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FACTORIAL STRUCTURE OF WEB CREDIBILITY IN A POPULATION OF ITALIAN INTERNET USERS: A PILOT STUDY[1]

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Summary.—Recent studies by Fogg and his colleagues have defined a new psychological construct called Web credibility. It describes the principal dimensions which lead people to believe (or not) online information. In this framework, the factorial structure of Web credibility was explored in a sample of 152 Italian students of psychology who were Internet users, using a questionnaire. A consistent four-factorial structure emphasized crucial aspects of Web credibility, namely, Inaccuracy, Efficiency, Social Validation, and Commercial Features. Such results seem in line with Fogg's theoretical model; however, further research is required to identify dimensions of this construct.

Answering questions about the credibility of Internet sources is quite complicated, but interesting both for Web users who need to select multiple online information sources and for psychologists attempting to study how people feel about the Internet. Theoretical antecedents of Web credibility are based upon traditional studies about credibility in interpersonal and mass communication (for more details, see Rieh & Danielson, 2007). Basically, these authors defined credibility as a multidimensional construct, but they suggested heterogeneous labels for its core aspects. They also proposed properties such as trustworthiness and expertise of the information source (Hovland & Weiss, 1951; Hovland, Janis, & Kelley, 1953); trustworthiness, competence, and good will (McCroskey & Young, 1981; McCroskey & Teven, 1999); or source attractiveness and dynamism (O'Keefe, 2002). Identifying the new construct of Web credibility, Fogg and Tseng (1999) specifically considered two dimensions, trustworthiness and expertise. Trustworthiness refers to the perceived ethical qualities of the information source (e.g., integrity, honesty), whereas expertise describes competence and experience attributed by individuals to a source (Fogg & Tseng, 1999; Fogg, Marshall, Laraki, Osipovich, Varma, Fang, *et al.*, 2001; Fogg, 2003a). Moreover, these authors proposed a categorization of Web credibility into four different types: "presumed credibility" which depends upon social stereotypes and personal beliefs about computers and the Internet, "reputed credibility" which indicates that an individual believes someone or something depending on how

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much he believes in what an information source has reported (Fogg & Tseng, 1999), "surface credibility" which refers not to the content but to immediate aspects such as the Web site's visual design, and "experienced credibility" which describes how much a person believes in someone or something as a result of his own experience (Fogg & Tseng, 1999). In their empirical research, Fogg and his colleagues examined the multidimensional features of the Web credibility applying a factor analytic approach. Specifically, they found seven factors for Web credibility, namely, Real-world feel, Ease of use, Expertise, Trustworthiness, Tailoring, Commercial implications, and Amateurism (Fogg, *et al.*, 2001).

The factor Real-world feel refers to Web site connections with a real-world context (e.g., The site gives a contact phone number). The factor, Ease of use focuses on technological efficiency (e.g., The site is difficult to navigate). The Expertise dimension refers to the credentials both of the Web site and of its contents (e.g., The site lists authors' credentials for each article). Trustworthiness describes the confidence which individuals have in the Web site (e.g., The site is linked to another site you think is believable). The factor Tailoring focuses on adaptability to the user (e.g., The site recognizes that you have been there before). The factor Commercial implications includes commercial aspects (e.g., The site is designed for e-commerce transactions). Amateurism regards the professional design of the site (e.g., The site has been updated since your last visit).

Starting from this model, Fogg, Kameda, Boyd, Marshall, Sethi, Sockol, *et al.* conducted the Stanford-Makovsky Web Credibility Study,[2] administering an online questionnaire to a number of Internet users from the USA and Finland. Their results suggest that various specific digital features might affect the individuals' perception of Web credibility. In particular, the perceived trustworthiness increases when a site provides the organization's physical address or a contact phone number, whereas it decreases when the site is linked to another site deemed not to be credible by users or when the site automatically pops up new windows with advertisements. Similarly, the perceived expertise increases when the site provides a quick response to user's questions or lists authors' credentials for each article. On the other hand, it decreases if the site is rarely updated, when it contains a link which doesn't work or shows typographical errors. The presumed credibility also increases when a Web site provides links to its competitors; the reputed credibility is enhanced when the site is linked to by another site one thinks is believable or prestigious and when it has been recommended by a friend. The surface

[2]Fogg, B. J., Kameda, T., Boyd, J., Marshall, J., Sethi, R., Sockol, M., & Trowbridge, T. (2002) Stanford-Makovsky web credibility study 2002: investigating what makes Web sites credible today. A research report by the Stanford Persuasive Technology Lab in collaboration with Makovsky & Company. Stanford Univer. Available at http://captology.stanford.edu/pdf/Stanford-MakovskyWebCredStudy2002-prelim.pdf.

credibility ameliorates when the layout is professionally well-designed; the experienced credibility increases when the site is easy to use or efficiently offers quick and personalized information.

