A New Framework of Web Credibility Assessment and an Exploratory Study of Older Adults' Information Behavior on the Web

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A NEW FRAMEWORK OF WEB CREDIBILITY ASSESSMENT AND
AN EXPLORATORY STUDY OF OLDER ADULTS’ INFORMATION BEHAVIOR ON THE WEB

By

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TO MY PARENTS
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ABSTRACT

This dissertation research aims to provide a better understanding of people’s credibility assessment of online information (i.e., Web credibility assessment), which is an important part of their information behavior. In particular, this research focuses on older adults as a research population as they are a less studied user group in the literature on information credibility. Considering the ever increasing presence of older adults on the Web and their needs for health information in their daily lives, this research explores older adults’ credibility assessment of online health information within the context of everyday life information seeking (ELIS).

The methodology employed in this research consists of a qualitative meta-study (Phase I) and semi-structured interviews (Phase II). In Phase I, the researcher analyzed 84 primary research reports on information credibility, identifying conceptual typologies of important facets of credibility assessment such as conceptualization, operationalization, variability (user characteristics and contexts), and process. Based on these conceptual typologies, the researcher proposed a new, extended framework of Web credibility assessment, named WC framework, that contains three main components, Assessment of WC—i.e., conceptualization and operationalization to measure Web credibility; Variability of WC—i.e., variables regarding individual and context; and Process of WC—i.e., the overall process of Web credibility assessment.

In Phase II, the researcher conducted semi-structured interviews with twenty-one older adults whose ages ranged from 61 to 80 ($M = 70.3$) in the manner of one-on-one, in-person. The purposeful sampling methods, such as convenience sampling and snowball sampling, were used to recruit older adults who meet the sampling criteria of the study: age (55 years old or older), residency (Florida residents for an in-person interview), and Internet use experience. Also, a
prescreen test was carried out via a telephone interview to make sure that the participant’s cognitive function was adequate for the study. Those who met all the sampling criteria and passed the prescreen test were recruited for an in-person interview which lasted around 45 minutes.

The interview data revealed that older adults needed health/wellness information regarding medication and supplements, symptoms of and cures for specific diseases, medical quality assurance, health insurance, nutrition, and exercise. In seeking health information, they used both interpersonal and online sources. As for the interpersonal sources, the research participants mentioned medical professionals (e.g., doctors and physicians), partners, family, and friends. On the Web, they referenced information from non-profit (i.e., non-commercial) institutions’ websites such as government websites (e.g., NIH, CDC) and university hospitals’ websites (e.g., Johns Hopkins Medicine, Harvard Medical School). The most frequently mentioned commercial website was WebMD. Depending on the purposes of health information seeking, some interviewees mentioned that they used pharmacists’ websites (e.g., Walgreens and CVS).

When judging the credibility of online health information, they employed various cues/markers and heuristics that are related to the attributes of the operator (i.e., source), content (i.e., message), and design (i.e., media) of Web resources. Based on the new framework developed in Phase I, the informants’ Web credibility assessment process was characterized with the two stages: initial and final evaluations.

Lastly, both theoretical and empirical implications of the research and future research directions were discussed. Specifically, the new Web credibility assessment framework (i.e., the WC framework) advanced our understanding of the conceptualization of Web credibility and can
be used as a knowledge resource in developing context specific credibility assessment models as well as information system interfaces that provide effective support for information credibility evaluation by users. Likewise, findings from the semi-structured interviews can inform online information system developers and librarians about how older users search for online health information and how they assess its credibility. Ultimately, the findings of this research should help the development of more effective online systems, services, and, training modules that are aligned with the online information behaviors of this rapidly growing, important user population—i.e., older adults.
CHAPTER 1
INTRODUCTION

1.1 An Introduction to Web Credibility

The notion of credibility has been a focus of examination from as early as the Aristotelian era, focused on the characteristics of the communicator’s ability to inspire confidence and belief in what was being said: ethos, pathos, and logos, corresponding to the source’s credibility, emotional appeal toward the audience, and the logic used to support a claim. In particular, ethos refers to the character of a speaker in the context of interpersonal communication, which is mainly based on the listener’s perception of the speaker’s credibility. Aristotle mentioned that “his [the speaker’s] character ethos is the most potent of all the means to persuasion” (Cooper, 1932, p. 9). Many of the later scholars also consider the source credibility one of the important variables affecting attitude change of a receiver (Hovland, Janis, & Kelley, 1953; Petty & Cacioppo, 1981). In other words, the perceived credibility of the communicator has been identified as a crucial criterion for judging the credibility of the statement itself. Even in cases where a statement was approved by highly respected persons or organizations, the statement may be perceived as credible as if it was originated by them (Hovland et al., 1953). The elaboration likelihood model (ELM), which is an instrumental model explaining communication and persuasion in the field of psychology, identifies credibility as one of the important variables for persuasion (Petty & Cacioppo, 1981); thus, a receiver’s attitude change (i.e., persuasion) may be a recognizable outcome of credibility (Rieh & Danielson, 2007).

While the ‘traditional’ studies on credibility in the context of interpersonal communication have focused heavily on the characteristics of the speaker’s ability to inspire confidence and belief in what was being said (i.e., source credibility), the literature focusing on
information seeking and retrieval, credibility has been viewed as a criterion for judging the relevance of information (i.e., information credibility). *Relevance* has been viewed as playing a significant role in users’ decisions about whether to accept or reject information (Cool, Belkin, Frieder, & Kantor, 1993). The term *quality* has been used in this field to indicate the value that leads people to choose and utilize certain information (Rieh & Belkin, 1998; Stvilia, Gasser, Twidale, & Smith, 2007). The literature using the term quality tends to consider credibility as a dimension of quality—a set of characteristics, which allows indirect (vs. direct) evaluation or prediction of information quality. That is, when users do not have sufficient knowledge to judge the quality of the given information and/or those who are not deeply involved with the given task, they may rely on the markers/cues and heuristics of information credibility, rather than directly evaluating the information quality. Based on the theoretical lens of “Information Foraging” by Pirolli and Card (1999), the indirect evaluation of information quality by credibility markers/cues may be understood as following ‘information scents’ (Pirolli, 1997) or ‘residues’ (Furnas, 1997), which are imperfect representations of the information quality based on proximal cues. Using the analogy, credibility markers/cues may exude either a positive, negative, or even neutral ‘scent’ in sense-making around the quality of the information.

Credibility of online information, which is also called *Web credibility* (Fogg, 2003a), involves various markers/cues and heuristics that are related to the unique features of Web-based platforms. Undoubtedly, source-related features, which have been the main focus in the interpersonal communication context, still have a significant impact on the perception of credibility even in the Web context. However, many scholars point out that the traditional cues and measures of source credibility may not be able to fully reflect the credibility of Web resources considering the unique features of the current Web such as the proliferation of peer-
production mechanisms (e.g., Wikis) and social content creation communities using those mechanisms, and increasingly interactive ways of information dispersion (Flanagin & Metzger, 2008; Hong, 2006b; Jessen & Jørgensen, 2012). For instance, Hong (2006b) draws attention to media and genre-specific structural features of Web resources, such as domain names, navigation tools, and hyperlinks to other sites, that may not be addressed appropriately by the measures focused on source-related attributes in the interpersonal communication setting. Also, Jessen and Jørgensen (2012) highlight that authors’ credential and authority markers/cues (i.e., source-related features) are not always available in online information, especially in user-generated resources; therefore, Web credibility assessment does not necessarily rely on source credibility markers/cues. There are other cases where the provided source information is hard to interpret due to the convergence of multiple sources and the easiness of reproducing and redirecting one source to another (Flanagin & Metzger, 2008). Therefore, although the concept of Web credibility is rooted in the traditional concept of credibility (i.e., source credibility in interpersonal communication), it is necessary to identify appropriate credibility markers/cues, heuristics, and measures that can be enabled by the distinct features of Web systems and genres. Chapter 2 provides a more in-depth discussion on conceptualization and operationalization of credibility.

1.2 Statement of the Problem

Web credibility has been defined and measured largely based on the three main objects of assessment: source, message, and media. Several underlying dimensions have been identified to address each type of credibility, such as trustworthiness, expertise, dynamism, and attractiveness for source credibility; accuracy, comprehensiveness, currency, reliability, and validity for message credibility; and stability, consistency, and easiness of use for media credibility. Even
though each type of credibility and associated dimensions seemed to focus on different objects of assessments, ultimately, the root or overarching concept under investigation has been credibility. Therefore, logically, the root concept, credibility, has to be conceptualized first, and the conceptualization should be applied to all types of credibility operationalizations. However, discussions of credibility in both interpersonal and Web contexts in the literature have been shaped more by the sources and/or objects of credibility assessment rather than guided by a systematic conceptualization. This may lead to a conflation and confusion of the conceptual structure, with measurements, and objects of measurements of the concept of credibility. Therefore, it is necessary to articulate the relationship among the key dimensions of Web credibility, related measures, and objects of those measures.

Web credibility assessment is often theorized as an iterative process that is influenced by user characteristics (e.g., age, gender, education, and so on) and contextual variables (e.g., task, user involvement, motivation, ability, and so on). Several existing theoretical frameworks conceptualized the process of Web credibility assessment, taking the impacts of different variables on users’ perceptions of Web credibility into account (Fogg, 2003b; Hilligoss & Rieh, 2008; Metzger, 2007; Sundar, 2008; Wathen & Burkell, 2002). However, as the existing theoretical frameworks have somewhat different perspectives on how people assess credibility when they seek for information on the Web, it is useful to analyze common and unique features of the existing theoretical frameworks, providing a better understanding of what is known and what needs to be further studied regarding the given topic—i.e., people’s Web credibility assessment.

Some previous studies have found that age may have a significant impact on Web credibility assessment (Choi, 2013; Fogg et al., 2001; Zulman, Kirch, Zheng, & An, 2011).
However, older adults are a relatively less studied user group, even though their use of Internet services has been expanding rapidly over the years: As of April 2014, 59% of American older adults who are 65 years old or older used the Internet (Smith, 2014), up from 15% in 2000, 37% in 2008, and 56% in 2013 (Smith, 2013); in terms of social networking sites (SNSs) use, 46% of the older Internet users used SNSs in 2014 (Smith, 2014), up from 5% in 2005, 11% in 2008, and 43% in 2013 (Brenner & Smith, 2013). In particular, about 30% of American older adults sought health information online as of 2012 (Fox & Duggan, 2013); considering the fact that 54% of those who were between 50 and 64 years old and 67% of those who were between 30 and 49 years old went online for health information online, future cohorts of older adults are expected to do so in much higher proportions. However, most of the previous studies on information credibility assessment have been either based on or focused on younger generations’ perceptions, such as college students or high school students (Eastin, 2001; Eysenbach, 2008; Flanagin & Metzger, 2000, 2008; Hargittai, Fullerton, Menchen-Trevino, & Thomas, 2010; Hilligoss & Rieh, 2008; Hong, 2006a, 2006b; Iding, Crosby, Auernheimer, & Klemm, 2009; Liu, 2004; Liu & Huang, 2005; Rieh & Hilligoss, 2008; Rowley & Johnson, 2013). Other studies have been conducted with the general population, consisting of a wide range of age groups (Fogg et al., 2003; Princeton Survey Research Associates, 2002; Rieh, Kim, Yang, & St. Jean, 2010; Savolainen, 2011; Yang & Rieh, 2013). Even though some studies have dealt with older adults’ credibility assessment of online health information, they tended to focus on the factors responsible for older adults’ distrust of online information (Robertson-Lang, Major, & Hemming, 2011; Zulman et al., 2011), rather than looking into the underlying dimensions and structures of their perceptions of Web credibility.
In fact, older adults, who have relatively less experience with the Internet than younger generations, tend to have more concerns or doubts about the credibility of health-related resources on the Web. Kaiser Family Foundation (2005) reported that only 26% of Internet users who were 65 years old and older trusted online health information “a lot” or “some” to provide accurate health information, while 57% of younger adults did. Fisk, Rogers, Charness, Czaja, and Sharit (2009) mention that this distrust may be because their expectations about how a system should work is based on how previous versions (i.e., non-electronic) were structured. In other words, they may assume that the credibility of online information is relatively lower than that of printed information because they are more familiar with printed information that is produced and disseminated through a stricter process that requires enough authority and capital to justify and sell information products.

However, the fact that older adults have more concerns with credibility issues does not necessarily mean that they are able to seek out indicators of credibility when exploring a Website. For instance, Robertson-Lang et al. (2011) found that 93% of older adults in their study considered the websites they chose credible, but only 29% of them actually checked the source of the sites to make sure they were credible. The study also reported that some participants automatically trusted online health information simply because it was on the Web (Robertson-Lang et al., 2011). Zulman et al. (2011) also highlighted that older adults’ lack of Internet experience and unfamiliarity with technology influenced their trust of online resources. More specifically, the relationship between age and distrust in the Internet as a source of health information was moderated after adjusting for Internet experience and technical difficulties with the computer or Internet. Therefore, older adults who have relatively lower levels of experience
and proficiency with the Internet than other age other age groups may need to be studied separately.

Lack of information technology (IT) proficiency, which would influence Web credibility assessment, may be also found in younger age groups. Ross, Grossmann, and Schryer (2014) argue that there is no sufficient evidence showing a higher possibility of being defrauded in the older adults group than younger population segments. However, older adults may still be considered one of the groups vulnerable to online fraud because they tend to lag behind younger people in adopting new technologies, regardless of whether or not they are familiar and confident with the current IT, due to perceptual, cognitive, and psychomotor declines (Charness & Boot, 2009; Fisk et al., 2009; Smith, 2014). Furthermore, there have been studies examining older adults’ vulnerability to fraud from the perspectives of neural activity. In Castle et al.’s (2012) study, older adults rated untrustworthy faces as significantly more trustworthy and approachable than younger adults did. Also, older adults showed lesser activation in the anterior insula (AI), which is known as a region that contributes to decision-making by instantiating subjective feeling states, when making explicit judgments of trustworthiness and when perceiving untrustworthy faces. The authors argue that reduced AI activation seen in older adults may be a neural indicator of a weaker warning signal regarding cues of untrustworthiness, which could cause a higher rate of being victimized by online fraud in older age groups.

To fill the aforementioned gap in the literature on information credibility in terms of both theoretical and empirical aspects, this dissertation research first synthesized existing theoretical frameworks pertinent to Web credibility assessment to propose a new framework (Phase I) by conducting a qualitative meta-study (Paterson, Thorne, Canam, & Jillings, 2001); then used the new framework to explore older adults’ perceptions of Web credibility and their behavioral
characteristics in Web credibility assessment through semi-structured interviews (Phase II). The findings from this dissertation, therefore, will contribute to the information behavior and HCI literature and provide theoretical and empirical considerations for future research on various user groups’ Web credibility assessment.

1.3 Purpose of the Study

This dissertation research has three goals to accomplish: First, the research seeks to enhance our understanding of what information credibility is, especially in the Web context (i.e., Web credibility), how theoretical frameworks in the literature conceptualize people’s Web credibility assessments, and which user-related variables come into play in the process of Web credibility assessment. By conducting a qualitative meta-study (Paterson et al., 2001) on the literature of information credibility, this research proposes a new framework that is useful to understanding people’s of credibility assessment of information in the Web context.

Second, this research explores older adults’ (i.e., the target research population’s) typical information needs in their everyday lives, and, in particular, their health information needs and related information behaviors using semi-structured interviews. Based on Savolainen’s (1995) everyday life information seeking (ELIS) model, various types of individual and social factors are taken into account in order to have a holistic understanding of older adults’ information behaviors in the everyday life context.

Third, this research aims to provide a deeper understanding of older adults’ Web credibility assessment as a crucial part of health information seeking in their everyday lives settings. The new framework of Web credibility assessment that is proposed by the qualitative meta-study guides the construction of the interview protocol as well as the data analysis and interpretation. To accomplish these goals, the following research questions have been developed:
RQ1: How is the process of Web credibility assessment conceptualized in existing theories and models?

RQ1-1: What are the common and unique features of existing theories and models of Web credibility assessment?

RQ1-2: How can the existing theoretical frameworks of Web credibility assessment be improved?

RQ2: In general, what are older adults’ common information needs in their everyday lives?

RQ3: What are older adults’ health information needs and related information behaviors?

RQ3-1: What sources do older adults use to find health information both on- and offline, and why do they use those sources?

RQ3-2: How do they use the information they find?

RQ4: How do older adults assess the credibility of health-related information on the Web?

RQ4-1: What are older adults’ perceptions of Web credibility?

RQ4-2: What are some of the psychological, social, and/or cultural mechanisms that underlie and/or affect those perceptions?

RQ4-3: What are some of the markers/cues and heuristics used by older adults to assess the credibility of health-related websites?
CHAPTER 2
LITERATURE REVIEW

This chapter reviews the literature on two areas that lay the groundwork for this dissertation research: (1) Web credibility and (2) older adults’ information behavior. The first subsection of the chapter reviews both theoretical and empirical studies on Web credibility published in journals of information studies as well as communication, psychology, and HCI. At the same time, however, this section reviews some of the older/classic studies of credibility that provide original definitions and conceptualizations of the concept of credibility, which then have been used in more recent studies and reviews of credibility assessment on the Web. Also, this section devotes a good deal of attention to reviewing theories and models that conceptualize the process of web credibility assessment.

The second subsection defines ‘who older adults are’ by reviewing different definitions in the literature. Also, this section describes older adults’ typical information needs and related information behaviors in their daily lives. In particular, this section focuses on distinct characteristics of their online information use and seeking behaviors, which may be different from younger generations.

2.1 Web Credibility

2.1.1 Definition of Web Credibility

According to the Oxford English Dictionary, credibility is defined as “the quality of being trusted and believed in” (Credibility, n.d.). As the dictionary definition indicates, the concept of credibility is based on specific qualities or virtues (i.e., underlying dimensions), such as trustworthiness, that are involved in making people believe
something. In the literature, the “something,” an object of credibility assessments, has varied depending on the main interests and approaches of research. The “something” can be a speaker in interpersonal communication and psychological research; an organization or group, as in the management sciences; media, such as television or the Internet in mass communication research; or information resources in the information sciences; and so on (Rieh & Danielson, 2007).

Even though the main objects of credibility assessments have varied among fields, scholars seem to agree on the idea that credibility is based on a person’s (e.g., a listener, a user, or a recipient) perception, rather than the objects of assessments (O'Keefe, 1990). That is, the essential part of credibility assessments concerns how people perceive “something” as credible, which then should theoretically be applicable for all types of credibility assessments regardless of the objects under investigation (e.g., source, message, media). In this regard, the initial investigations on credibility performed in interpersonal communication and psychological research can provide a foundation for conceptualizing credibility.

2.1.1.1 Dimensions of credibility. In his Rhetoric, Aristotle identifies three characteristics of the speaker, which affect the listener’s perception of the ethos of a speaker: intelligence, character, and goodwill (Cooper, 1932). His conceptualization of ethos having the three dimensions seems to serve as the fundamental reference in the following research that attempts to clarify the concept of credibility, while labels of the dimensions identified in the later studies were not always the same. Several of theoretical and empirical studies have suggested different models of credibility, consisting of different numbers and names of underlying dimensions.
Gaziano and McGrath (1986) propose the one-factor model of source credibility. The factor analysis in their study shows that 12 items (e.g., being fair, unbiased, trustworthy, complete, factual, accurate, public-beneficial, well-trained) are grouped together in a single factor, named *credibility*. However, most scholars consider credibility a multifaceted concept with underlying dimensions. Hovland et al. (1953) define the *trustworthiness* and *expertness* of the communicator (i.e., source) as determinants of the credence given to them, which highly influences the receiver’s judgment of whether to accept or reject the message generated by the communicator. Wilson (1983), who coined the term *cognitive authority*, mentions that cognitive authority is clearly related to credibility, as people would perceive the authority’s argument or idea as proper when the authority is thought credible. He highlights that cognitive authority is not necessarily people, but may be information resources, such as books, dictionaries, journals, etc. Thus, credible resources are regarded as potential cognitive authority. He identifies *trustworthiness* and *competence* (i.e., expertise) as two main components of credibility, which are in line with Hovland et al. (1953).

Petty and Cacioppo (1981) view credibility as one of the important variables for source effects in their model for persuasion (ELM of persuasion), along with attractiveness/likeableness, power, and number of sources. In particular, they examined the effect of credibility on persuasion by manipulating the source’s trustworthiness and expertise, assuming that they are the core attributes of source credibility. Similarly, O'Keefe (1990) also considers these two the key dimensions of credibility.

McCroskey and Teven (1999) add a third dimension, *goodwill*, to the two-factor model of source credibility (i.e., trustworthiness and expertise). This three-factor model is semantically the same as Aristotle’s conceptualization of ethos having three underlying dimensions, *intelligence*
(correctness of opinions), character (reliability), and goodwill (intent toward receiver). The authors pointed out that goodwill has been often either excluded from the key dimension lists or viewed as a sub-dimension of trustworthiness. They argued that Aristotle’s separation of character (general reliability) of a person from the perception of his intentions toward a specific trusting person (i.e., goodwill) is a valid and fundamental one because a person may be perceived as reliable (or trustworthy) and at the same time be perceived as opposed to the personal goals of the person who must rely upon him as a source of information. Their study results, which were derived from a factor analysis on 783 undergraduate students’ perceptions, also supported their assertion that goodwill is a separate component of the ethos/source credibility construct.

Berlo, Lemert, and Mertz (1969) suggest another three-factor model of source credibility, safety, qualification, and dynamism. The authors mention that this three-factor model is not necessarily incompatible with Hovland et al.’s (1953) two-factor model, consisting of trustworthiness and expertness. They explain that the safety factor is closely related to, yet more general than the concept of trustworthiness in Hovland et al.’s model, as safety includes a general evaluation of the source’s congeniality, such as kind and friendly; the second factor, qualification, is more likely to be identical to the expertness dimension. They suggest dynamism of the speaker as the dimension of source credibility, which includes items such as aggressive, emphatic, bold, active, and energetic.

Whitehead Jr. (1968) proposes a four-factor model, consisting of trustworthiness, competence, dynamism, and objectivity. The author also uses the factor analytic techniques to verify the previously identified dimensions of ethos (source credibility). Sixty-five scales regarding ethos or credibility from the literature were selected and factor analyzed based on 152 college students’ responses. Items which were significantly loaded to each dimension were: right,
honest, trustworthy, and just for trustworthiness; experienced and had professional manner for competence; aggressive and active for dynamism; and open-minded and objective for objectivity.

Lastly, Giffin (1967) argues that five factors play important roles in forming the perceived credibility of the source: expertness (authoritativeness or intelligence), character, goodwill, dynamism (or activity), and personal attraction (likability or affiliation). As shown above, expertness and character (trustworthiness) are the two core components of source credibility that have been identified in most of the previous studies examining what are the core components of ethos/source credibility. In addition, the third dimension, goodwill, was also identified as an important dimension of ethos/source credibility by Andersen and Clevenger Jr (1963); Cooper (1932); McCroskey and Teven (1999), and the fourth factor, labeled dynamism, was found by Berlo et al. (1969). With regard to the fifth factor, personal attraction, Giffin mentions that even though it did not account for a significantly large portion of the definition of credibility in the literature, it was an identifiable factor, and there is an indication of a possible influence of personal attraction, such as likability and affiliation. Table 2.1 summarizes the dimensions of credibility suggested in the literature.

Table 2.1 Underlying Dimensions of Credibility in Interpersonal Communication

<table>
<thead>
<tr>
<th></th>
<th>Trustworthiness</th>
<th>Expertise</th>
<th>Dynamism</th>
<th>Goodwill</th>
<th>Objectivity</th>
<th>Personal attraction</th>
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<tbody>
<tr>
<td>Hovland et al.</td>
<td>✓</td>
<td>✓</td>
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<td>(1953)</td>
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<tr>
<td>Berlo et al.</td>
<td>✓</td>
<td>✓</td>
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<tr>
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<td></td>
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<tr>
<td>McCroskey &amp;</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
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<tr>
<td>Teven (1999)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Whitehead Jr.</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
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<tr>
<td>(1968)</td>
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<td></td>
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</tr>
<tr>
<td>Giffin (1967)</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

14
2.1.1.2 Key dimensions of credibility: trustworthiness and expertise. Some scholars point out that the disagreement in defining the concept of credibility can be derived from the limitations of the factor analytic methods used to identify the construct’s core dimensions (O'Keefe, 1990; Taraborelli, 2008). As shown above, the most frequently used approaches for analyzing the construct (i.e., credibility) were creating candidate items relevant to credibility and validating them by using the factor analytic techniques. The variances in creating and validating those candidate items might have caused the disagreement. Acknowledging the limitations in defining the concept of credibility, the researcher aimed to identify the most frequently used terms or ‘expressions’ used in the literature to conceptualize credibility: trustworthiness and expertise (see Table 4.1 below). Several scholars addressing credibility issues in the Web context also see that credibility is fundamentally based on two primary dimensions of credibility, trustworthiness and expertise (Fogg, 2003a; Metzger, 2007). More recently, the Encyclopedia of Library and Information Sciences (EoLIS) has defined that trustworthiness and expertise are the two key dimensions of credibility, as well (Rieh, 2010). Thus, the researcher uses this two-dimensional conceptualization of credibility as an operational definition for organizing the rest of this review.

*Trustworthiness* captures the perceived goodness and morality of the source (Fogg, 2003a). Thus, the perception that a source is fair, unbiased, and truthful contributes to the trustworthiness of information (Rieh, 2010). Wilson (1983) mentions that a person is regarded as trustworthy if he or she is honest, careful about what he or she says, and disinclined to deceive. Hovland et al. (1953) say that the degree of confidence in the communicator’s intent to communicate a valid assertion is considered as the communicator’s trustworthiness.
*Expertise* is defined as the perceived knowledge, skill, and experience of the source (Fogg, 2003a). From the perspective of source credibility in the interpersonal communication, expertise is considered as the extent to which a communicator is perceived to be a source of valid assertion (Hovland et al., 1953). Wilson (1983) says that a person is competent in some area of observation or investigation if a person is able to observe accurately or investigate successfully.

### 2.1.2 Objects of Web Credibility Assessment

Fogg’s (2003a) *Web Credibility Framework* can guide the discussion on operationalization of Web credibility, as it suggests three main objects of Web credibility assessment that can be used to categorize various measures identified in the literature: (1) operator, (2) content, and (3) design. Even though these three categories correspond to the traditional typologies of credibility, such as source, message, and media credibility (Metzger, Flanagan, Eyal, Lemus, & McCann, 2003; Rieh & Danielson, 2007), Fogg’s framework is specialized for Web credibility assessment, labeling and defining each category appropriately for Web-based resources.

The first category of Web credibility framework, *operator*, is defined as “the organization or person offering the site” (p. 173). Operator can be interpreted as source in the conventional setting. As credibility of a speaker (i.e., source) is considerably important evidence for people to judge the credibility of the message from him or her in interpersonal communication, credibility of an operator, who runs a website, is an important object of assessment for judging the credibility of the website. For instance, whether or not the operator of the website is respectful or whether it is a profit or nonprofit organization can be some of the markers/cues that influence users’ perceptions of websites’ credibility.
Content is the second category of the Web credibility framework. Fogg (2003a) defines content as “what the site provides in terms of information and functionality” (p. 173). Currency, accuracy, relevance of content, and endorsement by a respected outside agency (e.g., the Health on the Net foundation; HON) are the message-related markers/cues that boost Web credibility. In addition, Fog (2003a) considers functionalities that a website can provide for users as the other aspect of content. Examples include the archive function that allows users to search past content on the website and customizability that allows tailoring pages to individual users.

Design is the third category of the framework, which is largely about the structural attributes of websites. Fogg (2003a) specifies that four key design elements come into play for Web credibility assessment: information design (the structure of information on each page and throughout the site – e.g., organization of information); technical design (how the site works from a technical standpoint – e.g., search function is powered by a respected search engine); aesthetic design (how things look, feel, or sound – e.g., whether or not the site is professionally designed); and interaction design (moment-by-moment experience of users as they go through the steps to accomplish their goals – e.g., easy to use, navigability). Table 2.2 provides the definitions and examples of the three objects (types) of Web credibility assessment.

<table>
<thead>
<tr>
<th>Assessment object</th>
<th>Definition</th>
<th>Types and examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator (source)</td>
<td>The organization or person offering the site</td>
<td>• Persons (individuals)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Organizations</td>
</tr>
<tr>
<td>Content (message)</td>
<td>What the site provides in terms of information</td>
<td>• Message-related markers/cues</td>
</tr>
<tr>
<td></td>
<td>and functionality</td>
<td>• Website’s functionalities</td>
</tr>
<tr>
<td>Design (media)</td>
<td>The structural attributes of the site</td>
<td>• Information design</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Technical design</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Aesthetic design</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Interaction design</td>
</tr>
</tbody>
</table>

Table 2.2 Objects of Web Credibility Assessments based Fogg’s Framework (2003a)
2.1.3 User Characteristics in Web Credibility Assessment

The process of assessing information credibility relies on users’ perceptions, which may be affected by different user characteristics. These include age, gender, socio-economic status, technology proficiency, information literacy, and so on (Ahmad, Komlodi, Wang, & Hercegfi, 2010a; Arazy & Kopak, 2011; Fogg, 2003b; Kim, 2012; Lucassen, Muilwijk, Noordzij, & Schraagen, 2013; Metzger, 2007; Robertson-Lang et al., 2011; Zulman et al., 2011). Therefore, to gain a better understanding of users’ assessments of the credibility of online resources and the effects of various demographic, cultural, and physiological variables on information behaviors, researchers have devised studies of populations defined by those variables.

2.1.3.1 Demographics. Age may be one of the important factors influencing Web credibility assessment. Fogg et al. (2001) found that participants of 28 years old or younger tended to be more critical of amateurism on a site, compared to those who were 37 years older or older. Also, the older respondents in the study rated credibility markers regarding expertise, trustworthiness, and tailoring (i.e., personalized services) more positively than their younger counterpart did. Castle et al.’s (2012) study that found the reduced AI activation in the older group, which implied a lower visceral warning signal to cues of untrustworthiness, can be understood in line with the findings from Fogg et al. (2001) that older users tended to be more generous in rating credibility markers than younger users.

In addition, older adults tended to have more concerns or doubts about the credibility issues on the Web (Kaiser Family Foundation, 2005). Considering the fact that the age effect on the perception of credibility of online health information was attenuated after controlling for technology proficiency (Zulman et al., 2011), age seems to have a both direct and indirect effect on people’s perception of Web credibility and their behaviors in Web credibility assessment.
Gender is another demographic factor that influences credibility perception on the web. Johnson and Kaye (1998) mentioned that gender was the only variable that was significantly associated with perceptions of credibility of all four types of sources (e.g., online newspapers, online news magazines, online candidate literature, and online issue sources) among the demographic variables under investigation, such as age, education, and income. In particular, female participants in the study viewed the web as more credible than males did. Fogg et al. (2001) also found that male participants rated credibility markers/cues more negatively than females did. However, gender does not have a consistent effect—i.e., men being more critical than women—on perceptions of Web resources. For instance, Flanagin and Metzger (2003) reported opposite findings, that males rated the given websites as more credible (i.e., more positive) than did females. Furthermore, Johnson and Kaye (2000) found that gender did not play a significant role in assessing Web credibility, while other studies have controlled gender in their data analyses (Hong, 2006a; Johnson & Kaye, 2009; Metzger, Flanagin, & Zwarun, 2003).

2.1.3.2 User involvement. Several models for Web credibility assessment view user involvement (e.g., motivation and ability) as a decisive factor having an impact on the overall process of Web credibility assessment (Fogg, 2003b; Lucassen et al., 2013; Lucassen & Schraagen, 2011; Metzger, 2007). When people have high motivation to evaluate Web credibility, they are more likely to look into the content-related features of the web resource, such as the arguments presented and/or source of the information. However, when they have low motivation, people tend to evaluate Web credibility based on more superficial features of the web resource, such as design, color schemes, and functionalities of the website (Fogg, 2003b; Metzger, 2007).
Furthermore, when people have the ability to evaluate the web resource, in addition to motivation, people use a more rigorous and systematic strategy for credibility assessment. However, if a user does not have motivation, no credibility assessment will happen; if he does not have the ability, yet has the motivation, to evaluate, the user would rely on the surface characteristics (i.e., peripheral cues) or heuristics to judge the credibility of the information (see Metzger, 2007, p. 2088). Thus, user motivation and ability are crucial factors that determine the extent to which users will critically evaluate the web resource.

*Familiarity* on a given topic is known as a contributing factor that influences Web credibility assessment, as well (Arazy & Kopak, 2011; Chesney, 2006; Lucassen et al., 2013). More specifically, Lucassen et al. (2013) found that people who were familiar with a given topic tended to pay more attention to the semantic features of the information (i.e., central cues), whereas people who were not familiar with the topic focused more on surface features of the information (i.e., peripheral cues). Arazy and Kopak (2011) also highlighted that assessing the accuracy of the content required knowledge of relevant facts (i.e., semantic features), whereas assessing the presentation of the Wikipedia article (i.e., surface features) did not require such expertise. Thus, his level of familiarity with the subject matter may affect the user’s interpretation of the web resource under examination.

**2.1.3.3 Technology proficiency.** Users’ *information literacy levels* play a significant role in assessing the structural and message features that influence credibility perceptions and evaluations of websites (Ahmad et al., 2010a; Lucassen et al., 2013; Zulman et al., 2011). With Julien and Barker’s (2009) definition of information literacy, “the set of skills required to identify information sources, access information, evaluate it, and use it effectively, efficiently, and ethically” (p. 12), expert users who have higher information literacy tend to use not only the
structural features of websites (e.g., links, policy, affiliation, sponsor, domain names, advertisements, and aesthetics) but also the message features (e.g., information timeliness, information language, information organization, information citation, information consistency, testimonials, author, and author expertise) to verify the credibility of websites. However, novice users having lower information literacy rely mainly on the visual appearance and structural features of websites.

Scholars in the field of communication have used the term *media reliance*, examining mainly the relative influence of reliance on different media types for credibility perceptions (Johnson & Kaye, 2009; Johnson, Kaye, Bichard, & Wong, 2007; Kiousis, 2001). These studies have focused on the relationship between users’ media reliance (or media use) and the perceived credibility of the medium under investigation. Overall, reliance has been found to be one of the influential factors for credibility perception both in traditional media, such as television, radio, and newspaper, and in the web sources such as websites in general, blogs, and SNSs. For instance, Flanagin and Metzger (2000) reported that more experienced users tended to consider the Internet more credible than those who had less experience with it. In blogs, in particular, reliance was the strongest predictor of blog credibility even after controlling for demographics and Internet use (Johnson & Kaye, 2004; Johnson & Kaye, 2009; Johnson et al., 2007): experienced Internet users considered blogs more credible than those having less experience with blogs (i.e., general Internet users) because the experienced users were familiar with the purpose of blogs or the style of writing. These findings seem to indicate that, the more users rely on a certain source, the more likely they are to judge the information from the source as credible. Table 2.3 lists the factors having an impact on Web credibility assessment in three categories: demographics, involvement, and technology proficiency.
Table 2.3 User Characteristics Influencing Web Credibility Assessment

<table>
<thead>
<tr>
<th>Types</th>
<th>Definition</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics</td>
<td>User’s demographic backgrounds that influence Web credibility assessment</td>
<td>• Age</td>
</tr>
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<td></td>
<td></td>
<td>• Gender</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Education</td>
</tr>
<tr>
<td>Involvement</td>
<td>The degree to which users know and care about specific topics under examination</td>
<td>• Motivation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Domain expertise</td>
</tr>
<tr>
<td>Technology proficiency</td>
<td>The degree to which users are familiar and comfortable with the technology (Internet) to identify, access, evaluate, and use information resources</td>
<td>• Information literacy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Media reliance</td>
</tr>
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</table>

2.1.4 Theoretical Frameworks of Web Credibility Assessment

Several of theoretical frameworks have been proposed to explain Web credibility assessment taking various attributes of online resources into consideration, in terms of source (i.e., operator), message (i.e., content), and structure (i.e., design), as well as the dynamic nature of the ‘process’ of assessing the information credibility. This section reviews the following six theoretical frameworks pertinent to Web credibility assessment: Wathen and Burkell’s (2002) Model for How Users Judge the Credibility of Online Information; Fogg’s (2003b) Prominence-Interpretation Theory (P-I Theory); Metzger’s (2007) Dual Processing Model of Website Credibility Assessment; Hilligoss and Rieh’s (2008) Unifying Framework of Credibility Assessment; Sundar’s (2008) MAIN Model; and Lucassen et al.’s (2013) Revised 3S-Model. In particular, the common and unique features of the theoretical frameworks are recapitulated in Table 2.4.

2.1.4.1 Fogg’s P-I theory. The P-I Theory proposed by Fogg (2003b), posits that two things happen when people assess credibility: a person notices something (i.e., prominence) and makes a judgment about it (i.e., interpretation). The fundamental idea of this theory is that people
would evaluate the given website as much as they have noticed based on their involvement, motivation, ability, etc.

The first concept of the theory, prominence, is defined as “the likelihood that a website element will be noticed or perceived” (Fogg, 2003b, p. 722). The author mentions that before a website element can affect a user’s credibility assessment of the site, the user must first notice the element. In other words, if certain website elements are not noticed by users, information in the website cannot have an impact on credibility assessment of the site. He identifies five factors that affect the prominence phase: involvement of the user, content, task, experience, and individual differences.

The second concept of the P-I theory is interpretation. Fogg (2003b) defines the concept as “a person’s judgment about an element under examination” (p. 723). In the interpretation phase, the user evaluates website elements as good or bad. For example, a user may interpret a broken link on a web either as the operator does not care for the site or the site was not carefully created in the first place. In either case, the broken link will contribute to a lower credibility perception of the site. Fogg mentions that at least three factors affect interpretation: user’s assumptions (e.g., culture, past experiences, and heuristics), skill/knowledge of a user (e.g., a user’s level of competency in the site’s subject matter), and context (e.g., the user’s environment, expectations, and situational norms).

2.1.4.2 Wathen and Burkell’s model for how users judge the credibility of on-line information. Wathen and Burkell (2002) view the credibility assessment of online resources as an iterative process. Particularly, they conceptualize the process of Web credibility assessment with two distinct phases: (a) evaluation of surface credibility and (b) evaluation of message credibility. According to their model, people begin the process by making immediate judgments
about the surface characteristics of the site, such as appearance (e.g., color, graphics, lack of error, etc.), usability (e.g., navigability, menus, download speed, etc.), and organization of information (e.g., layers, ease of access, and choice of detail level). The factors identified in this model are in line with the surface credibility markers suggested by Tseng and Fogg (1999). As motioned above, people consider the professional appearance of a website an important cue to judge its overall credibility.

In the second phase of credibility assessment (i.e., evaluation of message credibility), people evaluate the credibility of the message delivered by the website in terms of source and message. The authors identify expertise, competence, trustworthiness, and credentials as factors that influence source credibility. Also, they identify content, accuracy, currency, and relevance to the user need as factors that influence message credibility.

2.1.4.3 Hilligoss and Rich’s unifying framework of credibility assessment. Hilligoss and Rich (2008) suggested a unifying framework of credibility assessment in an attempt to consider diverse information seeking goals, tasks, and contexts in everyday life. They identified three distinct levels of credibility judgments: construct, heuristic, and interaction. In the framework, construct is the highest and the most abstract level as it is concerned with how people define (or perceive) the concept of credibility. Hilligoss and Rich suggest five constructs of credibility – trustfulness, believability, trustworthiness, objectivity, and reliability – and highlight that people may conceptualize credibility in different ways depending on the situation they are facing and the types of information encountered.

The second level of the framework is the heuristic level. Heuristics involve general rules of thumb that are utilized in cases where people are unwilling or unable to evaluate the content of the message because of time, motivation, and ability. Hilligoss and Rich categorize heuristics
for credibility assessment into four types: media-related heuristics (e.g., book, peer-reviewed journal articles, Web, etc.), source-related heuristics (e.g., familiar vs. unfamiliar sources, primary vs. secondary sources), endorsement-based heuristics (e.g., recommendation by knowledgeable and trusted individuals), and aesthetics-based heuristics (e.g., design in websites).

