

Is it me or is it what I say? Source image and persuasion

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Abstract. In a persuasive communication, not only the message but also the source of the message can influence the persuasibility of the audience. This paper investigates whether displaying a static image of the source can affect the perceived credibility of a message that aims to promote regular exercise. We find a clear influence of the source's appearance on the source's credibility and that this effect is topic dependent. We also explore how the perceived source's credibility for a particular topic correlates with the perceived credibility of a message on that topic.

1 Introduction

Persuasive communication is “any message that is intended to shape, reinforce or change the responses of another or others.” [1]. In other words, in a persuasive communication, a source tries to influence a receiver's attitudes or behaviours through the use of messages. Each of these three components (the source, the receiver, and the messages) affects the effectiveness of persuasion in different ways. Over the years, the three most recognised characteristics of the source that influence their persuasiveness are *perceived credibility*, *likeability* and *similarity* [2,3]. These are not commodities that the source possesses, but they are the perception of the receiver about the source. *Appearance cues* of the source (e.g. a white lab coat can make one a doctor or a scientist, while untidy dressing can make one less trustworthy) have been shown to affect his/her perceived credibility [4]. There is also some evidence that *physical attractiveness* can positively influence persuasion: for instance, it has been shown that attractive communicators had more success in getting students to sign a petition [5].

This raises the question of whether showing the source of information visually can influence the perceived credibility of the information. This problem has been looked at by a number of researchers and mixed results have been found. Two studies at Boston University showed that people were more willing to cooperate with a human-like character when that character had been made more attractive [6]. However, attractiveness alone was not sufficient to predict cooperation: subjects cooperated less with a more attractive, but dog-like character. Adding a formal photograph of an author has been shown to improve the trustworthiness, believability, perceived expertise and competence of a web article (compared to an informal or no

photograph) [7]. However, adding an image of a person did not increase the perceived trustworthiness of a recommendation system [8]. It has been suggested that a photo can boost trust in e-commerce websites, but can also damage it [9].

The reason of these inconsistent results may well be that the source's perceived credibility is topic dependent. When delivering information about a topic, a speaker might have high credibility in certain aspects but low credibility in others. For instance, a doctor might be more credible than an athlete while talking about the benefits of exercise on health. In contrast, an athlete might have an edge over a doctor while talking about fitness programs. Meanwhile, someone who is similar to the user might be the most persuasive character should the user need social support.

A source's credibility may also depend on characteristics of the receiver: a series of studies by Baylor has shown a positive influence of the similarity of human-like agents to subjects (in terms of e.g. gender and ethnicity) on credibility of a teacher agent and motivation for learning (e.g. [10]). She found that people have preferences about whom they would like to interact with.

In this paper, we investigate whether displaying the source of information can influence the credibility of a message that aims to promote regular exercise. In particular, we investigate whether this effect depends on the perceived credibility of the source on the topic of the message.

2 Experiment 1: Validation, credibility and preference for source

The aim of this experiment is two-fold. Firstly, we want to establish the perceived age, gender, profession, attractiveness, trustworthiness, and expertness (on two topics) for various potential source images. We hope to find a subset of images with good inter-subject agreement on all these criteria. These images can then be used in future experiments. The second aim of the experiment is to investigate the correlation between these criteria (and characteristics of the participants) and the preference people have for whom they want to learn from about each of the two topics.

2.1 Experimental Design

Fifty-one participants took part in the experiment (see Table 1 for the distribution of age and gender). Participants were staff and graduate students of the university, but came from all areas and professions.









Table 1. The distribution of participants' age and gender

	Gender		Age			
	Female	Male	18-20	21-24	25-29	>= 30
Number of subjects	32	19	5	17	9	20

Participants were presented with 16 head and shoulder images of doctors and sport instructors / athletes (see Table 2 and 3). All images were taken from Microsoft Clipart (using search keywords like doctor and sport) and varied in age, gender, and

profession (as identified based on the tags used in Clipart for each image). The presentation order of the images was randomized for each participant to control for order effects.

