparable to Wilson's (1983) authorship category, Fritch and Cromwell's (2002) author competence and trustworthiness category, Jeon and Rieh's (2014) attitude (including cues on the answerer's involvement and effort) and expertise (evaluated on the basis of the perceived knowledge or experience of the answerer) categories, and the expertise, life experience, educational background categories by Mansour and Francke (2017). Moreover, Rieh's (2000, 2002) source characteristics category, can be viewed as analogous to author-related cues. In Rieh's (2000, 2002) studies, however, this category included other source features as well. In this study, a particular source (the online forum) was investigated which explains the focus on authority evaluation based on the authors' characteristics. Similar lifestyles, values, and worldviews did not emerge as a separate category in this study as they did in Mansour and Francke's (2017) study, but the Demi forum was clearly viewed as a platform for sharing information with others with same gender, age, and situation in life. This is in line with the finding of Metzger *et al.* (2010) that like-mindedness of others is one of the strategies to assess credibility online and of Mansour and Francke (2017) suggesting that similarity of the person to oneself is an important tool in assessing the

cognitive authority based on experience. However, the respondents placed greater value on information from older and more experienced users.

Argumentation and tone can be understood as analogous to text's contents (Wilson 1983), document validity (Fritch and Cromwell 2002), characteristics of information objects (Rieh 2002), or as language and writing style (Mansour and Francke 2017). Jeon and Rieh (2014) found that *trustworthiness* was evaluated on the basis of the style of the message which was seen to determine the legitimacy of the answerer, and Fergie *et al.* (2016), for their part, that users identified content appropriate for a specific context ('expectancy violation'). In effect, cues about the author and those concerning argumentation and tone are difficult to discern since the style of the text is often used as evidence of the characteristics of its authors competence and trustworthiness. As noted by Jeon and Rieh (2014), an answerer can lose their credibility by 'trolling' or joking, for example.

In this study, *one's own prior knowledge and the veracity* of the post were combined in the same category since in many cases the respondents explained that a specific piece of information 'made sense' based on their earlier knowledge on the issue. Wilson (1983) called this *intrinsic plausibility*, "an awareness of a text's contents as plausible or implausible" in connection to "our own beliefs" (p.169). Prior knowledge was also identified by Rieh (2002) as a key means to evaluate information authority and quality.

In addition to these, and in accordance with Fergie's, Hilton's and Hunt's (2016) study, information was also *verified* by comparing multiple sources. Moreover, others' opinions served as cues in evaluating the credibility of information. At least to some extent, the respondents seemed to rely on the collective knowledge that is built in the online forum or in broader terms; if most people share similar ideas or opinions, they are deemed credible. This finding gives support to the argument that credibility can be distributed (Savolainen 2007, Metzger *et al.* 2010) and evaluations made by others serve as important cues to determine the credibility of information (Jessen and Jørgensen 2012). Wilson (1983) viewed *reputation* "among those we recognize as having cognitive authority in the appropriate sphere" (p. 167) as external test for cognitive authority. Partly, verification can be considered comparable to reputation. However, verification can focus on pieces of information rather than sources as a whole.

There are clear indications that both *trustworthiness* and *competence* play an important role in evaluating information credibility even in this online environment that enables anonymous

communication. Other girls and women discussing in the Demi forum seemed to be trusted in general, with some exceptions, such as trolls for instance. However, various cues including experience, age, and education, were used to assess their competence as sources of information. Wilson (1983) claimed, that as a rule, a text is trusted if we can trust the individual or the group behind it. Already ten years ago Lankes (2008) stated that the online environment, including participatory tools and applications, has brought about a shift in credibility evaluation "from an authority-based approach to a reliability-based approach". With the reliability approach, people determine credibility by synthesizing multiple concepts, such as reliability, accuracy, currency, truthfulness, and trustworthiness rather than relying on a single authoritative source and one author's expertise (Lankes 2008). While the findings of this study align with Lankes's (2008) idea of a reliability-based approach, author-related cues still seem to be important in determining credibility. The users appeared to be familiar with each other, at least based on their nicknames, and it seemed to be important for them that there are 'others like me' in the forum. Even in this relatively anonymous online context, they received information from 'someone' rather than 'anyone' (Sharon and John 2018). Familiarity of and skills in using a particular online platform may help people to make informed credibility assessments (Mansour and Francke 2017).