The third level of Hilligoss and Rieh’s framework is interaction. The authors define interaction as “specific attributes associated with particular information objects and sources for credibility judgments” (p. 1473). This level differs from the previous level (i.e., heuristics), in that credibility judgments in this level are based on specific source or content cues that are unique to a specific context. Three types of interactions are identified: interactions with content cues, peripheral source cues, and peripheral information object cues. Content cues are directly related to evaluating the credibility of the message itself. Peripheral source cues are source-related features that can affect the credibility assessment of information, such as affiliation, reputation, author’s education background, type of institution, etc. Peripheral information object cues are about the appearance or presentation of the information object, such as advertisements or language used in the website, etc. Hilligoss and Rieh mention that the three levels of credibility assessment are interlinked, affecting each other in both directions from the abstract level (i.e., construct) to the specific level (i.e., interaction), rather than functioning exclusively.

2.1.4.4 Sundar’s MAIN model. Sundar (2008) pays attention to the technology effects on credibility assessments. In particular, as multiple sources are often interlinked in online information, source credibility, which has been conventionally regarded as the most important clue to judge the believability of information, may not play a clear role in the Web context. Therefore, information receivers have to consider message credibility as well as the credibility of the medium itself to assess credibility of online information. In such information environment
where people have to take more things into consideration to find credible information, they get to face the information overload and the lack of uniformity in content quality. In this regards, he highlights the importance of roles of cognitive heuristics that people take advantage of to make judgments of credibility in the Web context. His MAIN model accommodates various heuristics pertaining to credibility assessments, categorized in four types of affordances in digital media, such as Modality (M), Agency (A), Interactivity (I), and Navigability (N).

*Affordance* is a particular capability possessed by the medium to facilitate a certain action, and the affordances exist in most digital media to some different degrees. The *modality* affordance is closely related to the structural aspects of the medium, rather than the content – e.g., “realism heuristic” that people tend to trust audiovisual modality because its content has a higher resemblance to the real world; the *agency* affordance-related heuristics are utilized to identify the source, which affect the perceived credibility of the information provided by the source – e.g., “machine heuristic” that people consider the objectivity of chosen news to be more credible if it is recommended by a machine; the *interactivity* affordance involves both concepts such as interaction and activity, which are the characteristics usually lacking in most traditional media – e.g., “activity heuristic” that influences users’ credibility judgments by the dynamism; *navigability* affordance is about interface features of digital media, such as organization of sites and hyperlinks – e.g., “browsing heuristic” that encourage users to take a look at the site by checking out the various links.

### 2.1.4.5 Metzger’s dual processing model of credibility assessment.

Metzger’s (2007) dual processing model takes user motivation and ability into account in theorizing the process of Web credibility assessment. This model adopts the main idea of the dual processing models, such as Petty and Cacioppo’s (1981) Elaboration Likelihood Model of persuasion (ELM), that divide
the process of information processing and assessment into two routes, (a) central and (b) peripheral routes, depending on the depth of the user’s motivation and ability to scrutinize it. The dual-processing-perspective is a useful approach to understand Web credibility assessment as it is mainly based on user perceptions, which are formed (influenced) by various audience factors (i.e., user characteristics) such as demographic background, involvement (motivation and ability), topic familiarity, and information skills. In other words, since user perceptions are not necessarily the same for all types of users, nor for various situations, it is reasonable to specify the evaluation process by considering the dynamisms in Web credibility assessment. In the exposure phase of the model, user’s motivation and ability decide whether or not they will go to the next phase, evaluation phase. When a user has motivation and ability to evaluate the information he or she is being exposed to, the user will take more rigorous and systematic strategies to credibility assessment (i.e., central route); however, if a user does not have motivation, no credibility assessment will happen; in case the user does not have ability, yet has motivation to evaluate, he or she will rely on the surface characteristics (i.e., peripheral cues) or heuristics to judge the credibility of the information (see Metzger, 2007, p. 2088).

2.1.4.6 Lucassen et al.’s revised 3S-model of credibility evaluation. Lucassen and Schraagen (2011) suggested the 3S-model, where 3S indicated the three information characteristics, semantic, surface, and source features. Lucassen et al. (2013) improved the initial version of the model by further examining the influences of the topic familiarity and information skills (i.e., information literacy). Defining topic familiarity (or domain expertise) as “having knowledge on the topic at hand” (Lucassen et al., 2013, pp. 256-257), people who have the higher level of knowledge on the topic tended to focus more on the semantic features (i.e., message of the information), while the novice users who are not familiar with the topic relied
more on surface features (i.e., structural features). Furthermore, when defining information skills as “the skills required to identify information sources, access information, evaluate it, and use it effectively, efficiently, and ethically” (Julien & Barker, 2009, p. 12), users with better information skills more often attempted to evaluate information quality, while those with poorer information skills did not.

The Revised 3S-Model shares common ideas with the dual processing model by Metzger (2007), in that credibility assessment may vary depending on the levels of motivation and abilities. In particular, ability can be seen as the same concept as information skills mentioned in the Revised 3S-Model. Thus, involving the two models together, users go through the different routes by focusing on different types (i.e., semantic vs. surface) and levels (i.e., number of cues) of credibility cues embedded in the given information depending on the information skills (i.e., ability).

Table 2.4 Characterization of Six Existing Theoretical Frameworks of Web Credibility Assessment by Four Facets

<table>
<thead>
<tr>
<th>Models</th>
<th>Facet 1: Context</th>
<th>Facet 2: User characteristics</th>
<th>Facet 3: Operationalization</th>
<th>Facet 4: Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Judgment Model (Wathen &amp; Burkell, 2002)</td>
<td>Situation</td>
<td>• Previous knowledge</td>
<td>• Surface credibility</td>
<td>• Enter websites</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Topic familiarity</td>
<td>• Source credibility</td>
<td>• Evaluation of surface credibility</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Willingness to believe and use the information</td>
<td>• Message credibility</td>
<td>• Evaluation of message credibility</td>
</tr>
<tr>
<td>P-I Theory (Fogg, 2003b)</td>
<td>• Context</td>
<td>• Involvement</td>
<td></td>
<td>• Content evaluation</td>
</tr>
<tr>
<td></td>
<td>• Task</td>
<td>• Experience</td>
<td></td>
<td>• Prominence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Individual difference</td>
<td></td>
<td>• Interpretation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Assumption</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Skill/knowledge</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2.4 – Continued

<table>
<thead>
<tr>
<th>Model</th>
<th>N/A</th>
<th>Motivation to evaluate</th>
<th>Heuristic evaluation</th>
<th>Exposure phase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Ability to evaluate</td>
<td>Systematic evaluation</td>
<td>Evaluation phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Judgment phase</td>
</tr>
<tr>
<td>Dual Model (Metzger, 2007)</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unifying Model (Hilligoss &amp; Rich, 2008)</td>
<td></td>
<td>Information seeker: motivation &amp; ability</td>
<td>Media heuristics</td>
<td>Construct</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Source heuristics</td>
<td>Heuristic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Endorsement heuristics</td>
<td>Interaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Aesthetics heuristics</td>
<td></td>
</tr>
<tr>
<td>MAIN Model (Sundar, 2008)</td>
<td>N/A</td>
<td></td>
<td>Modality cues</td>
<td>Affordance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Agency cues</td>
<td>Heuristics</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Interactivity cues</td>
<td>Quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Navigability cues</td>
<td>Credibility judgment</td>
</tr>
<tr>
<td>Revised 3S-Model (Lucassen et al., 2013)</td>
<td>N/A</td>
<td>Domain expertise</td>
<td>Semantic features</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Information skills</td>
<td>Surface features</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Source expertise</td>
<td>Source features</td>
<td></td>
</tr>
</tbody>
</table>

2.2 Older Adults

2.2.1 Definition of Older Adults

Full retirement age based on U.S. Social Security Administration, 65 years old, has been often used to define senior citizens (or older adults). The normal retirement age had been 65 for many years, but it has gradually increased to 67 for people born after 1959 (U.S. Social Security Administration, 2015). This age classification has been widely used for nationwide demographic surveys such as U.S. Census. However, when it comes to studying older adults as a user group of information systems (e.g., websites, search engines, and SNSs), it may not be appropriate to define this group solely by age because of their wide range of abilities and experiences with technology (Fisk et al., 2009; Moffatt, 2013).

Instead of using the chronological age of 65-year-old as a cut-off point, Laslett (1989) suggests four ages of human’s life span to define age groups: (1) the first age is the time between
birth and 20 to 25 years when education, socialization, and preparation for work occurs; (2) the second age is the period between taking on the obligations of a job, marriage, and retirement from paid work; (3) the third age is usually ushered in by retirement when people have time for self-fulfillment; and (4) the fourth age is the stage, which is characterized by illness, frailty, dependence, and the imminence of death.

Neugarten (1974) mentions that existing age norms, such as 65-year-old by the Social Security system, are increasingly irrelevant as precise guides for behavior particularly in late adulthood. She differentiates them broadly into young-old and old-old. Although chronological age may not be a satisfactory criterion, it is nevertheless an indispensable one. Her original formulation emphasizes patterns of functioning and involvement that are correlated but not isomorphic with age.

The young-old can be defined as the group composed of those who are approximately 55 to 75 years old. This group of people (i.e., young-old) is characterized as healthy, active older people, who are energetically engaged in leisure and social activities. Distinguished from young-old, the old-old are the group of people who are 75 and over with significant disabilities, whose health and social needs require an ever growing number of resources. Neugarten (1996) mentions that there is a set of stereotypes about old age that are based primarily upon the old-old, such as sick, poor, enfeebled, isolated, and desolated.

Williamson and Asla (2009) mention that people who are 75 years older or older can be part of the fourth age and they use significantly fewer sources than relatively younger seniors. Wicks (2004) also highlight that people in this age group often face significant changes in their lives, such as retirement from the workplace, declines of cognitive and physical abilities, and changes in technology and society that affect their ability to utilize online information.
<table>
<thead>
<tr>
<th>Source</th>
<th>Term</th>
<th>Definition/Characteristics</th>
<th>Age (year-old)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Social Security Administration (2015)</td>
<td>Full retirement age</td>
<td>The age at which a person may first become entitled to full or unreduced retirement benefits.</td>
<td>65 – 67 (or older)</td>
</tr>
<tr>
<td>Laslett (1989)</td>
<td>Third age</td>
<td>The population without a socially predetermined role but healthy, energetic, and ripe with experience.</td>
<td>From retirement</td>
</tr>
<tr>
<td></td>
<td>Fourth age</td>
<td>Also called “old age” or “the disability zone,” characterized by illness, frailty, dependence, and the imminence of death.</td>
<td>Approx. 60 – 100</td>
</tr>
<tr>
<td>Neugarten (1996)</td>
<td>Young-old</td>
<td>The group composed of those who are approximately 55 to 75 years old, characterized as healthy, active older people, who are energetically engaged in leisure and social activities.</td>
<td>Approx. 55 – 74</td>
</tr>
<tr>
<td></td>
<td>Old-old</td>
<td>The group of people who are 75 and over with significant disabilities, whose health and social needs require an ever growing number of resources.</td>
<td>Approx. 75+</td>
</tr>
</tbody>
</table>

### 2.2.2 Characteristics of Older Adults’ Information Behavior

Wicks (2004) points out that older adults may have particular information seeking behavior as they often face significant changes in their lives, such as retirement and declining health. Thus, older adults may need a relatively small range of information topics than younger adults due to physiological, cognitive, and/or physical declines (Asla, Williamson, & Mills, 2006). In terms of information needs, previous studies consistently find that the most necessary and important information topic for older adults is health- and wellness-related information, as they get old and accumulate various diseases and illnesses (Su & Conaway, 1995; Taha, Sharit, & Czaja, 2009; Wicks, 2004; Williamson, 1997, 1998; Williamson & Asla, 2009). For instance,
Williamson and Asla (2009) found that health was the most popular topic for the subjects in the study, followed by income and finance as second, and recreation as third; Getz and Weissman (2010) reported that older adults in their study were mainly interested in receiving information on economic subjects and preferred that the information included explanations about law and services as well as technical details such as addresses and opening hours of information suppliers.

As highlighted by Neugarten (1996), it also need to be noted that older adults are a more heterogeneous user group than any other age groups due to age-related declines in perception, cognition, and movement control (Charness & Boot, 2009; Fisk et al., 2009). Thus, even within the older adults group, there exist significant age effects (i.e., differences) on their information seeking behaviors: Williamson (1997) found that participants aged 85 and older tended to have a fewer number of topics of interest than younger adults in general.

An important finding was that the subjects tended not to share their problems with others until they encounter difficulty in receiving information. Williamson (1997) also found that older adults relied most heavily on people within their social networks; however, friends are not a key information source for some of the very old (aged 85+), particularly because they are becoming increasingly isolated due to failing health and the loss of friends through death or other circumstances. Even within older adults, the older seniors used significantly fewer sources than relatively younger seniors.

In the Web context, older adults, who have relatively less experience with the Internet than younger generations, tend to have more concerns or doubts about the credibility. Zulman et al. (2011) showed that Internet users who were 65 years or older were significantly less likely than younger than 65 to report trusting the Internet for health information. However, the
association between age and trust disappeared after accounting for two significant factors: confusion and lack of awareness. The results indicate that experience and familiarity with the Internet play a significant role in assessing the credibility of online health information.

A previous study on older adults’ health information use also found that regardless of whether they were online users or non-users, they relied mostly on their health care providers than any other types of sources under investigation, such as pharmacist; newspapers and popular magazines; medical journals, medical books, and popular books; television and radio; and friends and family (Taha, Sharit, & Czaja, 2009).

Selwyn, Gorard, Furlong, and Madden (2003) found that using the Internet for information search was less popular (common) activity for older adults in their everyday lives, and people who were older 70 years old used the Internet less than those who were between 60 to 69 years old.

Furthermore, Getz’s (2010) study on Israeli older adults’ legal information seeking behaviors found that older adults preferred to receive information from informal sources such as family members and mass media over formal sources such as counsellors from the National Insurance Institute and the Citizens’ Information Service. This tendency that older adults prefer informal sources for information seeking was also found in Su and Conaway (1995) focused on Chinese older adult immigrants’ information seeking behaviors; the participants in the study not only used their family and friends as information sources for various topics of information needs including health most frequently, but also they perceived them as more helpful sources than experts. Clubs and religious centers also serve as informal sources of information for older adult immigrants in the United States, who also prefer to receive information from neutral sources, such as libraries (Rait, 1989).
Theses additional training and research-related activities provided them with the opportunities to obtain more in-depth medical knowledge, such as symptoms and cures for certain diseases of which they played a role as a patient having the diseases in the standardized patient program and even (incidentally) acquired knowledge about typical medical procedures. These people showed self-confident in seeking and understanding health and wellness information. This finding is supported by the literature on the effects of health literacy programs for older adults. In particular, health literacy intervention significantly improved the research participants’ ($M = 69.99; SD = 8.12$) knowledge, skill, and eHealth literacy efficacy (Xie, 2011a, 2011b, 2012).

In terms of technology adoption and use, Charness and Boot (2009) highlight that regardless of whether older adults are confident with dealing with technology, there is a lag in older adults’ technology adoption and use due to perceptual, cognitive, and psychomotor declines. Thus, older adults are an important user group in the area of information behavior.
CHAPTER 3
METHODOLOGY

This chapter elaborates on the methodology used to achieve the three main research goals: developing a conceptual framework of Web credibility assessment; and providing a deeper understanding of older adults’—the research population—information needs and related information behavior in the everyday life context; and their perception of information credibility in the Web context and their behaviors relating to credibility assessment of online health information. Considering the interpretive and exploratory nature of this research, qualitative research approaches and methods were employed: (1) a qualitative meta-study (Phase I) and (2) semi-structured interviews (Phase II).

Qualitative research is appropriate and useful to understand how people make sense of the phenomenon of interest, construct the meaning, and interpret their experiences regarding the phenomenon, rather than to determine the causal relationships among the identified variables and predict similar cases in the future (Merriam, 2009). In the current research, therefore, the qualitative approach will allow the researcher to explore how the concept of credibility and the process of information credibility assessment are understood in the literature and by the target population, i.e., older adults. The following subsections explain the overall research design and provide details of each research procedure.

3.1. Overview of Research Design

The overall research design consists of two phases (Figure 3.1). In Phase I, a qualitative meta-study of the information credibility literature was carried out. The main purpose of the qualitative meta-study was to have a better-organized theoretical framework of Web credibility assessment based on a systematic literature analysis—it produced conceptual typologies of Web
credibility assessment. The researcher followed the guidelines of a qualitative meta-study suggested by Paterson et al. (2001) that involve (a) selection and appraisal of primary research reports, (b) meta-analysis of data, methods, and theory, and (d) meta-synthesis (see Table 3.3).

In Phase II, semi-structured interviews were conducted with older adults to explore their credibility assessment of online health information in their daily life contexts. The conceptual typologies of Web credibility assessment that were proposed in Phase I and the ELIS model by Savolainen (1995) were used to guide the construction of the interview protocol as well as the data analysis and interpretation. Thus, the interview data collected in Phase II helped the research not only study older adults’ Web credibility assessment in the context of ELIS, but also test and refine the new framework with empirical data.

The following subsections provide details of the research design. In particular, each phase’s methodological approach, sampling technique, data collection procedure, and data analysis methods are explained. Most importantly, the last subsection describes how the two phases of the research are combined, synthesizing the findings from each phase and drawing the integrated implications out of this dissertation project as a whole.

![Figure 3.1 Overall Design of the Research](image-url)
3.2 Phase I: A Qualitative Meta-Study

As mentioned above, a qualitative meta-study was conducted in Phase I to analyze the literature on information credibility with the particular goal of developing a new framework for Web credibility assessment. More specifically, the survey of the literature in the study identified conceptual typologies of the four core components of Web credibility assessment: conceptualization, operationalization, variability, and process. Ultimately, Phase I was designed to answer the following research questions:

RQ1: How is the process of Web credibility assessment conceptualized in existing theories and models?

RQ1-1: What are the common and unique features of existing theories and models of Web credibility assessment?

RQ1-2: How can the existing theoretical frameworks of Web credibility assessment be improved?

Qualitative meta-study is “a research approach involving analysis of the theory, methods, and findings of qualitative research and the synthesis of these insights into new ways of thinking about phenomena” (Paterson et al., 2001, p.1). This method synthesizes qualitative research reports taking into consideration the theoretical, methodological, and societal contexts of the original studies. Meta-study does not merely synthesize the results of the previous research (i.e., primary reports) on the given topic or simply combine the results of a collection of similar studies. Thus, meta-study is an interpretive qualitative research approach that is useful to critically interpret the findings from various disciplines with regard to a particular phenomenon under investigation (Paterson et al., 2001). In particular, Paterson et al. (2001) highlight that the
primary goal of meta-study is to develop a new (or expanded) theoretical framework concerning the phenomenon under investigation, which is well matched with the first goal of the current research—developing a new framework for Web credibility assessment.

The qualitative meta-study conducted in this research consists largely of three sequential processes, based on the methodological guidelines established by Paterson et al. (2001): (1) selection and appraisal of primary research reports; (2) meta-analysis of data, method, and theory in the primary research reports; and (3) meta-synthesis of the meta-analysis results. The following subsections describe the criteria for inclusion and exclusion of primary research reports, the process of developing the appraisal tool used in the study, and data analytic approach used in meta-analysis and meta-synthesis (Table 3.3).

3.2.1 Selection of Primary Research Reports

The literature analyzed in Phase I includes both theoretical and empirical studies on credibility assessment of online information conveyed through various Web-based platforms, such as more traditional and static websites and the newer and more collaborative social websites such as SNSs, social Q&A sites, Wikis, and blogs. Also, this study reviewed some of the older/classic studies of credibility which provided original definitions and conceptualizations of the concept of credibility, which then have been used in more recent studies and reviews of credibility assessment on the Web. It is important to review the older/classic studies as they provide the foundational discussions on the conceptualization of credibility, identifying key dimensions of credibility, which are directly related to the conceptualization of Web credibility.

To retrieve research reports examining Web credibility assessment, online databases specializing in library and information studies (LIS), communication, psychology, and human-computer interaction (HCI) were searched: Web of Knowledge; Association for Computing
Keywords used in the search included “credibility,” “information credibility,” OR “Web credibility.” Thus, primary research reports that assigned one or more of these words/phrases as keywords were included in the initial lists for further analysis. Further, the researcher also performed a manual search of reference lists of pertinent review articles on information credibility, such as Metzger, Miriam J. et al. (2003); Rieh and Danielson (2007). All searches were limited to English-language publications between the years of 2000 to 2014. A total of 83 primary research reports were included for analysis. The criteria for inclusion and exclusion of the articles identified are detailed below.

3.2.1.1 Criteria for inclusion. It is crucial to have clearly defined criteria for inclusion in accordance with the research purpose and research questions of the meta-study to locate the appropriate primary research reports (Paterson et al., 2001). In order to identify the appropriate primary research reports for the current qualitative meta-study, aiming to develop a new framework of Web credibility assessment, the following three inclusion criteria were used: (1) articles published in peer-reviewed journals or conference proceedings; (2) studies examining users’ perceived credibility of online information; and (3) studies that propose, use, and/or test theories and models of Web credibility assessment.

First, articles published in peer-reviewed journals or conference proceedings in LIS, communication, psychology, and HCI are included. Unpublished reports, including dissertations and works in progress are not included. The researcher agreed with the conventional point of view that considers primary research reports that have not been accepted for publication in a peer-reviewed journal (or conference proceedings) as initial statements about the quality of the research, rather than concrete findings on the given topic (Beatty, Reay, Dick, & Miller, 2011).
This approach seems to be more practical and in common with the decisions made in previous qualitative meta-studies (Beatty et al., 2011; Jørgensen & Shepperd, 2007; Paterson et al., 2001). Second, studies examining people’s perception of information credibility and their information behaviors in evaluating the credibility of various Web-based resources are included. More specifically, this study focuses on information credibility assessment in the Web context, rather than persuasion and/or attitude change in the interpersonal communication context. Further, the study includes the primary research reports that approach the Web credibility assessment issues from the user-centered perspective, as opposed to the system- or computer-oriented perspective, being more interested in people’s perception of information credibility in the Web context and their behavioral characteristics in looking for credible information online. As mentioned above, since credibility has long been studied in various disciplines from different perspectives, it is crucial to limit the boundary and pinpoint the focal area within the boundary.

Third, theoretical research studies that propose theories and models pertinent to Web credibility assessment are included—i.e., studies of which the theories or models are outcomes of the studies. Moreover, empirical studies that either use or test existing theories and models, examining the influence of various factors on Web credibility assessment (e.g., user characteristics, content topics, media types, etc.) are also included.

3.2.1.2 Criteria for exclusion. Paterson et al. (2001) highlight that including primary studies that fail to clearly report their research designs and findings can jeopardize the overall quality of a meta-study. Therefore, the current meta-study excludes: studies based on unusual or skewed samples; studies that omit significant data or details of the research design; and studies that come up with conclusions that are not supported by the data provided in the study.
Table 3.1 Criteria for Inclusion and Exclusion of the Qualitative Meta-Study

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Articles published in peer-reviewed journals or conference proceedings</td>
<td>× Studies based on unusual or skewed samples</td>
</tr>
<tr>
<td>o Studies examining users’ perceived credibility of online information</td>
<td>× Studies omitting significant data or details of the research design</td>
</tr>
<tr>
<td>o Studies that propose, use, and/or test theories and models of Web credibility assessment</td>
<td>× Studies with conclusions that are not supported by the data provided in the study</td>
</tr>
</tbody>
</table>

3.2.2 Appraisal of Primary Research Reports

An appraisal tool was developed to facilitate a systematic review and assessment of the primary research studies based on the guidelines of reporting empirical studies (Kitchenham et al., 2008; Paterson et al., 2001) and appraisal tools used in previous meta-studies (Beatty et al., 2011; Jørgensen & Shepperd, 2007). The appraisal tool was mainly used to describe, rather than evaluate, the primary research reports in terms of main objects of credibility assessments (e.g., source, message, and media), nature of sample, and research design. Thus, the appraisal tool helped the researcher determine whether or not each of the primary research studies was eligible for inclusion in the meta-study, as well as record pertinent data about the study under examination. Table 3.2 shows the overall design of the appraisal tool used in the study, which consists of four main sections and their subsections.

Table 3.2 Design of the Appraisal Tool Used in the Qualitative Meta-Study

<table>
<thead>
<tr>
<th>Sections</th>
<th>Required information/evaluation items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference Information</td>
<td>• Bibliographic information</td>
</tr>
<tr>
<td></td>
<td>• Publication type</td>
</tr>
<tr>
<td></td>
<td>• Discipline of the study</td>
</tr>
<tr>
<td>Content</td>
<td>• Credibility type investigated—objects of credibility assessment</td>
</tr>
<tr>
<td></td>
<td>• Topics of the online resources under study</td>
</tr>
<tr>
<td>Research Design</td>
<td>• Data collection methods</td>
</tr>
<tr>
<td></td>
<td>• Types of platforms</td>
</tr>
<tr>
<td>Nature of Sample</td>
<td>• Total number</td>
</tr>
<tr>
<td></td>
<td>• Demographics (age &amp; gender)</td>
</tr>
</tbody>
</table>
3.2.3 Qualitative Meta-Analysis of Data, Method, and Theory

3.2.3.1 Analytic approach. The first step to analyze a corpus of primary research studies is determining the appropriate data analytic approach. Even though any systematic interpretive approach can be applicable to meta-study, choosing the appropriate data analysis strategy that fits the given research questions and design remains as the researcher’s role (Paterson et al., 2001). Considering the purpose of the current study aiming at developing a new framework of Web credibility assessment by synthesizing common and unique components of existing theories and models, the researcher used (1) conceptual classification (i.e., typology), which is a useful approach to analyze existing theoretical frameworks, as it groups entities (i.e., main components of theories and models of Web credibility assessment) by similarity (Bailey, 1994). In particular, the researcher used substruction as the method of typology construction, which is the “process of extending the dimensions of a single type in order to form the full typology of which it is a part” (Bailey, 1994, p. 24).

Furthermore, (2) content analysis was used to summarize the contents of the selected primary research reports in terms of objects (or types) of credibility assessments, measures used to operationalize credibility, and characteristics of the samples. This analytic approach was intended to identify and describe these features in the primary research reports, rather than conducting inferential statistics, showing patterns or relationships among the variables identified out of the qualitative meta-study. When content-analyzing the primary research reports, the typologies developed through the conceptual classification using substruction in the previous phase of the data analysis.

3.2.3.2 Data management. Qualitative analysis of the collected data was performed using software applications such as NVivo 10 and EndNote X6. NVivo 10 was used for a
systematic coding process, facilitating the content analysis on the primary research reports, categorizing them based on the typologies developed in the study; additionally, *EndNote X6* was used to manage bibliographic information of a large number of primary research reports used in the qualitative meta-study.

### 3.2.4 Qualitative Meta-Synthesis

Qualitative meta-synthesis brings the insights from the prior processes of a qualitative meta-study together (i.e., meta-data-analysis, meta-method, and meta-theory) to suggest a new way of understanding the given research topic (Paterson et al., 2001). One of the distinguishable outcomes of the exercise is forming a new theory, rather than a simple aggregation the findings from the prior phases of a qualitative meta-study. The overall process of the Web credibility assessment framework development is guided by Bailey’s (1994) Three-Level Measurement model, which is a useful approach for typology construction. This model defines the ways of understanding a certain concept (or phenomenon) under investigation (i.e., Web credibility) with three levels, (1) conceptual, (2) empirical, and (3) indicator levels. The *conceptual level* is based on theoretical or hypothetical (or even imaginary) constructs with no empirical cases, while the *empirical level* identifies purely empirical examples with no theoretical counterpart. The *operational or indicator level* is a combination of the conceptual level with the empirical level. This exercise of mapping both the conceptual and empirical levels into the indicator level can be done through two ways, deductively or inductively. The deductive strategy—it was termed the *classical strategy* in Bailey (1973)—first identifies conceptual types of the concept under investigation and then searches for empirical examples for each type. In other words, it is a top-to-bottom approach. The inductive strategy, which is a bottom-to-top approach, first identifies
empirical clusters (the empirical level) and then assigns conceptual labels to them. This approach is also considered a strategy of grounded theory (Glaser & Strauss, 1967).

The current qualitative meta-study takes advantage of the both strategies, doing iterative comparison and refinement of the conceptual framework through matching the empirical examples. More specifically, the qualitative meta-study deductively proposes a conceptual framework of Web credibility assessment by synthesizing existing theoretical frameworks. In particular, the framework suggests conceptual (or hypothetical) typologies of key dimensions of credibility, measures used to operationalize credibility dimensions, influences of user characteristics and context, and the process of Web credibility assessment. This conceptual framework is then used to analyze the literature on information credibility, inductively forming clusters and categorizing the appropriate content into the typologies. The framework is updated when new credibility dimensions, measures, and/or variability factors (e.g., user characteristics and context) that cannot be accommodated by the conceptual framework are found.

Table 3.3 Summary of Phase I (Qualitative Meta-Study)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Activities</th>
<th>Data analysis techniques and instruments/tools</th>
<th>Results/Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection of primary research reports</td>
<td>Primary research reports search via online database hand search</td>
<td>Inclusion and exclusion criteria (Table 3.1)</td>
<td>83 primary research reports identified</td>
</tr>
<tr>
<td>Appraisal of primary research reports</td>
<td>Initial (descriptive) analysis of the identified primary research reports</td>
<td>Appraisal tool (Table 3.2)</td>
<td>Descriptive analysis of the research reports</td>
</tr>
</tbody>
</table>
| Qualitative meta-analysis of data, method, and theory | Meta-analysis of the findings, methods, and theories used in the primary research reports | • Conceptual classification  
• Content analysis  
• EndNote X6  
• QSR NVivo 10 | Initial typologies of the common and unique components of Web credibility assessment |
Table 3.3 – Continued

<table>
<thead>
<tr>
<th>Qualitative meta-synthesis</th>
<th>Synthesis of the findings from the meta-data-analysis, meta-method, and meta-theory</th>
<th>Three-Level Measurement model (Bailey, 1994)</th>
<th>Conceptual typologies for the main facets of Web credibility assessment identified:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Conceptualization</td>
<td></td>
<td>• Conceptualization</td>
</tr>
<tr>
<td></td>
<td>• Operationalization</td>
<td></td>
<td>• Operationalization</td>
</tr>
<tr>
<td></td>
<td>• Contexts</td>
<td></td>
<td>• Contexts</td>
</tr>
<tr>
<td></td>
<td>• User Characteristics</td>
<td></td>
<td>• User Characteristics</td>
</tr>
<tr>
<td></td>
<td>• Process of assessment</td>
<td></td>
<td>• Process of assessment</td>
</tr>
</tbody>
</table>

3.3 Phase II: Semi-Structured Interviews

In Phase II, the researcher employed semi-structured interviews as the effective means of data collection to explore older adults’ credibility assessment of online health information. The study focused on health information as it is one of the most common and necessary topics of information in older adults’ everyday life (Czaja et al., 2006; Su & Conaway, 1995; Taha et al., 2009; Williamson, 1998). Moreover, credibility is a particularly crucial factor that requires consideration in health information seeking as the decision to make use of health information can affect the overall quality of human life (Gustafson & Wyatt, 2004).

The new framework proposed in Phase I and the ELIS model by Savolainen (1995) were used in the process of developing the interview protocol, which then guided the data analysis and interpretation in the study. Phase II aimed to gain a better understanding of older adults’ common information needs and information seeking behaviors in their daily lives (i.e., ELIS) with special interests in their perceptions of credibility in the Web context. As the research participants were all retirees (one participant was preparing her retirement, which was scheduled for three days after the interview), it is appropriate to look into their information needs and related information behaviors through the lenses of ELIS based in the ‘non-work’ context, as opposed to the work-related context. In particular, this study frames older adults’ ELIS into two dimensions using the
ELIS model by Savolainen (1995): (1) seeking of orienting information that covers older adults’
general information needs and related information seeking behaviors that are closely related to
their hobbies and leisure activities; and (2) seeking of practical information that addresses older
adults’ specific information needs for problem solving and related information-seeking
behaviors—as mentioned above, the current study focused on health-related information needs
for older adults (Taha et al., 2009; Williamson & Asla, 2009).

Overall, Phase II was designed to answer the following research questions:

RQ2: In general, what are older adults’ common (ELIS) information needs?

RQ3: What are older adults’ health information needs and related information behaviors?

RQ3-1: What sources do older adults use to find health information both on- and
    offline, and why do they use those sources?

RQ3-2: How do they use the information they find?

RQ4: How do older adults assess the credibility of health-related information on the
    Web?

RQ4-1: What are older adults’ perceptions of Web credibility?

RQ4-2: What are some of the psychological, social, and/or cultural mechanisms
    that underlie and/or affect those perceptions?

RQ4-3: What are some of the markers/cues and heuristics used by older adults to
    assess the credibility of health-related websites?

3.3.1 Target Population and Sampling Criteria

The target population of this study is older adults who have sought for health information
online. This study defines older adults as people who are 55 years old or older based on
Neugarten’s (1974) definition, which is relatively more specific and comprehensive than other definitions reviewed in Chapter 2 (Table 2.5). In particular, Neugarten’s subdivision of older adults (i.e., ‘young-old’ and ‘old-old’) is a useful framework to have a deeper understanding of the target population, identifying differences in perceptions of information credibility on the Web even among older adults. Fisk et al. (2009) mention that older adults tends to be more heterogeneous than younger age groups due to age-related declines in perception, cognition, and movement control that might affect their interaction with computers and technology. Therefore, it would be more appropriate to use the definition of older adults by Neugarten that covers a wide range of ages (55+) and specifies the sub-groups (i.e., young-old and old-old), rather than relying on a single chronological age cut-off.

Among the total population of American older adults, this research limits the population to older adults who reside in Florida. Considering the location of the researcher (i.e., Tallahassee, Florida) and the desired manner of interviews with participants (i.e., one-on-one, face-to-face), the researcher focused on Florida residents for recruitment. Furthermore, since the proportion of older adults (aged 55+) in Florida (29.78%) is not only significantly higher than the average proportion of the age group in the country (24.86%), but is also the highest among all fifty states (U.S. Census Bureau, 2012), Florida is a good place to study older adults.

Lastly, since the study focused on the credibility assessment of ‘online’ health information, older adults who had not looked for information online about health/wellness issues were not included in the research. Focusing on older adults who use online health information specified the interview processes and helped to ensure the validity of the data. In particular, the researcher recruited ‘active’ online health information users who searched for health information
online at least once during last six months. This sampling criterion was also beneficial from recall perspective. Table 3.4 summarizes the target population and the criteria for sampling.

<table>
<thead>
<tr>
<th>Target population</th>
<th>Criteria for sampling</th>
</tr>
</thead>
<tbody>
<tr>
<td>American older adults, using online health information on a regular basis</td>
<td>• Older adults who are 55 years old or older</td>
</tr>
<tr>
<td></td>
<td>• Florida residents, as of the data collection point</td>
</tr>
<tr>
<td></td>
<td>• Older adults who have used/searched for online health information at least once over the past 6 months</td>
</tr>
</tbody>
</table>

### 3.3.2 Participant Recruitments

Considering the purpose of this qualitative investigation that aimed to explore the specific target group’s credibility perception of online health information and related behaviors, the researcher used the (1) purposive sampling and (2) snowball sampling methods to recruit subjects who could provide the appropriate, rich and in-depth information for the purpose of the study (Merriam, 2009; Schutt, 2009). *Purposive sampling* is “a nonprobability sampling method in which elements are selected for a purpose, usually because of their unique position” (Schutt, 2009, p. 173). This sampling technique helped the researcher select informants who met the three sampling criteria mentioned in Table 3.4. *Snowball sampling* is “a method of sampling in which sample elements are selected as they are identified by successive informants or interviewees” (Schutt, 2009, p. 174). This sampling technique was useful to recruit “hard-to-reach” participants.

The researcher received approval for the study from the Florida State University Human Subjects Committee (Appendix A: Human Subjects Committee Approval Memorandum) before the participant recruitments were initiated.
3.3.2.1 Recruitment site. The Osher Lifelong Learning Institute (OLLI) at Florida State University was used as the initial recruitment site where the researcher identified first few participants and looked for further participants using the snowball sampling technique. OLLI is a program of classes targeted to older adults who are 50 years old or older. On average, this institute offers 75 to 80 classes per year within the timeframes of a 6-week Spring- and a 6-week Fall Term and a 30-week session in May. Topics covered in the OLLI classes include current trends and issues, art, world history, technology, and so forth (Osher Lifelong Learning Institute, 2015). The researcher contacted the administrative staff of OLLI and gained permission to meet their members. The administrative staff sent out an invitation message to their members via email, introducing the research purpose and design, and those who were interested in the study were asked to contact the researcher to schedule an interview. Also, the researcher asked the initial study participants, recruited from OLLI and completed the interview, to spread the word to their friends who might be interested in the study.

3.3.2.2 Prescreen. When potential participants expressed their interests in the research via emails or calls, the researcher scheduled a telephone interview with each person and conducted a prescreen test. The main purpose of conducting a prescreen test was to make sure that the participant’s cognitive function was adequate for the study, as the participant was supposed to answer interview questions based on their previous experiences, reminding themselves of how they did to seek for information and judge the credibility of online health information. The researcher used two established instruments for the prescreen test over the telephone: (1) Pfeiffer’s (1975) Short Portable Mental Status Questionnaire (SPMSQ) and (2) Wechsler’s (1997) Wechsler Memory Scale III (WMS-III). SPMSQ (Pfeiffer, 1975) is an instrument developed to assess the presence and degree of any intellectual impairment using ten
questions that the participants must answer, without referencing outside materials. Questions asked in the instrument include the date, recalling the names of former presidents, a small subtraction problem, and so on. The following scale is the suggested cut-off points to determine if the participant has passed the prescreen test: 0 to 2 errors = intact; 3 to 4 errors = mild intellectual impairment; 5 to 7 errors = moderate intellectual impairment; 8 to 10 errors = severe intellectual impairment (Appendix C). WMS-III (Wechsler, 1997) involves reading aloud a short story that the participants must then recall as much as they can. If the participant does not pass the first story, a second story is then read aloud. The following scale is used to determine if the participant has passed: Story A = 6, if failed, Story B = 4. Only those who passed the prescreen test was invited to the interview study (Appendix C). There was no one disqualified based on the prescreening.

Overall, twenty-one participants were recruited. Each of the first nineteen participants received $10 and the last two received $25 in exchange of their participation. The researcher increased the amount of incentive to encourage the potential subjects’ participations from minority groups; the necessarily IRB update was approved (Appendix B).

3.3.3 Interview Protocol Development

Interview protocol is a set of questions that guide the interview (Barriball & While, 1994). As mentioned above, the interview protocol used in the current study was designed based on the new framework proposed in Phase I and the ELIS model by Savolainen (1995). Specifically, the three components of the new framework, i.e., assessment, variability, and process of Web credibility assessment, elicited necessary information that ultimately answered RQ4 and its sub-questions of the study, which asked about older adults’ credibility assessment of
online health information. The ELIS model guided the data analysis and interpretation process regarding older adults’ information behaviors in the everyday life context.

To develop items (questions) that would be included in the interview protocol (Appendix D), the researcher referenced the items used in two existing survey instruments designed by the Stanford Persuasive Technology Lab (Stanford Persuasive Tech Lab, 2015) and the Center for Research and Education on Aging and Technology Enhancement (CREATE, 2015). Since these two instruments focused on the key components of the current study (i.e., older adults and Web credibility assessment), and had been used with a large group of people, the validity and reliability of the questionnaires were assumed ensured. Furthermore, the interview protocol was pilot-tested in a preceding research (Choi, 2013) that explored how older adults perceive various credibility markers/cues on health-related websites. Table 3.5 below overviews the main sections and questions (items), requested information by each question, and question types. Appendix F also shows the relationships among the research questions, theoretical frameworks used, and interview questions.