Table 2. Eight of the images shown to the participants (all of doctors) and results

 1	Doctor 17		 2	Doctor 16; Other 1	
	Attractive 2.9 (0.7)			Attractive 3.0 (0.9)	
	Trustworthy 3.9 (0.8)			Trustworthy 4.1 (0.7)	
	H Exp 4.1(0.6) E Exp 3.0 (0.9)	#H 1 #E 1		H Exp 3.8 (1.1) E Exp 3.0 (0.8)	#H 7 #E 1
 3	Doctor 15; Other 1; Sport Instructor 1;		 4	Doctor 14; Other 3	
	Attractive 3.4 (0.6)			Attractive 2.4 (0.6)	
	Trustworthy 4.1 (0.8)			Trustworthy 3.2 (0.9)	
	H Exp 4.1 (0.6) E Exp 3.5 (0.5)	#H 1 #E 1		H Exp 3.5 (1.3) E Exp 2.5 (1.1)	#H 1 #E 0
 5	Doctor 16; Sport Instructor 1		 6	Doctor 15; Other 1 Sport Instructor 1;	
	Attractive 2.7 (0.6)			Attractive 2.7 (0.8)	
	Trustworthy 4.6 (0.5)			Trustworthy 3.7 (0.7)	
	H Exp 4.0 (0.8) E Exp 3.4 (0.7)	#H 1 #E 1		H Exp 3.9 (0.7) E Exp 3.5 (0.6)	#H 2 #E 3
 7	Doctor 16; Sport Instructor 1		 8	Doctor 11; Other 6	
	Attractive 3.3 (0.7)			Attractive 2.5 (0.7)	
	Trustworthy 4.5 (0.5)			Trustworthy 3.8 (1.0)	
	H Exp 4.1 (0.8) E Exp 3.5 (0.6)	#H 8 #E 2		H Exp 4.0 (0.9) E Exp 3.4 (0.6)	#H 1 #E 0

* H Exp, E Exp: Expertness on the health benefits of exercise, fitness programs respectively; #H, #E: number of subjects who picked this image as their favourite to learn from about the health benefits of exercise and fitness programs respectively; for most results mean (stdev) are given.

Participants were divided into four groups (to limit the time needed to perform the experiment and to avoid interaction effects between the questions). We asked each group to judge one or more characteristics of the person given in each image, namely:

- (Group A: 17 participants) *gender* (male or female), *most likely profession* (choosing from: doctor, sport instructor, other), and *age* (< 25, 25-30, 30-40, 40-45, or > 45)
- (Group B: 13 participants) *attractiveness*
- (Group C: 11 participants) *trustworthiness*
- (Group D: 10 participants) *expertness* with respect to (1) the health benefits of exercise, and (2) fitness programs.

A person's attractiveness, trustworthiness, and expertness were measured using 15 five-point Semantic Differential scale items developed by Ohanian [11] (see Appendix A for exact wordings).

Table 3. Eight of the images (all of sports people except image 11) and results

 9	Doctor 1; Other 5; Sport instructor 11;		 10	Sport instructor 11; Other 6	
	Attractive 3.8 (0.8)			Attractive 2.8 (0.9)	
	Trustworthy 3.2 (1.1)			Trustworthy 3.0 (0.9)	
	H Exp 3.7 (0.6) E Exp 3.9 (0.5)	#H 5 #E 14		H Exp 3.6 (1.0) E Exp 4.0 (0.7)	#H 6 #E 9
 11	Doctor 17		 12	Doctor 1; Other 5; Sport instructor 11;	
	Attractive 3.0 (0.8)			Attractive 3.6 (0.6)	
	Trustworthy 4.1 (0.7)			Trustworthy 3.9 (0.9)	
	H Exp 3.9 (0.6) E Exp 3.5 (0.7)	#H 1 #E 0		H Exp 3.8 (0.7) E Exp 4.1 (0.5)	#H 5 #E 12
 13	Doctor 1; Other 5 Sport instructor 11;		 14	Doctor 2; Other 13 Sport instructor 2;	
	Attractive 2.8 (0.9)			Attractive 2.4 (0.5)	
	Trustworthy 4.3 (0.5)			Trustworthy 3.3 (1.2)	
	H Exp 3.3 (0.9) E Exp 3.7 (0.9)	#H 1 #E 2		H Exp 3.0 (0.9) E Exp 3.1 (1.1)	#H 3 #E 2
 15	Other 7; Sport instructor 10;		 16	Doctor 1; Other 13 Sport instructor 3;	
	Attractive 2.6 (0.9)			Attractive 2.5 (0.9)	
	Trustworthy 4.3 (0.6)			Trustworthy 3.8 (0.9)	
	H Exp 3.5 (0.8) E Exp 3.6 (0.8)	#H 7 #E 3		H Exp 3.2 (1.2) E Exp 3.2 (1.2)	#H 1 #E 1

* See Table 2 for legend.