Influence is an element that separates cognitive authority from other sources that are deemed credible. In this study, more than half of the respondents rejected the idea that information found in the forum would have influenced their health behaviour but less than one tenth of them thought they had *not* received help from the forum. Unfortunately, the element of influence was considered more carefully only after the data collection, and it would have been beneficial to straightforwardly ask about influence on *thinking*. Yet, responses to the question on reasons for choosing Demi as a source for health information indicate that the forum is used to learn about health.

7 Conclusions

The online discussion forum presented in this study is an important source of experiential health information for girls and young women. In this relatively anonymous online environment, they may express information needs that are not considered acceptable or appropriate in their immediate surroundings and receive information from people they can identify with. In general, the respondents view the online forum as a credible source of opinions and experiential information and use a variety of strategies to assess the credibility of the obtained information. These strategies include evaluation of author-related cues, argumentation and tone, veracity and comparison to one's own prior

knowledge, and verification with the help of other sources. A share of the respondents recognized the information obtained to have influence on their thinking or behaviour. In the light of these findings, we may argue that the members of the online forum can act as cognitive authorities for other users either as individuals or collectively.

The findings of this study cannot be generalised beyond this particular online forum, to Finnish girls or young women or even the Demi users. However, they provide insights into the ways young people evaluate user-generated information in a specific online setting. Although the focus of the study was placed on individuals' views, cognitive authorities are understood as contextual and collaboratively negotiated in communities. Indeed, the findings support the notion that the evaluation of cognitive authority is context specific and relative to the sphere of interest and type of information obtained. Analysis of the actual online communication in this forum could help further understand the findings. Moreover, more attention should be paid to influence as a key element of cognitive authority.

The study contributes to research on cognitive authority and credibility evaluation in health settings. Moreover, information literacy researchers may value the findings considering the importance of the conceptions of authority for information literacy. The Association of College and Research Libraries (2016) acknowledges authority as one of six core concepts in information literacy. In their Framework for Information Literacy for Higher Education, an understanding of authority, as contextual and constructed, is seen to enable learners to critically examine information by asking questions about its origins, context, and suitability for one's information needs rather than relying only on basic indicators of authority, such as type of publication or author credentials. The framework recognizes the importance of knowing how to seek authoritative voices but also that unlikely voices can be authoritative, depending on one's needs (ACRL 2016). Subsequent research on cognitive authority construction in various communities and contexts including everyday situations is called for.

Acknowledgements

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Table 1. An example of coding.

ID	A meaning unit	Category and sub-categories
126	"Linked sources"	CREDIBILITY CUES : Argumentation and tone : Cited information sources
126	"a Demi user's previous comments"	CREDIBILITY CUES : Author-related cues : History of the username
126	"how clearly the information is presented"	CREDIBILITY CUES : Argumentation and tone : Language and tone of the post

Table 2. Reasons for choosing Demi as a source for health information. Themes identified and times mentioned in the responses (n=290).

Theme	Mentions
1. LEARNING FROM PEER EXPERIENCE	**256**
a. Identification, similar others	122
b. Experiences of others	100
c. Opinions and views of others	34
2. OBTAINING FACTUAL INFORMATION	**96**
a. Obtaining (reliable) information and advice	59
3. EMOTIONAL SUPPORT incl. peer support, sharing and solving problems together, help	**37**
4. ENTERTAINMENT AND BROWSING	**45**
a. Entertainment ("Just for fun")	7
b. Not an *information* source (incl. browsing, using by change, finding unreliable)	38
5. FORUM ACTIVITY AND ATMOSPHERE	**108**
a. Security and familiarity, atmosphere, anonymity	71
b. Easiness and promptness, interface	31
DON'T KNOW	**6**

Table 3. Credibility cues identified by the respondents' in evaluating health information obtained from Demi. Themes identified and times mentioned in the responses (n=290)

Theme	Mentions
1. AUTHOR-RELATED CUES	**200**
a. Nick or username, user info	59
b. Own experience	55
c. Age	45
d. History of the username	22
e. Education and background	19
2. ARGUMENTATION AND TONE	**321**
a. Language and tone of the post	116
b. Cited information sources	83
c. Argumentation	41
d. When a post was written	6
3. VERACITY, OWN PRIOR KNOWLEDGE	**75**
4. VERIFICATION	**86**
a. Other's opinions	49
b. Comparison to other sources	37

Table 4. Impact of information obtained from Demi. Themes identified and times mentioned in the responses (n=43).