Table 3.5 Design of the Interview Protocol

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Requested Information</th>
<th>Question Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section A</strong></td>
<td><strong>Internet Use</strong></td>
<td></td>
</tr>
<tr>
<td>A1</td>
<td>Hours of Internet use a week</td>
<td>Closed-ended (multiple choice)</td>
</tr>
<tr>
<td>A2</td>
<td>Years of Internet use experience</td>
<td>Closed-ended (multiple choice)</td>
</tr>
<tr>
<td>A3</td>
<td>Health information seeking on the Web</td>
<td>Closed-ended (yes-or-no)</td>
</tr>
<tr>
<td><strong>Section B</strong></td>
<td><strong>Older Adults’ Information Needs</strong></td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td>Topics of ELIS</td>
<td>Open-ended</td>
</tr>
<tr>
<td><strong>Section C</strong></td>
<td><strong>Older Adults’ Health Information Needs and Related Behaviors</strong></td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td>Health information needs</td>
<td>Open-ended</td>
</tr>
<tr>
<td>C2</td>
<td>Sources of health information</td>
<td>Open-ended</td>
</tr>
<tr>
<td>C3</td>
<td>Reasons for using certain source(s)</td>
<td>Open-ended</td>
</tr>
</tbody>
</table>
Table 3.5 – Continued

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>C4</td>
<td>Health information use</td>
</tr>
<tr>
<td>C5</td>
<td>Health information share</td>
</tr>
</tbody>
</table>

Section D

Credibility of Online Health Information

D1 Credibility markers/cues | Open-ended |
D2 Credibility markers/cues | Closed-ended (5-Likert scale; 35 items) |

3.3.4 Data Collection

3.3.4.1 Semi-structured interview. A semi-structured interview was employed as the data collection method to have a comprehensive understanding of older adults’ credibility assessment of online health information. A semi-structured interview is a type of interview that is well-suited for the exploration of the perceptions and opinions of respondents regarding complex issues and provides an additional opportunity to probe for more information and clarification of answers (Barriball & While, 1994). In terms of types of questions that can be asked in the interview, the semi-structured interview incorporates both open-ended and more theoretically driven questions, eliciting data grounded in the experience of the participant as well as data guided by existing theoretical frameworks regarding the particular research topic (Galletta, 2013). Thus, the semi-structured interview was a useful data collection method not only to understand older adults’ Web credibility assessment process, but also to test and refine the new framework developed in Phase I.

Another significant benefit of using the semi-structured interview was that the researcher had the opportunity to help participants understand any ambiguous and/or difficult-to-understand terms in the Likert-type items included in the last section of the interview protocol (see Appendix D). Since older adults have relatively less experience and familiarity with the Internet than younger generations and a wide range of cognitive and physical abilities (Fisk et al., 2009),
employing the self-administrated survey may not be an appropriate method to accurately capture older adults’ perceptions of Web credibility. Thus, the semi-structured interview, which allowed the researcher to utilize the pre-determined questions as well as have the additional opportunity to probe participants’ responses for clarification, was beneficial for examining older adults’ Web credibility assessment.

**3.3.4.2 Interview administration.** Interviews were conducted at sites of participants’ choosing (e.g., participants’ houses, public libraries, etc.). The researcher met with participants in a face-to-face, one-on-one interaction to produce considerable reciprocity between the participant and the researcher, which allows an interviewee the freedom to express his or her thoughts and creates space for the researcher to probe the interviewee’s responses for clarification, meaning making, and critical reflection (Galletta, 2013; O’Leary, 2005). The final sample size of the study was twenty-one. Each interview lasted for approximately 38 minutes. Data collection lasted from June 2014 to April 2015. Each interview was conducted through three segments: (1) opening segment, (2) middle segment, and (3) final segment.

In the *opening segment*, the researcher explained the purpose of the study, having the participant read and sign an informed consent form (Appendix E), and letting the participant know their rights in the study they were participating in. In particular, each participant was reminded of the fact that the interview would be voice-recorded, as stated in the consent form. After the participant understood and agreed upon the research design, questions regarding their Internet use and experience were asked using the interview protocol Section A. Since the perception of Web credibility and the process of Web credibility assessment may be affected by the user’s technology proficiency and experience with the Internet (Ahmad, Komlodi, Wang, & Hercegfi, 2010b; Lucassen et al., 2013; Zulman et al., 2011), the researcher further asked about
the interviewee’s background information regarding Internet use and technology proficiency, such as their past career—whether they were supposed to use a computer and the Internet in the workplace. This question elicited the information regarding the research participants’ occupational backgrounds, which was useful to better understand their information behaviors.

The middle segment had main questions that were more specific for the research questions. More specifically, questions in this segment asked about older adults’ common information needs in their everyday lives (Section B); older adults’ health information needs and related behaviors (Section C); and Web credibility assessment of online health information (Section D). In particular, when asking about the cues/markers and heuristics by using open-ended questions in Section D, the researcher helped the interviewee remind themselves of the specific cues/markers and heuristics that they employed in Web credibility assessment by showing the website(s) they identified as credible, using the researcher’s tablet or laptop.

In the final segment, each interview ended by asking a set of closed-ended questions, which were based on a 5-point Likert-type scale. The research participants were asked to rate each of the thirty-five pre-identified credibility markers/cues based on whether they would increase or decrease their perceptions of Web credibility, by indicating the appropriate number in a 5-point Likert-type scale with –2 being “much less credible;” –1 being “less credible;” 0 being “neutral;” +1 being “more credible;” and +2 being “much more credible.” As mentioned above, the items used in the final segment of the interview (i.e., credibility markers/cues) were developed based on the existing survey questionnaire that was used in large survey studies (Fogg et al., 2001; Fogg et al., 2003) and pilot-tested in a preceding study (Choi, 2013). After each participant finished answering all the questions in the final segment, the researcher addressed questions that participants had. Lastly, each participant was rewarded for his or her
participation—as mentioned in 3.3.2 Participant Recruitments, the first nineteen participants received $15 and the last two participants received $25 in cash.

3.3.5 Data Analysis

First of all, qualitative data collected from twenty-one semi-structured interviews were transcribed for data analysis. The initial lists of codes were identified based on the framework proposed in Phase I and the ELIS model by Savolainen (1995): (a) six types of credibility markers/cues and heuristics, (b) individual and contextual variables of Web credibility, (c) process of Web credibility assessment from the new framework; and (d) “way of life,” (e) “mastery of life,” (f) orienting and practical information-seeking, (g) social capital, and (h) cultural/cognitive capital (Appendix G). Even though the coding process was mainly guided by the frameworks (theoretical coding technique), the researcher also looked for emerging themes that could not be coded by the frameworks (open-coding technique). The computer software, QSR NVivo 10, facilitated the management of various types of raw data such as the voice-recorded interview files, transcripts, and memos, and aided a systematic analysis of the data sets, identifying and assigning codes, categories (themes), and relationships between codes.

Furthermore, descriptive (e.g., mean, median, range, standard deviation) as well as inferential statistics (e.g., one-sample t test) techniques were applied for the numeric data generated from the last segment of the semi-structured interviews, which were based on the 5-point Likert type scales (Appendix D). As mentioned above, the thirty-five items used in the current study were tested in previous studies (Choi, 2013; Fogg et al., 2001; Fogg et al., 2003). The ratings on these items were combined with and compared to the data acquired from the open-ended question asked about older adults’ Web credibility assessment process. IBM SPSS
Statistics 22 was used for the quantitative analysis of the numeric data. Table 3.6 below summarizes the overall process of the semi-structured interview.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Activities</th>
<th>Data analysis techniques and instruments/tools</th>
<th>Results/Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling</td>
<td>Defining the target population and sample</td>
<td>• 55+ years old (Neugarten, 1974)</td>
<td>Sampling criteria (Table 3.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Looked for health information online over the past 6 months</td>
<td></td>
</tr>
<tr>
<td>Participant recruiting</td>
<td>• Identifying potential subjects based on the sampling criteria</td>
<td>• Sampling criteria</td>
<td>21 participants recruited</td>
</tr>
<tr>
<td></td>
<td>• Conducting the prescreen test</td>
<td>• SPMSQ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• WMS-III</td>
<td></td>
</tr>
<tr>
<td>Data collection</td>
<td>• Developing the interview protocol</td>
<td>• The new framework developed in Phase I</td>
<td>• Interview protocol (Appendix D)</td>
</tr>
<tr>
<td></td>
<td>• Conducting semi-structured interviews:</td>
<td>• Two existing survey instruments (CREATE, 2015; Stanford Persuasive Tech Lab, 2015)</td>
<td>• Qualitative data collected</td>
</tr>
<tr>
<td></td>
<td>(1) Opening segment</td>
<td>• Voice-recording</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2) Middle segment</td>
<td>• Memo</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3) Final segment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data analysis</td>
<td>• Transcribing and coding the interviews</td>
<td>• Interview protocol</td>
<td>RQs 2, 3, and 4 answered</td>
</tr>
<tr>
<td></td>
<td>• Conducting descriptive and inferential statistics on the ratings of 35</td>
<td>• QSR NVivo 10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>closed-ended items</td>
<td>• IBM SPSS Statistics 22</td>
<td></td>
</tr>
</tbody>
</table>

3.3.6 Ethical Consideration of Semi-Structured Interview

Since the semi-structured interviews in this dissertation research involved human subjects, the researcher took into considerations of the ethical issues that may occur. First of all,
this research did not include any harmful or sensitive contents or materials to the participants. As the main purpose of conducting semi-structured interviews was to explore how older adults assess Web credibility to identify reliable and relevant online resources for their information needs, the researcher asked only about their opinions and perceptions of online information credibility, rather than testing or experimenting on any aspects of their cognitive or physical abilities. Thus, risks associated with the research were very low and were considered no greater than those of everyday life.

Also, the researcher collected the minimum range of personal information of the participants that was necessary for the research purpose, such as age, gender, ethnicity, educational background, and Internet experience. All collected data were made anonymous, and only pseudonyms were used in data analysis and reports. Thus, minimal risk was associated with the impact on privacy even if excerpts from interviews reveal information that may be considered to affect an individual’s privacy.

Lastly, all participation was voluntary; participants were asked to read and sign a consent form testifying to their willingness to voluntarily engage in the study. The consent form clearly informed about the research design and the right to privacy. The overall research design and associated research materials including the consent form, pretest instruments, and the interview protocol were reviewed and approved by the Florida State University’s Human Subjects Committee (Appendices A and B).

3.4 Trustworthiness of Qualitative Research

Qualitative research based on an interpretive/constructivist perspective assumes that there is no single reality that can be observed, measured, or ‘found’ as seen from a positivist/post-positivist perspective; rather, there are multiple realities of a single event that should be
understood, interpreted, and constructed (Merriam, 2009). In other words, qualitative research does not aim to find generalizable knowledge that is replicable (i.e., reliability) and applicable (i.e., valid) to understand different types of populations; rather, it aims to gain a deep understanding of a particular group of people’s social, psychological, and/or behavioral characteristics regarding a certain topic—e.g., older adults’ perceptions of Web credibility and their behaviors in assessing the credibility of online health information. Therefore, even though it is obvious that all types of research are supposed to produce reliable and valid knowledge, the ways to ensure the “trustworthiness” of qualitative research are necessarily different from those for quantitative research, as they stand upon different philosophical assumptions about the phenomenon or reality under examination. As the nature of the current research was qualitative, rather than quantitative, the researcher consulted four criteria suggested by Lincoln and Guba (1985) to ensure the trustworthiness and rigor in the qualitative investigation: (1) credibility, (2) transferability, (3) dependability, and (4) confirmability. The following subsections provide the definitions of the quality criteria and explain how the current research meets those criteria.

3.4.1 Credibility

The quality criterion credibility is concerned with “truth value” of findings from a qualitative study that represents the construction of the reality under investigation. In order to deal with the credibility criterion, one can pose a question of “how can one establish confidence in the trust of the findings of a particular inquiry for the subjects (respondents) with which and the context in which the inquiry was carried out?” (Lincoln, 1995, p. 290). When using the traditional term used in qualitative research, credibility may be understood as the internal validity (Lincoln & Guba, 1985; Merriam, 2009). In order to satisfy this criterion (i.e., credibility), this research used the technique of triangulation using multiple methods, sources of
data, and theories (Denzin, 1989). First of all, this research was designed to collect different types of data from multiple sources to address the research questions regarding people’s Web credibility assessment. More specifically, the qualitative meta-study (Phase I) analyzed both theoretical and empirical research results in the literature on information credibility. The meta-synthesized findings out of the study formed a new framework of Web credibility assessment, which then guided the semi-structured interviews with older adults (Phase II). As elaborated in the preceding section, 3.3.3 Interview Protocol Development, the interview protocol used in the semi-structured interviews included not only open-ended questions that allowed participants to freely talk about the topic under study (i.e., credibility assessment of online health information), but also closed-ended questions based on 5-point Likert scales helped the participants show their opinions about varied types of cues/markers and heuristics that might not be reminded of by themselves—i.e., triangulation using multiple methods was made.

In addition, in Phase II, the researcher put a significant amount of effort into recruiting different types of informants in terms of age, gender, and education in order to enhance the credibility of the findings, accommodating the variety in the target population’s perceptual and behavioral features by demographic variables. Nationally representative data about health information searching (Fox & Duggan, 2013) showed that there were significant differences between gender groups (female Internet users looked online for health information more than male Internet users); age groups (older Internet users who were 65+ looked online for health information less than younger age groups); and education levels (college graduates looked online for health information more than any other lower levels of education groups). Thus, the findings that are reported in the following chapters are mainly based on, but not limited to, the
intersectional information by multiple interview participants having different socioeconomic backgrounds—i.e., triangulation using multiple sources was made.

Lastly, this research was built upon multiple well-established theories and models pertinent to human information behaviors, such as the ELIS model (Savolainen, 1995), the IF theory (Pirolli & Card, 1999), and the synthesis of six existing models of Web credibility assessments (Table 2.4). Thus, findings from Phase II regarding older adults’ credibility assessment of online health information were interpreted using multiple angles of lenses, which helped enhancing the credibility of the findings—i.e., triangulation using multiple theories was made.

3.4.2 Transferability

Transferability is concerned with the “applicability” of the findings from a particular study to other studies in different contexts or with different subjects (Lincoln & Guba, 1985). In the traditional paradigm, transferability is named external validity (Lincoln & Guba, 1985; Merriam, 2009). However, from the interpretive/constructivist perspective (or the naturalistic paradigm) that aims to establish a deep understanding of a particular population’s information-seeking behaviors in a certain context, rather than seeking for generalizable findings that can be applicable to different settings, external validity is not the goal of the qualitative investigation (Merriam, 2009). Furthermore, since the transferability of the findings from one study to another depends on the degree of similarity between the two (Lincoln & Guba, 1985), the researcher cannot measure the degree of transferability of the findings from the current study to any future research that will be carried out in different contexts. Thus, “rich, thick description” can help readers and following researchers know whether the settings of the given study can be reused or referenced in other studies and whether the findings of the study can be transferred to other
studies in similar contexts (Merriam, 2009). Therefore, the researcher expatiated about the context where the study is situated and the processes of which the study went through, so that future researchers can use (i.e., transfer) the findings to understand the topic under similar contexts—i.e., people’s Web credibility assessment.

In particular, the new framework proposed by the qualitative meta-study (Phase I) is particularly transferable to other studies focusing on research topics regarding people’s credibility assessments in the Web context. As the framework was developed based on an extensive review of the literature on Web credibility in the disciplines of LIS, HCI, communication, and psychology, it may be useful and usable for studies in these fields that address Web credibility issues from the perspective of how people perceive the credibility of online information in the process of seeking relevant information for their information needs. The semi-structured interview study with older adults in this dissertation (Phase II) can be considered a case study that shows how to use the new framework along with existing theories or models pertinent to the given context. In particular, the attached appendices provide more detailed information about the research, such as interview protocol (Appendix D); relationships between research questions, theoretical frameworks, and methods (Appendix F); and coding schemes for data analysis (Appendix G).

3.4.3 Dependability

Dependability concerns with the question of whether the process of the inquiry is acceptable as well as whether the product (e.g., data, findings, interpretations, and recommendations) is supposed by the data collected and is coherent; dependability is a substitutive term for “reliability” (Lincoln & Guba, 1985). From the conventional research paradigm (i.e., positivist/post-positivist perspective) that assumes that there is a tangible and
unchanging reality, reliability is the extent to which research findings can be replicated with the same (or similar) subjects in the same (or similar) context. Lincoln and Guba (1985) suggested *inquiry audit* as a strategy to ensure the dependability of qualitative research. As the name of the technique implies—it is metaphorically based on the fiscal audit—auditors (i.e., reviewers) examine the process and product of the qualitative research determining whether they are sound and coherent. In this dissertation research, four members in the dissertation committee, including a university representative from outside of the school where the researcher was located, played the role as auditors in the stages of designing the research (i.e., prospectus defense) as well as conducting the proposed research and reporting the findings (i.e., dissertation defense).

As for the product’s dependability, the new framework of Web credibility assessment proposed in Phase I was reviewed by two external experts in the topic area (i.e., information credibility) for journal publication: Choi and Stvilia (in press). Through the two rounds of reviews and revisions between the reviewers and the researcher, the framework’s dependability was significantly improved.

In addition, the coding scheme used to analyze the interview data collected in Phase II was examined through the following four phases. First, the initial coding scheme was reviewed by the researcher’s academic advisor who was well aware of the overall research design as well as the theoretical frameworks used to develop the coding scheme. Second, a fellow doctoral student, who was familiar with the literature on human information behavior and the coding process, was recruited to check the dependability of the coding scheme and the interview data. In particular, the researcher provided the third-party coder (i.e., the doctoral student) with an instruction session, informing him about not only the overall research design (e.g., the main purpose of the study, theoretical frameworks used, and general characteristics of the
interviewees), but also the definition of each code and rules of assigning the codes and corresponding examples. After then, the researcher and the recruited coder coded an interview transcript independently and compared their coding results to identify any disagreements. Third, the researcher and the coder had an in-person meeting to discuss about the differences in their codes and resolved them. Using the refined coding scheme based on the discussion, both coders coded another interview together, reading the transcript line by line, to have further refinements in the coding scheme by exchanging opinions immediately when any disagreements or discussion points emerged. Fourth, the researcher used the final coding scheme refined in the third phase to code all the interviews collected.

3.4.4 Confirmability

Confirmability addresses the question of whether the characteristics of the data can be confirmed by other people who review the qualitative research, rather than the question of whether the researcher can establish the objectivity in the research findings; thus, confirmability concerns with whether the given study is free from the researcher’s biases, motivations, interests, or perspectives (Lincoln & Guba, 1985). The confirmability audit that examines the specification of the research data and process is a technique that allows readers to review and confirm the quality of a qualitative investigation (Lincoln & Guba, 1985). In order to enhance the confirmability of the current research, the four members of the dissertation committee, including a university representative from outside of the school where the researcher was located, reviewed the overall process of the research from designing the research to reporting findings.
CHAPTER 4

FINDINGS

4.1 Findings from Phase I: A Qualitative Meta-Study

This section reports on the findings from the qualitative meta-study conducted in Phase I. In Chapter 2, the researcher provided a thorough review of the literature on information credibility in terms of conceptualization (i.e., key dimensions of credibility), operationalization (i.e., measures for the dimensions); influences of user characteristics and contextual variables on Web credibility assessment; and theoretical frameworks that theorize the process of Web credibility assessment.

By synthesizing the main findings reported, the researcher proposes a new framework of Web credibility (WC) that consists of three main components: (1) Assessment; (2) Variability; and (3) Process of WC. As the WC framework stems from the typologies produced by the literature analysis (a qualitative meta-study), it is still in the conceptual stage. However, this new framework can be a useful theoretical lens to look into how people deal with credibility issues in the Web for several reasons.

First of all, this new framework combines all the important facets of theoretical frameworks of Web credibility assessment identified in the literature analysis (i.e., conceptualization and operationalization of credibility, context and user characteristics that influence Web credibility assessment, and the process of Web credibility assessment). In particular, the “Assessment” component of the WC framework provides a more elaborated typology of Web credibility measures by cross-mapping the two key dimensions of credibility (i.e., trustworthiness and expertise) and the objects of assessment (i.e., operator, content, and design). In other words, the extended (cross-mapped) typology further categorizes the measures
used to assess Web credibility in the literature, specifying which measures could be applicable for each of the credibility dimensions, i.e., trustworthiness and expertise (Table 4.1).

In addition, the WC framework takes both context- and user-related variables into account as they have significant impacts on the overall process of Web credibility assessment. Particularly, the WC framework can go well with models of human information behavior especially in the social paradigm that takes social factors into consideration (Pettigrew, Fidel, & Bruce, 2001). In this dissertation research, Savolainen’s ELIS model (1995) was employed to understand the target population’s (i.e., older adults’) health information behaviors in the context of ELIS, in which people have to select the most credible sources to fulfill their information needs. Several factors regarding an individual’s characteristics as well as social environments around the users identified in the ELIS model can be used to understand the dynamic, rather than static, nature of people’s perceptions of information credibility and the process of Web credibility assessment.

4.1.1 Assessment of Web Credibility

As mentioned above, the Assessment component of the WC framework deals with the conceptualization and operationalization of Web credibility. To connect the dimensions of the credibility conceptualization with relevant credibility measures found in the literature, the framework organizes those measures by the three categories of the Web Credibility Framework of Fogg (2003a) and then mapped to the two key dimensions of credibility (i.e., trustworthiness and expertise). This cross-mapping exercise produces six categories (i.e., operator trustworthiness; operator expertise; content trustworthiness; content expertise; design trustworthiness; and design expertise) that form a more elaborate conceptualization for
understanding relationships among the key dimensions of credibility, related measures, and objects of those measures (Table 4.1).

4.1.1.1 Measures of operator trustworthiness. The trustworthiness of a website can be assessed based on the trustworthiness of its operator. Several of the previous studies have identified sub-dimensions of trustworthiness by asking participants to rate the importance or appropriateness of related adjectives: neutral, balanced, unbiased, even-handed, fair, ethical, believable, consistent, well-respected, trusted, honest, and sincere (Cheung & Lee, 2006; Hong, 2006a; Johnson & Kaye, 2000, 2009; Liu & Huang, 2005; Westerwick, 2013). In this subsection, measures used in the literature that are related to the operator’s trustworthiness are reviewed within four categories: (1) commercial implication, (2) perceived integrity, (3) transparency, and (4) decency.

One of the frequently mentioned measures in the literature that can be grouped in the category of an operator’s trustworthiness is a website’s “commercial implication,” checking whether it is a commercial or non-commercial site. In particular, it examines the website’s URL—whether it ends with .com or .gov, .org, or .edu; ads on the website; whether it has pop-up windows with ads; whether it requires paid subscription to gain access (Fogg et al., 2001). Using these measures, Choi (2013) found that older adults perceived non-commercial websites as more credible than commercial ones for health information because they did not provide information to make a profit for themselves. Participants in the study mentioned that when they saw ads on health-related websites, they perceived the websites as trying to sell something, rather than providing the public with useful information.

Operator’s trustworthiness also matters in online shopping sites. Cheung and Lee (2006) measured “perceived integrity,” which was a significant factor for the trustworthiness of Internet
merchants, based on users’ ratings on whether the vendors charge the same price for Internet shoppers. Jansen and Resnick (2006) focused on the effect of sponsored links (vs. non-sponsored links) on Web searching behavior in the context of online shopping. This study showed that when using a Web searching engine for e-commerce searching, participants were more likely to view the non-sponsored links first and evaluate them as more relevant than sponsored links. On search results pages on Web searching engines (e.g., Google and Yahoo), sponsored links appear because a company, organization, or individual purchased the key words, while non-sponsored (i.e., organic) links show up based on their proprietary matching algorithms. Therefore, searchers’ perceived credibility of the given links, either sponsored or non-sponsored, can play an important role in their online information seeking behaviors.

On SNSs and user-generated content sites, where authors’ identity information is not always available, nor is their expertise necessarily assured, author trustworthiness and expertise could be assessed based on the records/logs of their past contributions and behaviors (Stvilia et al, 2008). For instance, the trustworthiness of a Wikipedia user who had been observed behaving maliciously in the past (e.g., inserting false content in article) and whose edits had been reversed often could be evaluated lower. Thus, whether or not the author opens their profile to the public can be used as a useful credibility marker/cue. In particular, users may look for an author’s online profile, the background information for online identity, such as a LinkedIn profile, Twitter stream, or personal website or blog, to evaluate (or presume) the author’s trustworthiness (Jessen & Jørgensen, 2012). Rieh, Jeon, Yang, and Lampe’s (2014) study focused on the credibility of bloggers also showed that “transparency,” in terms of a blogger’s identity (e.g., the background information of the blogger and the main purposes of running the blog) and open-modification process (e.g., announcement regarding correcting inaccurate information, rather than deleting it),
was considered an important cue/marker that signals the credibility of the blog. Similarly, Francke and Sundin (2012) mention that Wikipedia, which allows people to participate in content production, is considered open and independent (i.e., transparent), therefore more credible.

On social Q&A sites, the answerer’s (i.e., author’s) “intention” or “decency” can be an important criterion for askers to judge the trustworthiness of the answerer (Jeon & Rieh, 2014). For instance, when an answerer is perceived as facetious in answering a certain question, trying to make a joke, his or her answer tends to be judged as less credible by people.

4.1.1.2 Measures of operator expertise. Operator’s expertise is the perceived knowledge, skill, and experience of the operator. Sub-dimensions of expertise that are related to an operator are: name recognition, reputation, fame, authoritativeness, and competence (Cheung & Lee, 2006; Fogg et al., 2003; Liu & Huang, 2005; Westerwick, 2013; Zhang, 2014). In this subsection, we review various measures that are used in the literature to examine the operator’s expertise within three categories: (1) perceived reputation, (2) search engine ranking, and (3) history of author’s activity.

Operator’s expertise can be measured by checking whether or not the site lists author credentials for each article (Fogg et al., 2001). For scholarly information, in particular, the author’s affiliation information, qualification and credentials, and publications in printed journals are employed by people to evaluate the author’s expertise – i.e., “reputation” (Hargittai et al., 2010; Liu, 2004; Liu & Huang, 2005). In other contexts, such as seeking entertainment information, the positive reputation still plays an important role in forming the authority of the site (Huvila, 2013).
In addition, “search engine rankings” can play a significant role in judging source credibility (Hargittai et al., 2010; Huvila, 2013; Pan et al., 2007; Westerwick, 2013). Westerwick (2013) showed that Google top-ranking affected information credibility through the significant impact on perceived sponsor (i.e., operator) credibility. Other scholars also report the result that people tend to trust a website when it was suggested in the first result by a search engine (Hargittai et al., 2010; Huvila, 2013; Pan et al., 2007). These findings may be interpreted that users’ trust in search engines can influence their credibility perceptions of the search results.

“Historical data of member activities” in peer-production systems such as Wikipedia have been used for predicting the quality of information and/or identifying the expertise and interests of a member (Adamic, Zhang, Bakshy, & Ackerman, 2008; Cosley, Frankowski, Terveen, & Riedl, 2007; Stvilia, Twidale, Smith, & Gasser, 2005). In a recent study Jeon and Rieh (2014) reported that an answerer’s involvement in a given topic (e.g., top contributor badge) tended to be considered a positive marker/cue in credibility assessment of the answer in a social Q&A site, as the answerer was assumed to have at least some knowledge to answer the question.

**4.1.1.3 Measures for content trustworthiness.** Trustworthiness of content mainly concerns whether the given message or information itself on a website is perceived by users as fair, unbiased, and truthful. Measures used in the literature that are related to content’s trustworthiness can be grouped into four categories: (1) neutral/unbiased information, (2) aggregated social opinion, (3) consistency in content provision, and (4) currency/recency.

Fogg et al. (2001) mention that people tend to perceive content as trustworthy when it contains links to outside materials and sources, especially links to its competitors’ sites. Also, when policy on content is available on a website (i.e., “consistent in content provision”), the
content from the site is perceived to be trustworthy, providing consistent information (Princeton Survey Research Associates, 2002).

In terms of health-related topics, users tend to perceive a website as most credible when it provided both pros and cons on the given topic or issue (e.g., medication, side effects, etc.) because the site is viewed as attempting to provide “neutral/unbiased information” regarding the given topic (Choi, 2013). Neutrality also seems to be an important marker/cue to judge the trustworthiness of user-generated contents, such as social Q&A sites, blogs, online discussion forums, etc. In Metzger’s (2010) study, the proportion of negative to positive reviews on feedback systems or reputation systems was an important cue/marker that they paid attention to make credibility evaluations. Giudice (2010) also showed that mixed stances of user feedback on an issue (i.e., both positive and negative) influenced perceptions of Web credibility. In the study (Giudice, 2010), a Web page with positive or mixed user feedback was perceived as more credible than a Web page with negative feedback only; however, there was no statistically significant difference in credibility ratings between positive and mixed feedback. Therefore, interestingly, even counterclaims and rebuttals seem to be considered useful cues/markers for judging the credibility in user-generated content. These findings may be understood that the content having at least some negative reviews is perceived by users as more balanced, and therefore, more trustworthy.

Also, “aggregated social opinions” from other users (as opposed to experts) seem to play an important role in forming the perceived trustworthiness of content (Fernquist & Chi, 2013; Flanagan & Metzger, 2013; Jessen & Jørgensen, 2012). Since aggregated opinions of other users are assumed to be honest (i.e., not manipulated by someone), the social information may be perceived as more credible. Flanagan and Metzger (2013) showed that the volume of ratings
provided by other users on a movie rating site was positively associated with perceived credibility. This result indicates that opinions on a certain topic or issue from a large number of ‘general’ users may suggest trustworthy information, while presumably a smaller number of ‘experts’ may provide expert information.

In the literature, “currency” (or recency) has been considered one of the important message-related features that may influence the perception of information credibility (Bernstam, Shelton, Walji, & Meric-Bernstam, 2005; Hargittai et al., 2010; Sundar, Knobloch-Westerwick, & Hastall, 2007). For online news, in particular, currency can be an important criterion to judge its trustworthiness because the validity of news information is time sensitive. Sundar et al. (2007) measured the number of minutes since the news story broke, named upload recency, to see whether or not currency affects the perceived credibility of the news lead itself. The authors found that users considered the most recently uploaded news more credible when the news was from a low-credibility-source, while they did not care much about the currency of news when the news was from a high-credibility-source.

4.1.1.4 Measures for content expertise. Content expertise, which is based on evaluations of whether or not the information on the website is accurate, clear, comprehensive, informative, factual, in-depth, useful, etc., plays an instrumental role in Web credibility assessment (Eastin, 2001; Hong, 2006a; Kim, 2010; Liu, 2004; Savolainen, 2011; Sundar, 1999; Zhang, 2014). Measures regarding content’s expertise that are used in the literature can be grouped into four categories: (1) provision of citations and references, (2) social validation, (3) thoroughness of content, and (4) reinforcement of content expertise.

When a website has articles that list citations and references – i.e., “provision of evidence,” people tend to perceive the site as more credible (Fogg et al., 2001). People seem to
view citations and references as scientific supports/evidence for the arguments made in the articles, assuming that these markers/cues guarantee the accuracy and completeness of the content. In their empirical study, Sundar et al. (2007) examined whether the number of related articles would have a significant impact on the perceived credibility of online news leads. The authors found that a news lead from a low-credibility-source was perceived as more credible when it included a larger number of related articles. However, there was no significant relationship between the number of related articles and perceived credibility of a news lead when it came from a high-credibility-source. In other words, in a case where source’s credibility is not guaranteed, people tend to give higher credibility to the argument being supported by a larger number of citations and references.

Various types of “social validation,” such as Facebook ‘Likes,’ social bookmarks, ratings (Jessen & Jørgensen, 2012), best answers in social Q&A sites (Kim, 2010), and annotations by other users (Kulkarni & Chi, 2013), are useful cues in assessing the expertise of content. Kulkarni and Chi (2013) showed that social annotations play an important role in the persuasiveness of online news articles, even though the impact varied depending on by whom and in which situation the annotations were generated: annotations by friends were persuasive in a logged-in context where users were able to recognize their friends; in a logged-out context, annotations by computer and companies were more persuasive than those by unknown users. Even though the effect of social annotations is not homogeneous, the findings imply that the existence of social annotations on online news articles may influence the persuasiveness of content, as social annotations are seen as endorsements of content by other users (Kulkarni & Chi, 2013).
When it comes to user-generated content, such as answers in social Q&A sites, Kim (2010) found that questioners paid more attention to content-related markers/cues than source-related ones to judge the quality of answers. In particular, users considered a ‘Best Answer’ rating an important credibility marker, as it may guarantee the expertise of the answer (informativeness, accuracy, usefulness, etc.). Thus, the Best Answer in Yahoo! Answers can be regarded as a representative form of social validation in social Q&A sites.

In determining the best answers in social Q&A sites, the length of reply and the number of competing answers (i.e., number of other answers the questioner has to choose from) were identified as significant predictors; in particular, the answer length was the most influential factor for predicting the ‘Best Answer’ in Yahoo! Answers (Adamic et al., 2008; Agichtein, Castillo, Donato, Gionis, & Mishne, 2008). Given that, people seem to consider length of answer and number of competing answers as cues/markers signaling the “thoroughness” of the user-generated content.

There is a unique type of information behavior on the Web that influences the credibility of user-generated content. St. Jean, Rieh, Yang, and Kim (2011) paid attention to the fact that people have a chance to reinforce the credibility of their content even after they post it online. The authors found that many content contributors posted additional information – i.e., “reinforcement of context expertise,” including supplementary images, and/or provide feedback to their audience, and these interactions with audience provided the content contributors with an additional chance to promote their knowledge and expertise to the audience in the social sites. Savolainen (2012) finding that people tend to perceive user-generated content (e.g., answers in a social Q&A site) more credible when the content provides further evidence for or competing answer candidates is in line with the findings from St. Jean et al. (2011).
4.1.1.5 Measures for design trustworthiness. As mentioned above, Fogg’s (2003a) Web credibility framework defines the design aspect of Web credibility with four sub-categories: information design – the structure of information on each page and throughout the site; technical design – technical functionalities; aesthetic design – layouts, graphics, and colors of the site; and interaction design – usability. Based on the framework, design ‘trustworthiness’ can be determined by whether or not the website’s performance is stable and consistent; whether or not it ‘looks’ trustworthy, etc. This subsection examines measures used in the literature that are related to a design’s trustworthiness according to real-world feel and stability of the website.

An early study on Web credibility assessment (Fogg et al., 2003) reported that the most frequently mentioned criteria for evaluating the credibility of a website were design look and information design/structure. The result tells us that visual aspects of a website, such as pleasing graphics, higher quality look and feel, and professional appearance, may have significant impacts on users’ perceptions of the credibility of Web-based resources. In particular, scholars have examined the effects of trustworthiness of a website’s design in terms of “real-world feel,” such as whether or not the site lists the operator’s physical address, contact number, and email address (Choi, 2013; Fogg et al., 2001; Fogg et al., 2003), and whether or not it includes a picture of the operator (e.g., organization’s members; authors of certain articles) (Fogg et al., 2001; Liu, 2004; Liu & Huang, 2005). In particular, posting a profile picture may have a positive effect on users’ perceived credibility of user-generated content, as well. Jeon and Rieh (2014) reported that some participants noticed answers’ profile pictures in Yahoo! Answers, considering them being more involved in the site. When people feel that there are actual people behind the website, they may perceive the website as more trustworthy.
Moreover, technical design also has a significant impact on the perceived trustworthiness of a website. In particular, users seem to be sensitive to the “stability” of a website, such as how often the site is down, or whether or not links from all pages work properly (Fogg et al., 2001). Previous studies using these measures showed that people considered the websites that are often unexpectedly unavailable or have broken links less credible because these are perceived as less consistent and reliable—i.e., less trustworthy (Choi, 2013; Fogg et al., 2001; Fogg et al., 2003; Liu, 2004; Liu & Huang, 2005).

4.1.1.6 Measures for design expertise. Web resources involve various design-related features, such as the structure of information, search functions, aesthetics design, and usability (Fogg, 2003a). Even though these design-related features are not particularly about content or its source(s), which have been traditionally considered as the main objects of credibility assessments, several scholars have shown that design may have a significant effect on the overall perception of Web credibility (Fogg et al., 2001; Robins & Holmes, 2008; Wathen & Burkell, 2002). In particular, a website’s credibility can be communicated by its quality design (i.e., design’s expertise) in terms of aesthetics based on first impressions of surface traits and usability based on first-hand experience (Fogg, 2003a). Measures regarding a design’s expertise identified in the literature are grouped into three categories: (1) visual aesthetics, (2) appropriateness of design, and (3) professionalism.

Robins and Holmes (2008) found that people tended to judge the content with a higher aesthetic treatment as having higher credibility than the same content with a lower aesthetic treatment – i.e., impact of “visual aesthetics” on Web credibility assessment. Also, based on Wathen and Burkell’s (2002) model for Web credibility assessment, people begin the process of assessing Web credibility with making immediate judgments about the surface characteristics of
the website, which is directly related to the structural features of websites. Surface characteristics mentioned in this research include appearance of the site (e.g., color, graphics, no errors, etc.), usability (e.g., navigability, menus, download speed, etc.), and organization of information (e.g., layers, ease of access, and choice of detail level). Rieh et al. (2014) also mentioned that visual aesthetics can play an instrumental role in signaling credibility of blogs – e.g., changing the background of a blog and including pictures. In particular, the “appropriateness of design,” being in harmony with the type of content and tone of writing, was suggested as an important aspect of a credible blog, as blogs are a type of user-generated content sites where bloggers and audience are closely engaged, interacting with each other regarding their common concerns and interests.

In particular, professional design of a website can give a positive first impression to users, which then can influence their credibility judgments of the website itself. In this regard, Fogg et al. (2001) showed that a lack of “professionalism,” such as typographical errors in the site or small size (e.g., having less than 5 pages), made the participants rate the website as less credible. These cues tend to have a negative effect on the perceived expertise of a website.

One interesting finding regarding the impact of design features on Web credibility is that quality design and site organization tend to be considered as a basic requirement (or even prerequisite) that a health-related website must have (Choi, 2013). In other words, a high level of website design may or may not increase the overall credibility of a health-related website, while poor surface credibility significantly decreased the overall credibility of a website. Westerwick (2013) also showed that credibility perceptions could not be enhanced by more appealing website design when the site has lower source credibility; instead, higher source credibility increased users’ ratings of the website’s design appeal.
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<th>Table 4.1 Measures of Web Credibility Assessment</th>
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</thead>
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<tr>
<td><strong>Operator</strong></td>
</tr>
<tr>
<td>-</td>
</tr>
<tr>
<td>Commercial implication:</td>
</tr>
<tr>
<td>- URL ends with .com</td>
</tr>
<tr>
<td>- Ads on the site</td>
</tr>
<tr>
<td>- Pop-up windows with ads</td>
</tr>
<tr>
<td>- Paid subscription required</td>
</tr>
<tr>
<td>Perceived integrity:</td>
</tr>
<tr>
<td>- Same condition for both on- and off-line shopping products</td>
</tr>
<tr>
<td>- Sponsored links (vs. non-sponsored links)</td>
</tr>
<tr>
<td>Perceived transparency:</td>
</tr>
<tr>
<td>- Accessibility of author’s online profile (e.g., LinkedIn profile, Twitter stream, personal website or blog, etc.)</td>
</tr>
<tr>
<td>- Announcement (notice) on correcting inaccurate information (not deleting it)</td>
</tr>
<tr>
<td>Perceived decency:</td>
</tr>
<tr>
<td>- Whether the author is serious or facetious in information provision.</td>
</tr>
<tr>
<td>Content</td>
</tr>
<tr>
<td>- Links to outside materials and sources</td>
</tr>
<tr>
<td>- Links to its competitors’ sites</td>
</tr>
<tr>
<td>- Mixed stances of user feedback on an issue (both pros and cons are provided)</td>
</tr>
<tr>
<td>- Proportion of positive and negative comments on user-generated contents</td>
</tr>
<tr>
<td>Aggregated opinion/social validation:</td>
</tr>
<tr>
<td>- Duplication (i.e., certain information is found on multiple websites.)</td>
</tr>
<tr>
<td>- Social annotations and rating from other people</td>
</tr>
<tr>
<td>- ‘Best Answer’ rating (e.g., ‘Best Answer’ in Yahoo! Answers and ‘Likes’ in Facebook)</td>
</tr>
<tr>
<td>Consistency in content provision:</td>
</tr>
<tr>
<td>- Posting policy on content</td>
</tr>
<tr>
<td>Currency/Recency:</td>
</tr>
<tr>
<td>- Upload recency (number of minutes since a message was posted)</td>
</tr>
</tbody>
</table>
### 4.1.2 Variability of Web Credibility Assessment

The Variability component of the WC framework combines the *user characteristics* such as demographics, user involvement, and technology proficiency (Table 2.3) and the *context* facet included in the existing theories and models for Web credibility assessment (Table 2.4). Since both the user- and context-related factors can affect the overall process of Web credibility assessment, they are grouped together and named “Variability” in the WC framework.