Next, all participants were presented with a webpage showing all 16 images (the order of the images was also randomized for each participant and each image was scaled down so that all images fitted on one screen in a 4x4 table). They could hover on each thumbnail to see the full size version. They were asked to choose whom they would like to learn from about each topic (i.e. health benefits of exercise and fitness programs), and the rationale for their decision.

2.2 Results and Discussion

Tables 2 and 3 show the results of the experiment, excluding results on gender and age to increase readability. With the odd exception, gender was completely agreed upon. There was more variation in the perception of age, but participants still tended to agree on a person looking older or younger (and for most images, there was a clear majority for one age category). The perception of profession was in accordance with expectation in fourteen out of sixteen images (in the sense that the majority of subjects agreed the image looked like a doctor or sports instructor respectively). The perceived profession of images 14 and 16 was not according to expectation, so these images are not suitable for further experiments.

The low standard deviations show that participants tended to agree on attractiveness, trustworthiness and expertness. Interestingly, all images were judged to show trustworthy people (with a lowest average of 3.0 for image 10, which is clearly above a neutral 2.5). Also, none of the images were judged to show really unattractive people (the lowest average was 2.4 which is close to neutral).

Independent sample t-tests indicated that profession influences perceived expertness. Doctors are perceived as more expert with respect to the health benefits of exercise than sport instructors (average 3.92, stdev 0.21 vs. average 3.59, stdev 0.18, $p < 0.05$), while sport instructors are perceived as more expert with respect to fitness programs than doctors (average 3.86, stdev 0.22 vs. average 3.26, stdev 0.34, $p < 0.05$). However, interestingly, almost all doctors (with the exception of image 4 who had a neutral score of 2.5) are perceived as having expertise in fitness programs, and all sport instructors are perceived as having expertise in the health benefits of exercise. Quite probably, sport instructors are assumed to be interested in exercise not just for the sake of exercise, but also because they care about the health aspects.

Our results also showed that there is a clear preference about whom people want to learn from about fitness programs. Forty subjects chose a sport instructor while nine subjects chose a doctor to learn from about fitness programs (two subjects who chose image 14 were not counted). However, the same does not hold for the topic of health benefits of exercise. Twenty-four subjects chose a sport instructor and twenty-three subjects chose a doctor to learn from about the health benefits of exercise (three subjects who chose image 14 and one subject who chose image 16 were not counted).

We found a correlation between expertness, as well as attractiveness, and the preference of the source for fitness programs (Pearson coefficient = 0.738 and 0.666 respectively, $p < 0.01$), but not for health benefits. This means participants preferred to learn about fitness programs from an attractive looking expert in that area. The images for each topic that were selected most often also had the highest credibility (defined as the combination of attractiveness, trustworthiness and expertness). Despite

this, no correlation was found between credibility, nor trustworthiness, and the preference of the source for either topic. Our qualitative analysis also confirmed this result. A healthy (but not overly fit) appearance, friendliness (both can be considered elements of attractiveness), and expertise were mentioned the most among reasons for choosing the preferred source. A list of all criteria mentioned by subjects is given in Table 4.

Table 4. Criteria used by subjects to choose whom to learn from

Health benefits of exercise		Fitness programs	
Criteria	No of subjects mentioned	Criteria	No of subjects mentioned
Fit (but not overly fit)	16	Fit (but not overly fit)	16
Friendly	10	Expert	16
Expert	9	Friendly	6
Nice	8	Fun	3
Near my age	3	Serious and committed	2
Unfit	3	Same gender	2
Approachable	3	Near my age	1
Same gender	2	Nice	1
Fun	2	Non judgmental	1
Non judgmental	2	Mature	1
Serious and committed	2	Approachable	1
Mature	1	Unfit	1
Credible	1		
Relaxed	1		

There was no correlation between the participants' gender and the gender of the selected image for both topics (using Pearson Chi-square). We also did not note an effect of the participants' age. So, for the given topics, similarity in the strict sense of age and gender between the source and the participant seems to have little effect (though some participants did regard this as important, see criteria mentioned above). However, similarity is a much broader concept than just age and gender (see e.g. research in the SIDE paradigm, [12]).

3 Experiment 2: Credibility of source and message

3.1 Experimental Design

In this experiment, we explore whether the social appearance of the source in the form of a static image influences the perceived credibility of the message. Following our discussion in Section 1, we proposed the following hypothesis:





H1: The perceived credibility of a message on a topic is positively related to the perceived credibility of the source on that topic (as resulting from the source's social appearance).

Fifty-nine participants took part in the experiment. Participants were staff and graduate students of different departments across the university (including secretarial staff).