Fogg explained such results in the light of his prominence–interpretation theory (Fogg, 2003b), pointing out that Web credibility perception is not only based on the digital cues of the site but also on a two-fold process wherein the individual has first to notice something (e.g., prominence) and then has to interpret it. In this sense, the probability that the user focuses on an element depends upon different factors such as motivation (and other psychological variables), the topic of the Web site, and so on.

The present study attempted to explore Web credibility in a student sample of Italian Internet users, taking into account that no empirical studies have been conducted in Italy so far.

Method

Participants

Students in Psychology at Palermo University ($N = 152$; 73% women, 27% men; M age = 23.7 yr., $SD = 4.3$) took part in the study. They volunteered during class time. Data were collected in the autumn of 2006.

Materials and Procedure

All participants were requested to complete a self-report scale, called the Italian Web Credibility Scale, which had two sections. The first section described the demographical characteristics of participants (e.g., sex, age). The second section included 32 items adapted from the original questionnaire developed by Fogg[2] for the Stanford-Makovsky Web Credibility Study.[3] To investigate the psychological dimensions of Web credibility, an Italian sample of student users were chosen by considering their Web expertise and specific cultural backgrounds. Successively, the selected items were translated into the Italian language to administer the questionnaire to the participants. All items were statements rated on a 6-point Likert-type scale using anchors of 1: Less credible and 6: More credible. It took about 10 min. to complete the scale.

Results

To estimate the internal consistency reliability of each factor, Cronbach coefficient alpha was calculated. Values were .80 for Inaccuracy, .77 for Efficiency, .80 for Social Validation, and .68 for Commercial Features. For the overall questionnaire, Cronbach alpha was .78.

[3]Dr. B. J. Fogg graciously gave permission to adapt, translate, and reproduce these items from his questionnaire and to administer them as a scale in this research and publish them in Table 1 of this article.

TABLE 1
FACTOR LOADINGS OF ITALIAN WEB CREDIBILITY SCALE ITEMS AFTER VARIMAX ROTATION

Item Content	Inaccuracy	Efficiency	Social Validation	Commercial Features
The site represents an organization that exists offline.	−.002	.051	**.541**	.091
The site is easy to use and well-designed.	.327	**.383**	.295	−.055
The site automatically pops up new windows with advertisements.	**.593**	−.052	−.026	−.119
An online community (e.g., newsgroup, forum, chat) was generated from the site.	.327	.182	**.514**	.099
The site links to outside institutions (e.g., medical, academic, scientific).	−.125	.316	**.501**	.208
It takes a long time to obtain access and download from this site.	**.672**	−.139	.123	.164
The site was recommended to you by someone.	.073	.130	**.347**	−.198
The site's domain name does not match the company's name.	**.500**	.023	.034	.266
The site provides a quick and functional response to users' questions.	−.468	**.446**	.413	−.093
The site has spelling or grammatical errors.	**.629**	−.043	.261	−.029
The site contains user comments and reviews.	−.055	.077	**.622**	.026
The site is multilingual.	−.462	.258	**.306**	.120
The site has clear and reference-endowed information sources.	−.594	**.465**	.214	−.024
The site contains more text than images.	−.409	**.360**	.101	−.084
The site provides authors' credentials for each document (e.g., name and surname, institution).	.572	.300	**.431**	.012
The site sometimes has a few technical problems (e.g., difficult access, link that doesn't work).	**.751**	−.039	.153	.106
The site lists its corporate customers.	.125	**.619**	−.018	.260
The site requires a paid subscription to gain access.	.132	.023	.134	**.689**
The site is rarely updated.	**.669**	−.040	−.194	.272
With correct key words, the site is the first to be selected in Google or other search engines.	−.162	**.653**	−.037	−.026
The site links to another site you think is not credible.	**.653**	.021	−.241	.335
The site is designed for e-commerce transactions.	.109	−.132	.360	**.574**
The site requires you to register or log in.	−.084	.102	.040	**.405**
The site represents a nonprofit organization.	−.235	.150	**.384**	−.389
The site recognizes that you have been there before.	−.269	**.604**	.072	−.059