#### 4.1.2.1 Context

Among the six frameworks reviewed in Chapter 2 (Table 2.4), the *P-I Theory* (Fogg, 2003b) and *Unifying Framework of Credibility Assessment* (Hilligoss & Rieh, 2008) explicitly included *context* as an independent variable that influenced Web credibility assessment. Fogg (2003b) highlights that the interpretation of identical website elements for Web credibility assessment is not necessarily the same, as it is based on a person’s judgment, which can be influenced by his or her environment and situational norms (i.e., context). In particular, he mentions that context may be (1) user context and/or (2) task context. For instance, if a person has to look for the lowest price for airfare online with a time constraint at work, he or she would more likely perceive pop-up advertisements as negatively than when in a situation where he or she is browsing travel sites for planning vacation with no time constraint at home. In other words, the different *user contexts* (i.e., at work with a time constraint vs. at home without a time

---

**Table 4.1 – Continued**

<table>
<thead>
<tr>
<th>Design</th>
<th>Real-world feel:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Operator’s contact information (e.g., physical address, contact number, email address, etc.)</td>
</tr>
<tr>
<td></td>
<td>• Picture of operator</td>
</tr>
<tr>
<td>Stability of the website:</td>
<td>• The site is rarely down.</td>
</tr>
<tr>
<td></td>
<td>• All links in the site are working (number of broken links).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Visual aesthetics:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Professionally designed (e.g., color, graphics, etc.)</td>
</tr>
</tbody>
</table>

**Appropriateness of design:**

| • Well-matched with content (topic) |
| • Well-matched with tone of writing |
constraint) and task context (i.e., looking for the best airfare vs. browsing travel sites for vacation idea) would influence one’s perception of Web credibility.

Hilligoss and Rieh (2008) also mention that context is an important factor that influences the overall process of Web credibility assessment. In particular, the context in which the information need emerged (i.e., the context of the given task such as information need for school homework) influences people’s credibility judgment and guide (or even limit) their source selection practices. In their study, college students tried not to use Web-based resources for their homework, assuming that their class instructors would consider the Internet a less credible source for academic work. This case could be seen as an example showing the influence of task context on credibility perception, rather than user context, based on the categorization of context-related variables mentioned by Fogg (2003b)—i.e., user context vs. task context.

4.1.2.2. User characteristics. Most of the theoretical frameworks reviewed (5 out of 6) identified some of the user characteristics-related factors as important variables that may have significant impacts on Web credibility assessment. The MAIN model by Sundar (2008), however, focused primarily on the cues/markers and heuristics that can be used for Web credibility assessment, without considering user characteristics. In the current research that focuses on older adults as a target research population, user characteristics were considered one of the most important variables that would produce meaning findings; thus, user characteristics are included in the new framework (Table 4.2).

<table>
<thead>
<tr>
<th>Type</th>
<th>Variables</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context</td>
<td>User context</td>
<td>User’s environment that influence the process of Web credibility</td>
<td>• Time</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Situational norm</td>
</tr>
<tr>
<td></td>
<td>Task context</td>
<td>Types of tasks that influence the process of Web credibility</td>
<td>• Topic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Goal</td>
</tr>
</tbody>
</table>

Table 4.2 Variability of Web Credibility Assessment
Table 4.2 – Continued

<table>
<thead>
<tr>
<th>User characteristics</th>
<th>Demographics</th>
<th>User’s demographic backgrounds that influence Web credibility assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involvement</td>
<td></td>
<td>• Age</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Gender</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Education</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Motivation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Domain expertise</td>
</tr>
<tr>
<td></td>
<td>Technology</td>
<td>• Information literacy</td>
</tr>
<tr>
<td></td>
<td>proficiency</td>
<td>• Media reliance</td>
</tr>
</tbody>
</table>

4.1.3 Process of Web Credibility Assessment

The third component of the WC framework focuses on how people go through the process of Web credibility assessment. Hilligoss and Rieh (2008) make a distinction between credibility assessment and credibility judgment by defining that “credibility assessment is seen as an iterative process involving one or more credibility judgments” (p. 1468). Using the distinction, the ‘process-oriented’ frameworks of Web credibility assessment encompass the overall process of credibility assessment, while the ‘judgment-oriented’ frameworks focus on the effects of certain factors on users’ perceptions of information credibility. Among the six theoretical frameworks reviewed in Chapter 2, five out of six described Web credibility assessment as a process.

Metzger’s (2007) Dual Model depicts the process of Web credibility assessment with three phases: exposure, evaluation, and judge phases. Overall, this model considers users’ personal and situational contexts, especially motivation and ability, as crucial factors deciding to what extent a person will critically evaluate Web information they found. More specifically, in the exposure phase of the model, the user’s motivation and ability decide whether or not they will go to the next phase, the evaluation phase. When a user has motivation and ability to
evaluate the information he or she is being exposed to, the user will take a more rigorous and systematic strategies to credibility assessment; however, if a user does not have motivation, no credibility assessment will happen; in case the user does not have ability, yet has motivation to evaluate, he or she will rely on the surface characteristics (i.e., peripheral cues) or heuristics to judge the credibility of the information (see Metzger, 2007, p. 2088).

Fogg’s (2003b) P-I theory also describes the process of Web credibility assessment with two phases (or stages). As reviewed in Chapter 2 above, this theory posits that a person notices something (i.e., prominence) and makes a judgment about it (i.e., interpretation). Thus, the first phase of the theory is the stage where information seekers select a potentially relevant website for their information needs based on the elements that they notice from the website. In other words, any elements that are not noticeable to users cannot have any impact on users’ credibility assessments of the website. Fogg (2003b) mentions that at least five factors can have significant impacts in this phase: involvement, topic, task, experience, and individual differences (e.g., learning style, literacy level). In the second phase (i.e., interpretation), users evaluate the credibility of the website based on available markers/cues and heuristics. The author identifies three factors that can influence the interpretation phase such as users’ assumptions, skill/knowledge, and context (e.g., user’s environment, user expectations, situational norms).

Wathen and Burkell (2002) also conceptualize the process of Web credibility assessment with three phases: evaluation of surface credibility, evaluation of message credibility, and content evaluation. In the first phase of this model, people make immediate judgments about the surface characteristics of the site, such as appearance (e.g., color, graphics, lack of error, etc.), usability (e.g., navigability, menus, download speed, etc.), and organization of information (e.g., layers, ease of access, and choice of detail level); the markers identified in this model are in line
with the surface credibility markers suggested by Tseng and Fogg (1999). In the second phase, then, people evaluate the message credibility using various markers for source (operator) and message (content). The authors identify expertise/competence, trustworthiness, and credentials as factors that influence source credibility; content, accuracy, currency, and relevance to the user need are identified as factors that influence message credibility. The last phase assesses the interaction of the surface, source, and message credibility, completing the process of credibility assessment. In this phase, the user’s cognitive status (e.g., knowledge, familiarity, time, and so on) comes into play as mitigating factors.

Even though Hilligoss and Rieh’s (2008) framework identifies three levels of credibility assessment (i.e., construct, heuristics, and interaction levels), rather than two phases, this framework can be also understood with the two-phase process model, as well. Construct is the highest and the most abstract level in the framework, in which people form a particular point of view for judging credibility. More specifically, depending on the given context of credibility assessment (e.g., types of tasks), people conceptualize credibility based on different constructs—the authors identified five constructs such as trustfulness, believability, trustworthiness, objectivity, and reliability. For instance, those who are evaluating a news article would consider objectivity a more important construct than the others (Hilligoss & Rieh, 2008). Thus, what people would do on the construct level can be understood with the third facet of the new framework proposed in the current research, operationalization, in which people identify the appropriate measures based on the key dimensions of credibility.

The second and third levels of this framework (i.e., heuristics and interaction levels) mainly deal with how people measure the constructs (or dimensions) of credibility. Particularly, in the second level, heuristics, people utilize general rules of thumb, especially when they are
unwilling or unable to evaluate the content of the message because of time, motivation, and ability. In the third level, *interaction*, people examine specific attributes of information objects and sources for credibility judgments, while the judgments in the *heuristics* level are based on more general and widely-applicable rules of thumb gained from individual’s experience (Hilligoss & Rieh, 2008). The idea that people take advantage of heuristics when they have low motivation and/or ability to engage in the credibility assessment process is in line with other frameworks reviewed in this research, such as Metzger’s (2007) Dual Processing Model and Wathen and Burkell’s (2002) Judgment Model; fundamentally, it is based on the ELM of persuasion (Petty & Cacioppo, 1981) that addresses the broader issues of how people change their attitudes.

Lastly, Sundar’s (2008) MAIN model also highlights the roles of heuristics in credibility assessment in the digital media context. This model views that the process of credibility assessment consists of four stages: affordance, heuristics, quality, and credibility assessment. *Affordance* is the starting point in the process where people recognize a particular capability possessed by the medium, which can facilitate completion of the desired task—in the context of ELIS, the task would be information seeking to fulfill certain information needs. Therefore, even though the author does not particularly articulate it, some of the user characteristics-related factors (e.g., proficiency/experiences with technology) would have effects on the affordance stage.

In the following stage, heuristics, various types of heuristics are triggered by the cues embedded in or offered by the medium used in the affordance stage. This model identifies varied heuristics under the four types, Modality (M), Agency (A), Interactivity (I), and Navigability (N), which are related to the structural aspects of the medium; source of information; interaction
and activity; and interface features (or design), respectively. As the name of the model, MAIN model, implies, the MAIN model considers that the four types of heuristics play the instrumental role in judging the quality of content in the third stage. Finally, some of the quality criteria, such as trustworthiness and reliability, are linked to credibility assessment. Overall, the MAIN model has the similar viewpoint on the process of credibility assessment with Hilligoss and Rieh’s Unifying Framework in particular, and with other models reviewed in the current research at large, in that it sees that people begin the process with less expensive methods in terms of time and cognitive load. Table 4.3 summarizes the characteristics regarding the process facet in the existing theories and models reviewed in this research.

Table 4.3 Process of Web Credibility Assessment Identified in Existing Frameworks

<table>
<thead>
<tr>
<th>Theory/Model</th>
<th>Stage 1: Initial Evaluation</th>
<th>Stage 2: Final Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-I Theory (Fogg, 2003b)</td>
<td>Prominence: notices elements of a website that may influence Web credibility assessment.</td>
<td>Interpretation: evaluates the credibility of the website based on the interpretations of</td>
</tr>
<tr>
<td></td>
<td>Factors that may have impacts include:</td>
<td>the elements noticed in Prominence. Factors that may have impacts include:</td>
</tr>
<tr>
<td></td>
<td>• Involvement</td>
<td>• User’s assumption</td>
</tr>
<tr>
<td></td>
<td>• Topic; Task</td>
<td>• Skill/knowledge</td>
</tr>
<tr>
<td></td>
<td>• Experience</td>
<td>• Context</td>
</tr>
<tr>
<td></td>
<td>• Individual differences</td>
<td></td>
</tr>
<tr>
<td>Judgment Model (Wathen &amp;</td>
<td>Evaluation of Surface Credibility: makes immediate judgments about the surface characteristics of the site:</td>
<td>Content Evaluation: assessing the interaction of the message presentation and content with</td>
</tr>
<tr>
<td>Burkell, 2002)</td>
<td>• Appearance/presentation</td>
<td>the user’s cognitive state:</td>
</tr>
<tr>
<td></td>
<td>• Usability/interface design</td>
<td>• Knowledge</td>
</tr>
<tr>
<td></td>
<td>• Organization of information</td>
<td>• Familiarity</td>
</tr>
<tr>
<td></td>
<td>Evaluation of Message Credibility:</td>
<td>• Time</td>
</tr>
<tr>
<td></td>
<td>evaluates the source and message based on various markers:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Expertise/competence, trustworthiness, etc. for source;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Relevance, currency, accuracy, etc. for message</td>
<td></td>
</tr>
<tr>
<td><strong>Table 4.3 – Continued</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Unifying Model</strong></td>
<td>Interaction Level: examines specific attributes of information objects and sources for credibility judgments.</td>
<td></td>
</tr>
<tr>
<td>(Hilligoss &amp; Rich, 2008)</td>
<td>• Content cues</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Peripheral source cues</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Peripheral information object cues</td>
<td></td>
</tr>
</tbody>
</table>

**Construct Level**
- Conceptualizes credibility using constructs such as:
  - Trustfulness
  - Believability
  - Trustworthiness
  - Objectivity
  - Reliability

**Heuristics Level**
- Utilizes general rules of thumb to measure the construct(s) defined in the Construct Level.
  - Media-related heuristics
  - Source-related heuristics
  - Endorsement-based heuristics
  - Aesthetics-based heuristics

**Interaction Level**
- Examines specific attributes of information objects and sources for credibility judgments.

**MAIN Model**

**Affordance**
- A particular capability possessed by the medium that facilitates a certain action. Types of affordances include:
  - Modality
  - Agency
  - Interactivity
  - Navigability

**Heuristics**
- Judgment rules that result in estimation of content quality. Heuristics are triggered by certain cues in the affordances.

**Credibility Judgment**
- Users’ perceptions of the credibility of the information based on some of the considerations for content quality:
  - Trustworthiness
  - Reliability
  - etc.

**Dual Model**

**Exposure Phase**
- A person decides to what extent he or she critically evaluate Web credibility based on:
  - Motivation
  - Ability

**Evaluation Phase**
- Heuristic/peripheral evaluation relies on the surface characteristics.
- Systematic/central evaluation takes more rigorous and systematic strategies to credibility assessment.

**Judgment Phase**
- The final judgment of Web credibility

### 4.1.3.1 Initial evaluation stage
Based on the qualitative meta-analysis of the processes of Web credibility assessment identified in the existing frameworks (Table 4.3), the researcher came up with a two-stage model of Web credibility assessment process, which consists of (1)
initial and (2) final evaluation stages. As this model is based on the literature analysis, which is still in the conceptual level, it needs to be tested with empirical data in future research.

In the initial evaluation stage, the researcher hypothesizes that people begin their Web credibility assessment process with identifying the initial lists of websites that might convey credible information for their information needs. This process may be influenced by the types of tasks, topics of information, levels of user involvement, and individual presumptions and firsthand experiences. People may go directly to the trusted websites that they already know or use, such as Google and Yahoo! When they use a search engine, they would examine the search results to narrow down the number of candidate websites by using credibility markers/cues and heuristics such as checking the URL of the site and reading the short description of the site. They would make a decision of the website on which they would spend time and effort in the following stage, final evaluation stage.

When using the analogy of Information Foraging Theory by Pirolli and Card (1999), what people do in the initial evaluation stage may be understood as following “Credibility Scents,” which are imperfect representations of the information quality based on proximal cues, such as source credentials, hyperlinks in a Website, etc. In other words, credibility markers/cues may exude either a positive, negative, or even neutral ‘scent’ in sense-making around the quality of the information to the given information-seeking task.

**4.1.3.2 Final evaluation stage.** In the final evaluation stage, the researcher hypothesizes that people select the ‘most credible’ and the relevance (value) information to the given information-seeking task. People would examine the content of the chosen websites in the previous stage (i.e., initial evaluation) to make the final decision of whether or not they would use the information from the site for their information needs. Also, in the process of navigating
the website in this stage, they would receive impressions about design and functionality of the site, which could influence their perception of the site’s credibility. In this stage, they would go through the iterative process of credibility assessment of the candidate websites, which were identified in the initial stage. The final evaluation stage may be influenced by individual factors such as familiarity and knowledge about the given topic (e.g., specific diseases and symptoms), IT proficiency, and time.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial evaluation</td>
<td>The stage in which people identify initial lists of the most relevant online resources that can fulfill their information needs.</td>
</tr>
<tr>
<td>Final evaluation</td>
<td>The stage in which people go through the iterative process of assessing the credibility of the candidate websites identified in the initial evaluation stage.</td>
</tr>
</tbody>
</table>

### 4.2 Findings from Phase II: Semi-Structured Interviews

The purpose of the semi-structured interview study (Phase II) was to explore older adults’ credibility assessment of online health information within the context of ELIS. In particular, this study aimed at exploring how older adults define information credibility and how they assess it especially in the Web context. Another important goal of Phase II was to test the new framework of Web credibility assessment (i.e., the WC framework) developed in Phase I and identify any refinement suggestions. The average interview time was about 30 minutes; interview times ranged from about 8 minutes to 51 minutes.

The following subsections report findings based on the WC framework and the ELIS model proposed by Savolainen (1995). In particular, the coding scheme (Appendix G) guided this process, identifying (1) individual and contextual variables that may influence the overall process of Web credibility assessment (i.e., Variability of WC); (2) older adults’ information
needs and related information behaviors in their everyday lives (i.e., ELIS); (3) older adults’
credibility assessment of online health information, in terms of the utilization of credibility
markers/cues and heuristics (i.e., Assessment of WC) and the process of identifying credible
sources to fulfill their health information needs (i.e., Process of WC); and (4) any emerging
themes that are useful to refine the WC framework.

4.2.1 Profiles of Research Participants

A total of twenty-one older adults ($n = 21$) participated in the semi-structured interview
study (Phase II). Table 4.5 provides an overview of the research participants’ profiles in terms of
age, gender, ethnicity, education level, occupational background, and the Internet usage and
experience. In particular, the profiles of the research participants are organized based on the two
sub-groups of older adults suggested by Neugarten (1974)—the ‘young-old’ (55 to 74 years old)
and the ‘old-old’ (75+ years old). The age subdivision may be a useful framework to look into
the qualitative interview data from older adults who are known as a more heterogeneous age
group, than its younger counterparts, due to age-related declines in perception, cognition, and
movement control (Fisk et al., 2009). Overall, 71.4% (15 out of 21) of the research participants
were young-olds and 28.6% (6 out of 21) were old-olds (75+). The following sections will
provide more detailed descriptions of the research participants’ profiles.

4.2.1.1 Demographic characteristics. 76.2% (16 out 21) of the interview participants
were females and 23.8% (5 out of 21) were males. Looking into the gender distribution by the
age groups, 57.1% (12 out of 21) were female young-olds and 19% (4 out 21) were female old-
olds; as for male participants, 14.3% (3 out of 21) were male young-olds and 9.5% (2 out of 21)
were male old-olds. The majority of the interview participants (90.5%; 19 out 21) were White
Caucasians; 9.5% (2 out of 21) were Black/African Americans (Table 4.5).
Table 4.5 Profiles of Research Participants by Age Group

| Variables                     | Total  | Age group | | | |
|-------------------------------|--------|-----------|---|---|
|                               | n (%)  | Young-old | Old-old |
|                               |        | (n = 15)  | (n = 6) |
| Gender                        |        |           |         |
| Female                        | 16 (76.2) | 12 (57.1) | 4 (19.1) |
| Male                          | 5 (23.8)  | 3 (14.3)  | 2 (9.5)  |
| Ethnicity                     |        |           |         |
| Black/African American        | 2 (9.5)  | 2 (9.5)   | 0 (0.0)  |
| White Caucasian               | 19 (90.5) | 13 (61.9) | 6 (28.6) |
| Education                     |        |           |         |
| High school graduate/GED      | 1 (4.8)  | 0 (0.0)   | 1 (4.8)  |
| Some college/Associate’s degree | 5 (23.8) | 3 (14.3)  | 2 (9.5)  |
| Bachelor’s degree             | 5 (23.8) | 4 (19.0)  | 1 (4.8)  |
| Master’s degree               | 4 (19.0) | 4 (19.0)  | 1 (4.8)  |
| Doctoral degree               | 6 (28.6) | 5 (23.8)  | 1 (4.8)  |
| Occupational experience       |        |           |         |
| Education/research-related fields | 5 (23.8) | 4 (19.0)  | 1 (4.8)  |
| Freelancer (e.g., artist, writer) | 2 (9.5)  | 2 (9.5)   | 0 (0.0)  |
| Government employees          | 4 (19.0) | 4 (19.0)  | 0 (0.0)  |
| Health/medical profession     | 2 (9.5)  | 0 (0.0)   | 2 (9.5)  |
| Legal profession              | 4 (19.0) | 2 (9.5)   | 2 (9.5)  |
| Not specified                 | 4 (19.0) | 3 (14.3)  | 1 (4.8)  |
| Internet use                  |        |           |         |
| Between 1 hour and 5 hours a week | 3 (14.3) | 0 (0.0)   | 3 (14.3) |
| Between 6 hours and 10 hours a week | 3 (14.3) | 2 (9.5)   | 1 (4.8)  |
| Between 11 hour and 15 hours a week | 3 (14.3) | 2 (9.5)   | 1 (4.8)  |
| Between 16 hour and 20 hours a week | 5 (23.8) | 4 (19.0)  | 1 (4.8)  |
| More than 20 hours a week     | 7 (33.3) | 7 (33.3)  | 0 (0.0)  |
| Internet experience           |        |           |         |
| More than 5 years             | 21 (100.0) | 15 (71.4) | 6 (28.6) |

The mean age of the twenty-one research participants was 70.3 years old ($M = 70.3$; median = 70.0; $SD = 5.6$) within the range from 61 to 80 years old (range = 19). The ages of the young-old group ranged from 61 to 72 years old (range = 11) with the mean of 67.4 years old ($M = 67.4$; median = 67.0; $SD = 3.0$). The ages of the old-olds ranged from 75 to 80 years old (range
with the mean of 77.7 years old \((M = 77.7; \text{median} = 77.5; SD = 1.8)\). Table 4.6 provides a summary of the interviewees’ genders and ages.

<table>
<thead>
<tr>
<th>Variable</th>
<th>n (%)</th>
<th>Age (year-old)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>Median</td>
<td>SD</td>
<td>Range</td>
<td></td>
</tr>
<tr>
<td>Young-old</td>
<td>15 (71.4)</td>
<td>67.4</td>
<td>67.0</td>
<td>3.5</td>
<td>11 (61–72)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>12 (57.1)</td>
<td>67.0</td>
<td>67.0</td>
<td>3.6</td>
<td>11 (61–72)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>3 (14.3)</td>
<td>69.0</td>
<td>70.0</td>
<td>2.6</td>
<td>5 (66–71)</td>
<td></td>
</tr>
<tr>
<td>Old-old</td>
<td>6 (28.6)</td>
<td>77.7</td>
<td>77.5</td>
<td>1.8</td>
<td>5 (75–80)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>4 (19.1)</td>
<td>78.3</td>
<td>79.0</td>
<td>1.5</td>
<td>3 (77–80)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2 (9.5)</td>
<td>76.5</td>
<td>76.5</td>
<td>2.1</td>
<td>3 (75–78)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>21 (100.0)</td>
<td>70.3</td>
<td>70.0</td>
<td>5.6</td>
<td>19 (61–80)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>16 (76.2)</td>
<td>69.8</td>
<td>69.0</td>
<td>5.9</td>
<td>19 (61–80)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>5 (23.8)</td>
<td>72.0</td>
<td>71.0</td>
<td>4.6</td>
<td>12 (66–78)</td>
<td></td>
</tr>
</tbody>
</table>

4.2.1.2 Health condition. Most of the research participants (17 out of 21; 81.0%) mentioned that they had chronic illnesses, such as arthritis and blood pressure, and/or more serious diseases, such as different types of cancers (e.g., breast cancer, bladder cancer, lung cancer) and stroke. In particular, all the participants who were grouped in the old-old (75+) mentioned at least one or more chronic illness and/or serious diseases experiences (6 out of 6; 100%), while about 73.3% (11 out of 15) in the young-old group did (Table 4.7). Due to their experiences with these illnesses and diseases, older adults seemed to have accumulated a significant amount of related knowledge and kept monitoring their health conditions and the medication information to deal with their health conditions. Those who had not had particular illnesses and diseases were still interested in common geriatric illnesses (e.g., dementia) and wellness information (e.g., healthy diet, nutrition, exercise). A more detailed discussion on their health information behavior including Web credibility assessment in relation to their health conditions will be provided in Chapter 5.
<table>
<thead>
<tr>
<th>ID</th>
<th>Age</th>
<th>Age group</th>
<th>Gender</th>
<th>Ethnicity</th>
<th>Chronic illnesses/diseases mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>P20</td>
<td>61</td>
<td>Young</td>
<td>F</td>
<td>Black</td>
<td>High blood pressure</td>
</tr>
<tr>
<td>P21</td>
<td>63</td>
<td>Young</td>
<td>F</td>
<td>Black</td>
<td>Skin disease</td>
</tr>
<tr>
<td>P01</td>
<td>64</td>
<td>Young</td>
<td>F</td>
<td>White</td>
<td>Chronic kidney disease</td>
</tr>
<tr>
<td>P17</td>
<td>65</td>
<td>Young</td>
<td>F</td>
<td>White</td>
<td>Breast cancer survivor; arthritis</td>
</tr>
<tr>
<td>P18</td>
<td>65</td>
<td>Young</td>
<td>F</td>
<td>White</td>
<td>Chronic ailments</td>
</tr>
<tr>
<td>P04</td>
<td>66</td>
<td>Young</td>
<td>F</td>
<td>White</td>
<td>-</td>
</tr>
<tr>
<td>P12</td>
<td>66</td>
<td>Young</td>
<td>M</td>
<td>White</td>
<td>Replacements (artificial parts)</td>
</tr>
<tr>
<td>P11</td>
<td>67</td>
<td>Young</td>
<td>F</td>
<td>White</td>
<td>Foot operation</td>
</tr>
<tr>
<td>P08</td>
<td>69</td>
<td>Young</td>
<td>F</td>
<td>White</td>
<td>High blood pressure</td>
</tr>
<tr>
<td>P10</td>
<td>69</td>
<td>Young</td>
<td>F</td>
<td>White</td>
<td>Skin cancer</td>
</tr>
<tr>
<td>P09</td>
<td>70</td>
<td>Young</td>
<td>M</td>
<td>White</td>
<td>-</td>
</tr>
<tr>
<td>P03</td>
<td>71</td>
<td>Young</td>
<td>M</td>
<td>White</td>
<td>-</td>
</tr>
<tr>
<td>P14</td>
<td>71</td>
<td>Young</td>
<td>F</td>
<td>White</td>
<td>Arthritis; lower back problem</td>
</tr>
<tr>
<td>P05</td>
<td>72</td>
<td>Young</td>
<td>F</td>
<td>White</td>
<td>Breast cancer survivor</td>
</tr>
<tr>
<td>P07</td>
<td>72</td>
<td>Young</td>
<td>F</td>
<td>White</td>
<td>Low blood pressure</td>
</tr>
<tr>
<td>P06</td>
<td>75</td>
<td>Old</td>
<td>M</td>
<td>White</td>
<td>Lung-related disease</td>
</tr>
<tr>
<td>P02</td>
<td>77</td>
<td>Old</td>
<td>F</td>
<td>White</td>
<td>Lung cancer survivor; stroke (TIA)</td>
</tr>
<tr>
<td>P19</td>
<td>77</td>
<td>Old</td>
<td>F</td>
<td>White</td>
<td>Arthritis</td>
</tr>
<tr>
<td>P16</td>
<td>78</td>
<td>Old</td>
<td>M</td>
<td>White</td>
<td>Bladder cancer survivor; knee replacement</td>
</tr>
<tr>
<td>P15</td>
<td>79</td>
<td>Old</td>
<td>F</td>
<td>White</td>
<td>Lyme disease; arthritis; spinal problem</td>
</tr>
<tr>
<td>P13</td>
<td>80</td>
<td>Old</td>
<td>F</td>
<td>White</td>
<td>-</td>
</tr>
</tbody>
</table>

4.2.1.3 Cultural capital. Based on Savolainen’s (1995) ELIS model, cultural capital is “cognitive resources acquired through education and life experience” (p. 269). Thus, cultural capital may be accumulated through formal school education as well as extra training opportunities, including self-study. Savolainen (1995) considers cultural (or cognitive) capital an important factor that influences one’s ELIS.

As shown in Table 4.5 above, the research participants’ education level was overall very high: 28.6% (6 out of 21) had a doctoral degree; 19% (4 out of 21) had a Master’s degree; 23.8% (5 out of 21) had a Bachelor’s degree; indicating that 71.4% (15 out of 21) were college educated. The rest also took some college courses, but did not complete (23.8%; 5 out of 21); and only one participant in the study sample (4.8%) did not experience any higher education (i.e., high school
graduate). Besides the formal education, there were several participants who gained additional education experiences or trainings. These included the Red Cross training in first aid, cardiopulmonary resuscitation (CPR), and fever therapy; IT-related training by IBM; courses in health informatics; the standardized patient program in the College of Medicine at Florida State University (Table 4.8).

Their occupational experiences were closely related to their educational backgrounds. Most of them worked in professions that required cognitive ability and/or professional training, such as a university professor, attorney, and nurse. Specifically, 23.8% (5 out of 21) of the research participants were in the teaching and researching field such as a university professor and researcher in the higher educational institutions. 19% (4 out of 21) worked as legal professionals such as an attorney and legal assistant. 9.5% (2 out of 21) worked in the health/medical field as a nurse and a pathologist. There were four people (19%) who worked as federal or state government employees; the other four (19%) did not specify the types of professions they had. Table 4.8 provides the summary of the research participants’ educational and occupational experiences.

<table>
<thead>
<tr>
<th>ID</th>
<th>Age</th>
<th>Gender</th>
<th>Highest degree</th>
<th>Extra training/experience</th>
<th>Occupational experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>P06</td>
<td>75</td>
<td>M</td>
<td>High school</td>
<td>-</td>
<td>Not specified</td>
</tr>
<tr>
<td>P05</td>
<td>72</td>
<td>F</td>
<td>Some college</td>
<td>-</td>
<td>Not specified</td>
</tr>
<tr>
<td>P14</td>
<td>71</td>
<td>F</td>
<td>Some college</td>
<td>-</td>
<td>Government employee</td>
</tr>
<tr>
<td>P15</td>
<td>79</td>
<td>F</td>
<td>Some college</td>
<td>-</td>
<td>Researcher</td>
</tr>
<tr>
<td>P19</td>
<td>77</td>
<td>F</td>
<td>Some college</td>
<td>Senior center classes</td>
<td>Legal assistant</td>
</tr>
<tr>
<td>P21</td>
<td>63</td>
<td>F</td>
<td>Some college</td>
<td>-</td>
<td>Not specified</td>
</tr>
<tr>
<td>P01</td>
<td>64</td>
<td>F</td>
<td>Bachelor</td>
<td>-</td>
<td>Writer</td>
</tr>
<tr>
<td>P04</td>
<td>66</td>
<td>F</td>
<td>Bachelor</td>
<td>Standardized patient</td>
<td>Court reporter</td>
</tr>
<tr>
<td>P10</td>
<td>69</td>
<td>F</td>
<td>Bachelor</td>
<td>Standardized patient</td>
<td>Government employee</td>
</tr>
<tr>
<td>P13</td>
<td>80</td>
<td>F</td>
<td>Bachelor</td>
<td>Online course on Spanish</td>
<td>Nurse</td>
</tr>
<tr>
<td>P17</td>
<td>65</td>
<td>F</td>
<td>Bachelor</td>
<td>IT training by the IBM</td>
<td>Government employee</td>
</tr>
</tbody>
</table>
4.2.1.4 Social capital. Savolainen (1995) defines social capital as “the nature of contact networks” (p. 269). He considers social capital one of the factors that shape one’s “way of life” and “mastery of life” as it may play a role as an important source for ELIS. In the current study, the most significant type of social contact network (i.e., social capital) mentioned was partner (61.9%; 13 out of 21). Those who were either in a marital relationship or a romantic relationship mentioned that they share (provide and/or receive) necessary information for various topics with their partners in their everyday lives. In the study sample, there were three couples who participated in the study together. One common characteristic of these couples’ information behavior was that in each couple, one person played a role of the primary information ‘provider’ (i.e., source) for the other; and the other tended to rely on the ‘provider’s information as a ‘receiver.’ The ‘receivers’ in each couple often mentioned in the interviews that their partners (i.e., providers) were the most credible sources for their ELIS.

There were seven other participants who were in couple relationships, but whose partners did not participate in the current study. These people mentioned that they were all information ‘providers’ (as opposed to receivers) for their partners in their daily lives. Even though it is
premature to make a generalizable argument considering the small sample size, gender, seniority, and the relative education level in a partner relationship did not seem to be decisive factors in assigning a role, either a provider or a receiver, in older adult couples’ ELIS. Rather, assigning a role in the couple’s ELIS context seemed to be more influenced by a person’s orientation towards a problem solving situation—based on the ELIS model by Savolainen (1995), it can be understood with the concept, “Mastery of Life.” Table 4.9 below shows each participant’s general orientation in practical information seeking, and these findings will be interpreted in Chapter 5.

Another type of social relationship mentioned by the participants was friend: 66.7% (14 out of 21) answered that they were keeping touch with their friends. When they needed information about health and wellness, for instance, they consulted friends who were in the same (or similar) situation with them (e.g., had the same symptoms with theirs) or who worked as medical professionals (e.g., doctor and nurse).

Lastly, there was a participant who was actively involved in a local chapter of the National Parkinson Foundation. She was sharing information with the community members who had family members suffering from the disease.

Table 4.9 Research Participants’ Social Contact Networks

<table>
<thead>
<tr>
<th>ID</th>
<th>Age</th>
<th>Gender</th>
<th>Ethnicity</th>
<th>Nature of social contact network</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>64</td>
<td>F</td>
<td>White</td>
<td>Partner; mother</td>
</tr>
<tr>
<td>P02</td>
<td>77</td>
<td>F</td>
<td>White</td>
<td>Friends (sharing common interests)</td>
</tr>
<tr>
<td>P03</td>
<td>71</td>
<td>M</td>
<td>White</td>
<td>Partner; children &amp; grandchildren</td>
</tr>
<tr>
<td>P04</td>
<td>66</td>
<td>F</td>
<td>White</td>
<td>Friends (worked in the medical field); children;</td>
</tr>
<tr>
<td>P05</td>
<td>72</td>
<td>F</td>
<td>White</td>
<td>Partner; friends; children</td>
</tr>
<tr>
<td>P06</td>
<td>75</td>
<td>M</td>
<td>White</td>
<td>Partner; friends</td>
</tr>
<tr>
<td>P07</td>
<td>72</td>
<td>F</td>
<td>White</td>
<td>Partner (worked in the medical field); grandchildren</td>
</tr>
<tr>
<td>P08</td>
<td>69</td>
<td>F</td>
<td>White</td>
<td>Partner; sister; relatives; other</td>
</tr>
<tr>
<td>P09</td>
<td>70</td>
<td>M</td>
<td>White</td>
<td>Partner; nephews (working in the medical field)</td>
</tr>
<tr>
<td>P10</td>
<td>69</td>
<td>F</td>
<td>White</td>
<td>Family; friends</td>
</tr>
</tbody>
</table>
4.2.1.5 Internet usage and experience. As this study is particularly interested in older adults’ credibility assessments in the Web context, which involves computer-related skills, the research participants’ Internet usage and experience were considered important factors that may influence their perceptions of Web credibility and assessment behaviors. About 33.3% (7 out of 21) of the research participants answered that they used more than 20 hours in a given week, and 23.8% (5 out of 21) used the Internet between 16 and 20 hours a week. In other words, about 57.1% (12 out of 21) of the interviewees were online at least 16 hours a week, meaning that more than a half of the research participants spend at least more than two hours and a half using the Internet everyday. Only 13.3% (3 out of 21) answered that they used the Internet between 1 and 5 hours a week (Table 4.5).

Overall, the research participants’ Internet usage ranged from 3 to 7 with the mean of 5.5 ($M = 5.5; \text{ median} = 6.0; \text{ SD} = 1.47$), where 1 indicated “never;” 2 indicated “less than one hour a week;” 3 indicated “between 1 hour and 5 hours a week;” 4 indicated “between 6 hours and 10 hours a week;” 5 indicated “between 11 hours and 15 hours;” 6 indicated “16 hours and 20 hours a week;” and 7 indicated “more than 20 hours a week” (Table 4.10). When looking into the
Internet use by the sub-age groups, the old-old group seemed to spend relatively less time than
the young-old group did. More specifically, the mean of the young-old group’s Internet use was
6.1 hours a week ($M = 6.1; \text{median} = 6.0; \text{SD} = 1.10$), while the old-old group used 4.0 hours a
week ($M = 4.0; \text{median} = 3.5; \text{SD} = 3.5$). In particular, those who answered that they were using
the Internet more than 20 hours a week ($n = 7$) were all from the young-old group; and those who
answered that they were using the Internet less than 5 hour a week ($n = 3$) were all from the old-old
group. In terms of experience with the Internet—the period of time that a person has been
using the Internet—all of them (100%; 21 out of 21) had more than five years of experience with
the Internet (Table 4.10).

<table>
<thead>
<tr>
<th>Age group</th>
<th>$n$ (%)</th>
<th>Internet usage (per week)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$M$</td>
</tr>
<tr>
<td>Young-old</td>
<td>15 (71.4)</td>
<td>6.1</td>
</tr>
<tr>
<td>Old-old</td>
<td>6 (28.6)</td>
<td>4.0</td>
</tr>
<tr>
<td>Total</td>
<td>21 (100.0)</td>
<td>5.5</td>
</tr>
</tbody>
</table>

### 4.2.2 Way of Life and Mastery of Life

Based on the ELIS model by Savolainen (1995), people’s information behavior is closely
related to how one’s daily life is organized, which can be reflected by the relationships between
work and leisure, models of consumption, and the nature of hobbies—i.e., “way of life.” In
addition, one’s information behavior can be characterized by his or her orientation toward
problem-solving situations—i.e., “mastery of life.” The subsequent sections therefore describe
the research participants’ “way of life” (Table 4.11) and “mastery of life” (Table 4.12) by
analyzing the comments they made in interviews regarding how they gathered health-related
information in the everyday life context.
However, the exercise of categorizing the types of the informant’s “way of life” and “mastery of life” was not intended to examine inferential statistics yielding generalizable findings, due to the small sample size of the study \((n = 21)\) and a lack of validated instruments. Rather, considering the qualitative nature of the research data, the main intent of this examination was to explore the informants’ information behaviors regarding how they find and use credible sources in their daily lives. The two concepts in the ELIS, “way of life” and “mastery of life,” therefore provided the researcher with useful theoretical lenses for looking into the characteristics in the informants’ (i.e., older adults’) ELIS in terms of both passive and active information-seeking in their everyday lives.

### 4.2.2.1 Way of life.
Savolainen (1995) mentioned that “the analysis of hobbies sheds light on the substance of way of life because the nature of hobbies informs us of the things which people find most pleasant; the analysis also reveals the role of informational interests, for instance, newspaper reading in leisure time” (p. 263). Thus, information about the nature of hobbies can be useful for understanding people’s information needs and the ways in which they acquire information in their daily lives. Savolainen (1995) suggested two types of hobbies, cognitive and affective types. (1) **Cognitive types** of hobbies include reading newspapers and books on topics such as politics, science, and culture. (2) **Affective types** of hobbies include watching television (TV), movies, and entertainment programs and listening to rock music. Using this typology, the researcher coded the types of hobbies mentioned in the interviews. In addition, many participants mentioned that they often spent time engaging in social networking with their social contact networks both in the interpersonal and online contexts. Social networking activities, such as meeting with friends and using SNSs (e.g., Facebook and LinkedIn), were coded as (3) **social types** of hobbies (Table 4.11).
Overall, about 66.7% (14 out of 21) of the research participants mentioned the cognitive types of hobbies, such as reading newspapers and/or online news, reading books, and watching cultural and educational presentations (TED Talks); 85.7% (18 out of 21) mentioned the affective types of hobbies, such as playing games, watching movies and TV shows, and listening to music; and 95.2% (20 out of 21) mentioned the social types of hobbies, such as email, in-person social networking, and SNSs. However, considering that some informants were more willing to share information about their daily lives, including their hobbies, it should be noted that the main intent of this data analysis was to explore the exhaustive lists of older adults’ hobbies in their everyday lives, rather than categorizing each informant’s hobbies by type.