All participants were shown two messages: a first about the health benefits of exercise and a second about fitness programs. We composed the messages based on the information available on www.mayoclinic.com and www.nutristrategy.com. Participants were asked to read the two given messages carefully. After reading each message, they judged its credibility by rating 15 items on a seven-point Likert scale. The items were developed and validated by Hong [13] for assessing the credibility of health-related websites. They assess four commonly recognised dimensions of credibility: goodwill, expertise/trustworthiness, depth, and fairness (see Appendix B for exact wordings). The items were ordered such that no two items from the same dimension appeared sequentially.

Participants were randomly divided into three groups (see Table 6 for demographics of the groups). The messages for Highly Credible Image and the Lowly Credible Image groups prominently showed a source image. The messages for No Image group lacked any image of the source. For the Highly Credible Image group, the images chosen were the most credible source images for the topics (as determined in Experiment 1): image 7 for the message about the health benefits of exercise and image 12 for the message about fitness programs. For the Lowly Credible Image group, the images chosen were the least credible source images for the topics (as determined in Experiment 1): image 4 for the first message and image 8 for the second message. All images used are shown in Table 5.

Table 5. Characteristics of the images used in the experiment as determined in Experiment 1

					
		7	12	4	8
Attractiveness		3.28	3.63	2.38	2.52
Trustworthiness		4.52	3.85	3.22	3.83
Expertness	H*	4.05	3.82	3.47	3.96
	E*	3.53	4.13	2.53	3.38

* H: Health benefits of exercise; E: Fitness program

Participants also indicated the extent to which they already knew the information presented to them, their knowledge on the topic before the experiment. The exact wordings and results are shown in Table 6. Please note that the first four questions were asked at the start of the experiment, and the last two at the end. There were no significant differences between the groups on any of these questions.

Table 6. Participants' backgrounds

		Highly Credible Image		Lowly Credible Image		No Image	
		M	F	M	F	M	F
Gender		6	13	4	15	8	13
I am currently doing some form of exercise		Yes	No	Yes	No	Yes	No
		9	10	14	5	15	6
I am more educated about my health than most people*		4.95 (1.03)		5.11 (1.37)		5.14 (1.31)	
I have full knowledge of the benefits (consequences) of regular exercise (or the lack of it)*.		5.47 (1.31)		5.32 (1.38)		5.43 (1.36)	
I already knew all the information presented**	Health	2.63 (1.16)		2.79 (0.71)		3.29 (1.27)	
	Exercise	2.37 (1.07)		2.47 (0.61)		2.86 (1.20)	

* 1 = strongly disagree 7 = strongly agree

** 1 = everything 7 = nothing

3.2 Results and Discussion

Table 7 shows the results of the experiment. We averaged the results on each dimension to get an overall score of credibility. Our hypothesis posited that the presence of an image of a highly credible source increases the perceived credibility of the message and that of a lowly credible source decreases the perceived credibility. So, we expected the message credibility to be highest for the Highly Credible Image group, lowest for the Lowly Credible Image group, and in between for the No Image group.

As shown in Table 7, the average results for the health benefits of exercise follow these predictions perfectly, both for every individual dimension and for overall credibility. However, this is only partly shown to be statistically significant. Though a one-way ANOVA indicated that there is indeed a difference on credibility among the three groups as predicted ($F=3.26$, $p<0.05$), only the contrast between the Highly Credible Image group and the Lowly Credible Image group was significant (Tukey, $p<0.05$).

The average results for fitness programs are clearly less in accordance with our hypothesis. The average results for the Highly Credible Image group are still higher than the average results for the Lowly Credible Image group for every dimension and for overall credibility. However, the average results for No Image group are clearly not following the hypothesis: the overall credibility and trust/expertise are very similar to those of the Highly Credible Image group and depth is even higher. No statistical differences were found. Maybe participants did not pay as much attention to the second message and its associated questions as they had to the first one. Messages

were quite long (576 words for the first one, and 919 words for the second one), and maybe participants were tired and less motivated when they started on the second message. The increased length of the second message may also have had an impact. We also note that unfortunately the groups were not equal in the sense that the majority of participants in the Lowly Credible Image and No Image groups are currently exercising, which was not the case for the Highly Credible Image group. We do not think this will have affected the results for the health benefits of exercise, considering the groups were equally aware of the health benefits of exercising. However, it may well have had an impact on the results for fitness programs. A follow-up experiment will be needed to investigate these issues further.

It should be noted that the images we used for the Lowly Credible Image group still had a reasonable credibility. It would have been easy to use images with lower credibility, increasing the difference between the Highly and Lowly Credible Image groups (and the Lowly Credible Image and No Image groups). However, we wanted to make this experiment as realistic as possible, using images a designer might have used.

