Measuring Credibility Assessment Targets in Web-Based Information

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PROBLEM STATEMENT AND GOAL

This research consisted of two separate, but inter-related studies. In Study 1, a rating scale, called the Web Credibility Scale, was created to measure the credibility of a Web page. This scale improves the precision of measuring the credibility of Web pages by offering a replacement to the unvalidated scales currently in use [3]. Study 2 included the goal of learning more about credibility assessment targets [6]. This refers to the precise focus of user attention when evaluating the credibility of a Web page. Fogg and Tseng have postulated four targets of credibility assessment: on-screen characters, computer qua computer (the computer itself), brand (a corporation), and expert creator. However, their work does not address comparative magnitudes of influence between these four targets. The research in Study 2 compared two of the targets, brand and expert creator, in an experiment to discover which makes a greater contribution to credibility. Both studies used 100 to 200 participants, which should provide ample sample size [18].

Fogg and Tseng [6] provide little information on the characteristics of the credibility assessment targets postulated and they have not been investigated in later research [4, 5]. Consequently, the precise details on their definition are lacking other than brand refers to a corporation as the source of a Web page and expert creator refers to an individual as the source of a Web page. The difference between brand and expert creator seems to hinge on the fact that one is an institution and the other an individual.

In order to experimentally determine which of the two credibility assessment targets makes a greater contribution to credibility, it seemed reasonable to include a means of accounting for preexisting differences in participants' disposition to trust—differences in participants' general expectation of another's trustworthiness. Disposition to trust affects how much a person is willing to trust [10] and is especially important when one is unfamiliar with the situation or individuals involved. Several researchers have included disposition to trust when investigating the perception of trustworthiness in others [16, 17].

Together, Study 1 and Study 2 accomplished the following three goals:

1. Developed a reliable and valid instrument to measure the credibility of Web-based information.
2. Collected data on preexisting differences in participants' disposition to trust and incorporated it into the experiment in Study 2.
3. Conducted an experiment to determine if credibility perception differs when the source is manipulated.

In addition to the three goals given above, two research questions were investigated.

1. Will disposition to trust significantly influence the perception of credibility?
2. If one credibility target makes a greater influence on credibility than the other, are the differences statistically significant?

BACKGROUND (DEFINITION OF TERMS)

1. Credibility — the perception of expertise and trustworthiness of the source of a message [7].

2. Credibility Assessment Targets — precise focus of user attention when evaluating the credibility of a Web page.
3. Disposition to trust — a tendency, consisting of the subconstructs benevolence, integrity, competence, and trusting stance, to treat others as trustworthy in a variety of situations [10].
4. Expertise — the amount a communicator is seen as a valid source of assertions [7].
5. Trust — the willingness to become vulnerable to another due to some expectation, but independent of any external controls [9].
6. Trustworthiness — the perceptions of the probability that a source is providing information that the source considers to be correct [7].

SOLUTION PROCESS AND DETAILS

Item generation for the Web Credibility Scale began with adoption of a definition of credibility as the perception of expertise and trustworthiness of the source of a message, which was first given by [7]. Existing literature was used to construct questions to measure expertise and

Table 1. Web credibility scale with 31 items

Question
1. I believe the source would act in my best interest.
2. If I required help, the source would do its best to help me.
3. The source is interested in my well-being, not just its own.
4. I trust the source.
5. The source is truthful in its dealings with me.
6. The source presents information that is reliable.
7. The source is fair.
8. The source is impartial in the presentation of information.
9. The source is well-intentioned.
10. The source presents information that is unbiased.
11. I would characterize the source as honest.
12. The source is sincere in the presentation of information.
13. I believe the source.
14. The source presents information that is convincing.
15. The source treats others with decency.
16. I believe the source is honorable in dealing with others.
17. The source has a great amount of knowledge.
18. The source is intelligent.
19. I believe the source is very capable.
20. The source has a great amount of experience.
21. The source has a great amount of competence.
22. I would characterize the source as powerful.
23. Overall, the source is very capable.
24. I believe the source is skillful in what it does.

(table continues)

Table 1. cont.

Question
1. The source is very accurate in the presentation of information.
2. I would characterize the source as factual when dealing with others.
3. The source is well-trained.
4. I believe the source is well-informed.
5. I believe the source is a leader in their field.
6. The source could be characterized as an authority.
7. The source performs their role very well.

trustworthiness by subdividing each one into smaller components. In addition, two existing instruments, the Trusting Beliefs Scale [11] and the Perceived Corporate Credibility Scale [13] were used to provide additional initial items in the Web Credibility Scale. The resulting 31-item scale, shown in Table 1, included 16 items intended to represent the trustworthiness dimension and 15 items designed to represent the expertise dimension.