<table>
<thead>
<tr>
<th>Type</th>
<th>N (%)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td>14 (66.7%)</td>
<td>• Reading newspapers/online news articles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reading books on cultural and scientific topics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Watching cultural and educational presentations (e.g., TED Talks)</td>
</tr>
<tr>
<td>Affective</td>
<td>18 (85.7%)</td>
<td>• Playing games</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Watching movies and TV shows</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Listening to music</td>
</tr>
<tr>
<td>Social</td>
<td>20 (95.2%)</td>
<td>• Email</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SNSs (e.g., Facebook, Twitter, LinkedIn)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• In-person social</td>
</tr>
</tbody>
</table>

### 4.2.2.2 Mastery of life.
Savolainen (1995) identifies two dimensions that describe people’s problem-solving behaviors: cognitive versus affective, and optimistic versus pessimistic. The first dimension, *cognitive vs. affective*, characterizes whether an individual’s approach to a problem-solving situation that occurred in his or her everyday life is systematic and analytic (i.e., cognitive) or emotional and unpredictable (i.e., affective). The second
dimension, optimistic vs. pessimistic, categorizes whether an individual believes that he or she can solve most of the problems they face in their everyday lives (i.e., optimistic) or acknowledges the possibilities that some problems might not be solved (i.e., pessimistic). These two dimensions are combined into four types of “mastery of life:” (1) optimistic-cognitive; (2) pessimistic-cognitive; (3) defensive (optimistic)-affective; and (4) pessimistic-affective (Savolainen, 1995, pp. 265-266).

Even though the four ideal types of “mastery of life” were used in the current study as a useful framework in analyzing the interview data to have a better understanding of the informants’ tendencies in ELIS, it was neither the main focus of the study to examine the informants’ coping strategies, nor possible to accurately measure one’s propensity without using a validated instrument. However, throughout the interviews, the informants naturally implied how they usually dealt with problems that occurred in their everyday lives in the past, in terms of whether they were cognitively versus affectively oriented and optimistic versus pessimistic towards the problem-solving situations. In particular, some comments made in the interviews revealed whether they had a high or relatively lower level of self-confidence in information seeking to fulfill their information needs in everyday life contexts. The subsequent sections provide the definitions of the four types of “mastery of life” based on Savolainen (1995) and explain how each informant in the current study was categorized into one of the four types of “mastery of life.”

4.2.2.2.1 Optimistic-cognitive. Individuals who are optimistic-cognitive (O-C) toward a problem-solving situation are “characterized by a strong reliance on positive outcomes for problem solving” (Savolainen, 1995, p. 265). This type of person tends to have a strong belief that he or she can solve the problem by consulting different sources and channels; thus, this type
of person would have a good possibility of selecting the most appropriate information to solve
the given problem.

When categorizing the research participants in the current study in terms of “mastery of
life,” if someone said that he or she always attempted to make sense of new (unfamiliar) health
information by searching online by themselves, the person was considered cognitive, in that the
person was approaching the given situation by researching, seeking for useful information to
understand the unfamiliar topic. Furthermore, if the person used various sources to verify certain
health information and explicitly said that he or she had expertise in the medical fields (based on
their occupational background or accumulated knowledge in the area), the person was considered
optimistic about the solvability of the problem. The following are some of the comments from
those who were categorized as O-C:

“If I’m taking a medication, say, I’m taking one medication and I want to take an over-the-
counter medication, too. Then I’ll check and see what the interaction is. If my doctor has given
me a diagnosis and I don’t understand it, I’ll come home and research it. She may have used some
terminology, which I didn’t understand, or she may have said something like, ‘Well, you have
tendonitis in your left arm and maybe it’ll heal up in six months, but then sometimes it takes
longer,’ I might come home and look up bicep tendinitis and read about it and then I would make
a decision as to whether I wanted to go back and see her again about something or ask for a
reference to a physical therapist, so yes I’ll act on the information that I get.” (P09, Male, 70)

“I sometimes will double check doctor’s diagnoses … a couple of months ago, a dermatologist, I
had a rash, and he told me that it was Eczema, and I just didn’t think it was because I’ve done
research on Eczema before. So, I got online and did a lot of research. I realized that was not
Eczema at all. And then, I did alone experimenting on my own and I realized it was an allergy to
a laundry detergent that I had started using.” (P10, Female, 69)
“I think my professional background makes it easier for me to decide … again, I generally, for example, I have a problem with [my health condition] … I have had a chance to see a doctor about that, but I wanted to find out what does it mean, and what is that about. So, I went to probably four or five different websites among those I mentioned.” (P14, Female, 71)

4.2.2.2.2 Pessimistic-cognitive. Individuals who are categorized as pessimistic-cognitive (P-C) are characterized as relatively less confident in problem solving than those who are optimistic-cognitive even though they also take the cognitive and systematic approaches to information seeking (Savolainen, 1995). People in this category acknowledge the situation where the given problem may not be solved.

The researcher categorized the research participants into the P-C type of “mastery of life” when they mentioned that they sought for necessary information by themselves using multiple sources, but relied more on others’ (e.g., doctor’s or partner’s) suggestions for the final decisions of which information they would use to solve the given problem. Below are some excerpts from the interviews data that were used as evidence for the P-C type of “mastery of life:”

“Because of reading about that [newer drugs] in a Mayo clinic health letter, then I looked it up and learned about it, which leads to questioning him. So, very practical usage of that … I’ve looked up stuff online about that. I generally would look up health something information when it concerns me or somebody I care about … I don’t feel like I have the credibility myself to solve between reliable and unreliable information, I mean some stuff, yes you can.” (P02, Female, 77)

“If I’m in pain and it tells how to relieve that, I’m going to do that right away. Something on new medications for blood pressure, I’m not going to change my medication usually it’s, you just don’t do that with blood pressure medications. I might mention it to my doctor or if I’ve looked up the side effects of the drugs that I’m taking, I might mention those to my doctor to see if he wants to change the medication.” (P08, Female, 69)
4.2.2.2.3 Defensive-affective. Individuals who are defensive-affective (D-A) in a problem-solving situation are oriented towards the optimistic perspective on the solvability of the problem; yet, their coping strategies are mainly based on affective (emotional), as opposed to cognitive (systematic), factors. One distinctive characteristic of this type of person is that he or she may either avoid the given situation when it is perceived as too challenging to solve by themselves, or treat the situation lightly having ‘optimistic’ wish, rather than being based on realistic considerations (Savolainen, 1995).

In the interviews, those who selected or deselected certain information based on feelings or simple inspection were considered affective, rather than cognitive. Also, individuals who rely heavily on their partners or other people in seeking necessary information, unwilling to search information by themselves were considered pessimistic, rather than optimistic. Based on these coding rules, there were two participants who were D-A “mastery of life.” Below are excerpts of their comments made in the interviews that were used to group them in the D-A type:

“I don’t know. I use it, Drugs.com. It has all medications and supplements there. It tells me if there’s any interaction. And, I believe that. Don’t ask me why … For some reason, I believe what they tell me. I guess it’s because I have all my drugs in there, and it will tell me “don’t take this” because you’re taking this and they interact one another.” (P05, Female, 72)

“I don’t know, I don’t necessarily know if it [WebMD] is credible or not. But, it gives me the information that I need and it’s easy to read. You know, I’m not a doctor, if I put something and say having problem breathing, it will give me whole list. And I think it starts with the things and goes down … Sometimes, it makes me feel better when I know I’m not dying. And sometimes it makes, you can tell what you should do.” (P11, Female, 67)

4.2.2.2.4 Pessimistic-affective. Lastly, pessimistic-affective (P-A) is also characterized by the affective nature of information-seeking behavior. However, individuals who are pessimistic-
affective are different from those who are defensive-affective, in that they do not appreciate the usefulness of systematic information seeking—the author used the expression of “learned helplessness” (Savolainen, 1995, p. 266).

In the interviews, those who selected or deselected certain information based on feelings or simple inspection were considered affective, rather than cognitive. Also, individuals who rely heavily on their partners or other people in seeking necessary information, unwilling to search information by themselves were considered pessimistic, rather than optimistic. In the current study, there was only one informant (1 out of 21; 4.8%) who was categorized as P-A “mastery of life:”

“There’s too much information, and everybody has got their whatever they’re promoting. Everybody has got promotion. Who knows whether you’re getting truth or not? It may be 3/4 truth? … I go to see a doctor and take what the doctor tells me. I live like that … and, I ask my girlfriend, she looks a lot.” (P06, Male, 75)

Overall, about a half of the research participants (11 out of 21; 52.4%) were grouped in the O-C type; 33.3% (7 out of 21) were in the P-C type; 9.5% (2 out of 21) were in the D-A type; and there was one participant (4.8%) who was characterized as the P-A type. Table 4.12 summarizes the informants’ “mastery of life,” along with their age, gender, educational background, and Internet usage.

<table>
<thead>
<tr>
<th>ID</th>
<th>Age</th>
<th>Gender</th>
<th>Education</th>
<th>Internet use</th>
<th>Mastery of Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>64</td>
<td>F</td>
<td>Bachelor</td>
<td>20+ hours</td>
<td>O-C</td>
</tr>
<tr>
<td>P03</td>
<td>71</td>
<td>M</td>
<td>Doctorate</td>
<td>16-20 hours</td>
<td>O-C</td>
</tr>
<tr>
<td>P09</td>
<td>70</td>
<td>M</td>
<td>Doctorate</td>
<td>20+ hours</td>
<td>O-C</td>
</tr>
<tr>
<td>P10</td>
<td>69</td>
<td>F</td>
<td>Bachelor</td>
<td>16-20 hours</td>
<td>O-C</td>
</tr>
<tr>
<td>P12</td>
<td>66</td>
<td>M</td>
<td>Doctorate</td>
<td>6-10 hours</td>
<td>O-C</td>
</tr>
<tr>
<td>P13</td>
<td>80</td>
<td>F</td>
<td>Bachelor</td>
<td>11-15 hours</td>
<td>O-C</td>
</tr>
</tbody>
</table>
Table 4.12 – Continued

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P14</td>
<td>71</td>
<td>F</td>
<td>Some College</td>
<td>16-20 hours</td>
<td>O-C</td>
</tr>
<tr>
<td>P15</td>
<td>79</td>
<td>F</td>
<td>Some College</td>
<td>16-20 hours</td>
<td>O-C</td>
</tr>
<tr>
<td>P17</td>
<td>65</td>
<td>F</td>
<td>Bachelor</td>
<td>20+ hours</td>
<td>O-C</td>
</tr>
<tr>
<td>P20</td>
<td>61</td>
<td>F</td>
<td>Master</td>
<td>20+ hours</td>
<td>O-C</td>
</tr>
<tr>
<td>P21</td>
<td>63</td>
<td>F</td>
<td>Some College</td>
<td>20+ hours</td>
<td>O-C</td>
</tr>
<tr>
<td>P02</td>
<td>77</td>
<td>F</td>
<td>Master</td>
<td>6-10 hours</td>
<td>P-C</td>
</tr>
<tr>
<td>P04</td>
<td>66</td>
<td>F</td>
<td>Bachelor</td>
<td>16-20 hours</td>
<td>P-C</td>
</tr>
<tr>
<td>P07</td>
<td>72</td>
<td>F</td>
<td>Doctorate</td>
<td>20+ hours</td>
<td>P-C</td>
</tr>
<tr>
<td>P08</td>
<td>69</td>
<td>F</td>
<td>Doctorate</td>
<td>11-15 hours</td>
<td>P-C</td>
</tr>
<tr>
<td>P16</td>
<td>78</td>
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<td>Doctorate</td>
<td>1-5 hours</td>
<td>P-C</td>
</tr>
<tr>
<td>P18</td>
<td>65</td>
<td>F</td>
<td>Master</td>
<td>11-15 hours</td>
<td>P-C</td>
</tr>
<tr>
<td>P19</td>
<td>77</td>
<td>F</td>
<td>Some College</td>
<td>1-5 hours</td>
<td>P-C</td>
</tr>
<tr>
<td>P05</td>
<td>72</td>
<td>F</td>
<td>Some College</td>
<td>20+ hours</td>
<td>D-A</td>
</tr>
<tr>
<td>P11</td>
<td>67</td>
<td>F</td>
<td>Master</td>
<td>6-10 hours</td>
<td>D-A</td>
</tr>
<tr>
<td>P06</td>
<td>75</td>
<td>M</td>
<td>High School</td>
<td>1-5 hours</td>
<td>P-A</td>
</tr>
</tbody>
</table>

4.2.3 Older Adults’ Information Needs in the Everyday Life Context

When asked about information needs in the context of everyday life, the informants mentioned several different topics of information needs, such as health/wellness, travel, finance, leisure activities, and others. Obviously, older adults had great interests in health/wellness topics as they had experienced serious illness and/or were suffering from some of the diseases, including geriatric diseases. Furthermore, since the research participants were all retired from their work (except one person, as mentioned above), their information needs seemed to be closely related to their leisure activities in the settings of everyday life. For instance, many informants mentioned that they travel. The following sections report the topics of information needs frequently mentioned by the research participants in the study (Table 4.13).

4.2.3.1 Health/wellness. The most frequently mentioned orienting information needs were about health/wellness-related topics. All the research participants (21 out of 21; 100%) answered that they were interested in and had sought health/wellness-related topics in their daily lives for various reasons such as feeding general wellness knowledge on a regular basis, solving
general curiosity about health/wellness-related myths or rumors, gaining knowledge about healthy diet and nutrition, and information about exercise. These health/wellness information needs, however, were usually about general knowledge that is useful to know to have a healthy life, but relatively less serious and urgent than those for the practical information seeking that will be discussed in the following section. In seeking these types of information, they seemed to be relatively more open to use their ‘non-expert’ social connections such as family and friends, as well as more traditional sources such as newspapers. For instance, one female participant who was interested in reading a local newspaper as a hobby mentioned that:

“I follow health things that are featured in our local newspaper. There’s generally one day a week where the section devoted to health will include exercise, diet, activities that are healthy.” (P04, Female, 66)

Another female participant who was actively engaged in a social group with friends said that:

“I was losing my hair. It’s an age problem and my fingernails were breaking, so when my friends met in a group, I mentioned something about it and they said, ‘Oh, just go get some biotin. It’s over the counter. It’s like a health supplement thing.’ At first I thought, everybody says take health supplements and I’m not really into that, but I took it and I was amazed. Yeah, it really helped.” (P08, Female, 69)

Within health-related topics, most of them (17 out of 21; 85.7%) were interested in information about medications and supplements regardless of the seriousness of the health-related issues the research participants were suffering from (see Table 4.7, health conditions). More specifically, they mentioned that they had sought information to compare the prices of drugs they were prescribed: to better understand the prescriptions; to know about the appropriate dose for themselves; and to research any side effects and drug interactions. Below are two
examples that demonstrate older adults’ health information needs regarding medications and supplements:

“I’ll look the medication up and see what the side effects are and how you should take the medicine and interactions, anything just so I’ll be really informed about the prescription.” (P18, Female, 65)

“When I change my medications or do anything along that line, I look at it online. Or, if I’m having what I think are strange reactions, I might go online to see if it’s normal, particularly if it’s a medicine, if I’ve never taken it before.” (P19, Female, 77)

“I spent a lot of time doing research on the cancer drugs they want you to take. I quit taking them based on my research. They want you to take these low-level chemo drugs for 5 years after I made my decision to have a lumpectomy. Research showed very little proof that being on those drugs for 5 years made any difference, but the quality of life, it gets to the point where you sometimes … for me, I couldn’t even walk. The pain was so great because it inflames all the fluid in your body. I found all that out online. After a year of trying to make it work, I quit taking it and I’m still cancer-free and it’s been since 2007. I did all the research online.” (P17, Female, 65)

Also, those who had certain diseases or ailments sought information regarding the diseases or ailments (17 out of 21; 81%). If it was a chronic disease or a disease that could not be cured completely, they kept paying attention to their conditions (or the patient’s condition), updating with any new information on the diseases/ailments, such as new medication or operating techniques.

“I have high blood pressure, so I keep up with the latest on that and the latest in blood pressure cuffs and things like that, and medications.” (P08, Female, 69)

“When my husband had a stroke I started doing research on stroke improvement techniques, physical therapy, things we can do at home. I also did research on diabetes when he started going to the diabetes clinic.” (P20, Female, 61)
In some cases, older adults played a role as a caregiver for other people, mostly their family members, looking for necessary information for them (6 out of 21; 28.6%). Moreover, those who had a pet needed information for their pet’s health, as well (3 out of 21; 14.3%).

“As we have grown older and have children and now grandchildren, I’m often interested in their health, pregnancy, and a variety of things related to health.” (P03, Male, 71).

“Recently not much, but my husband had Parkinson and I used the information about that a lot to find out a lot about Parkinson.” (P13, Female, 80)

“I have a sister who is battling cancer, and, if I had done this with my first sister who was battling cancer I would’ve known more and I would’ve been able to help her more during her lifetime, during her illness before she died. I learned a lot about chemo and radiation treatments that they give cancer patients and how they’re supposed to take care of themselves and all this kind of stuff. I did not know all of this stuff with my first sister so I couldn't help. You know, the first sister who had cancer, I couldn’t help her. Then I have got my nephew who has a rare blood disease; the doctor says it’s rare. It’s similar to sickle cell. I learned a lot about that by searching the Internet. I could give him advice.” (P21, Female, 63)

Some of the research participants pursued information to better understand or even to verify doctor’s diagnoses (11 out of 21; 52.4%).

“I’m continually interested in preserving our own health. So, before I take any prescription or after talking with a doctor, I’m very careful to do my own investigations before starting a new medicine.” (P03, Male, 71)

“If my doctor has given me a diagnosis and I don't understand it, I'll come home and research it. She may have used some terminology which I didn't understand or she may have said something like, "Well, you have tendonitis in your left arm and maybe it'll heal up in six months, but then sometimes it takes longer." I might come home and look up bicep tendonitis and read about it and then I would make a decision as to whether I wanted to go back and see her again about
something or ask for a reference to a physical therapist. So, yes, I'll act on the information that I get.” (P09, Male, 70)

“So, whatever medications the doctor gives me and whatever they say is wrong with me, I’ll look that up so I can understand it better. A lot of times I don’t understand what the doctors are saying, so, if I look it up and read it, I can understand it better.” (P21, Female, 63)

Another type of health information need mentioned by the research participants was

*health insurance* (8 out of 21; 38.1%).

“Well, you know, I do go to the ... Of course, I’m Blue Cross Blue Medicare and Blue Cross Blue Shield. We have, so far, had wonderful experiences with our ... Pretty much wonderful. I find that the print outs that you get from Blue Cross Blue Shield and Medicare, you are almost unable to decipher what they're telling you. They say make sure that you’ve been billed properly. Make sure this. You look at it. They’re terrible. I’m looking to see if there’s one around, but ... I mean my husband’s an attorney. He’s accustomed to really looking into things. I’ve done research. I mean you can say yes, you were at the office. Well, it’s just pertinent. They have a lot of nonsense, rather than saying you had this. They use all the codes … you can look up the codes and it’s determined whether that was in fact what you had done, but we’ve been lucky with the Medicare and our supplemental insurance takes care of most everything.” (P15, Female, 79)

“I also used the Internet for different programs to find out the different services that’s available, what could be provided for her at Medicaid. Then when my husband turned 65 I started doing research for Medicare building up, getting more knowledge. The more you know when you’re going to sit with somebody trying to get services, the more you know I found that it’s helpful. It’s better to go in prepared with thorough information about a particular situation.” (P20, Female, 61)

### 4.2.3.2 Travel

*Travel-related information* was mentioned by the research participants as one of the necessary information topics for their everyday lives (13 out of 21; 61.9%). In particular, they used online sources to compare airline fares, hotel rates, and rental car rates. Also,
they sought for general information about the places they were going, such as transportation and
good restaurants. One participant who was taking a mission trip to Central America checked the
websites of the Central Intelligence Agency (CIA), the World Health Organization (WHO) and
the Centers for Disease Control and Prevention (CDC) to have information about endemic
diseases and local contacts in case he had any emergency issues. Below are some of the mentions
regarding travel-related information needs:

“In do a lot of price searching. End of this month, I am going to Las Vegas with some of my
friends. And, so, I was looking for Las Vegas sites for shows to go to that kind of thing.” (P01,
Female, 64)

“I use it for travel, yes, a lot for travel. Maps, GPS, researching places I’m going. Washington DC
has a bunch of things like, it has all the bus schedules, it has train schedules, and it has city works.”
(P07, Female, 72)

“I take students on trips, mission trips. I do research with the State Department, CIA. Maybe
that’s government. When I’m taking students to a Central American country, I do research there
about the country, make sure it’s safe, make sure we know whom to contact in case we have
issues that arise.” (P12, Male, 66)

4.2.3.3 Culture and education. Several research participants in the study (13 out of 21;
61.9%) were also interested in getting information regarding cultural and educational topics such
as history, archeology, architecture, languages, and so on. Some of these people were reading
books and following online news on the topics mentioned. Some of them took online courses or
watched TED Talks as well. They also looked for reviews of books and movies and background
information about authors. Below are some of the statements showing the participants’
information needs on cultural/educational topics:
“I spent a lot of time looking at historical, geographical topics, and read background information about authors of interest to me. I’m also interested in archeology, so I read a lot on archeology.”

(P03, Male, 71)

“Sometimes I want to know, I’m interested in the history of everything. I’ll be reading a book and something will come up.” (P14, Female, 71)

4.2.3.4 Entertaiment. Another type of information needs that the research participants sought in their everyday lives was regarding entertainment (12 of 21; 57.1%). They enjoyed watching TV shows, movies, sports games, and performances on YouTube; listening to radio and music; and playing games. Some of them needed information about exhibition and music concerts:

“I watch ESPN all the time. Entertainment, sports! … I used it [the Internet] to play Scrabble, a word game.” (P07, Female, 72)

“I use it [the Internet] to watch Netflix for entertainment. I also use it for radios. I have iTunes radio so we use that. Well, that’s entertainment. I guess you’d put that under entertainment.” (P15, Female, 79)

“I sometime check, I’d like to know any art exhibits, music… I like music, so concerts, different bands playing.” (P10, Female, 69)

4.2.3.5 Random topics: looking for factual information. Some informants (8 out of 21; 38.1%) mentioned that they needed specific pieces of information for random topics such as definitions of words, names of authors and movie stars they could not remember, opening times of stores, locations of things, and so on. For this type of information needs, they usually employed online sources using search engines such as Google. Below are two examples demonstrating this case:

“I look up definitions of words I don’t know. I look for names of authors and movie stars I can’t remember. So, that would be kind of pop cultural information.” (P04, Female, 66)
“I use it [Internet] for research. You’re sitting around, and ‘Oh, what was the name of the second wife of the president in 1850?’ something like that. No more do you have to go looking for this having an encyclopedia or have some kind of reference books. You just pick up your phone and you go look on a website and get that information.” (P07, Female, 72).

4.2.3.6 Finance. There were some participants (5 out of 21; 23.8%) who mentioned financial information needs such as economic situation in general and personal financial management-related topics (e.g., online banking, credit cards, paying bills, and financial investment):

“It might be for financial investment. It might be to look at products they make. It might be to look for, get a feel for the company and how long it’s been in business or how trustworthy it is.” (P18, Female, 65)

4.2.3.7 Others. Other information needs mentioned included cooking information such as recipes (4 out of 21; 19%), voluntary activity-related information (3 out of 21; 14.3%), housing-related information (1 out of 21; 4.8%), legal information (1 out of 21; 4.8%), and religion-related information (1 out of 21; 4.8%).

“Let’s see, what else? Recipes? Absolutely! You know, it’s so much easier than going and looking through my cabinet with all the books I have. I just type in what I want, and sometimes it’s not so quick to find it, but ... recipes.” (P01, Female, 64)

“Well, you know, under the information, for instance, I’d look up… we like to garden. I’ll look up different plants. I’ll use it a lot for bird ID, plant identification, organic gardening. Oh, cooking. I used to have a huge collection of cookbooks. I don’t even bother with them anymore. I just put it in. You know, like I want to make quinoa pilaf or something, which my cookbooks never even used quinoa. You know? It’s amazing.” (P15, Female, 79)

“If I was doing a fund raiser for OLLI, I’ve done one fund raiser last year, and the year before two fund raisers for OLLI. And a lot of there was done online, keeping up with how many tickets
I gave to whom, and if they’ve sold, tracking whole that information, which I don’t like doing.”

(P02, Female, 77)

<table>
<thead>
<tr>
<th>Topics of information needs</th>
<th>n  (%)</th>
<th>Examples mentioned</th>
</tr>
</thead>
</table>
| Health/wellness                      | 21 (100.0) | • Medication & supplements  
• Diseases (symptoms)  
• Medical quality assurance  
• Health insurance and price  
• Nutrition  
• Exercise  
• Pet’s health |
| Travel                               | 13 (61.9) | • Price search and reservation (airline, rent car, hotel)  
• Map  
• Restaurant  
• Endemic diseases |
| Culture/education                    | 13 (61.9) | • Books  
• Online courses (futurelearn.com; coursera.org)  
• Family history (ancestry.com)  
• TED Talks |
| Entertainment                        | 12 (57.1) | • Music  
• Movies  
• Games |
| Random topics (general search on factual information) | 8 (38.1) | • Definitions of words  
• Pop culture information (e.g., names of authors, actors and actresses)  
• Hours and locations of local stores |
| Finance                              | 5 (23.8) | • Personal banking, credit card, billing  
• Financial investment |
| Others                               | 8 (38.1) | • Cooking (e.g., recipes)  
• Voluntary activity  
• Housing  
• Law  
• Religion |
4.2.4 Older Adults’ Health Information Behavior

Among the varied topics of information needs in older adults’ everyday life, this study focused on health-related topics and related information behavior. The following subsections provide the findings of (1) how older adults seek necessary health information, identifying the relevant sources, and (2) how they use and share the acquired health information.

4.2.4.1 Interpersonal sources. Most of the research participants considered medical professionals such as a doctor and a primary care physician reliable sources for practical health information seeking. In particular, they went to see a doctor, rather than searching online by themselves, when they have serious problems or for regular check-ups.

“If there’s a significant health event, such as serious abdominal pain or something like that, then obviously I’ll be in the emergency room to see a physician.” (P09, Male, 70)

“I go and see the doctor if I’m sick for sure. I have a primary care physician. I go for quarterly check-ups. I will talk to my doctor about symptoms or issues or whatever but I also, at the same time, will go online and look stuff up. It’s simultaneous, but I’m not like definitely, when I go to the computer to see what I’ve got, I go to the doctor.” (P18, Female, 65)

As another human source for health information seeking, some of the research participants mentioned their partners. They seemed to rely on the health information from their partners based on accumulated trust over a long period of time, rather than their expertise in the given topic—when asked about their partners’ educational backgrounds or occupational experiences, they were not necessarily experts in the medical fields. However, the research participants did not necessarily rely on what they were told by other human sources, such as family members or friends, unless otherwise they were trained as medical professionals. Thus, older adults seemed to value the health-related information from those of whom they have
accumulated a special level of trustworthiness with or from those who have sufficient expertise in the topic area. Below statements demonstrate this tendency:

“I go to [P15] most of the time anyway. I do some of this on my own but I usually go and get her advice on what to do.” (P16, Male, 78)

“Unfortunately, it’s [health information from friends or family] not very reliable information, but yes, I sometimes get information from them.” (P08, Female, 69)

4.2.4.2 Online sources. The research participants considered various Web-based resources as useful sources for health information seeking. Particularly, they highly valued the websites run by government, such as NIH and CDC, and academic institutions, such as Johns Hopkins Medicine (JHM) and Harvard Medical School (HMS). These types of websites seemed to be considered the ‘Web’ representations of the public organizations and institutions that have established their reputations as reliable sources for health information. Some participants mentioned that they trust the health information from these websites because it is based on research, rather than opinion (i.e., expertise), and their main intent is on improving public health and wellness, rather than selling their products (i.e., trustworthiness).

“If I go on the Web, looking at, I tend to go to a site that is reputable like Hopkins or Mayo, where you know that they’re not going to be putting up false information. You can depend on it, having been pretty reputable stuff.” (P02, Female, 77)

“I’d think medical schools. They publish peer-reviewed, learned articles about things that I think are a little bit more trustworthy than Wikipedia or some drug company who’s really just trying to sell what their pills are.” (P04, Female, 66)

“I think the non-profit sites, their purpose is to educate generally, and they have public interests. That’s not related to profit, whereas I think that some of the .com sites, well, they may have good information, often reliable information, they generally have a profit motive.” (P14, Female, 71)
Also, some of the research participants considered the health information from *official associations for certain diseases* (e.g., the American Association for Cancer Research, the American Arthritis Society, and the National Parkinson Foundation) useful and reliable sources that can be used for health information seeking. Similarly to the reasons for using .gov and .edu sites, older adults liked the ‘non-commercial’ nature of the associations, as well as the research-based information provision. Another important reason for using medical associations’ websites mentioned was that they were able to share information with other patients (or caregivers) who were suffering from the same ailments or diseases. This seemed to be more useful for them to obtain the most recent as well as specific information about their information needs.

“Associations of people who have a particular illness or who have family members. So, I think diabetes association, Parkinson’s association, heart society, and so on. They are probably more reliable than others because they have only the interest of their members in mind, not trying to sell them something.” (P03, Male, 71)

“The Parkinson’s website has what’s new, they have doctors, and they have several physicians, and nutritionists and pharmacists. You can look at questions people have asked, or you can ask questions and get answers.” (P13, Female, 80)

Even though most of the research participants preferred non-profit websites (i.e., .gov, .edu, and .org sites), there were some participants who were using commercial websites (i.e., .com sites) for health information seeking, as well. The most frequently mentioned .com site by the research participations in this study was *WebMD*, which provides health/wellness-related news and information on variety of topics. Another type of commercial sites mentioned was a pharmacist’s site such as Walgreens or CVS. They were using these websites to get information about prescriptions and to compare the prices of medications they take.
“Main source would be WebMD. Well, I Google it, and things come up. I usually go to WebMD because they seem to be most trustworthy … I don’t know, I don’t necessarily know if it [WebMD] is credible or not. But, it gives me the information that I need and it’s easy to read. You know, I’m not a doctor, if I put something and say I’m having a problem breathing, it will give me whole list. And I think it starts with the things and goes down.” (P11, Female, 67)

When asked about social media as a source of health information, most of the research participants gave skeptical responses. Even those who were using social media such as Facebook or Twitter in their everyday lives pointed out that information posted on social media is often based on personal opinions rather than facts—i.e., lack of expertise.

“Everybody has got their opinions but a lot of those opinions are not based on fact. They’re just an opinion. They may have read a book and think they know everything.” (P17, Female, 65)

“I want to base my reliance on information on somebody that has expertise. And, most of my friends on Facebook are not in the medical community. I mean, they can talk about the benefits of nutrition and vitamins or they might talk about some disease they’ve had or something that somebody’s experienced, but I’m going to then go and search for more expertise. I’m not just going to take it at face value. And, most the people on Facebook really don’t talk about that kind of stuff. I wouldn’t trust just like a Facebook page from a company or something. You just don’t know who’s really doing the page.” (P18, Female, 65)

Moreover, some older adults highlighted privacy issues in using social media for health information seeking, as they were concerned with the possibility that their medical situations may be disclosed to unwanted groups of people:

“I use social media with my friends and I don’t discuss medical information with them. That’s not something that I do and my social media is kind of exposed to the world and the world doesn’t need to know that I have a medical situation, because privacy is a big part of that.” (P09, Male, 70)
One participant even mentioned that she did not use Facebook for health information seeking because it was difficult to use:

“When I firstly go to use Facebook, it was easy to use. But, it changed and it’s harder for me to use … it’s kind of difficult to use now. (P11, Female, 67)

Four informants (19%) mentioned that they looked at Facebook pages for certain health-related topics such as breast cancer and Lymphedema because they were able to gather and share information with other people who had the similar questions and/or concerns about the same health-related issues. However, even those who were using social media for health information seeking were cautious of the “credibility” of the information as they were aware of the fact that the health information from social media users may not be necessarily trustworthy and expert. Below are some comments from the informants who were using social media as a source for health information, with caution:

“I do use the Facebook pages for Lymphedema. I have Lymphedema. This is a symptom: red and swollen. I connect with people who have Lymphedema.” (P05, Female, 72)

“I use Facebook and Twitter. No, I might follow a link to an article about a health-related issue. I will frequently do that, but again, I don’t give it credibility and I say it comes from a reliable source … I think there is so much bad information, circulating on the Internet. People have a tendency to believe if they saw on Facebook or some other social media or websites and that’s got to be true, and that isn’t the case … it lacks expertise, and it lacks accuracy.” (P14, Female, 71)

Also, social media was used as a tool for feeding news on general wellness topics such as diet and nutrition. After they obtained certain information from social media, they further verified whether the information was correct and researched details of how to apply the
information to their actual life. Thus, social media seemed to be considered a source for orienting information seeking, rather than practical information seeking.

“Somebody on social media on Facebook put out a thing, a whole list of things with honey and cinnamon would do for blood pressures, diabetes, lost weight, and gum disease, just all that. Then when I went and did research, I found quantity, how much to take a day, different ways you can take it and what the honey and sugar would do to help.” (P20, Female, 61)

Wikipedia was another type of social site that was mentioned as a source for health information seeking (5 out of 21; 23.8%). Similarly to what they mentioned about Facebook pages, the informants were cautious when they acquired certain information from Wikipedia. They did not automatically trust the Wikipedia information, as they understood the open, collaborative information production mechanism in Wiki pages:

“Occasionally, I look at Wikipedia just to get a simple explanation, but I don’t rely on that 100% because it’s not verified.” (P01, Female, 64)

“I’m cautious about Wikipedia. I use it a lot, but I always verify the information because it’s not always updated, you don’t know who did the editing.” (P14, Female, 71)

However, some participants appreciated the usefulness of Wikipedia for relatively simple health information needs, such as definitions of diseases, because they perceived the Wikipedia articles were written in a layman’s language, which helped them understand difficult medical terms.

“It depends upon what I’m looking for. If it’s a medication, sometimes I even go to Wikipedia because it’ll explain in laymen’s terms what the medication is used for.” (P08, Female, 69)

“They’re (Wikipedia) usually written in a little more plain language that’s easy to understand. So, I use that to get a feel for the topic and then that helps me understand what other sites may be saying. They will often times define terms where other sources don’t because other sources assume you know what it is.” (P18, Female, 65)
Lastly, there were other types of Web-based sources for health information seeking mentioned by the research participants in the study, such as local doctors’ websites, patient portal, and consumer report.

<table>
<thead>
<tr>
<th>Source types</th>
<th>n (%)</th>
<th>Examples mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpersonal sources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical professionals</td>
<td>20 (95.2)</td>
<td>• Doctors&lt;br&gt;• Primary care physicians&lt;br&gt;• Wife and husband&lt;br&gt;• Girlfriend and boyfriend</td>
</tr>
<tr>
<td>Partners</td>
<td>4 (19.0)</td>
<td>• Wife and husband&lt;br&gt;• Girlfriend and boyfriend</td>
</tr>
<tr>
<td>Friends</td>
<td>3 (14.3)</td>
<td>• Friends in the similar situation&lt;br&gt;• Friends in the medical fields</td>
</tr>
<tr>
<td>Local community</td>
<td>1 (4.8)</td>
<td>• Local chapter for the National Parkinson Foundation</td>
</tr>
<tr>
<td>Online sources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-commercial sites</td>
<td>18 (85.7)</td>
<td>• Government (e.g., NIH, CDC, FDA)&lt;br&gt;• Organizations (e.g., Mayo Clinic, WHO)&lt;br&gt;• University hospitals (e.g., JHM, HMS, FSU College of Medicine)&lt;br&gt;• Associations (e.g., National Kidney Foundation, National Parkinson Foundation, American Arthritis Society)</td>
</tr>
<tr>
<td>Commercial sites</td>
<td>8 (38.1)</td>
<td>• Online databases (e.g., WebMD, Cochrane Library, MERCK Manual)&lt;br&gt;• Pharmacists (e.g., Walgreens, CVS)</td>
</tr>
<tr>
<td>Social sites</td>
<td>8 (38.1)</td>
<td>• Online communities on Facebook pages (e.g., Breast Cancer, Lymphedema)&lt;br&gt;• Wikipedia</td>
</tr>
<tr>
<td>Others</td>
<td>5 (23.8)</td>
<td>• Local doctors’ websites&lt;br&gt;• Patient portal&lt;br&gt;• Consumer report</td>
</tr>
</tbody>
</table>

4.2.4.3 **Older adults’ health information use and share.** When asked about whether they used the acquired health information, all of them answered that they acted on the information in general. However, they said that they did not necessarily use all the health
information they obtained from the Web—many of them answered, ‘it depends on situations.’

More specifically, they considered serious topics that might directly affect their health conditions such as changing medications or treating certain symptoms that they felt serious. In this case, they consulted with medical professionals first and used the information they found only as a secondary reference.

“If I’m really sick, maybe I will call a doctor and see what’s going on.” (P11, Female, 67)

“If it’s an issue of medication, I’d call my doctor’s office and share what I had learned and say, is it possible I need to take a different medication, or talk to my Pharmacist. Based on the information, I’d generally try to get expert’s opinion first. A doctor or pharmacist.” (P14, Female, 71)

When the given situation is relatively less serious, such as looking for information regarding healthy diet, nutrition facts, or good exercise for older adults, they applied the information they found online to their everyday lives.

“I’ll print out the information and keep it as I look for more. For instance, recently I’ve been interested in a plant-based diet. Not eating meat. More like vegan diet. I can’t eat wheat anymore because of the Lyme.” (P15, Female, 79)

There was an exceptional case where a participant relied on the health information on the Web regardless of the seriousness of the situation because she could not afford to have health insurance that would allow her to see a doctor.

“Since I don’t have medical insurance, I can’t go to the doctor like I’m supposed to like I did when I was working and had insurance through my job. I look up my symptoms that I am having and I look for ways that I can take care of myself naturally. Somebody in the family who's taking medication or whatever, I research that medication so I can find out what the side effects are and tell them about that.” (P21, Female, 63)
In terms of sharing health information, most of the research participants mentioned that they shared health information with family and friends only when they were interested in or asked to do so. They were reluctant to automatically share health information with other people, as it might be unnecessary or even inappropriate for them. Some of them were also concerned about any unexpected problems that might be caused by their recommendations.

“Yeah, sometimes. If it’s pertinent. I don’t normally say, ‘I was just on the Mayo website and I found out such and such’ unless I think it really is going to be relevant to people.” (P8, Female, 69)

“I am not an expert. When it comes right down to it, I really don’t know what I’m talking about. I only know what I have found online and I don’t want anybody to take that information and then have some kind of a problem. I’m not adept.” (P18, Female, 65)

4.2.5 Older Adults’ Credibility Assessment of Online Health Information

The research participants used varied types of markers/cues to select the most credible sources in the process of health information seeking. The following sections organize the findings by the six types of Web credibility measures identified in the Assessment of WC framework: (1) operator trustworthiness; (2) operator expertise; (3) content trustworthiness; (4) content expertise; (5) design trustworthiness; and (6) design expertise. Furthermore, (7) descriptive statistics of the ratings on the 35 credibility markers/cues that were included in the last segment of the semi-structured interviews (Appendix D) are provided in Table 4.16. A more detailed discussion on the ratings will be given in Chapter 5.