(continued on next page)

TABLE 1 (CONT'D)
FACTOR LOADINGS OF ITALIAN WEB CREDIBILITY SCALE ITEMS AFTER VARIMAX ROTATION

Item Content	Inaccuracy	Efficiency	Social Validation	Commercial Features
The site has only commercial purposes.	.241	.042	.061	**.738**
The site offers instruments (e.g., virtual agents, shop assistants) to facilitate decision-making.	.020	.424	.011	**.475**
The site is cited in other media (e.g., TV, newspapers).	–.148	.290	**.344**	.287
The site gives a contact e-mail address.	.022	.190	**.405**	.324
The site represents a company that is well-respected.	–.184	.190	**.315**	–.005
The site offers information in Italian only.	.184	.130	.259	–.138
The site is linked to by another site you think is believable.	–.364	.556	.002	.320

Note.—Scores statistically significant ($r > .30$) are reported in boldface.

Factor Structure

To analyze further the psychometric properties of the Italian Web Credibility Scale and the Web credibility structure in a sample of Italian Internet users, an exploratory factor analysis was conducted on the 32 items using the principal components method.

To judge the best fit of the model to these data, criteria used included the eigenvalue rule, the scree test, and the interpretability of item content. Analysis yielded a total of nine factors with eigenvalues greater than 1.00; however, four eigenvalues accounted for the largest amount of variance. A scree test supported a four-factor model; indeed, the scree plot allowed selection of the four principal components which accounted for 46.6% of total variance. Each item was associated with a minimal number of factors, but to provide a reasonable interpretation of the data, a varimax rotation with Kaiser normalization was used. After varimax rotation, only items with factor loadings greater than .30 were considered.[4] The items and their loadings on each factor are shown in Table 1.

The items loading on each factor shared common characteristics which aided in naming the factors appropriately. The first component, Inaccuracy, explained 15.2% of variance and included items which described low care. The second component, Efficiency, accounted for 13.2% of the total variance and included items which refer to a good organization of the Web site. The third component, Social Validation, accounted for 9.7% of the variance and included items associating trustworthiness with the Web site's social reputation, using citations by media or recommendations by friends. The fourth component, Commercial Features, accounted for 8.5% of the total variance and included items referring to the commercial aims of the Web site.

Discussion

This investigation represents a first attempt to analyze the construct of Web credibility in a small sample of Italian students who were Internet users. The Web credibility factorial structure is comparable to that in Fogg's model. Indeed, the first factor, Inaccuracy, refers to a low level of care in the Web design and management, implying both technical malfunctioning and rare updating. In this sense, it could be approximately equivalent to the Amateurism dimension outlined by Fogg, *et al.* (2001). The second factor, Efficiency, describes the Web site usability which may be compared with the Ease of use dimension proposed by Fogg, *et al.* Indeed, this factor expresses the Web site technical efficiency, its speed of downloading, and other general usability features. The third factor, Social Validation, pertains to the Web

[4]Two items were eliminated by the factor analysis because the factor loadings were less than .30.

site's social reputation and seems similar to Fogg, *et al.*'s Real-world feel and Trustworthiness dimensions. This reflects that a site is credible to the extent to which it is well-known by other people, media, and trustworthy organizations. The fourth component, Commercial Features, is quite similar to the Commercial implication and Tailoring factors of Fogg, *et al.*, stressing the role of decision aids as well as security in improving the Web credibility.

This four-factor structure was consistent, then, in capturing the different psychological aspects of Web credibility among Italian undergraduate students who were Internet users. In the factorial model, the four factors accounted for 46.6% of the total variance, whereas Fogg, *et al.* (2001) reported 15.1% of total variance. Although the present study represents a work-in-progress involving a relatively small number of undergraduates from psychology classes, the similarity of results between Fogg's studies and this pilot approach encourages further research into the multiple aspects of Web credibility. To overcome the limitations of this preliminary research, the scale should be administered to a much larger and more representative Italian population than undergraduates in one field (Merenda, 2007). Refinement of the scale through attention to other measures of reliability and validity may support generalization of the present findings.

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