To strengthen the evidence for content validity, a panel of five experts reviewed the initial items in the Web Credibility Scale. Reviewers were asked to evaluate the 31 initial items for sampling adequacy—the extent to which the items effectively reflect the domain of credibility. Feedback from the panel resulted in rewording three items, eliminating twelve items, and adding two items. The resulting 21-item scale, shown in Table 2, was then formatted as a 7-point Likert-type instrument. Pilot testing of the format with 20 university student participants revealed no areas of concern in usability of the instrument; all 20 participants responded that the instrument was easy to understand and use.

Full administration of the Web Credibility Scale was conducted at Missouri Southern State University and the data collected was used to investigate the construct dimension of credibility and select items for deletion. One hundred seventy-two completed surveys were collected in

Table 2. Web credibility scale with 21 items

Question
1. The source presents information that is reliable.
2. I believe the source would act in my best interest.
3. If I required help, the source would do its best to help me.
4. The source is interested in my well-being, not just its own.
5. The source is truthful in its dealings with me.
6. The source is fair.
7. The source is impartial in the presentation of information.
8. The source presents information that is unbiased.
9. I would characterize the source as honest.
10. The source treats others with decency.
11. I believe the source is honorable in dealing with others.
12. The source discloses full information, good and bad.
13. I would characterize the source as factual when dealing with others.
14. The source is competent.
15. Overall, the source is capable.
16. I believe the source is skillful in what it does.
17. The source is accurate in the presentation of information.
18. I believe the source is a leader in their field.
19. The source could be characterized as an authority.
20. The source performs their role well.
21. The source has an excellent past performance.

Table 3. Factor analysis with all items

Question	Factor 1	Factor 2	Factor 3
16. I believe the source is skillful in what it does.	.83	.23	.21
15. Overall, the source is capable.	.77	.40	.16
18. I believe the source is a leader in their field.	.73	.19	.36
20. The source performs their role well.	.72	.38	.21
14. The source is competent.	.70	.42	.17
19. The source could be characterized as an authority.	.69	.17	.16
21. The source has an excellent past performance.	.58	.44	.20
10. The source treats others with decency.	.29	.81	.17
11. I believe the source is honorable in dealing with others.	.34	.79	.27
9. I would characterize the source as honest.	.33	.71	.41
4. The source is interested in my well-being, not just its own.	.32	.68	.35
6. The source is fair.	.27	.65	.42
3. If I required help, the source would do its best to help me.	.34	.63	.35
2. I believe the source would act in my best interest.	.40	.60	.34
12. The source discloses full information, good and bad.	.13	.17	.79
8. The source presents information that is unbiased.	.20	.31	.77
7. The source is impartial in the presentation of information.	.18	.31	.72
17. The source is accurate in the presentation of information.	.51	.29	.65
5. The source is truthful in his dealings with me.	.29	.53	.57
13. I would characterize the source as factual when dealing with others.	.46	.47	.57
1. The source presents information that is reliable.	.47	.36	.49

Study 1. An exploratory factor analysis of the 21 items was conducted to eliminate items that did not load on the appropriate high-level construct, as recommended by McKnight et al. [11]. When no factors were specified for the exploratory factor analysis, a three-factor solution was generated with eigenvalues greater than one. The three-factor solution, shown in Table 3, consisted of one factor made up entirely of items designed to measure source expertise; a second factor consisted entirely of items designed to measure source trustworthiness, and a third factor consisted of a mix of items designed to measure either expertise or trustworthiness. Although the third factor contained items written to measure either the expertise or trustworthiness of a source, a common theme could be identified—the source's ability to convey correct information. Scree plot analysis suggested a two-factor solution consisting of expertise and trustworthiness. Consequently, the third factor was removed. After removal of the third factor, which consisted of seven items, two factors remained with seven items in each. Together the two factors explained 69% of the variance.

The Web Credibility Scale was shortened to reduce participant fatigue and decrease semantic overlap [1] and make it more comparable to other trust-like scales [20, 18, 15]. Reducing the number of items in the Web Credibility Scale to eight resulted in decreasing reliability for the expertise factor from .92 to .88 and decreasing reliability for the trustworthiness factor from .93 to .90. Overall reliability of the Web Credibility Scale with eight items was .92, which is characterized as high according to Ohanian [14] and very good according to DeVellis [2]. The final version of the Web Credibility Scale is presented in Table 4. Items were designed so that the generic term "the source" would be replaced with the specific source of a Web page; in this study, "the source" was replaced with the name of a person (an expert creator) or the name of a company (a brand) and the sentence slightly reworded as appropriate for the type of source.

Table 4. Item analysis for the Web credibility scale

Question	Item-Total Correlation	Alpha if Item Deleted
11. I believe the source is honorable in dealing with others.	.80	.90
15. Overall, the source is capable.	.80	.90
9. I would characterize the source as honest.	.78	.91
10. The source treats others with decency.	.73	.91
16. I believe the source is skillful in what it does.	.73	.91
4. The source is interested in my well-being, not just its own.	.70	.91
18. I believe the source is a leader in their field.	.69	.91
21. The source has an excellent past performance.	.66	.91

Note. Coefficient alpha for both factors together is .92.