4.2.5.1 Operator trustworthiness. Most of the participants in the study considered the trustworthiness of the operator an important criterion for selecting a credible source for online health information (19 out of 21; 90.5%). Particularly, older adults gave special attention to the nature of the website—i.e., whether or not the website has commercial interests—when they
judged the credibility of the website and the health information within it. As mentioned above, the research participants tended to perceive health information from a non-commercial and academic institution’s website (i.e., .gov, .edu, .org site) as more credible than that from a commercial company’s, for example, a pharmaceutical company’s website selling their products (i.e., .com sites). Considering their common online information searching behavior that begins with search engines (e.g., Google), it seemed to be the simplest as well as safest way for them to first examine the non-commercial websites from the research results. Below quotes demonstrate this finding:

“One is the nature of the organization that provides the website. Is it a nonprofit organization or is it attempting to sell me a product?” (P09, Male, 70)

“When I’m looking for medical stuff, I want to know what doctors say, and, you know, a lot of times the universities have in depth information because they do studies and the hospitals, what are they called, research hospitals? … the majority of the time you could believe [universities or research hospitals] because those people are doing research and that is all they do. And, I don’t believe they will publish something that has not been proven. I don’t believe that.” (P21, Female, 63)

“I try to go first to .gov or .org sites because they don’t have something to sell to me. Also, I go to academic sites … I’m generally trying to verify that information from a more independent source and I perceive that an academic institution or a non-profit foundation, for example the Arthritis Foundation, might be a better source than .com sources. I think the non-profit sites, their purpose is to educate generally, and they have public interests. That’s not related to profit, whereas I think that some of the .com sites, well, they may have good information, often reliable information, they generally have a profit motive.” (P14, Female, 71)

In the same context, having commercial advertisements on a website seemed to significantly decrease the perceived credibility of the health information on the website. Several
of the research participants were hostile to being exposed to unwanted advertisements having commercial intents (e.g., pop-up windows with advertisements):

“It has happened pop-up on the computer when I’m using it; I pay no attention to it at all because their interests and mine are not necessarily perfectly coincided.” (P03, Male, 71)

“Do you want to know some negative markers? No advertising at all!” (P04, Female, 66)

4.2.5.2 Operator expertise. About 71.4% (15 out of 21) mentioned that the operator’s expertise is an important criterion for selecting credible sources for online health information—i.e., whether or not the operator (source) of the Web resources is reputable, famous, authoritative, and competent (Choi & Stvilia, 2015). In particular, many of the informants mentioned that they would trust certain health information if it was from reputable and authoritative institutions in the medical field, such as NIH, CDC, and Mayo Clinic or associations (foundations) of specific diseases such as the American Cancer Society and the Arthritis Foundation. Thus, ‘name recognition’ seemed to be an important criterion for selecting sources for online health information for older adults:

“If I search, and pops up Johns Hopkins, I might not look at any of the cues. Okay? I’m going by name recognition. I don’t look at cues.” (P10, Female, 69)

“I think credentials. They’re professional, like you said, Johns Hopkins … the producer probably, the producer of them. The source, yeah, more than the producer … I think that’s [credentials of the source] the most important for me for medical information.” (P08, Female, 69)

Informants also mentioned about operator’s credentials, especially when they were not familiar with the operator of the website (or the author of an online article). For instance, when the site was a private physician’s website or an institution that is less famous or less reputable, older adults would look for the information about credentials of the physician and staff (i.e.,
operator) who were providing the health information on their websites to judge the credibility of health information on the website:

“‘Yes, reputation and credentials, that’s the word … if I was looking at a private physician or private practice’s website, I’ll go and look at their providers and see where they’re trained. Well, if they’re certified, that kind of thing.’ (P01, Female, 64)

“I’m going to look at the masthead kind of thing that has who’s running the site, are they doctors, are they MDs or PhDs? You know, their experience, I guess. So, I look to see who’s on their staff basically, how well trained, what kind of training their staff have. (P10, Female, 69)

4.2.5.3 Content trustworthiness. Some of the research participants (8 out of 21; 38.1%) considered content trustworthiness-related markers/cues important criteria for credibility assessment of online health information—i.e., whether or not the message/information being provided in the website is neutral, unbiased, even-handed, consistent, and current (Choi & Stvilia, 2015). Several of the research participants pointed out that the health information from one source may not be reliable as it may be just his or her opinion, rather than fact. Thus, they said that they verified certain information they obtained by double-checking if it was agreed (or mentioned) by other sources (i.e., unbiased and consistent).

“I might look at more than one site on the same topic. And, sometimes, you can read what people have had to say in response to the information.” (P02, Female, 77)

“I just keep looking. Sometimes I spend a whole day going from one website to another. I take notes because I will find the same information on several websites. Then I believe, I don’t really know, but then I believe that this information is correct.” (P21, Female, 63)

Also, some of the participants checked whether the health information is up to date when they assess the credibility of online health information. Currency (or recency) of information in
health topics seemed to be considered crucial, as outdated health information may be neither
useful nor trustworthy.

“He [his doctor] is as old as I am a little older. Sometimes, [he is] not quite as current as he might
be … I know very well what CDC recommends for older people, how frequently to take a certain
vaccines or so on. And, occasionally, I have discovered my doctor’s not quite as current as they
are.” (P03, Male, 71)

“For this one [a Facebook page for a certain disease called Lyme disease], it’s very current.
Current and new findings, new news and then it has a website to go to so I can check it out myself
… Here are the things. They can’t find what I’m looking for. That’s nice, but they have recent
posts and contacts. There it is about the Lyme disease today, which I might do.” (P15, Female, 79)

“I’m cautious about Wikipedia. I use it a lot, but I always verify the information because it’s not
always updated, you don’t know who did the editing.” (P14, Female, 71)

4.2.5.4 Content expertise. There were also some comments regarding content expertise
(11 out of 21; 52.4%)—i.e., whether or not the message/information being provided in the
website is informative, complete, comprehensive, in-depth, accurate, correct, and clear (Choi &
Stvilia, 2015). In particular, when certain health information was based on academic research
findings, providing citations and references (i.e., evidence-based), the health information tended
to be perceived as more credible. As mentioned above, the informants valued highly the health-
related information from well-known academic and government institutions, as opposed to
commercial institutions, as it was believed as being based on a good intention (i.e., promoting
public interests, rather than making profit), but it is also based on scientific evidence:

“It references high quality journal articles and they seem to be credible to me … the Cochrane
Collection collects journal articles where there’s actual evidence been collected, medical evidence
been collected, to verify that hypothesis. That’s their job and so it’s sort of the gold standard of
studies that are good and reliable and they’re testing their criteria very rigorously.” (P09, Male, 70)
“What I was taught when I was getting my Master’s is that when you’re pulling information off the Internet, if it’s an article, if you look at the very last, check the references. What I found on health is, if there’re medical associations, then when you check those references, then it will tell you whether this article is just an opinion.” (P20, Female, 61)

Another cue/marker for judging content’s expertise mentioned was regarding the intrinsic quality of the information itself. One participant in the study pointed out that any typographical errors on a website (or a webpage) would play a role as a trigger that decreases her perception of the given health information on the website.

“If it’s well written, you know if something, I guess probably it’s more of negative one if it’s poorly written, if there are errors in grammar, syntax, and punctuation. I immediately discount, I just do that automatically with everything. I’m really suspect when people don’t write well. (P07, Female, 72)

4.2.5.5 Design trustworthiness. Markers/cues regarding design trustworthiness was relatively less mentioned as being influential to older adults’ perceptions of health information credibility, than other types of credibility cues/markers (2 out of 21; 9.5%). In other words, older adults did not care much about whether or not the website is stable (e.g., all links in the site are working properly); or whether or not the website has ‘real-world feel’ (e.g., providing the operator’s picture and contact information) when they select the credible source for health information:

“I don’t care whether or not there are pictures. I don’t really feel that they need for somebody to have big classy pictures.” (P04, Female, 66)

4.2.5.6 Design expertise. Design expertise-related cues/markers were relatively more often mentioned than those for design trustworthiness (9 out of 21; 42.9%)—i.e., whether or not the structure, functionality, aesthetic design, and interactivity of the website is well organized,
easy to use, and aesthetically put together (Choi & Stvilia, 2015). Specifically, several of them highlighted that usability-related features could affect their perception of the credibility of the website, as it might enhance (or hinder) finding necessary information out of it. Below are some of the mentioned regarding the effect of a poorly designed website on the perceived credibility of the website:

“[It was] very consumer- and user-friendly. And, it was set up as a question and answer format, which you can just look for what you're looking for question-wise and there was the answer. Much easier!” (P01, Female, 64)

“It’s got a terrible, terrible user interface. It’s awful. It’s horrible. It’s like something done in 1910 … the information on the bottom of it is pretty credible and good, but it’s awful to use.” (P09, Male, 70)

Also, there were some informants who considered the aesthetic impression of a health-related website a useful cue/maker in judging the credibility of health information:

“Yeah, for me visuals. I can get a lot of information out of a visual, as well as what’s written there. One of the things I like about the Mayo website is if you go and you look up something, it’ll have just enough to read on a page, and then it’ll have other, you can click on another page to find out more about part of the area. It doesn’t overwhelm you.” (P08, Female, 69)

“I’m influenced by the design, certainly. This is an excellent website. I go back to the home page. It’s colorful, it’s not cluttered. It’s very easy to navigate.” (P14, Female, 71)

Table 4.15 Credibility Markers/Cues Mentioned by the Research Participants

<table>
<thead>
<tr>
<th>Types of measures</th>
<th>n  (%)</th>
<th>Markers/cues mentioned</th>
</tr>
</thead>
</table>
| Operator trustworthiness | 19 (90.5) | • Nature of website (e.g., government and academic sites vs. commercial sites)  
|                      |        | • Commercial intent (e.g., advertisements)                  |
| Operator expertise  | 15 (71.4) | • Name recognition                                           |
|                      |        | • Credentials                                                |
Table 4.15 – Continued

<p>| | | |</p>
<table>
<thead>
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<th></th>
<th></th>
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</tr>
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</table>
| **Content trustworthiness** | 8 (38.1) | • Unbiased and consistent across sources  
                     |                 | • Current information |
| **Content expertise**   | 11 (52.4) | • Research-based evidence provision  
                     |                 | • Intrinsic quality (e.g., typo) |
| **Design trustworthiness** | 2 (9.5) | Mentioned as non-influential (‘neutral’) |
| **Design expertise**    | 9 (42.9) | • Easy-to-use and easy-to-navigate  
                     |                 | • Aesthetic impression |

### 4.2.6 Ratings on Credibility Markers

After the participants freely talked about their strategies to choose credible sources for health information, identifying various types of credibility markers/cues and heuristics, they were asked to rate each of the 35 items chosen from the literature using a five-point Likert scale. They were to rate each item in terms of the extent to which the given item (marker/cue) would increase or decrease their perceptions of health information credibility. Specifically, when a given item would have a negative impact on their Web credibility assessment of a health-related website, the participants were asked to select –1 or –2, depending on the perceived extent; they were asked to choose +1 or +2 when a given item would have a positive impact on their perceptions of credibility of a health-related website; when a given item would have neither a positive nor a negative impact on their Web credibility perception, they were asked to choose 0 (zero).

The participants’ ratings on the given items were transformed into positive numbers for data analysis: –2 to 1; –1 to 2; 0 to 3; 1 to 4; and 2 to 5. Using the transformed numbers, mean values of the ratings on each item (i.e., credibility marker) ranged from 1.24 ($median = 1.00; SD = .539$) to 4.76 ($median = 5.00; SD = .436$), where 1.00 indicated much less credible; 2.00 indicated less credible; 3.00 indicated neutral; 4 indicated more credible; and 5 indicated much
more credible. As mentioned above, the ratings were based on the participants’ perceptions of whether the given markers/cues would have a positive, negative, or even neutral impact on their Web credibility assessment. Thus, it should be noted that even though the items in Table 4.16 below are sorted by the mean values in descending order, the lowest value—i.e., D29 ($M = 1.24$; median = 1.00)—does not indicate that the item has the least impact on Web credibility assessment; rather, it means that the given item was perceived as the most negative credibility marker for the research participants.

The researcher performed the one-sample $t$ test to categorize the credibility markers/cues into positive, negative, or neutral types based on the participants’ ratings (Table 4.16). More specifically, the researcher examined whether or not a particular marker/cue was perceived as significantly different from neutral (i.e., “3”), using the $t$ statistic against a population value of 3.

<table>
<thead>
<tr>
<th>No.</th>
<th>Item wordings</th>
<th>Ratings</th>
<th>$M$</th>
<th>$SD$</th>
<th>$t(20)$</th>
<th>$p$</th>
<th>$r^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>D19</td>
<td>The site is by an organization that is well-respected outside of the Internet.</td>
<td></td>
<td>4.76</td>
<td>.436</td>
<td>18.50</td>
<td>&lt; .001</td>
<td>.945</td>
</tr>
<tr>
<td>D03</td>
<td>The site lists authors’ credentials for each article.</td>
<td></td>
<td>4.48</td>
<td>.750</td>
<td>9.02</td>
<td>&lt; .001</td>
<td>.803</td>
</tr>
<tr>
<td>D07</td>
<td>The site was recommended to you by a doctor.</td>
<td></td>
<td>4.48</td>
<td>.602</td>
<td>11.25</td>
<td>&lt; .001</td>
<td>.863</td>
</tr>
<tr>
<td>D02</td>
<td>The site has articles containing citations and references.</td>
<td></td>
<td>4.43</td>
<td>.746</td>
<td>8.77</td>
<td>&lt; .001</td>
<td>.794</td>
</tr>
<tr>
<td>D34</td>
<td>The site tries to cover all of the different approaches to the issue.</td>
<td></td>
<td>4.43</td>
<td>.746</td>
<td>8.77</td>
<td>&lt; .001</td>
<td>.794</td>
</tr>
<tr>
<td>D17</td>
<td>The site represents an organization you respect.</td>
<td></td>
<td>4.43</td>
<td>.598</td>
<td>10.95</td>
<td>&lt; .001</td>
<td>.857</td>
</tr>
<tr>
<td>D32</td>
<td>This site is complete in the information it provides.</td>
<td></td>
<td>4.24</td>
<td>.831</td>
<td>6.83</td>
<td>&lt; .001</td>
<td>.700</td>
</tr>
<tr>
<td>D04</td>
<td>The site is arranged in a way that makes sense to you.</td>
<td></td>
<td>4.19</td>
<td>.680</td>
<td>8.03</td>
<td>&lt; .001</td>
<td>.763</td>
</tr>
<tr>
<td>D22</td>
<td>The site states its policy on content.</td>
<td></td>
<td>4.05</td>
<td>.805</td>
<td>5.97</td>
<td>&lt; .001</td>
<td>.640</td>
</tr>
<tr>
<td>D33</td>
<td>The site provides information that is neutral.</td>
<td></td>
<td>4.05</td>
<td>.805</td>
<td>5.97</td>
<td>&lt; .001</td>
<td>.640</td>
</tr>
<tr>
<td>D09</td>
<td>The site has ratings or reviews of its content.</td>
<td></td>
<td>3.95</td>
<td>.805</td>
<td>5.42</td>
<td>&lt; .001</td>
<td>.595</td>
</tr>
<tr>
<td>D23</td>
<td>The site is linked to by a site you think is believable.</td>
<td></td>
<td>3.95</td>
<td>.669</td>
<td>6.52</td>
<td>&lt; .001</td>
<td>.680</td>
</tr>
<tr>
<td>D05</td>
<td>The site has been updated since your last visit.</td>
<td></td>
<td>3.90</td>
<td>1.261</td>
<td>3.29</td>
<td>&lt; .001</td>
<td>.351</td>
</tr>
<tr>
<td>D08</td>
<td>The site represents a nonprofit organization.</td>
<td></td>
<td>3.86</td>
<td>.727</td>
<td>5.40</td>
<td>&lt; .001</td>
<td>.593</td>
</tr>
<tr>
<td>D18</td>
<td>The site gives a contact phone number.</td>
<td></td>
<td>3.81</td>
<td>.981</td>
<td>3.78</td>
<td>&lt; .001</td>
<td>.417</td>
</tr>
</tbody>
</table>
Table 4.16 – Continued

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>t</th>
<th>df</th>
<th>p</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>D21</td>
<td>The site gives a contact email address.</td>
<td>3.81</td>
<td>.873</td>
<td>4.25</td>
<td>.001</td>
<td>.475</td>
<td></td>
</tr>
<tr>
<td>D01</td>
<td>The site lists the organization’s physical address.</td>
<td>3.67</td>
<td>.796</td>
<td>3.84</td>
<td>.001</td>
<td>.424</td>
<td></td>
</tr>
<tr>
<td>D10</td>
<td>The URL for the site ends with “.org”</td>
<td>3.67</td>
<td>.796</td>
<td>3.84</td>
<td>.001</td>
<td>.424</td>
<td></td>
</tr>
<tr>
<td>D35</td>
<td>The site is customizable according to your preference.</td>
<td>3.52</td>
<td>1.030</td>
<td>2.33</td>
<td>.03</td>
<td>.213</td>
<td></td>
</tr>
<tr>
<td>D20</td>
<td>The site looks professionally designed.</td>
<td>3.38</td>
<td>.865</td>
<td>2.02</td>
<td>.06</td>
<td>.169</td>
<td></td>
</tr>
<tr>
<td>D24</td>
<td>The site provides links to its competitors’ sites.</td>
<td>3.33</td>
<td>.856</td>
<td>1.78</td>
<td>.09</td>
<td>.137</td>
<td></td>
</tr>
<tr>
<td>D06</td>
<td>The site was recommended to you by a friend (non-expert).</td>
<td>3.14</td>
<td>.655</td>
<td>1.00</td>
<td>.33</td>
<td>.048</td>
<td></td>
</tr>
<tr>
<td>D25</td>
<td>The site displays an award it has won.</td>
<td>3.00</td>
<td>.837</td>
<td>0.00</td>
<td>1.00</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>D26</td>
<td>The site is small (e.g., fewer than five pages).</td>
<td>2.95</td>
<td>.590</td>
<td>-3.84</td>
<td>.001</td>
<td>.424</td>
<td></td>
</tr>
<tr>
<td>D11</td>
<td>The site recognizes that you have been there before.</td>
<td>2.95</td>
<td>.740</td>
<td>-3.03</td>
<td>.004</td>
<td>.77</td>
<td></td>
</tr>
<tr>
<td>D13</td>
<td>The site requires a paid subscription to gain access.</td>
<td>2.33</td>
<td>.796</td>
<td>-3.84</td>
<td>.001</td>
<td>.424</td>
<td></td>
</tr>
<tr>
<td>D14</td>
<td>The site takes a long time to download.</td>
<td>2.24</td>
<td>.889</td>
<td>-3.93</td>
<td>.001</td>
<td>.435</td>
<td></td>
</tr>
<tr>
<td>D28</td>
<td>The site is sometimes unexpectedly unavailable.</td>
<td>2.05</td>
<td>.805</td>
<td>-5.42</td>
<td>.001</td>
<td>.595</td>
<td></td>
</tr>
<tr>
<td>D12</td>
<td>The site has one or more ads on each page.</td>
<td>1.81</td>
<td>.814</td>
<td>-6.71</td>
<td>.001</td>
<td>.692</td>
<td></td>
</tr>
<tr>
<td>D27</td>
<td>The site has a commercial purpose (as opposed to an academic one).</td>
<td>1.71</td>
<td>.845</td>
<td>-6.97</td>
<td>.001</td>
<td>.708</td>
<td></td>
</tr>
<tr>
<td>D16</td>
<td>The site links to a site you think is NOT credible.</td>
<td>1.48</td>
<td>.602</td>
<td>-11.61</td>
<td>.001</td>
<td>.871</td>
<td></td>
</tr>
<tr>
<td>D15</td>
<td>The site is rarely updated with new content.</td>
<td>1.38</td>
<td>.498</td>
<td>-14.91</td>
<td>.001</td>
<td>.917</td>
<td></td>
</tr>
<tr>
<td>D31</td>
<td>The site has links that do not work.</td>
<td>1.38</td>
<td>.590</td>
<td>-12.58</td>
<td>.001</td>
<td>.888</td>
<td></td>
</tr>
<tr>
<td>D30</td>
<td>The site has typographical errors.</td>
<td>1.24</td>
<td>.539</td>
<td>-14.98</td>
<td>.001</td>
<td>.918</td>
<td></td>
</tr>
<tr>
<td>D29</td>
<td>The site automatically pops up new windows with ads.</td>
<td>1.24</td>
<td>.539</td>
<td>-14.98</td>
<td>.001</td>
<td>.918</td>
<td></td>
</tr>
</tbody>
</table>

Note: The mean values indicate whether each of the items (markers/cues) has a positive, negative, or neutral impact on people’s perceptions of Web credibility, not the extent of its importance. Thus, the lowest mean value indicates that the given item (D29 in the study) had the most negative impact on the research participants’ perceptions of credibility of a health website among the given 35 items. The items shaded in gray are neutral markers/cues that were perceived as being neither positive nor negative (p >.05); thus, the items listed above the gray shading are positive markers, and the items below the gray shading are negative markers.

4.2.6.1 Positive, neutral, and negative credibility markers. Based on the \( t \) test results, 19 out of 35 items were included in the positive credibility marker category with an average of \( M = 4.09, SD = .381 \). Statistical analysis indicated that the ratings on the positively perceived items were significantly greater than the neutral value “3,” \( t(20) = 13.08, p < .001, r^2 = .895 \). In the negative credibility marker category, 10 out of 35 items were included with an average of \( M = 1.69, SD = .437 \). The \( t \) statistic showed that the ratings on these items were significantly lower.
than the neutral value “3,” $t(20) = -13.771, p < .001, r^2 = .905$. Lastly, 6 out of 35 items were grouped into the neutral credibility marker category with an average of $M = 3.13, SD = .428$. These items were not perceived as being different from the neutral value “3” $t(20) = 1.360, p = .189, r^2 = .085$. Table 4.17 reports the mean and standard deviation of each category.

Table 4.17 Positive, Neutral, and Negative Credibility Markers

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of items</th>
<th>Ratings</th>
<th>$t(20)$</th>
<th>$p$</th>
<th>$r^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$ (%)</td>
<td>$M$</td>
<td>$SD$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive markers</td>
<td>19 (54.3%)</td>
<td>4.09</td>
<td>.381</td>
<td>13.08</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Neutral markers</td>
<td>6 (17.1%)</td>
<td>3.13</td>
<td>.428</td>
<td>1.36</td>
<td>.19</td>
</tr>
<tr>
<td>Negative markers</td>
<td>10 (28.6%)</td>
<td>1.69</td>
<td>.437</td>
<td>-13.77</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

4.2.6.2 Ratings by user characteristics. Based on the categorization of the credibility markers (i.e., positive, neutral, and negative groups), Table 4.18 provides the average ratings by user characteristics, such as age, gender, ethnicity, educational background, Internet usage, and the types of “mastery of life.” Given the small sample size, the researcher did not conduct inferential tests comparing subgroups, such as age groups (i.e., young-old vs. old-old), gender groups (i.e., female vs. male), education levels, and so on. Rather, the researcher explored any notable features that might influence the research participants’ perceptions of credibility markers, which then could be examined through quantitative examinations in future research.

Table 4.18 Ratings on Credibility Markers by User Characteristics

<table>
<thead>
<tr>
<th>User characteristics</th>
<th>$n$</th>
<th>Positive</th>
<th>Neutral</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young-old</td>
<td>15</td>
<td>4.21</td>
<td>.349</td>
<td>3.05</td>
</tr>
<tr>
<td>Old-old</td>
<td>6</td>
<td>4.09</td>
<td>.521</td>
<td>3.26</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>16</td>
<td>4.25</td>
<td>.324</td>
<td>3.11</td>
</tr>
<tr>
<td>Male</td>
<td>5</td>
<td>3.93</td>
<td>.531</td>
<td>3.09</td>
</tr>
</tbody>
</table>

131
<table>
<thead>
<tr>
<th>Ethnicity</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>White Caucasian</td>
<td>19</td>
<td>4.15</td>
<td>.391</td>
<td>3.09</td>
<td>.319</td>
<td>1.57</td>
</tr>
<tr>
<td>African American</td>
<td>2</td>
<td>4.41</td>
<td>.486</td>
<td>3.27</td>
<td>.129</td>
<td>1.19</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>High school</td>
<td>1</td>
<td>3.31</td>
<td>-</td>
<td>3.00</td>
<td>-</td>
<td>1.63</td>
</tr>
<tr>
<td>Some college</td>
<td>5</td>
<td>4.24</td>
<td>.263</td>
<td>3.18</td>
<td>.386</td>
<td>1.63</td>
</tr>
<tr>
<td>Bachelor</td>
<td>5</td>
<td>4.03</td>
<td>.298</td>
<td>2.95</td>
<td>.277</td>
<td>1.45</td>
</tr>
<tr>
<td>Master</td>
<td>5</td>
<td>4.55</td>
<td>.281</td>
<td>3.22</td>
<td>.378</td>
<td>1.43</td>
</tr>
<tr>
<td>Doctorate</td>
<td>5</td>
<td>4.06</td>
<td>.362</td>
<td>3.11</td>
<td>.226</td>
<td>1.63</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Internet use (per week)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1–5 hours</td>
<td>3</td>
<td>3.65</td>
<td>.243</td>
<td>3.11</td>
<td>.096</td>
<td>1.80</td>
</tr>
<tr>
<td>6–10 hours</td>
<td>3</td>
<td>4.54</td>
<td>.030</td>
<td>3.61</td>
<td>.419</td>
<td>1.63</td>
</tr>
<tr>
<td>11–15 hours</td>
<td>3</td>
<td>4.12</td>
<td>.185</td>
<td>3.17</td>
<td>.333</td>
<td>1.60</td>
</tr>
<tr>
<td>16–20 hours</td>
<td>5</td>
<td>4.07</td>
<td>.435</td>
<td>2.93</td>
<td>.450</td>
<td>1.54</td>
</tr>
<tr>
<td>20+ hours</td>
<td>7</td>
<td>4.08</td>
<td>.354</td>
<td>3.05</td>
<td>.469</td>
<td>1.80</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mastery of life</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pessimistic-affective</td>
<td>1</td>
<td>3.37</td>
<td>-</td>
<td>3.00</td>
<td>-</td>
<td>1.70</td>
</tr>
<tr>
<td>Defensive-affective</td>
<td>2</td>
<td>4.34</td>
<td>.335</td>
<td>3.42</td>
<td>.354</td>
<td>1.30</td>
</tr>
<tr>
<td>Pessimistic-cognitive</td>
<td>7</td>
<td>4.02</td>
<td>.299</td>
<td>3.29</td>
<td>.381</td>
<td>1.67</td>
</tr>
<tr>
<td>Optimistic-cognitive</td>
<td>11</td>
<td>4.15</td>
<td>.392</td>
<td>2.98</td>
<td>.246</td>
<td>1.76</td>
</tr>
</tbody>
</table>

**4.2.6.2.1 Mastery of life.** Acknowledging the prematurity of arguing any generalizable findings with the limited sample size of the study, there were some notable discussion points regarding the relationship between the ratings on the credibility markers and the types of “mastery of life.” One participant (n = 1) who had relatively less educational experience (high school graduate) than other study participants did showed the typical characteristics of the pessimistic-affective (P-A) type of “mastery of life,” such as a heavy reliance on others (e.g., doctor and partner) for information-seeking in his everyday life as well as a lack of confidence in and appreciation of systematic and cognitive information-seeking. This participant’s ratings on the positive credibility markers tended to be lower than those from other types of “mastery of life” groups. In particular, his average rating on the positive items was 3.31 (M = 3.37), while the average of the whole group was 4.12 (M = 4.12; SD = .353), which simply showed his suspicion
about the credibility of online health information (Figure 4.1). The comments he made in the interview also supported the finding that he did not trust information on the Web because he had difficulty with distinguishing credible health information from fraudulent and/or false information.

![Figure 4.1 Ratings on Credibility Markers by Mastery of Life](image)

**Figure 4.1 Ratings on Credibility Markers by Mastery of Life**

**4.2.6.2.2 Internet usage.** Three participants ($n = 3$) answered that they used the Internet for one to five hours per week, which was the lower bound in the current study; the aforementioned P-A-type participant was included in this group. The range of this group’s ratings on the credibility markers tended to be narrower than those from other groups (Figure 4.2). Like the ratings by the P-A type of “mastery of life” mentioned above (Figure 5.1), this “less-tech-savvy” group gave relatively more negative ratings on the positive credibility markers ($M = 3.65; SD = .243$) than other groups did ($M = 4.15; SD = .353$).
Figure 4.2 Ratings on Credibility Markers by Internet Usage
CHAPTER 5

DISCUSSION

This chapter discusses the findings presented in Chapter 4. In Phase I, the researcher analyzed the literature on information credibility to have a theoretical understanding of how people assess the credibility of various types of online resources in different contexts. As a product of the qualitative meta-study in Phase I, a new framework for Web credibility assessment, called the WC framework, was proposed. The new framework was then used as a theoretical framework, along with the ELIS model by Savolainen (1995), in the following study focusing on older adults’ credibility assessment of online health information (Phase II). Findings from Phase II provided a deeper understanding of how older adults judge the credibility of online health information in the context of ELIS. The subsequent sections, therefore, discuss both the theoretical and empirical implications of the dissertation research.

5.1 A New Framework of Web Credibility Assessment

The first set of research questions asked about how existing theories and models conceptualized people’s credibility assessment of online information and how they could be synthesized and improved for empirical studies:

RQ1: How is the process of Web credibility assessment conceptualized in existing theories and models?

RQ1-1: What are the common and unique features of existing theories and models of Web credibility assessment?

RQ1-2: How can the existing theoretical frameworks of Web credibility assessment be improved?
A new framework of Web credibility assessment, named *WC framework*, was developed based on a qualitative meta-synthesis of the core facets of Web credibility assessment identified in Phase I, such as conceptualization, operationalization, user characteristics, context, and process. The processes of synthesizing these facets of Web credibility assessment into three main components of the WC framework (i.e., Assessment of WC; Variability of WC; and Process of WC) were explained in Chapter 4. This section discusses the usefulness of the new framework.

### 5.1.1 Assessment of WC

The first component of the new framework, *Assessment of WC*, provides a conceptual typology of Web credibility assessment, cross-mapping the two key dimensions of credibility (i.e., trustworthiness and expertise) and three objects of credibility assessments (i.e., operator, content, and design credibility; Table 4.1). As highlighted, the existing frameworks reviewed in this study did not articulate the relationship between the key dimensions of credibility (i.e., conceptualization) and the measures that can be used to examine the credibility dimensions (i.e., operationalization). Rather, they tended to focus on deploying some of the markers/cues and heuristics that are known as being influential to Web credibility assessment along with user characteristics such as demographics and user involvement. For instance, Wathen and Burkell (2002) depicted the Web credibility assessment process as two phases (i.e., evaluation of surface credibility and evaluation of message credibility) and listed various markers/cues for each phase. Specifically, they identified appearance/presentation, usability/interface design, and organization of information for the first phase of credibility assessment, evaluation of surface credibility; they also identified expertise/competence, trustworthiness, credentials, etc. for the second phase, evaluation of message credibility. Even though this model provided a good understanding of how people go through the process of Web credibility assessment, it did not define what credibility is
and which measures can be used to measure each of the key dimensions of credibility (i.e., operationalization).

Metzger (2007) proposed a three-phase model of Web credibility assessment, i.e., exposure phase, evaluation phase, and judgment phase. This model focuses mainly on the effects of user motivation and ability on the three phases of Web credibility assessment—the overall idea of the model is that a user goes through one of the two routes (peripheral or central evaluation route) at the beginning of Web credibility assessment process depending on his or her motivation and ability in the given context. The last phase of this model is “credibility judgment,” but, it does not articulate what credibility is and how it is measured. This is the case in the MAIN model (Sundar, 2008) and the P-I Theory (Fogg, 2003b); they theorize the process of Web credibility assessment, but do not explain how the concept of credibility is defined in the given model and which measures can be employed to examine the operationalized concept of credibility.

Hilligoss and Rieh’s (2008) “Unifying Model” did identify a phase for conceptualization of credibility, i.e., Construct. The authors conceptualized that a user would define credibility using one or more dimensions of credibility such as trustfulness, believability, trustworthiness, objectivity, and reliability. They argued that depending on how users define credibility in the phase Construct, different heuristics are employed, which then influence their Web credibility assessment. However, the five dimensions of credibility identified in this model were based on the frequency of the research participants’ \( n = 24 \) expressions (mentions), rather than a more systematic conceptualization. For instance, some of the credibility dimensions identified in the study could be grouped as synonyms (e.g., trustworthiness, trustfulness and believability) if they used a factor analytic approach to the candidate terms. Furthermore, the heuristics identified in
the model were not explained in full regarding which of the five credibility dimensions were specifically related with.

Besides the six frameworks reviewed in the current research, Tseng and Fogg’s (1999) *Four Types of Computer Credibility* is arguably an initial framework that is focused on various factors contributing to credibility of computer-based information system. As the Web has become an important source of information, the four types of credibility were used to understand users’ experiences on the Web and called *Four Types of Web Credibility* (Fogg, 2003a). The authors suggest that four types of credibility may come into play: presumed, reputed, surface, and earned (or experienced) credibility. Briefly summarizing the each type of credibility in the framework, “presumed credibility” is defined as the extent to which a person believes someone or something because of general assumptions in the person’s mind (e.g., some people assume that nonprofit organizations are more likely to be trustworthy because they are not seeking commercial gain); “surface credibility” is derived from simple inspection—people often make an initial judgment about credibility based on first impressions of surface traits (e.g., people perceive a website to be credible when the site looks professionally designed); “reputed credibility” is defined as the extent to which a person believes someone or something because of what third parties have reported (e.g., awards, seals of approval, links, and endorsements from friends); “earned (or experienced) credibility” is assumed to be the most powerful form of credibility that is derived from people’s interactions with systems over an extended period of time (e.g., first-hand experience with a certain website). Even though the typology is useful to understand types of credibility markers/cues and heuristics, it does not articulate how the core concept, credibility, is defined and connected to the four types of Web credibility; it does not
explain the process of Web credibility assessment and the roles of context and user characteristics in the process, either.

Because of the absence of a systematic conceptualization of the relationships between key dimensions of credibility and measures that could be used to operationalize them in the existing theories and models, their explanatory power to provide a comprehensive and integrated interpretation of the findings from empirical studies was rather limited. The new framework proposed in the current study (i.e., the WC framework), therefore, has its strength in articulating the relationship between the key dimensions of credibility (i.e., trustworthiness and expertise) and the main objects of credibility assessments (i.e., operator, content, and design). As shown in Table 4.1, the new conceptual typology of Web credibility sorted out the markers/cues and heuristics employed in empirical studies in the literature. For more generalizable application of the new framework in empirical studies, Table 5.1 provides definitions of the six types of Web credibility assessment proposed in the Assessment component of the WC framework and lists sub-dimensions of each category. This new typology can be used as a more elaborate organization of Web credibility, its key dimensions, and sub-dimensions of each key dimension, which all have been identified and examined in the literature over the decades. In future research, the framework needs to be tested, as to whether it is supported by empirical data.

<table>
<thead>
<tr>
<th>Table 5.1 Conceptual Typology of WC Assessment</th>
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<tbody>
<tr>
<td><strong>Trustworthiness</strong></td>
</tr>
<tr>
<td>Operator</td>
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<td></td>
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<tr>
<td><strong>Expertise</strong></td>
</tr>
<tr>
<td>How expert is the operator? – Whether or not the operator (source) of the Web resources is:</td>
</tr>
<tr>
<td>• Reputable</td>
</tr>
<tr>
<td>• Famous</td>
</tr>
<tr>
<td>• Authoritative</td>
</tr>
<tr>
<td>• Competent</td>
</tr>
</tbody>
</table>
Table 5.1 – Continued

<table>
<thead>
<tr>
<th>Content</th>
<th>How trustworthy is the content? – Whether or not the message/information being provided in the website is:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Neutral</td>
</tr>
<tr>
<td></td>
<td>• Unbiased</td>
</tr>
<tr>
<td></td>
<td>• Even-handed</td>
</tr>
<tr>
<td></td>
<td>• Consistent</td>
</tr>
<tr>
<td></td>
<td>• Current</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design</th>
<th>How trustworthy is the design? – Whether or not the structure, functionality, aesthetic design, and interactivity of information and/or the website as a whole is:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Stable</td>
</tr>
<tr>
<td></td>
<td>• Consistent</td>
</tr>
<tr>
<td></td>
<td>• Reliable</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>How expert is the content? – Whether or not the message/information being provided in the website is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Informative</td>
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<tr>
<td>• Complete</td>
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<tr>
<td>• Comprehensive</td>
</tr>
<tr>
<td>• In-depth</td>
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<tr>
<td>• Accurate</td>
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<tr>
<td>• Correct</td>
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<tr>
<td>• Clear</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>How expert is the design? – Whether or not the structure, functionality, aesthetic design, and interactivity of information and/or the website as a whole is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Well-organized</td>
</tr>
<tr>
<td>• Easy to use</td>
</tr>
<tr>
<td>• Aesthetically put together</td>
</tr>
</tbody>
</table>

5.1.2 Process of WC

Process of WC is the second component of the new framework proposed in this dissertation research. It conceptualizes the process of how people identify and select credible information items to fulfill their information needs in the Web context. Based on the findings from the qualitative meta-study on existing theories and modes of Web credibility assessment (Phase I), two stages of Web credibility evaluations were identified: Initial Stage of Evaluation and Final Stage of Evaluation. The definitions of the stages, actions taken by users in each stage, and associated makers/cues and heuristics are provided in Chapter 4.

In a broad sense, Web credibility assessment is part of human information behavior that seeks, uses, and shares information in the Web context. The process of Web credibility assessment is thus influenced by various contextual, individual, and social variables that have impacts on information behavior. Thus, in the current dissertation research, one of the useful
models of information behavior in the everyday life context, ELIS model by Savolainen (1995) was employed as a theoretical framework, along with the new framework of Web credibility assessment (i.e., the WC framework), which was developed in Phase I.

Considering the close relationships between information behavior and credibility assessment, this section discusses how the new framework of Web credibility assessment can be ‘plugged into’ other theories and models of information behavior to better understand how people optimize the use of resources, including cultural/cognitive and social capital, to acquire necessary information in a given context. In particular, the two-stage model of Web credibility assessment described in the Process of WC (Table 4.4)—i.e., initial and final evaluations—is looked into in relation to existing theories of information behavior.

The “Information Foraging Theory” (Pirolli & Card, 1999), which addresses the overall processes of people’s information seeking and using, may be a good theoretical lens to understand the relationship between information behavior and information credibility assessment. Using the analogy of animals’ food seeking and prey selection (i.e., food foraging), the authors conceptualize people’s information-gathering and sense-making strategies with three concepts: (1) information patch, (2) information diet, and (3) information scent. The underlying assumption of the theory is that the optimal information forager (i.e., information seeker) would acquire the necessarily information at a minimal cost (e.g., time) within the given circumstances. By the analogy, information patches are various sources of information. For instance, when an information forager seeks certain information, he or she navigates different information patches such as piles of documents, books in libraries, and various online sources that may provide him or her with the relevant information for the given task. Pirolli and Card (1999) argue that the relevance of specific information patches (i.e., sources) may change depending on the context of
the task, in which the activity of information foraging is embedded. It is the same idea with how other theories and models see people’s information seeking behavior—i.e., context-dependent. For instance, the ELIS model by Savolainen (1995) focuses on people’s information behavior in the context of everyday life, as opposed to a work-related context.

*Information diet* explains the situation where an information forager selects and uses (consumes) certain information items from various information patches. Specifically, he or she has to make decisions of which information patch should be examined first, and whether they would focus on the chosen information patch (i.e., within-patch foraging) or move to another information patch (i.e., between-patch foraging) to seek information relevant to the given task (Pirolli & Card, 1999). In this process, the information forager estimates (defines) the potential ‘profitability’ of a certain information patch by considering the unit cost (e.g., time) of processing the source, and it is alike the energy returned from certain food (prey)—i.e., information diet.