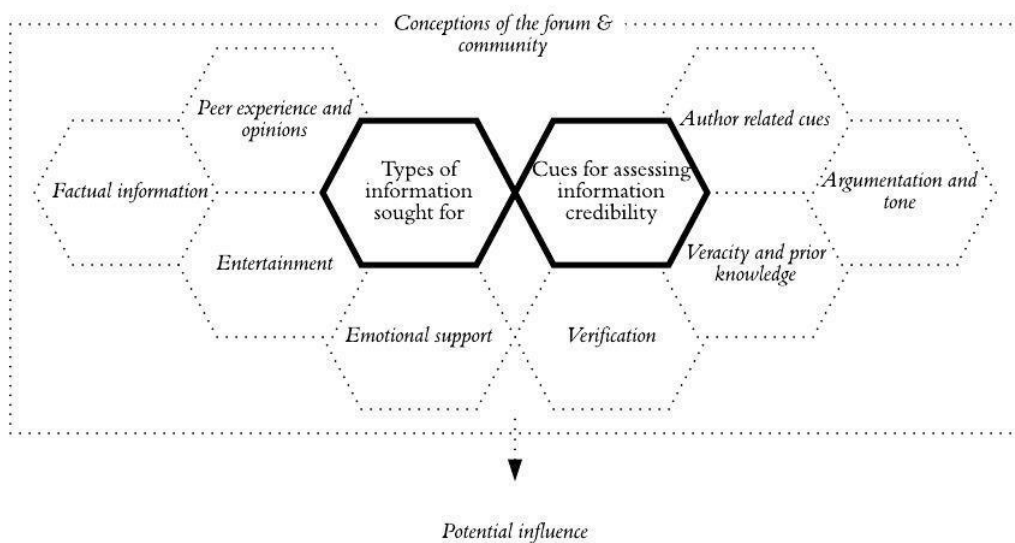| Theme	Mentions
1. HEALTH BEHAVIOR	**42**
a. Nutrition and diet	26
b. Exercise	11
c. Other everyday health and beauty routines	5
2. OVERALL LIFESTYLE CHANGES AND INCREASED KNOWLEDGE	**10**
3. MENTAL AND EMOTIONAL HEALTH	**9**
a. Positive influence on body image, confidence, courage to seek help, recognizing similar emotions	8
b. Negative influence on body image	1

Figure 1. Key themes identified in the study.

APPENDIX 1. Comparison of the findings on credibility evaluation cues to credibility and/or cognitive authority cues or criteria identified in previous research.

The present study	Wilson (1983)[1]	Fritch and Cromwell (2001)[1]	Rieh 2002[2]	Jeon and Rieh (2014)[3]	Fergie, Hilton and Hunt (2016)[3]	Mansour and Francke (2017)[3]
Author-related cues (nick, username, user info; history of the username, age, education and background, experience)	*Author* ("[w]e can trust a text if it is the work of an individual or group of individuals whom we can trust", p. 166),	*Author competence and trustworthiness* including author identity and credentials	Characteristics of sources (URL domain, type, reputation, single-collective, author credentials)	*Attitude* (cues on the answerer's involvement and effort)		Expertise, life experience, educational background, similar lifestyles, values and worldviews
Argumentation and tone (language and tone, argumentation, cited sources, time of the post)	*Recency* ("when present reputation is unknown"--- "the newer is the better" (p. 167), *intrinsic plausibility* ("if it seems eminently sensible", p. 169)	*Document validity* including factual accuracy of information, information presentation and format, and organizational or institutional identity and authority	Characteristics of information objects (type, title, content, organization, presentation, graphics, functionality)	*Trustworthiness* (based on the style of the message which was seen to determine the legitimacy of the answerer); *expertise* (the perceived knowledge or experience of the answerer)	Identifying content appropriate for a specific context ('expectancy violation')	Language and writing style
Veracity and own prior knowledge	*Intrinsic plausibility* ("an awareness of a text's contents as plausible or implausible" in connection to "our own beliefs", p.169)		Prior knowledge (domain knowledge, system knowledge)			
Verification (comparison to other sources, other's opinions)	*Reputation* ("reputation among those we recognize as having cognitive authority in the appropriate sphere", p. 167)				Comparing content to ensure consistency ('consistency'); recognizing recommendations ('endorsement')	
	Publication history ("a publishing house can acquire a kind of cognitive authority", "a single journal can have the same kind of authority", p.168), *document type* (for example "a standard reference work that is repeatedly revised may be thought as an institution in its own right", p. 169)	O*vert affiliation with an organization, institution, or individual* including advertisements and links to organizational home pages or other resources; *covert affiliation with an organization, institution, or individual* including less obvious cues on affiliation				

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[1] Cognitive authority
[2] Cognitive authority and quality
[3] Credibility