The Web Credibility Scale was evaluated for convergent and discriminant validity using two other scales that were administered along with the Web Credibility Scale: the Trusting Beliefs Scale [11] and the Perceived Complexity of Computer Use [8]. The 11-item Trusting Beliefs Scale was designed to measure the perceived benevolence, integrity, and competence of the source of a Web site offering legal advice. The Perceived Complexity of Computer Use Scale was developed to measure the amount of difficultly participants perceived in using a computer. The Pearson product-moment correlation coefficient was utilized to measure the relationships between the continuous scales. A strong correlation ($r = .91$, $p < .05$) between the Web Credibility Scale and the Trusting Beliefs Scale and no correlation ($r = .02$) between the Web Credibility Scale and the Perceived Complexity of Computer Use Scale were found. As with any scale development, further studies in a more generalized population will be required for greater generalizability. Since initial support for validity and reliability was found, the Web Credibility Scale was deemed ready for use in Study 2, where the remaining goals and research questions were investigated.

The experiment using the Web Credibility Scale in Study 2 addressed disposition to trust by use of a blocking design through the following steps. First, 200 participants were measured on disposition to trust using the scale developed by McKnight et al. [11]; this was a separate sample from the one used in scale development. After this, participants were grouped according to their scores into one of three groups: low, medium, or high, as suggested by Yamagishi and Kikuchi [21]. Three groups of participants are sufficient to capture curvilinear relationships between CV and DV [19]. Lastly, participants from each of the three groups were randomly assigned to one of the two manipulated IV levels so as to place an equal number of low, medium, and high disposition to trust scoring participants in both levels. An independent-samples *t*-test indicted that the two participant groups did not differ significantly in disposition to trust.

Study 2 compared the two assessment targets, brand and expert creator, proposed by Fogg and Tseng [6] to discover which makes a greater contribution to credibility. One group of participants viewed a Web page that appeared to be authored by a corporation (brand version), while a different experimental group of participants viewed the same Web page, but from a different source—a person (expert creator version). Both Web pages represent modifications of the original Web pages at http://sir.jrc.it/abi/ [12].

SOLUTION RESULTS

An independent-samples *t*-test indicated that the two groups did not significantly differ ($p = .01$); those that viewed the brand version of the Web page perceived the same amount of credibility as those that viewed the expert creator version. Scores from the Web Credibility Scale could range from –24 to +24; the average score reported between the two participant groups was 8.45. Comparisons of the two subscales, trustwor-

thiness and expertise, which make up the Web Credibility Scale, also revealed no significant difference between the two participant groups. Thus, Study 2 lends support to the conclusion that, in some situations, neither of the two credibility assessment targets is more important than the other in fostering the perception of credibility.

A correlation between perceived credibility and disposition to trust was found ($r = .55$, $p < .01$, $n = 189$). As participants' disposition to trust scores increased, so did their perception of credibility. Thus, the research question investigating whether disposition to trust significantly influences the perception of credibility can be answered; there is a correlation between disposition to trust and perception of credibility. Since there is a correlation between disposition to trust and perception of credibility, an even distribution of participants into the two participant groups based on their disposition to trust scores helps to assure that measurement of credibility perception between the two groups is not biased by disposition to trust. It is unknown if disposition to trust would have been evenly distributed by relying on random assignment alone.

Correlations between disposition to trust and credibility subconstructs were also conducted. The correlation between disposition to trust and the factors of credibility, expertise ($r = .52$, $p < .01$) and trustworthiness ($r = .51$, $p < .01$), was almost even. The correlation between the factors of disposition to trust, benevolence, integrity, competence, and trusting stance, revealed the highest correlations between expertise and integrity ($r = .52$, $p < .01$) and trustworthiness and integrity ($r = .51$, $p < .01$). The lowest correlations between the factors were between expertise and trusting stance ($r = .36$, $p < .01$) and trustworthiness and trusting stance ($r = .36$, $p < .01$). Consequently, participants with the highest disposition to perceive integrity in others tend to also perceive more credibility in Web pages.

The correlation between credibility and disposition to trust provided further evidence of convergent validity support for the Web Credibility Scale. Several authors have postulated a relationship between trustworthiness and disposition to trust [13, 6, 16, 17]. Similarly, this study postulated a relationship between credibility and disposition to trust and a correlation between data collected from the Web Credibility Scale and the Disposition to Trust Scale [11] was found. Consequently, the Web Credibility Scale behaved as expected, which [2] indicates is crucial to construct validity support.

Given the results of the present study indicating beginning evidence of reliability and validity, the Web Credibility Scale can be recommended for use in studies on credibility and Web page design. In this way, the Web Credibility Scale has the potential to aid in understanding credibility— how it differs from other trust-like constructs and how it is assessed by users.

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