When navigating through various information patches, the information forager often has to make the indirect, as opposed to direct, evaluation of information quality (or relevance) in an attempt to identify the most ‘profitable’ information patch among many. The authors conceptualize that the information forager would follow *information scents* (Pirolli, 1997) or *residues* (Furnas, 1997), which are imperfect representations of the information quality (or relevance) based on proximal cues. In the Web context, the proximal cues include source credentials, hyperlinks in a Website, and icons representing the sources (Pirolli & Card, 1999), which are closely related to the markers/cues and heuristics identified in the information credibility literature (Table 4.1). If using the analogy, credibility markers/cues may exude either a positive, negative, or even neutral ‘scent’ in sense-making around the relevant information to
the given task. Thus, Web credibility assessment could be understood as part of the process of following the “information scents” to find the most profitable, high quality “information diet” among the various types of “information patches.”

Applying the three main concepts of the Information Foraging Theory to interpreting the findings from Phase II, the research participants (i.e., older adults) navigated various types of online “information patches” such as websites run by government, academic institutions, and other non-profit organizations (e.g., NIH, CDC, Mayo Clinic, JHM, HMS), as well as some of the commercial sites (e.g., WebMD, Walgreens, CVS) to find the relevant information for their health information needs. In choosing and pursuing the information patches on the Web, older adults followed various “information scents” in terms of the perceived trustworthiness and expertise of the operator (source), content (message), and design (media). In other words, they used one or more of the six types of Web credibility markers/cues to identify the best “information diet” for the given task. Considering the current online information environment, in which users (i.e., online information foragers) have to seek out the relevant information from a great amount and variety of information sources, Web credibility assessment seems to be a crucial component of online information seeking.

Table 5.2 conceptualizes the relationships between the process of information behavior, especially information seeking in the Web context, and Web credibility assessment, based on the discussion above on the connections between the Information Foraging Theory by Pirolli and Card (1999) and the WC framework. As mentioned above, since this theory-synthesis exercise is still in the conceptual stage, future research should test and validate the conceptual relationship between the two theoretical frameworks with empirical data.
Table 5.2 Conceptual Relationship between Information Foraging Theory and WC framework

<table>
<thead>
<tr>
<th>Information Foraging Activities</th>
<th>WC Process</th>
<th>WC Assessment</th>
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<tbody>
<tr>
<td>Scent-following activities:</td>
<td>Initial Stage</td>
<td>• Source trustworthiness</td>
</tr>
<tr>
<td>• Information credibility scent</td>
<td></td>
<td>• Source expertise</td>
</tr>
<tr>
<td>• Information Diet</td>
<td></td>
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<tr>
<td>Enrichment activities:</td>
<td>Final Stage</td>
<td>• Source trustworthiness</td>
</tr>
<tr>
<td>• Information Patch</td>
<td></td>
<td>• Source expertise</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Content trustworthiness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Content expertise</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Design trustworthiness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Design expertise</td>
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</tbody>
</table>

5.1.3 Variability of WC

One of the three components of the WC framework, *Variability of WC*, accounts for the contextual and individual factors that have impacts on the overall process of Web credibility assessment. For instance, the qualitative meta-study on information credibility literature (Phase I) identified time, situational norm, topic, and goal as context-related factors; and demographics, motivation, ability, domain expertise, information literacy, and media reliance as user-related factors (Table 4.2). The findings from the semi-structured interviews with older adults in the current research (Phase II) showed that some of the contextual and individual variables might come into play when older adults assess the credibility of online health information. For instance, some of the informants paid attention to the information from their friends or family who were not experts in the medical field when it comes to seeking general wellness information (e.g., healthy diet, nutrition facts, and good exercise for elderly), while they did not necessarily trust them when they were supposed to figure out more critical health-related issues/problems (e.g., symptoms and cure for certain diseases)—i.e., context. Also, those who were suffering from a certain disease had more knowledge and experience with the disease than those who were not
involved with the disease, and, therefore, they were able and willing to judge the credibility of the content as well as the source and design of the online health information—i.e., involvement (user characteristic).

In addition to the aforementioned variables, one of the factors included in Savolainen’s (1995) ELIS model “social capital” seems to be a useful factor that can expand the perspective on the variability in Web credibility assessment. As defined above, social capital refers to “the nature of contact networks” (Savolainen, 1995, p. 269) and it is considered a significant factor that forms people’s “ways of life” and “mastery of life,” which influence their information behaviors in daily life settings. Using the categorization of the conceptual frameworks for information behavior by Pettigrew et al. (2001)—cognitive approaches examine “the individual as the main driving force behind information behavior” and social approaches examine “frameworks that focus on the social context” (p. 46)—the dynamic and variable nature of people’s Web credibility assessment could be further explained by social approaches that acknowledge the influences of social factors on information behavior.

More specifically, in the initial evaluation stage of the process of WC, people identify the lists of candidate websites that may be useful to fulfill their information needs. In this stage, several of the research participants in the semi-structured interviews mentioned that they might have a positive impression of a certain website if it was recommended by their trusted social contact networks such as doctors, partners, and friends. Even in the cases where they would not necessarily trust the recommended website, they mentioned that they would at least take a look at the site because they trust the recommenders. Thus, people’s social connects could have an effect on the initial stage of Web credibility assessment.
Wilson’s (1983) cognitive authority, defined as “influence on one’s thoughts that one would consciously recognize as proper” (p. 15), seems to be a useful concept that can add the social perspectives to the WC framework. Wilson (1983) says that a cognitive authority could be a friend, colleague, or expert, who has a significant effect on an individuals’ decision making. Thus, various types of interpersonal sources that one relies heavily on (e.g., doctors and partners) may have a significant impact on his or her Web credibility assessment. On the Web, cognitive authorities may be online communities for specific topics (e.g., a Facebook page for breast cancer).

The social approaches were useful to further interpret the interview data regarding older adults’ Web credibility assessment (Phase II). As mentioned above, older adults who were in a couple relationship tended to trust information from their partners. Thus, these people seemed to perceive a website credible if it was recommended by their partners; they were at least willing to spend time and effort to examine the recommended website for their information seeking. In addition, as shown in Table 4.9 above, those who were participating in local communities for specific diseases, such as a local chapter for the National Parkinson Foundation or a Facebook page for breast cancer, regarded their social networks within the communities as credible sources to acquire (and share) necessarily health information. Thus, recommendations from the communities where people are involved in could influence their initial choice of websites to seek for necessary health information.

In the new framework, therefore, the potential impacts of social factors (e.g., “cognitive authority” by Wilson, 2003; and “social capital” by Savolainen, 1995) on Web credibility assessment are taken into consideration as part of the Context. Table 5.3 provides the definitions and examples of variables that influence people’s Web credibility assessment process.
Table 5.3 Variability of Web Credibility Assessment

<table>
<thead>
<tr>
<th>Variability types</th>
<th>Variables</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Context           | User context | User’s environment that influence the process of Web credibility | • Time  
|                   | Task context | Types of tasks that influence the process of Web credibility | • Topic  
|                   | Social context | User’s social networks that influence the process of Web credibility | • Social capital (Savolainen, 1995)  
|                   |             |            | • Cognitive authority (Wilson, 1983) |
| User characteristics | Demographics | User’s demographic backgrounds that influence Web credibility assessment | • Age  
|                   | Involvement | The degree to which users know and care about specific topics under examination | • Motivation  
|                   | Technology proficiency | The degree to which users are familiar and comfortable with the technology (Internet) to identify, access, evaluate, and use information resources | • Domain expertise  
|                   |             |            | • Information literacy  
|                   |             |            | • Media reliance |

5.2 Characteristics of Older Adults’ ELIS

The second and third research questions examined older adults’ information behavior, especially health information behavior, in their everyday lives:

RQ2: In general, what are older adults’ common (everyday life information seeking: ELIS) information needs?

RQ3: What are older adults’ health information needs and related information behaviors?

RQ3-1: What sources do older adults use to find health information both on- and offline, and why do they use those sources?

RQ3-2: How do they use the information they find?
As reported in Chapter 4, the research participants mentioned various topics of information needs, such as health/wellness, travel, culture/education, finance, entertainment, and others. Particularly, health/wellness seemed to be the most important topic of ELIS for older adults, as it was mentioned by all of the research participants in the study. Furthermore, there were some characteristics in their health information seeking behaviors that encompass not only the ‘purposive’ meaning of information-seeking, but also the ‘passive’ ways of acquiring health information—the latter is termed *incidental information acquisition* (Williamson, 1998) or *accidental information discovery* (Wilson, 1977). Using the Savolainen’s (1995) ELIS model that guided the current research in understanding older adults’ information behaviors in the everyday life settings, the serendipitous way of health information acquisition is regarded as part of ‘orienting’ information seeking, as opposed to ‘practical’ information seeking. As part of health information behavior, older adults used and shared the acquired health information with people in their social networks, as well. The subsequent sections provide discussions on: (1) older adults’ health and wellness information needs in their daily lives; (2) the characteristics of their orienting and (3) practical information seeking behaviors to fulfill health/wellness-related information needs; and (4) the ways that older adults use (act on) and share the acquired health/wellness information.

### 5.2.1 Older Adults’ Health/Wellness Information Needs

As reported in Table 4.13, the most frequently mentioned type of information needs by the research participants was health and wellness. Considering the sampling criteria of the research (i.e., older adults’ who have looked for health information online over the past 6 months), it was not a surprising result that all the research participants (21 out of 21; 100%) had sought health/wellness information in their daily lives. Beyond as a requirement for participating
in the study, each of the participants showed strong interests and/concerns with various health/wellness-related topics, which made them seek for necessary health information. Health topics mentioned included medication and supplements; diseases and symptoms; verifying and/or understanding doctor’s notes; health insurance; healthy diet and nutrition facts; exercise; and even pets’ health.

The finding that shows older adults’ interests and concerns in health/wellness-related topics was in line with previous studies on older adults’ information needs and information seeking behaviors (Fox & Duggan, 2013; Hirth, Czaja, & Sharit, 2007; Su & Conaway, 1995; Williamson, 1998). For instance, Williamson (1998) reported that all of the 202 research participants who were 60 years old and older highlighted “health” as an important topic of information needs in their daily lives, along with “income and finance.” More recently, Fox and Duggan (2013) found that approximately 58% of Internet users who were 65 years old and older looked for health information online as of 2012. The health topics identified in this study were almost the same as those found in the current dissertation research: specific disease or medical problem (55%); certain medical treatment or procedure (43%); how to lose weight or how to control your weight (27%); health insurance (25%), and so on.

Hirth et al. (2007) found that older adults aged from 55 to 80 years old looked for health information to better understand doctor’s notes. They gathered some background information of the given health topic before they went to see a doctor, so that they could ask more specific questions in the meeting with the doctor. They also sought for further information about the topic after the visit. This type of health information seeking behavior was often found in the group of people who were categorized into the cognitive type of “mastery of life” such as O-C and P-C in the current study (see Section 4.2.2 Way of Life and Mastery of Life). In particular, those who
were cognitive and optimistic towards the information-seeking tasks often mentioned that they attempted to double check all the health information that obtained from others, including doctors. They preferred to validate health information by themselves by consulting with multiple sources of information on the Web.

5.2.1.1 Health condition and health information needs. Most of the research participants (17 out of 21; 81.0%) were suffering from some of the chronic geriatric diseases and/or had experienced more serious diseases and illnesses such as cancer. The interview data showed that those who were having such health issues were mainly interested in getting information that was useful to deal with their health conditions, rather than more general wellness-related information, while those who explicitly mentioned that they were healthy or who did mention any specific health-related issues were interested in getting more general wellness-related information (e.g., healthy diet, exercise). This finding can be understood within the model of ELIS by Savolainen (1995). He pointed out that one’s “current situation of life” is an important individual factor that has a significant impact on his or her ELIS along with other factors such as material, cultural/cognitive, and social capital. Since the focus of the current study was on health-related information behavior, one’s health condition was considered an important aspect that shows the current situation of his or her life.

Zhang (2014) also highlighted that people’s health information behaviors are affected by not only the characteristics of sources or the relevance and usefulness of the content itself, but also the characteristics of users, such as knowledge status, personal preference, socioeconomic status (SES), intention, characteristics of the health problem and information needs, problematic situation. Among these factors identified in her study, the characteristics of the problematic situation—whether it is acute or chronic; severe or not; common or rare; stigmatized or not—are
useful to understand the findings from the current study regarding the difference in the types of health information needs between those who were having/had serious health issues and those who were relatively healthier.

5.2.1.2 Social contact network and health information needs. Older adults sought for health/wellness-related information not only for themselves, but also for others such as partners (7 out of 21; 33.3%), other family members (5 out of 21; 23.8%), and friends (1 out of 21; 4.8%); there were three participants who mentioned information needs for their pets (14.3%). In particular, as reported in Chapter 4, partners were the second most frequently mentioned interpersonal sources for health information in the current study, after medical professionals (e.g., doctors and physicians), and one in a couple relationship played the main role as an information ‘provider’ for the other in the relationship. These findings implied that older adults’ social contact networks, especially the partner relationships, would have a significant impact on the types of information needs, and for the opposite ends (i.e., information ‘receivers’), information seeking behaviors, as well. Based on the ELIS model (Savolainen, 1995), the nature of contact networks (i.e., social capital) seemed to be a crucial factor that influenced older adults’ information behaviors, considering their relatively narrow social contact networks due to the limited social activities—as mentioned above, the research participants were all retirees. Zhang (2014) also found that whether the search is for self or for others was a situational factor that formed the characteristics of information needs.

5.2.2 Orienting Information Seeking (Incidental Information Acquisition)

Orienting information seeking in ELIS is closely related to how one’s daily life is organized (i.e., “Way of Life”), which may be reflected by the relationship between work and leisure, models of consumption, and the nature of hobbies (Savolainen, 1995). This type of ELIS
is more passive than *practical information seeking*, which is to seek for specific information to solve problems, and can be seen as *incidental information acquisition* (Williamson, 1998) or *accidental information discovery* (Wilson, 1977). The following subsections discuss about some of the characteristics of older adults’ orienting information seeking behaviors found in the interview data.

**5.2.2.1 Non-expert interpersonal sources.** For orienting health information needs (e.g., general knowledge about healthy food, nutrition facts, news about drugs and supplements), older adults were relatively more open to the information from their social connections, such as family and friends, who were not experts in medicine, than when they were seeking for practical health information. In this study, social networking was the most frequently mentioned type of daily activities for older adults (17 out of 21; 81%), meaning that older adults spent their leisure time with their friends talking about various topics in their everyday lives. Through the social networking activities, they not only sought for practical information regarding their common health/wellness issues, but also they incidentally ‘picked up’ unexpected information. For instance, P08 (Female, 69) mentioned that she incidentally acquired health information about the effect of biotin as a supplement for healthy hair in a casual conversation with her friends. In other words, even though she did necessarily needed or particularly asked for the information regarding biotin, she became to have the information from the social connections. She said that she searched the Internet for more information about biotin to verify the information from her friend, who was non-expert in the medical field.

This type of information acquisition was based on the nature of social contact networks in the informants’ everyday life. In particular, as mentioned above, partners were one of the important non-expert interpersonal sources for health information seeking for older adults. Also,
local communities for specific diseases/illnesses served as sources for health information seeking for older adults, as well. For instance, P13 (Female, 80) was participating in the local chapter for the National Parkinson Foundation in Tallahassee. Even though the main purpose of the local chapter was to share useful information regarding Parkinson disease, it also played a role as a social network, in which people who were in similar situations get together and develop a bond of sympathy between members of the group—the informant considered it “a cordial retreat.” This type of social connection provided the participant with the opportunities to gather unsolicited information.

However, even though the participants in the study identified their non-expert social connections as useful sources of health information, they did not rely solely on the information from them. Rather, the ‘unexpected’ or ‘unsolicited’ new information from the non-expert interpersonal sources (i.e., orienting information seeking or incidental information acquisition) intrigued them to actively seek for further information to verify it (i.e., practical information seeking). Thus, as Savolainen (1995) mentioned, the two different types of information seeking seemed to be closed related to each other.

**5.2.2.2 Cognitive hobbies.** Older adults often obtained orienting health information through their hobbies. Savolainen (1995) classifies individuals’ orientations to media use, which is a crucial aspect of information seeking, into three categories by the nature of hobbies: cognitive oriented, balanced, and affective oriented. As reported in Table 4.11, cognitive types of hobbies included learning new things, reading books on cultural and scientific topics, and reading newspapers to keep up with current affairs and cultural/social issues through TV or radio; affective type of hobbies included playing games, enjoying entertaining programs on TV and radio, watching movies, and listening music.
Even though the research participants were overall well educated—71.4% (15 out of 21) graduated from a college—those who had relatively higher educational backgrounds (college graduate or higher) seemed to have cognitive types of hobbies more often than those who had relatively lower educational backgrounds (some college experience or high school graduate). More specifically, 80% (12 out of 15) of the research participants who graduated from a college (bachelor, master, and/or doctorate degree holders) mentioned that they enjoyed cognitive types of hobbies such as reading newspapers and online new articles on current issues, reading books on various topics (e.g., history, archeology, medicine, and so on), watching TED talks online, and taking online courses. However, only 33.3% (2 out of 6) of those who did not graduate from a college (some college and/or high school graduates) had cognitive types of hobbies (Table 4.11). In terms of affective and social types of hobbies, most of the participants seemed to enjoyed these types of hobbies in their everyday lives: 85.7% (18 out of 21) of the research participants mentioned the affective types of hobbies; and 95.2% (20 out of 21) mentioned the social types of hobbies.

Thus, even though it is hard to generalize this finding with the limited sample size, it seemed that those who had experiences in higher education tended to have both cognitive and affective types of hobbies, while relatively less educated people were more into the affective type of hobbies (Table 4.11). Given that the nature of hobbies is one of the important cues that simply show how individuals organize their daily lives (Savolainen, 1995), which then directs their information behaviors, especially source selection (Zhang, 2014), those who read books and newspapers on various topics including health and wellness would have more opportunities to incidentally (and purposefully) acquire reliable health information than those who only enjoy affective hobbies.
5.2.2.3 Additional training and research-related activities. Except one participant who worked as a nurse, none of them had formal school trainings or occupational experiences in the medical field. However, there were some participants who had accumulated a substantial amount of medical knowledge by participating in additional training activities such as the standardized patient program and the Red Cross training in first aid, and even participating in a long-term research project in a medical school as a participant. These additional training and research-related activities provided them with the opportunities to obtain more in-depth medical knowledge, such as symptoms and cures for certain diseases of which they played a role as a patient having the diseases in the standardized patient program and even (incidentally) acquired knowledge about typical medical procedures. These people showed self-confidence in seeking and understanding health and wellness information. This finding is supported by the literature on the effects of health literacy programs for older adults. In particular, Xie (2011b) found that their health literacy intervention significantly improved the research participants’ \((M = 69.99; SD = 8.12)\) knowledge, skill, and eHealth literacy efficacy.

These people were all highly educated (holding a bachelor or a higher level degree) and all had cognitive types of hobbies such as reading newspapers and books. Thus, cognitively-oriented, rather than affectively-oriented, individuals seemed to be more often and naturally exposed to the environment where they can acquire orienting health information purposefully as well as incidentally.

5.2.3 Practical Information Seeking

Practical health information seeking happens when people need health information to deal with specific medical issues and problems. For this type of information need, people ‘purposefully’ seek information to find answers, reduce uncertainty, and make sense of the given
health issues/problems that they are facing (Case, 2012). Since practical health information seeking is more contextualized in specific problem-solving situations than orienting information seeking, it is important to understand how people approach their problems in their everyday lives—“mastery of life” (Savolainen, 1995). As mentioned above, “mastery of life” may be understood as individuals’ information-seeking styles in terms of two dimension: (1) whether they are cognitive or affective (emotional); and (2) whether they are optimistic or pessimistic towards the solvability of the problem (Savolainen, 1995). As mentioned, even though categorizing the research participants’ “mastery of life” types was not the main purpose of the current research, the exercise of analyzing the participants’ coping styles towards problem-solving situations allowed the researcher to provide more in-depth interpretations of the interview data. Thus, the characteristics of older adults’ health information behavior, including Web credibility assessment, were understood in relation to their “mastery of life” types in some of the following subsections.

5.2.3.1 Medical professionals as the primary source for practical health information seeking. Considering the potential lethality of the misinformation of health issues, most of the research participants regarded medical professionals such as doctors and primary care physicians as the most reliable sources for practical health information seeking. They went to see a doctor, rather than referencing family’s or friends’ advice or searching online sources by themselves when they needed information about ‘acute’ or ‘serious’ health issues that might affect their health condition in a negative way. In particular, when they were suffering from certain chronic diseases and/or had experienced serious illnesses that needed to be monitored in their everyday lives (e.g., cancer), they tended to rely on the information from their doctors, who had been giving them medical treatments regarding their medical conditions. In this case, they were
supposed to take medicines and have regular checkups. As older adults often suffered from minor and major illnesses and ailments, individuals’ health conditions seemed play an important role in seeking practical health information, especially in choosing the primary source for health information. A previous study on older adults’ health information use also found that regardless of whether they were online users or non-users, they relied mostly on their health care providers than any other types of sources such as pharmacist; newspapers and popular magazines; medical journals, medical books, and popular books; television and radio; and friends and family (Taha et al., 2009).

This information seeking behavior, however, seemed to be context-dependent. More specifically, the seriousness of the given situation and privacy concerns seemed to influence older adults’ behaviors in source selection. Getz’s (2010) study on Israeli older adults’ legal information seeking behaviors found that older adults preferred to receive information from informal sources, such as family members and mass media, over formal sources, such as counselors from the National Insurance Institute and the Citizens’ Information Service. Getz and Weissman (2010) mentioned that older adults in the study were cautious about the situation where their problems were exposed to other people. Thus, unless they perceived the difficulties in receiving necessary information from informal sources, they were reluctant to consult with experts on the given topic area. This tendency that older adults preferred informal sources for information seeking was also found in Su and Conaway’s (1995) study focused on Chinese older adult immigrants’ information seeking behaviors: the participants in the study not only used their family and friends as information sources for various topics of information needs including health most frequently, but also they perceived them as more helpful sources than experts.
Based on these results, the Internet could be a useful channel for older adults who are seeking information for relatively less acute and less serious medical issues/problems. If they have sufficient levels of familiarity and confidence in using IT technologies, they could take advantage of the anonymity of the Internet to obtain necessary information on the Web.

5.2.3.2 Partner as a source or an object of practical health information seeking.

Those who were in partner relationships mentioned that their partners were either the most reliable source for practical health information (i.e., partner as an information provider) or the object of information provision (i.e., partner as an information receiver). In the former case, they relied heavily on the health information from their partners based on accumulated trust over a long period of time, rather than their expertise in the given topic—when asked about their partners’ educational backgrounds or occupational experiences, they were not necessarily experts in the medical fields. On the opposite end, their partners were the dependents to whom they were providing information for various topics including health and wellness.

Looking into the potential factors that might affect the role allocation in the couples’ health information seeking, being either information provider or receiver, “mastery of life” and “Internet usage” seemed to be important factors; other factors, such as gender, age, education level, and occupational experience, which were initially assumed to be influential to the role allocation in a couple relationship, did not seem to be useful to explain these cases in the study. Overall, those who were more optimistic towards information-seeking situations (i.e., “mastery of life”) played the role as “information provider” in the couple relationships, while those who were pessimistic and/or affective played the role as “information receiver” in the current study (Table 5.4). In addition to the three couples who participated in the current study together, there were five more participants who mentioned that they were the primary health information
providers for their partners in their everyday lives. They all showed strong self-confidence in practical information seeking based on their cognitive/cultural capital (e.g., educational and occupational experiences).

Furthermore, each of the three couples had the same orientation towards the nature of information sources—cognitive vs. affective. In other words, both in a couple were either cognitive or affective together; there was no couple that had different orientation in terms of cognitive vs. affective. Thus, those participants who were more optimistic in practical health information seeking seemed to play the information provider role in their couple relationships.

Lastly, all the “information providers” in the current study used the Internet more hours a week than their partners did. Even though it is yet premature to generalize the relationships between the couple role allocation, “mastery of life” types, and Internet usage given the small sample of couples in the dataset (i.e., three couples), it seemed that those who were more familiar with the Internet and Web-based resources tended to have higher confidence in seeking necessary information online and played the role as “information providers” for their partners (i.e., “information receivers”). Future research will need to examine the role allocation patterns in older couples’ information behaviors with a large amount of quantitative data, yielding generalizable findings.

<table>
<thead>
<tr>
<th>ID</th>
<th>Age</th>
<th>Gender</th>
<th>Education</th>
<th>Occupation</th>
<th>Internet Use (hours a week)</th>
<th>Mastery of Life</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>P05</td>
<td>72</td>
<td>F</td>
<td>Some college</td>
<td>Not specified</td>
<td>20+</td>
<td>DA</td>
<td>Provider</td>
</tr>
<tr>
<td>P06</td>
<td>75</td>
<td>M</td>
<td>High school</td>
<td>Not specified</td>
<td>1-5</td>
<td>PA</td>
<td>Receiver</td>
</tr>
<tr>
<td>P09</td>
<td>70</td>
<td>M</td>
<td>Doctorate</td>
<td>Attorney</td>
<td>20+</td>
<td>OC</td>
<td>Provider</td>
</tr>
<tr>
<td>P08</td>
<td>69</td>
<td>F</td>
<td>Doctorate</td>
<td>Artist</td>
<td>11-15</td>
<td>PC</td>
<td>Receiver</td>
</tr>
<tr>
<td>P15</td>
<td>79</td>
<td>F</td>
<td>Some college</td>
<td>Researcher</td>
<td>16-20</td>
<td>OC</td>
<td>Provider</td>
</tr>
<tr>
<td>P16</td>
<td>78</td>
<td>M</td>
<td>Doctorate</td>
<td>Attorney</td>
<td>1-5</td>
<td>PC</td>
<td>Receiver</td>
</tr>
<tr>
<td>P01</td>
<td>64</td>
<td>F</td>
<td>Bachelor</td>
<td>Writer</td>
<td>20+</td>
<td>OC</td>
<td>Provider</td>
</tr>
</tbody>
</table>
Table 5.4 – Continued

<table>
<thead>
<tr>
<th>ID</th>
<th>Age</th>
<th>Gender</th>
<th>Highest Degree</th>
<th>Occupation</th>
<th>Experience</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>P03</td>
<td>71</td>
<td>M</td>
<td>Doctorate</td>
<td>Professor</td>
<td>16-20</td>
<td>OC</td>
</tr>
<tr>
<td>P11</td>
<td>67</td>
<td>F</td>
<td>Master</td>
<td>Not specified</td>
<td>6-10</td>
<td>DA</td>
</tr>
<tr>
<td>P17</td>
<td>65</td>
<td>F</td>
<td>Bachelor</td>
<td>Government</td>
<td>11-15</td>
<td>OC</td>
</tr>
<tr>
<td>P20</td>
<td>61</td>
<td>F</td>
<td>Master</td>
<td>Government</td>
<td>20+</td>
<td>OC</td>
</tr>
</tbody>
</table>

Note. There are three couples who participated in the study together. IDs of these couples are noted with superscripts, such as c1, c2, and c3, to indicate the couple relationships. The shaded cells in the table indicate the participants who played the role as “information provider” for their partners in the couple relationships.

5.2.3.3 Online sources for practical health information seeking. The informants utilized various Web resources to find factual information, seeking answers for specific questions. In particular, many of them mentioned that they went online to verify certain health information that they acquired from the non-expert interpersonal sources such as their family and friends. Furthermore, there were some participants (8 out of 21; 38.1%) who sought health information to verify and/or make sense of what doctors said to them (e.g., diagnosis, prescription). These people were all categorized in the cognitively-oriented “mastery of life” types, regardless of whether they were optimistic (i.e., optimistic-cognitive) or pessimistic (i.e., pessimistic-cognitive) about the solvability.

In general, the research participants highly valued the websites run by government (e.g., NIH, CDC) and academic institutions (e.g., JHM, HMS), as these types of websites were seen as the Web representations of the highly respected organizations and institutions outside of the Web. Some participants mentioned that they trust the health information from these websites because it is based on research, rather than opinion, and their main intent is on improving public health and wellness, rather than selling their products.

Also, some of the research participants considered the health information from official associations for certain diseases (e.g., the American Association for Cancer Research, the American Arthritis Society, and the National Parkinson Foundation) useful and reliable sources that can be used for health information seeking. Similarly to the reasons for using .gov and .edu
sites, older adults liked the ‘non-commercial’ nature of the associations, as well as the research-based information provision. Another important reason for using medical associations’ websites mentioned was that they were able to share information with other patients (or caregivers) who were suffering from the same ailments or diseases. This seemed to be more useful for them to obtain the most recent as well as specific information about their information needs.

When asked about social media as a source of health information, most of the research participants showed skeptical responses. Even those who were using social media such as Facebook or Twitter in their everyday lives pointed out that social media posts are often based on personal opinions rather than facts—lack of expertise. Moreover, some older adults highlighted privacy issues in using social media for health information seeking, as they were concerned with the possibility that their medical situations may be disclosed to unwanted groups of people.

Only a few mentioned that they looked at Facebook pages for certain health-related topics such as breast cancer and Lymphedema. However, even those who were using social media for health information seeking tended to consider social media a means for connecting with other people who had the same diseases or for sharing the information with their friends or family.

Lastly, even though most of the research participants preferred non-profit websites (i.e., .gov, .edu, and .org sites), there were some participants who were using commercial websites (i.e., .com sites) for health information seeking. The most frequently mentioned .com site by the research participants in this study was WebMD, which provides health/wellness-related news and information on a variety of topics. Another type of commercial site mentioned was pharmacists’ sites such as Walgreens and CVS. They were using these websites to have information about prescriptions and to compare prices of medications they take.
5.3 Older Adults’ Credibility Assessment of Online Health Information

This section provides discussion on the findings from Chapter 4, which answered the last set of research questions:

RQ4: How do older adults assess the credibility of health-related information on the Web?

RQ4-1: What are older adults’ perceptions of Web credibility?

RQ4-2: What are some of the psychological, social, and/or cultural mechanisms that underlie and/or affect those perceptions?

RQ4-3: What are some of the markers/cues and heuristics used by older adults to assess the credibility of health-related websites?

As discussed in 5.1.2 Process of WC, assessing information credibility is an important part of people’s information behavior. The interview data revealed major topics for information needs in older adults’ everyday life, including health-/wellness-related topics, and several different information-seeking strategies older adults used to fulfill their health information needs. As for the -based resources for health information seeking, all the research participants recognized the importance of and difficulties in identifying credible sources for health information on the Web. Various types of credibility markers/cues and heuristics were mentioned by the research participants in terms of operator (source), content (message), and design (media). The following sections (1) look into older adults’ perceptions of the credibility markers/cues and heuristics based on the six types of WC assessment, combining the verbal interview data and ratings on the Likert-type items; (2) provide a discussion on the variability of Web credibility assessment from both empirical and theoretical perspectives; and (3) discuss the
process of older adults’ Web credibility assessment using the two-stage model in the WC framework.

5.3.1 Credibility Markers/Cues and Heuristics

Overall, the ratings on the 35 items by the research participants (Table 4.16) were in line with what they mentioned in the interviews (Table 4.15). Using the six types of Web credibility proposed in the WC framework, operator-related credibility markers/cues (e.g., commercial intent and credentials of the operator or author) were mentioned in the interviews more frequently than other types of credibility markers/cues (i.e., content- and design-related credibility markers/cues); related items based on Likert-type scales were also rated as the most influential in older adults’ Web credibility assessment. However, relatively fewer people mentioned design-related credibility markers/cues (e.g., real-world feel, aesthetic design of a site) as being influential in their Web credibility assessment (Table 4.15).

5.3.1.1 Operator expertise. Regarding the ratings and comments on the credibility markers, the participants seemed to perceive expert knowledge in the given topic area as the most important characteristic that boosts the credibility of online health information. As mentioned above, many of the research participants had suffered from serious illnesses/diseases (e.g., cancer) and/or had some chronic diseases as well. Also, they showed great concerns about geriatric diseases they might be diagnosed with in the future. Therefore, most of them were interested in having health information about new medicines and supplements that would be helpful for them to control and cure the diseases/ailments from which they were suffering or which they might prevent themselves from having in the future. Considering the potentially lethal effects of incorrect health information on human life (Gustafson & Wyatt, 2004), it seemed the expertise of the health information provider was considered the prerequisite to be assured of
the information’s credibility. As reported above, many participants in the interviews mentioned they would rely on their doctors’ information, rather than information from the Web, especially in regard to information about serious health-related issues. Thus, the ratings in Table 5.5 seem to directly reflect the participants’ perceptions of health information credibility.

<table>
<thead>
<tr>
<th>No.</th>
<th>Item wordings</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>D19</td>
<td>The site is by an organization that is well respected outside of the Internet.</td>
<td>4.76</td>
</tr>
<tr>
<td>D03</td>
<td>The site lists authors’ credentials for each article.</td>
<td>4.48</td>
</tr>
<tr>
<td>D07</td>
<td>The site was recommended to you by a doctor.</td>
<td>4.48</td>
</tr>
<tr>
<td>D17</td>
<td>The site represents an organization you respect.</td>
<td>4.43</td>
</tr>
<tr>
<td>D23</td>
<td>The site is linked to by a site you think is believable.</td>
<td>3.95</td>
</tr>
<tr>
<td>D06</td>
<td>The site was recommended to you by a friend (non-expert).</td>
<td>3.14</td>
</tr>
<tr>
<td>D25</td>
<td>The site displays an award it has won.</td>
<td>3.00</td>
</tr>
</tbody>
</table>

5.3.1.2 Operator trustworthiness. Credibility markers/cues regarding the operator’s trustworthiness also had an impact on older adults’ credibility perception of online health information. As shown in Table 5.6 below, the three reversely worded items (D12, D27, and D29) regarding operator trustworthiness were perceived very negatively; in other words, these items had significant impacts, as opposed to being ignored or perceived as neutral.

As emphasized in the interviews, older adults paid close attention to whether the website (or other Web-based source) tried to sell something to them or promote public interests (i.e., the presence or absence of commercial intention). More specifically, 90.5% (19 out of 21) of participants highlighted they preferred health information from academic institutions (e.g., JHM and HMS) or government research centers (e.g., NIH and CDC) because of their “healthy” intentions (i.e., operator trustworthiness), in addition to their expertise and reputations (i.e., operator expertise). Based on the ratings reported in Table 5.5 and Table 5.6, as well as their
comments in the interviews in Table 4.13, older adults seemed to evaluate online health information based mainly on operator (i.e., source)-related markers/cues. This tendency is not new to the credibility literature; rather, it seems reasonable, as the concept of Web credibility is rooted in the source’s credibility in interpersonal communication settings, as reviewed in Chapter 2 (Table 2.1).

Table 5.6 Ratings on Operator’s Trustworthiness-Related Items

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Rating</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>Median</td>
<td>SD</td>
</tr>
<tr>
<td>D08</td>
<td>The site represents a nonprofit organization.</td>
<td>3.86</td>
<td>4.00</td>
<td>.727</td>
</tr>
<tr>
<td>D10</td>
<td>The URL for the site ends with “.org”</td>
<td>3.67</td>
<td>3.00</td>
<td>.796</td>
</tr>
<tr>
<td>D13</td>
<td>The site requires a paid subscription to gain access.</td>
<td>2.33</td>
<td>3.00</td>
<td>.796</td>
</tr>
<tr>
<td>D12</td>
<td>*The site has one or more ads on each page.</td>
<td>1.81</td>
<td>2.00</td>
<td>.814</td>
</tr>
<tr>
<td>D27</td>
<td>*The site has a commercial purpose (as opposed to academic).</td>
<td>1.71</td>
<td>2.00</td>
<td>.845</td>
</tr>
<tr>
<td>D29</td>
<td>*The site automatically pops up new windows with ads.</td>
<td>1.24</td>
<td>1.00</td>
<td>.539</td>
</tr>
</tbody>
</table>

Note. An asterisk (*) indicates negatively rated items.

5.3.1.3 Content trustworthiness. As shown in Table 5.7, content trustworthiness-related credibility markers/cues seemed to have significant impacts on older adults’ perceptions of health information credibility. Specifically, the research participants seemed to perceive health information that has an unbiased orientation, covering different perspectives on the given issue, as a positive characteristic of credible health information on the Web (D34, $M = 4.43$, $SD = .746$).

As discussed above, the participants in the current study had well-established cognitive/cultural backgrounds in terms of education level and occupational experience (Table 4.8). Also, many of them had cognitive types of hobbies such as reading books on varied topics, including health and wellness (Table 4.11), which provided them with the opportunity to acquire knowledge on the topics with which they were concerned. In particular, those who were characterized as the O-C “mastery of life” type (52.4%) preferred to gather necessary
information from multiple sources, including both interpersonal (e.g., doctors) and Web sources, and to verify whether the obtained information was supported by other sources. As quoted in Chapter 4, there were some participants who did not automatically trust health information even from a doctor; rather, they did further research on the given topic to verify and make sense of the information. These user characteristics might influence the research participants’ conceptualization of health information’s credibility, as well as how they verify the credibility of online health information (i.e., their process of Web credibility assessment). In other words, these people seemed to prefer judging the credibility of online health information for themselves, examining multiple sources for verification, rather than relying on others’ suggestions.

“Cross-referencing multiple resources” seems to be one of the common strategies people employ when seeking necessary information. For instance, Rieh and Hilligoss (2008) reported most of the college students in their study assessed the credibility of the information they found by checking multiple sources, as they believed judging information credibility could not be done solely based on a single source’s argument. This credibility assessment strategy was also found in Yi, Stvilia, and Mon’s (2012) study in which 45% of the research participants perceived online health information as more trustworthy when the information was presented on multiple websites; the authors used the term “duplication” (p. 49). People’s “cross-referencing multiple resources” behavior is also in line with one of the credibility heuristics mentioned in Sundar’s (2008) MAIN model, the bandwagon heuristic, in that people tend to perceive certain information as more credible if it is considered credible by other people. In the SNS contexts, this heuristic can be operated in the forms of “social validation” (Jessen & Jørgensen, 2012) and “social annotations” (Kulkarni & Chi, 2013). Based on the interview data of the current study,
content trustworthiness-related credibility markers/cues and heuristics were used in the final evaluation stage using the two-stage model in the WC framework.

Table 5.7 Ratings on Content Trustworthiness-Related Items

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Rating</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>Median</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>D34</td>
<td>The site tries to cover all the different approaches to the issue.</td>
<td>4.43</td>
<td>5.00</td>
<td>.746</td>
<td></td>
</tr>
<tr>
<td>D22</td>
<td>The site states its policy on content.</td>
<td>4.05</td>
<td>4.00</td>
<td>.805</td>
<td></td>
</tr>
<tr>
<td>D33</td>
<td>The site provides information that is neutral.</td>
<td>4.05</td>
<td>4.00</td>
<td>.805</td>
<td></td>
</tr>
<tr>
<td>D09</td>
<td>The site has ratings or reviews of its content.</td>
<td>3.95</td>
<td>4.00</td>
<td>.805</td>
<td></td>
</tr>
<tr>
<td>D05</td>
<td>The site has been updated since your last visit.</td>
<td>3.90</td>
<td>4.00</td>
<td>1.261</td>
<td></td>
</tr>
<tr>
<td>D24</td>
<td>The site provides links to its competitors’ sites.</td>
<td>3.33</td>
<td>3.00</td>
<td>.856</td>
<td></td>
</tr>
<tr>
<td>D15</td>
<td>*The site is rarely updated with new content.</td>
<td>1.38</td>
<td>1.00</td>
<td>.498</td>
<td></td>
</tr>
</tbody>
</table>

Note. An asterisk (*) indicates negatively rated items.

5.3.1.4 Content expertise. Content expertise concerns both scientific evidence provisions for content and intrinsic quality. As reported in Table 5.8, the research participants were concerned about whether the health information they found on the Web was based on scientific evidence or someone’s personal opinion (D02, $M = 4.43; SD = .746$). The interview data also showed older adults paid attention to content expertise when they sought health information on the Web; 52.4% (11 out of 21) of the interviewees mentioned credibility markers/cues regarding content expertise (Table 4.15).

Furthermore, from looking at the ratings in Table 5.8 below, a website would be seen as much less credible if it had typographical errors (D30, $M = 1.24; SD = .530$). This finding is also in line with previous studies regarding the effects of surface credibility markers on websites’ credibility: Fogg et al.’s (2001) study, which analyzed ratings on credibility markers/cues collected from 1,410 people ($M = 33$ years old), showed having typographical errors on a website significantly decreased users’ perceptions of the site’s credibility; in Choi’s (2013) study
with older adults ($M = 71.6$ years old), the same item (i.e., having typographical errors) was rated as the most negative credibility marker/cue among 57 items on the questionnaire. These findings were well supported by several participants’ comments in the semi-structured interviews that, regardless of whether the content was good or not, the intrinsic quality of the content influenced their perception of the health information’s credibility:

“I guess probably it’s more negative if it’s poorly written, if there are errors in grammar, syntax, and punctuation. I immediately discount [the credibility of the information]. I just do that automatically with everything. I really suspect when people don’t write well” (P07, Female, 72).

As the excerpt from the interview above simply shows, the intrinsic quality of health information appeared to be considered a basic requirement for providing credible health information on the Web, as having no typos may or may not increase the perceived credibility of the site, but having typos or any other errors would significantly decrease its credibility.

Table 5.8 Ratings on Content Expertise-Related Items

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Rating</th>
<th>M</th>
<th>Median</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>D02</td>
<td>The site has articles containing citations and references.</td>
<td>4.43</td>
<td>5.00</td>
<td>.746</td>
<td></td>
</tr>
<tr>
<td>D32</td>
<td>This site is complete in the information it provides.</td>
<td>4.24</td>
<td>4.00</td>
<td>.831</td>
<td></td>
</tr>
<tr>
<td>D26</td>
<td>The site is small (e.g., less than five pages).</td>
<td>2.95</td>
<td>3.00</td>
<td>.590</td>
<td></td>
</tr>
<tr>
<td>D16</td>
<td>*The site links to a site you think is NOT credible.</td>
<td>1.48</td>
<td>1.00</td>
<td>.602</td>
<td></td>
</tr>
<tr>
<td>D30</td>
<td>*The site has typographical errors.</td>
<td>1.24</td>
<td>1.00</td>
<td>.539</td>
<td></td>
</tr>
</tbody>
</table>

*Note. An asterisk (*) indicates negatively rated items.*

5.3.2 Credibility Markers by User Characteristics: Variability of WC

Even though no inferential statistics were conducted to compare the ratings by subgroups due to the small sample size of the study, there were two factors that might have had significant
impacts on older adults’ Web credibility assessment if the sample size were large enough to carry out inferential statistics: (a) “mastery of life” and (b) Internet usage. More specifically, one participant (n = 1) who had relatively less educational experience (high school graduate) than the other participants in the study showed the typical characteristics of the P-A type “mastery of life” such as heavy reliance on others for information seeking in everyday life settings and lack of confidence and appreciation of systematic and cognitive information seeking. On the ratings by the orientation of the items (i.e., positive, neutral, or negative), this participant’s (P-A) ratings on the positive credibility markers/cues were lower than those on the same items by the other three groups (i.e., O-C, O-P, and D-A). As shown in Table 4.17, his average ratings on the positive items was $M = 3.37$, while the other groups’ average ratings were $M = 4.15$ (O-C), $M = 4.02$ (P-C), and $M = 4.34$ (D-A); however, his ratings on the negative items ($M = 1.70$) were similar to the other groups’ ratings: $M = 1.76$ (O-C), $M = 1.67$ (P-C), and $M = 1.30$ (D-A). As shown in Figure 4.1, the P-A type of participant’s range of average ratings on the positive and negative items was narrower than other “mastery of life” types’ ranges. This simply showed the P-A type of participant’s suspicion about the credibility of online health information and his inability to distinguish the positive credibility markers from the negative markers. His comments made in the interview also supported these findings that he did not trust information on the web because of the difficulties in distinguishing the “trustworthy” and “expert” health information from false information and/or layman’s opinion. Considering the relatively lower Internet usage of this participant (1–5 hours a week) compared to other participants (median = 6, indicating 16–20 hours a week), his relatively lower familiarity with the Internet might also come into play in forming his distrust of online health information, becoming more reliant on his partner and doctors for health information seeking. As Robertson-Lang et al. (2011) highlighted, being
concerned with credibility issues seemed to be a different matter than being able to identify and appreciate indicators of credibility on the Web for older adults.

There were three participants ($n = 3$), including the aforementioned participant (P-A), who answered they used the Internet from 1 to 5 hours a week. The range of this group’s ratings on the credibility markers tended to be narrower than that of the other groups (Figure 5.2). This “less-tech-savvy” group tended to give more negative ratings ($M = 3.65$) on the positive credibility markers, whereas they gave more positive ratings ($M = 1.80$) on the negative credibility markers than others groups did. It seemed to be more challenging for those who used the Internet less than others to rate the positive and negative markers differently. These findings are in line with the findings from Zulman et al.’s (2011) study, which demonstrated users’ experience and familiarity with technology, including the Internet and computer, mitigated the relationship between age and distrust of online sources for health information. This result indicates that, depending on the levels of IT proficiency, older adults’ credibility perceptions of online health information may change. Thus, the findings from the current study along with those from the literature highlight the importance of information literacy education for older adults, which would help them become more familiar with IT technologies in general and Web credibility markers/cues and heuristics in particular.

**5.3.3 Web Credibility Assessment in ELIS**

This section discusses older adults’ Web credibility assessment process based on the verbal interview data, which were based on the informants’ retrospective reports about their Web credibility assessment. Within the context of ELIS, Web credibility assessment seems to be closely related to the source selection. Using the two-stage model in the WC framework, in the initial stage of Web credibility assessment, in which people make a decision about which online
sources to examine to fulfill their information needs, many of the participants already had specific sources in mind based on their previous experiences. This can be understood as Fogg’s (2003a) “experienced credibility.” They went to the preferred websites directly and searching for necessary information. Websites frequently mentioned by the research participants included those of the Mayo Clinic (10 out of 21; 47.6%), NIH (9 out of 21; 42.9%), CDC (4 out of 21; 19.0%), JHM (4 out of 21; 19.0%), and HMS (4 out of 21; 19.0%). They seemed to be familiar with these online resources because of their general interests in and experiences with specific medical issues (i.e., involvement in health topics).

Many of them also began their health information seeking with search engines, chiefly Google, to identify a list of candidate sources potentially relevant to their information needs. In order to narrow down the search results, they mentioned they conducted an initial evaluation by using various credibility markers/cues and heuristics. In particular, the most frequently mentioned types of credibility markers in the initial stage were source-related markers, such as the nature of the website (i.e., operator’s trustworthiness) and the operator’s reputation and authority (i.e., operator’s expertise), to form the initial lists of websites they would visit and read the content. As mentioned above, older adults tended to rely on health information from well-known, noncommercial institutions such as NIH, CDC, Mayo Clinic, JHM, and HMS, as well as representative associations/foundations for specific ailments/diseases such as the American Cancer Society, the American Diabetes Association, and the American Arthritis Society.

The participants reported that in the final evaluation stage of Web credibility assessment they may put effort into verifying the health information they had identified in the initial evaluation stage. Many of the participants in this study mentioned they examined more than one source to see if certain health information they obtained from a source was consistent with that
from other sources. As discussed above, cross-checking multiple sources seemed to be a useful strategy for the research participants, who were mostly nonexperts in the medical field. This strategy seemed to help them validate the accuracy of the health information they acquired on the Web by referencing the aggregated opinions (i.e., content’s trustworthiness). In the current study, when the information from different sources was not consistent or even contradictory, the research participants mentioned they either trusted the information from the more authoritative source (i.e., the source with the greatest expertise) or sought further information to verify the controversial issue.

In addition, as reported above, some older adults regarded the currency (or recency) as an important cue/marker that could be used to judge the trustworthiness of health information. Also, the research participants attempted to examine the expertise of the health information by checking the intrinsic quality (e.g., typographical errors, size of the site) or by determining whether certain health information—for instance, an article on a website—was based on scientific evidence or not.

Lastly, older adults took into consideration not only source- and content-related markers/cues but also design-related ones in the final stage of Web credibility assessment. However, among those who mentioned the visual aspect of a website, more people answered they were not influenced by visuals than those who answered they were. Thus, the influence of visual aesthetics on older adults’ credibility assessment of online health information seemed to vary depending on individual preferences. The participants’ ratings on the corresponding item also showed the research participants did not care much about the “prettiness” of the website when they judged the credibility of online health information (D20, $M = 3.38; SD = .865$, where 3 meant neutral, meaning the cue/marker did not have either a positive or a negative role in
judging the credibility of the online health information). In terms of the functional aspect of a website (i.e., the usability of a website), however, all the participants who mentioned this aspect considered it an important criterion that might influence the perception of the website’s credibility. Table 5.9 summarizes what older adults mentioned in the interviews based on the conceptual model of the Web credibility assessment process (i.e., two-stage model in the WC framework). Thus, the process model needs to be tested with empirical data (e.g., observations or log data) that could directly and more accurately capture how older adults go through the entire process of Web credibility assessment.

<p>| Table 5.9 Process of Web Credibility Assessment of Online Health Information |
|-----------------------------------------------|------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Stage</th>
<th>Definition</th>
<th>Activities</th>
<th>Cue/Markers Used</th>
</tr>
</thead>
</table>
| Initial | The stage in which people identify initial lists of the most relevant online resources that can fulfill their information needs | • Directly go to trusted websites (e.g., NIH, CDC, Mayo)  
• Begin with a trusted search engine (e.g., Google) | • Source trustworthiness  
• Source expertise |
| Final | The stage in which people go through the iterative process of assessing the credibility of the candidate websites identified in the initial evaluation stage | • Compare multiple sources (i.e., cross-check)  
• Check the currency of the health information  
• Check the intrinsic quality (e.g., for typographical errors)  
• Check visual aesthetics  
• Check usability | • Source trustworthiness  
• Source expertise  
• Content trustworthiness  
• Content expertise  
• Design trustworthiness  
• Design expertise |
CHAPTER 6
LIMITATIONS, FUTURE RESEARCH DIRECTION, AND CONCLUSION

6.1 Limitations of the Research

This dissertation research examined the information credibility issues in the Web context from both theoretical and empirical perspectives. Phase I of the research developed a new framework for Web credibility assessment (i.e., the WC framework) by synthesizing existing models and theories from the literature, and Phase II used the new framework to explore older adults’ credibility assessment of online health information in everyday life settings (i.e., ELIS). This research identified a number of important characteristics of older adults’ Web credibility assessment as well as interesting theoretical considerations for Web credibility assessment.

However, there were several limitations in the research data. First of all, even though the qualitative meta-analysis was an appropriate method to synthesize a new theoretical framework for the given topic (i.e., Web credibility assessment), the qualitative nature of the verbal interview data and limited sample size ($n = 21$) were inadequate to test and validate the new framework. Thus, the framework is still in the conceptual stage.

In the same context, although the semi-structured interview data were useful to explore the target population’s (i.e., older adults’) Web credibility perceptions and related behaviors, the qualitative nature of the data and small sample size did not allow the researcher to apply any inferential statistics to compare the participants’ Web credibility perceptions by subgroups such as age (i.e., young-old vs. old-old), gender (i.e., female vs. male), “mastery of life” (i.e., the four types suggested by Savolainen in 1995), or Internet usage.

Another limitation of the research stems from the methodology used. O’Leary (2005) pointed out researchers may face challenges in managing the interview process, such as resisting
the urge to lead the participants and figuring out how the demographics (e.g., race, gender, ethnicity, class, age) of the interviewer and the interviewee would affect the interview process. Also, communication miscues are possible in the process of interviewing. Additionally, a lack of anonymity might hinder the respondents from providing honest and open responses (Barriball & While, 1994). Furthermore, given that the semi-structured interviews were solely based on the interviewees’ retrospective recall, rather than direction observations, the consistency of the information collected from each interviewee might be skewed in terms of accuracy.

6.2 Future Research

Based on the limitations of the current research mentioned above, the researcher suggests future research directions in terms of both theoretical and empirical aspects of information behavior research including Web credibility assessment: (1) positioning Web credibility assessment in information behavior, (2) operationalizing Web credibility in various contexts, and (3) validating the new framework for web credibility assessment.

6.2.1 Positioning Web Credibility Assessment in Information Behavior

One important future research agenda would be to determine a clearer relationship between Web credibility assessment and information behavior in the Web context. As discussed above, Pirolli and Card’s (1999) information foraging theory may be a useful theoretical framework to help understand the right position of Web credibility assessment within the process of information seeking, including both purposeful information seeking and more passive, meaning of incidental information acquisition (Williamson, 1998). At the conceptual level, Web credibility assessment seems to be the most useful in the source selection process because users are supposed to identify credible sources of necessary information from a plethora of information on the Web. When it comes to health-related information seeking (or other serious topics of
information seeking), it is critical to ensure the credibility of the information, as it may affect the information user’s wellness.

However, in the empirical studies on information behavior, similar constructs have been used interchangeably, such as information credibility, information quality, authority, and more. For instance, in the literature on information credibility, many of the criteria for message credibility overlap with those for information quality. These include: accuracy, currency, reliability, and relevance. Scholars focusing on information quality have often considered credibility a dimension of quality—a set of characteristics that allow indirect (vs. direct) evaluation or prediction of information quality. That is, when users do not have sufficient knowledge to judge the quality of the given information and/or are not deeply involved with the given task, they may rely on the markers/cues and heuristics of information credibility rather than directly evaluate the information quality. Therefore, future research will need to provide a better understanding of the relationship between the related concepts, examining the unique role of credibility assessment in people’s information behavior.

6.2.2 Operationalizing Web Credibility in Various Contexts

Future research will continue studying human information behavior regarding how people judge information credibility in various contexts. In particular, as new types of websites and information systems emerge continuously, the design of information scents or residues (Furnas, 1997; Pirolli, 1997) to support heuristic evaluation of information credibility by users will still remain a very active area of research in the future.

As mentioned above, Web credibility assessment is different from and more complex than credibility assessment in interpersonal communication due to the dynamic nature of the Web, its technologies, and document genres. Recent studies on Web credibility started paying
attention to user-generated content, such as posts on SNSs, blogs, including microblogs (e.g., Twitter), and questions and answers in social Q&A sites. Since the user-generated content often lacks cues/markers for source credibility, it can be a challenge for users to evaluate whether the given information (i.e., user-generated content) is credible or not. Therefore, future research on Web credibility assessment will need to study the unique features of user-generated content and related information behaviors on those sites. Appropriate measures need to be identified to capture those user behaviors and enable Web credibility assessment in specific contexts.

6.2.3 Validating the New Framework for Web Credibility Assessment

One of the most significant contributions of the current dissertation research would be the new framework for Web credibility, named the WC framework, consisting of three components: WC assessment, WC variability, and WC process. In particular, the first component, WC assessment, is based on the conceptual typology of measures for web credibility assessment. As shown in Table 5.1, the conceptual typology contains six types and is based on two key dimensions of credibility (i.e., trustworthiness and expertise) and three objects of credibility assessment (i.e., operator, content, and design). This typology can be understood as a reorganization of the concept, its key dimensions, and the subdimensions of each key dimension, which all have been identified and examined in the literature over the decades. Thus, it is a systematic and elaborate typology that can be used to understand how various markers/cues and heuristics affect users’ perception of Web credibility.

However, since the typology is still in the conceptual stage and has only been tested with the limited amount of qualitative interview data in the current study (Phase II), it has to be tested with a larger amount of quantitative data. To test the typology, a research instrument needs to be developed in accordance with the definitions and features of the six types of credibility measures.
in the framework. This new conceptual typology and related research instrument will help researchers operationalize Web credibility assessment in different contexts, as well as provide system developers with cues/markers to design credible systems. Once the conceptual typology and instrument are validated through such a study, they can be used as knowledge tools to understand how people assess the credibility of various online information topics (e.g., health, education, politics, entertainment), as well as media types (e.g., websites in general, social networking sites, social Q&A sites, blogs).

6.3 Conclusion

The purpose of this dissertation research was to develop a new framework for Web credibility assessment and use it to explore and describe older adults’ perceptions of information credibility in the Web context, identifying markers/cues, heuristics, and other factors influencing their credibility assessment of online health information. This research employed mixed methods of a qualitative meta-study and semi-structured interviews to achieve the goals listed below.

First, this research sought to enhance our understanding of people’s perception of information credibility in the Web context. A qualitative meta-study was conducted to analyze the literature on information credibility regarding credibility conceptualization (key dimensions of credibility), operationalization (measures used to operationalize credibility dimensions), variability (influences of user characteristics and context), and the process of assessment. As an outcome of the literature analysis, this research synthesized a new, extended framework for Web credibility assessment, the WC framework.

Second, this research aimed to provide a better understanding of older adults’ credibility assessment of online health information using semi-structured interviews. The researcher used the new credibility assessment framework (i.e., the WC framework) to guide the construction of
an interview protocol used in the data collection and interpretation of results. In addition, as Web credibility assessment was seen as a part of information behavior, the ELIS model by Savolainen (1995) was employed to interpret the semi-structured interview study in terms of the research participants’ “way of life” and “mastery of life,” as well as the social and cultural/cognitive capital that have significant impacts on people’s information behavior in everyday life contexts.

This dissertation research has both theoretical and empirical implications. The new Web credibility assessment framework advances our understanding of the conceptualization of Web credibility and can be used as a knowledge resource in developing context-specific credibility assessment models as well as information system interfaces that provide effective support for information credibility evaluation by users. Furthermore, in that the new framework for Web credibility assessment was used within the context of ELIS (Savolainen, 1995), the research provided a better idea of the conceptual relationships between information behavior and information credibility assessment.

Likewise, findings from the semi-structured interviews can inform online information system developers and librarians on how older users search for online health information and how they assess its credibility. Despite the increase in the population of older adults who use the Internet and their vulnerability in perceiving and/or processing markers/cues to assess information credibility they find online, there is a dearth of research on older adults’ credibility assessment of online information. Therefore, the findings from this study contribute to the information behavior and HCI literature and provide preliminary data for future research.

Further, studying the mechanisms of older adults’ Web credibility assessment has several practical implications as well. First of all, Web credibility assessment contributes to a better understanding of how older adults make decisions about the quality of information pertinent to
their information needs on the Web. When people do not have sufficient knowledge or expertise
to directly judge the quality of information, credibility markers (i.e., cues) and heuristics can play
roles in the decision-making process of acceptance or rejection of the information.

Also, findings from the study can inform online service developers and intermediaries
(e.g., search engines) about how older adults perceive credibility of online information and how
it affects their use of online systems. This can be used as a knowledge base in designing,
describing, indexing, ranking, and promoting Web-based services.

Lastly, the findings can be utilized for teaching purposes. Knowledge about the process
of Web credibility assessment and involved markers and heuristics could be used to teach people
how to evaluate information and recognize credible sources.
APPENDIX A

HUMAN SUBJECTS COMMITTEE APPROVAL MEMORANDUM

From: Human Subjects humansubjects@fsu.edu
Subject: Use of Human Subjects in Research - Approval Memorandum
Date: May 12, 2014 at 2:32 PM
To: Wonchan Choi
Cc: Besiki Stvilia, Advisor

The Florida State University
Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 5/12/2014
To: Wonchan Choi

Address: [Redacted]
Dept.: INFORMATION STUDIES

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
Older Adults' Credibility Assessment of Online Health Information

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and one member of the Human Subjects Committee. Your project is determined to be Expedited per per 45 CFR § 46.110(7) and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 5/11/2015 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chair of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is FWA00000168/IRB number IRB00000446.

Cc: Besiki Stvilia, Advisor
HSC No. 2014.12763
APPENDIX B

UPDATED HUMAN SUBJECTS COMMITTEE APPROVAL MEMORANDUM

From: Human Subjects humansubjects@fsu.edu
Subject: Use of Human Subjects in Research - Approval Memorandum
Date: February 18, 2015 at 12:54 PM
To: 
Cc: 

The Florida State University
Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

RE-APPROVAL MEMORANDUM

Date: 2/18/2015
To: Wonchan Choi
Address: 
Dept.: INFORMATION STUDIES

From: Thomas L. Jacobson, Chair
Re: Re-approval of Use of Human subjects in Research
Older Adults’ Credibility Assessment of Online Health Information

Your request to continue the research project listed above involving human subjects has been approved by the Human Subjects Committee. If your project has not been completed by 2/17/2016, you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the committee.

If you submitted a proposed consent form with your renewal request, the approved stamped consent form is attached to this re-approval notice. Only the stamped version of the consent form may be used in recruiting of research subjects. You are reminded that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report in writing, any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chair of your department and/or your major professor are reminded of their responsibility for being informed concerning research projects involving human subjects in their department. They are advised to review the protocols as often as necessary to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

Cc: Besiki Stvilia, Advisor
HSC No. 2015.14892
APPENDIX C

PRESCREEN TEST TOOLS

Florida's iSchool
Florida State University School of Information

Participant Pre-Screening

PRE-SCREENING ID: __ __ __ __ DATE: __ __ / __ __ / __ __

P1. Gender:  ☐ Male  ☐ Female  Age: ___

P2. What is your highest level of education? Please check the category.
☐ No formal education
☐ Less than high school graduate
☐ High school graduate/GED
☐ Vocational training
☐ Some college/Associate’s degree
☐ Bachelor’s degree (BA, BS)
☐ Master’s degree (or other post-graduate training)
☐ Doctoral degree (PhD, MD, EdD, DDS, JD, etc.)

P3. How would you describe your primary racial group? Please check the category.
☐ No Primary Group
☐ White Caucasian
☐ Black/African American
☐ Asian
☐ American Indian/Alaska Native
☐ Native Hawaiian/Pacific Islander
☐ Multi-racial
☐ Other (specify): ________________

P4. Is English your primary language? Please check the category.
☐ Yes  ☐ No
  a) If “No,” what is your primary language? ___________________________

P5. Do you have any problems with your vision that cannot be corrected?
☐ Yes  ☐ No
  a) If “Yes,” specify _________________________

P6. Do you wear glasses or contacts?
☐ Yes  ☐ No
  a) If “Yes,” specify _________________________
P7. Do you have any problems hearing that cannot be corrected?
   □ Yes   □ No
   a) If “Yes,” specify_____________________

P8. Do you wear a hearing aid?
   □ Yes   □ No

P9. Do you have arthritis in your hands to the extent that it makes it difficult for you to write?
   □ Yes   □ No
   a) If “Yes,” ask subject if they think they would be able to type on a keyboard:
      □ Yes   □ No
### Short Portable Mental Status Questionnaire (SPMSQ)

<table>
<thead>
<tr>
<th>Question</th>
<th>Wrong</th>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1  What is the date today?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S2  What day of the week is it?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S3  What is your street address?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S4  What is your telephone number?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S5  How old are you?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S6  When were you born?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S7  Who is the current president of the U.S.?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S8  Who was the President just before him?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S9  What was your mother’s maiden name?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S10 Subtract 3 from 20 and keep subtracting 3 from each number, all the way down. 20, 17, 14, 11, 8, 5, 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total number of errors:** ____

- 0 – 2 errors = intact
- 3 – 4 errors = mild intellectual impairment
- 5 – 7 errors = moderate intellectual impairment
- 8 – 10 errors = severe intellectual impairment

Allow one more error if subject had no grade school education. 
Allow one fewer error if subject had education beyond high school.

Subject Passed: □ Yes □ No
Wechsler Memory Scale III (WMS-III)

PRE-SCREENING ID: __ __ __ __          DATE: __ __ / __ __ / __ __

Story A and B

Say I am going to read a short story to you. Listen carefully and try to remember it just the way I say it, as close to the same words as you can remember. When I am through, I want you to tell me everything I read to you. You should tell me all you can remember even if you are not sure. Are you ready?

Read Story A
Anna / Thompson / of South / Boston, // employed as a cook / in a school / cafeteria, // reported / at the police / station / that she had been held up / on State Street / the night before / and robbed / of fifty-six dollars. // She had four / small children, // the rent was due, / and they had not eaten / for two days. // The police, / touched by the woman’s story, // took up a collection / for her. //

After reading the story, say Tell me everything you can remember about this story. Start at the beginning.

Read Story B
At 6:00 / on Monday / evening, / Joe / Garcia / of San Francisco // was watching television /// as he dressed / to go out. // A weather bulletin / interrupted the program // to warn that thunderstorms / would move into the area / within the next two to three hours / and remain until morning. // The announcer said / the storm could bring hail / and up to four inches / of rain / and cause the temperature to drop / by fifteen degrees. // Joe decided to stay home. // He took off his coat / and sat down / to watch old movies.

Number of elements Story A: ___
Number of elements Story B: ___

For subjects aged 18 – 54: Story A $\geq$ 7 elements. If failed, Story B $\geq$ 5.
For subjects aged 15 – 80: Story A $\geq$ 6 elements. If failed, Story B $\geq$ 4.

Subject Passed: ☐ Yes ☐ No
APPENDIX D

SEMI-STRUCTURED INTERVIEW PROTOCOL

Florida’s iSchool
Florida State University School of Information

STUDY #: __ __ __                         DATE: __ __ / __ __ / __ __

Section A – Internet Use

The purpose of this set of questions is to ask your familiarity and experience with the Internet. Please answer all questions by placing a check mark on or filling in the appropriate response.

A1. About how many hours a week do you use the internet?
   - □ Never (skip the rest of the questionnaire)
   - □ less than one hour a week
   - □ between 1 hour and 5 hours a week
   - □ between 6 hours and 10 hours a week
   - □ between 11 hours and 15 hours a week
   - □ between 16 hours and 20 hours a week
   - □ more than 20 hours a week

A2. How long have you been using the internet?
   - □ Less than 6 months
   - □ between 6 months and 1 year
   - □ more than 1 year, but less than 3 years
   - □ more than 3 years, but less than 5 years
   - □ more than 5 years

A3. Have you looked for health-related information online during the past 6 months?
   - □ Yes   □ no
   A) if “no,” when was the last time you searched for health information online? ____
**Section B – Older Adults’ Information Needs**

The purpose of this set of questions is to ask your information needs for your everyday life. Please answer the following questions.

B1. What are your everyday life information needs, as opposed to work-related information needs? Examples of topics may include health/wellness, shopping, leisure, etc.

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Section C – Older Adults’ Health Information Needs and Related Behaviors

The purpose of this set of questions is to ask your information needs for health-related topics. Please answer the following questions.

C1. What are some of your health-related information needs?

________________________________________________________________________

C2. How do you search for health information?
   C2-1. What source(s) do you use to obtain health information (e.g., physicians, family and friends, websites, social media, etc.)?

________________________________________________________________________

C2-2. Which **online** sources do you use to look for health information (e.g., websites, social media, mobile applications, etc.)?
   - Websites:
   - Social media:
   - Mobile applications:

C3. Why do you use the source(s) to obtain health information?

________________________________________________________________________

C4. Do you use (apply) or act on the health information you obtained?
   □ Yes □ No
   C4-1. If “Yes,” when, why, and how?

________________________________________________________________________

C5. Do you share the health information you obtain? If yes, when, why, how, and with whom?
   □ Yes □ No
   C5-1. If “Yes,” when, why, how, and with whom?

________________________________________________________________________
Section D – Credibility of Online Health Information

This section asks you about credibility markers/cues and heuristics on health-related websites. Please tell me what makes health-related websites credibility for you.

D1. How do you evaluate credibility of a health-related website? Which markers/cues on the website make you perceive it as credible?

D2. Please indicate the extent to which you disagree or agree with the following statements by circling the appropriate number in the scale next to each statement:

<table>
<thead>
<tr>
<th></th>
<th>+2</th>
<th>+1</th>
<th>0</th>
<th>-1</th>
<th>-2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Much More Credible</td>
<td>More Credible</td>
<td>Neutral</td>
<td>Less Credible</td>
<td>Much Less Credible</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>The site lists the organization’s physical address.</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>+1</th>
<th>+2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The site has articles containing citations and references.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td></td>
<td>The site lists authors’ credentials for each article.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td></td>
<td>The site is arranged in a way that makes sense to you.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td></td>
<td>The site has been updated since your last visit.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
</tbody>
</table>
Florida’s iSchool
Florida State University School of Information

<table>
<thead>
<tr>
<th></th>
<th>The site was recommended to you by a friend (non-expert).</th>
<th>Much Less Credible</th>
<th>Less Credible</th>
<th>Neutral</th>
<th>More Credible</th>
<th>Much more Credible</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td></td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>7</td>
<td>The site was recommended to you by a doctor.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>8</td>
<td>The site represents a nonprofit organization.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>9</td>
<td>The site has ratings or reviews of its content.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>10</td>
<td>The URL for the site ends with “.org”</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>11</td>
<td>The site recognizes that you have been there before.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>12</td>
<td>The site has one or more ads on each page.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>13</td>
<td>The site requires a paid subscription to gain access.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>14</td>
<td>The site takes a long time to download.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>15</td>
<td>The site is rarely updated with new content.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>16</td>
<td>The site links to a site you think is NOT credible.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>17</td>
<td>The site represents an organization you respect.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>18</td>
<td>The site gives a contact phone number.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>19</td>
<td>The site is by organization that is well respected outside of the Internet.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>20</td>
<td>The site looks professionally designed.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>21</td>
<td>The site gives a contact email address.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
</tbody>
</table>
Florida's iSchool
Florida State University School of Information

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Much Less Credible</th>
<th>Less Credible</th>
<th>Neutral</th>
<th>More Credible</th>
<th>Much more Credible</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>The site states its policy on content.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>23</td>
<td>The site is linked to by a site you think is believable.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>24</td>
<td>The site provides links to its competitors' sites.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>25</td>
<td>The site displays an award it has won.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>26</td>
<td>The site is small (e.g. less than five pages).</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>27</td>
<td>The site has a commercial purpose (as opposed to academic).</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>28</td>
<td>The site is sometimes unexpectedly unavailable.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>29</td>
<td>The site automatically pops up new windows with ads.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>30</td>
<td>The site has typographical errors.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>31</td>
<td>The site has links that do not work.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>32</td>
<td>This site is complete in the information it provides.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>33</td>
<td>The site provides information that is neutral.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>34</td>
<td>The site tries to cover all the different approaches to the issue.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>35</td>
<td>The site is customizable according to your preference.</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>+1</td>
<td>+2</td>
</tr>
</tbody>
</table>

Thank You!
APPENDIX E

INFORMED CONSENT FORM

Older Adults’ Credibility Assessment of Online Health Information

Informed Consent Form

Introduction to the Study

This dissertation project will explore older adults’ health information seeking and Web credibility assessment behaviors. In particular, this study will explore the ways older adults search for and select health-related websites and will identify a set of cues/markers and heuristics they use to judge credibility of health information.

A doctoral candidate, Wonchan Choi in the School of Information at the Florida State University will be conducting this study.

What Will Happen During the Study

In a semi-structured interview, each participant will be asked to answer questions regarding his or her health information needs and perception of health-related websites’ credibility. Each interview is anticipated to take around 45 minutes to complete. Interviews will be scheduled at a time and place convenient to the participant. Interviews will be tape recorded; transcripts will be prepared with names and any personal identifiers changed. Participants have the right to have the tape turned off at any time during the interview. In appreciation for participating in the study, each interviewee will receive an honorarium in the amount of $25.

Signing this form constitutes informed consent for participation in the study.

If you have questions or concerns about participating in this study, please contact:

Principal Investigator:
Wonchan Choi, Doctoral Candidate
Florida State University School of Information
Email: [redacted]
Tel: [redacted]
Web: [redacted]

Academic Advisor:
Besiki Stvilia, Ph.D.
Florida State University School of Information
Email: [redacted]
Tel: [redacted]

IRB Study#: [redacted]
Risks

Risks associated with the research are very low and are considered no greater than those of everyday life. All collected data will be confidential, and only pseudonyms will be used in data analysis and subsequent reports and publications. Collected data will be kept on a secure, password protected external hard drive. Primary data will be disposed of 1 year from the end of the project. Minimal risk is associated with the impact on privacy if excerpts from interviews reveal information that may be considered to affect an individual’s privacy.

Benefits of this Project

This study will benefit the studies of older adults’ health information need and associated behaviors, consumer wellness and health informatics, and credibility assessment research. No promise or guarantee of benefits is made to encourage you to participate.

Extent of Anonymity and Confidentiality

Confidentiality is assured to the participants to the extent allowed by law. Publications about the findings from the study will mask the identity of the individual. Interviews will be tape recorded; transcripts will be prepared with names and any personal identifiers changed. Participants have the right to have the tape turned off at any time during the interview. Tapes and transcripts will remain in the possession of the primary investigator.

Participant’s Rights

In accordance with Florida State University (FSU) policy, and as the principal investigator, I would like to assure you that:

- Participation in this study is entirely voluntary.
- If you decide to participate, you are free to withdraw at any time without consequence. You are free to decline to answer any questions that you choose or to request that the tape recorder be turned off at any time during an interview.

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have any questions or concerns regarding the study and would like to talk to someone other than the researcher, you are encouraged to contact the FSU IRB at telephone number 850-644-8633. You may also contact this office by email at jjcooper@fsu.edu, or by writing or in person at 2010 Levy Street, Research Building B, Suite 276, FSU Human Subjects Committee, Tallahassee, FL 32306-2742.
Participant’s Permission

By signing this form below, you acknowledge that you have read and understood the above statement and consent to participate in this study.

If I participate, I may withdraw at any time. I agree to abide by the rules of this project.

________________________________________                       ____________________
Signature                                                                                           Date
# APPENDIX F

## RESEARCH QUESTIONS, THEORETICAL FRAMEWORKS, AND METHODS

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Theoretical Frameworks</th>
<th>Methods</th>
<th>Interview Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ1: How is the process of Web credibility assessment conceptualized in existing theories and models?</td>
<td>3LM: Conceptual level</td>
<td>Qualitative meta-study</td>
<td>N/A</td>
</tr>
<tr>
<td>RQ1-1: What are the common and unique components of existing theoretical frameworks of Web credibility assessment?</td>
<td>3LM: Empirical level</td>
<td>Qualitative meta-study</td>
<td>N/A</td>
</tr>
<tr>
<td>RQ1-2: How can/should these theoretical frameworks be synthesized?</td>
<td>3LM: Indicator level</td>
<td>Qualitative meta-study</td>
<td>N/A</td>
</tr>
<tr>
<td>RQ2: In general, what are older adults’ common information needs?</td>
<td>• ELIS: Way of Life</td>
<td>Semi-structured interviews</td>
<td>B1</td>
</tr>
<tr>
<td>RQ3: What are older adults’ health information needs and related information behaviors?</td>
<td>• ELIS: ELIS—Seeking orienting information</td>
<td>Semi-structured interviews</td>
<td>C1</td>
</tr>
<tr>
<td>RQ3-1: What sources do older adults use to find health information both on- and offline, and why do they use those sources?</td>
<td>• ELIS: ELIS—Selection of information sources and channels • ELIS: Individual Factors</td>
<td>Semi-structured interviews</td>
<td>C2, C3</td>
</tr>
<tr>
<td>RQ3-2: How do they use the information they find?</td>
<td>• ELIS: Way of Life</td>
<td>Semi-structured interviews</td>
<td>C4, C5</td>
</tr>
<tr>
<td>RQ4: How do older adults assess the credibility of health-related information on the Web?</td>
<td>WC: Process</td>
<td>Semi-structured interviews</td>
<td>D1</td>
</tr>
<tr>
<td>RQ4-1: What are older adults’ perceptions of Web credibility?</td>
<td>WC: Assessment</td>
<td>Semi-structured interviews</td>
<td>D1</td>
</tr>
<tr>
<td>RQ4-2: What are some of the psychological, social, and/or cultural mechanisms that underlie and/or affect those perceptions?</td>
<td>WC: Variability</td>
<td>Semi-structured interviews</td>
<td>A1, A2, A3, D1</td>
</tr>
<tr>
<td>RQ4-3: What are some of the markers/cues and heuristics used by older adults to assess the credibility of health-related websites?</td>
<td>WC: Assessment</td>
<td>Semi-structured interview</td>
<td>D1, D2</td>
</tr>
</tbody>
</table>

3LM: The three-level measurement model (Bailey, 1994)
ELIS: The model of everyday life information seeking (Savolainen, 1995)
WC: the new framework of Web credibility assessment (a product of the current dissertation research)
### APPENDIX G

### CODING SCHEME

<table>
<thead>
<tr>
<th>Theoretical Concepts</th>
<th>Definitions</th>
<th>Codes and Examples</th>
</tr>
</thead>
</table>
| Nature of Hobbies    | Order of things, which is based on the choices that individuals make in everyday life | • Cognitive (e.g., reading books on cultural and scientific topics, reading newspapers, reading online news, taking courses)  
• Affective (e.g., watching TV shows and movies, listening to music, playing games)  
• Social (e.g., email, SNSs, in-person socializing) |
| Mastery of Life      | Keeping things in order; typical ways of approaching everyday problems | • Optimistic-cognitive (O-C):  
  o People who are optimistic about the solvability of a given problem based on their familiarity and confidence in seeking information using IT technologies; **AND**  
  o Who use multiple sources to seek for necessary information  
• Pessimistic-cognitive (P-C):  
  o People who use their cognitive abilities and multiple sources to seek necessary information; **BUT**  
  o They acknowledge the possibility that the given problem may not be solved; relatively less confident in information seeking than O-C  
• Defensive-affective (D-C):  
  o People who are optimistic toward problem-solving situations; **BUT**  
  o Their information seeking strategies are based on affective, rather than cognitive, means; thus, they often have wishful thinking or avoid the situation  
• Pessimistic-affective (P-A):  
  o People who do not appreciate the value of systematic and cognitive information seeking; **AND**  
  o Who heavily rely on their social contact networks to seek necessary information (e.g., friends, partners, doctors) |
| Individual Factors   | A set of social cultural, and individual factors that influence the structure of one’s way of life and mastery of life | • Social capital (i.e., social contact networks such as families, partners, friends, experts in the given topic area)  
• Cultural/cognitive capital (e.g., educational background, occupational background, extra training experience) |
### Assessment of WC

A set of cues/markers and heuristics that influence users’ perception of online information credibility (i.e., web credibility)

- **Operator trustworthiness (O-T):**
  - Whether or not the operator’s character is ethical, honest/sincere, fair, believable, trusted
- **Operator expertise (O-E):**
  - Whether or not the operator’s expertise is reputable, famous, authoritative, competent
- **Content trustworthiness (C-T):**
  - Whether or not the message/information being provided on the website is neutral, unbiased, evenhanded, consistent, current
- **Content expertise (C-E):**
  - Whether or not the message/information being provided on the website is informative, complete, comprehensive, in-depth, accurate, correct, clear
- **Design trustworthiness (D-T):**
  - Whether or not the structure, functionality, aesthetic design, and interactivity of the information and/or the website as a whole is stable, consistent, reliable
- **Design expertise (D-E):**
  - Whether or not the structure, functionality, aesthetic design, and interactivity of the information and/or the website as a whole is well organized, easy to use, aesthetically put together

### Variability of WC

A set of individual and contextual variables that influence the process of web credibility assessment

- **Demographics (e.g., age, gender)**
- **Involvement (e.g., motivation, ability, domain expertise)**
- **Technology proficiency (e.g., information literacy, media reliance)**
- **Context (e.g., task, goal, situation)**

### Process of WC

The iterative process of how people select and evaluate the credibility of online resources

- **Initial evaluation:** The stage where people identify the initial lists of most relevant online resources that can fulfill their information needs
  - Directly going to trusted websites
  - Using trusted search engines
- **Final evaluation:** The stage where people go through the iterative process of assessing the credibility of candidate websites identified in the initial evaluation stage

---

**ELIS:** The model of everyday life information seeking (Savolainen, 1995)

**WC:** the new framework of Web credibility assessment (a product of the current dissertation research)
REFERENCES


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BIOGRAPHICAL SKETCH

Wonchan Choi received his Master’s and Bachelor’s degrees in Library and Information Science (LIS) from Pusan National University in Korea. His research interests include information behavior, human-computer interaction (HCI), health informatics, longevity informatics, digital libraries, and bibliometrics. He is also interested in useful methodologies for both qualitative and quantitative research. As part of his effort to explore methodologies, he has learned various statistical analysis techniques, pursuing the Graduate Certificate in Measurement and Statistics, which is granted by Florida State University.