The task given in the experiment was based on self-reporting of the various credibility dimensions after reading the messages, which may have reduced the need for participants to carefully assess them. We would like to increase participants' engagement by giving them a more direct task, e.g. deciding which particular exercise they are going to do themselves.

As shown in Table 6, participants already knew most of the information presented. This may have created a reverse effect in which the credibility of the message influenced the credibility of the source as suggested in social psychology [4], rather than the other way around. The fact that participants already knew most of the information may also have resulted in them having no difficulty in processing the information. Therefore, they may have been less influenced by peripheral cues such as the message source [14]. This is inline with research in the domain of e-commerce [9] which also suggested that the effects of specific interface elements (e.g. photos) on trust may be mediated by other site variables.

Table 7. Average score and standard deviation of each group (HC=Highly Credible Image, LC=Lowly Credible Image, NI=No Image)

	Fairness	Depth	Goodwill	Trust/Expertise	Credibility
Health benefits					
HC	4.61 (1.09)	3.79 (1.26)	5.60 (1.00)	4.46 (0.95)	4.62 (0.84)
LC	4.01 (1.35)	2.88 (1.01)	4.90 (1.02)	3.83 (1.19)	3.90 (0.84)
NI	4.07 (1.25)	3.63 (1.32)	5.18 (0.95)	4.32 (0.92)	4.30 (0.90)
Fitness programs					
HC	4.80 (1.37)	3.51 (1.18)	4.65 (0.44)	4.51 (0.73)	4.37 (0.74)
LC	4.67 (1.16)	3.11 (1.22)	4.42 (0.35)	4.09 (1.04)	4.07 (0.73)
NI	4.63 (1.07)	3.76 (1.38)	4.40 (0.44)	4.51 (0.98)	4.32 (0.76)

In summary, we found some evidence for the topic of the health benefits of exercise that the credibility of a source image influences the credibility of the message. However, the results of the experiment were not as supporting of our

hypothesis as they could have been, and clearly follow-up research in this area is needed.

4 General Discussion

In this paper, we investigated whether people have a preference about whom they would like to learn from about a certain topic and whether an appearance of the source in the form of a static head and shoulder image can influence the perceived credibility of the message.

To avoid any overgeneralization of our conclusions, we will first discuss the limitations of the study. Firstly, the majority of our participants are female, and over 30 years old. Hence, any findings in this paper should only be generalized to other demographics with care. Secondly, findings in this paper are restricted to the subject of promoting the health benefits of exercise and how to choose the most suitable fitness program.

Our experiments suggested that the source's appearance can influence his/her perceived credibility. This effect is topic dependent. For each topic, people do have a preference for whom they would like to learn from. This is very important in the process of designing onscreen characters as choosing the most liked character might create a better initial relationship between the system and the user. Furthermore, adding an image of a highly credible source with respect to the topic discussed in the message can have a positive effect on the message's perceived credibility. Finally, our experiments suggested a number of criteria for choosing the appropriate image for the topic of promoting health benefits of exercise and fitness programs.

In the future, we would like to investigate this issue further by extending our experiments in various ways. Firstly, we plan to develop our own credibility scale that is more suitable for our chosen topics based on our findings in Experiment 1. This could result in a more precise measure of credibility with respect to our chosen topics. Secondly, we would like to redesign the experiment in a more direct, task-based design which does not rely purely on self-report. Furthermore, we plan to explore the effect of social presence of the source in different form (e.g. animated characters, voice).

The use of social presence of the source is not restricted to its visual appearance alongside the message. It can be utilized in other ways to win trust and credibility from users. For instance, studies in psychology have shown the positive effects of social norms and indirect communication on persuasion [3,4]. By using a team of onscreen characters, we can simulate the effect of social norms by having each character repeat the same information in different ways. We can also simulate the effect of indirect communication by having the characters converse with each other while the user pays attention to the dialogue. We have started to explore these ideas, and some preliminary results can be found in [15].

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Appendix A

A person's attractiveness, trustworthiness and expertise scale developed by Ohanian [11].

	5	4	3	2	1	
Attractiveness						
Attractive	—	—	—	—	—	Unattractive
Classy	—	—	—	—	—	Not classy
Beautiful/Handsome	—	—	—	—	—	Ugly
Elegant	—	—	—	—	—	Plain
Sexy	—	—	—	—	—	Not sexy

Trustworthiness

Dependable	—	—	—	—	—	Undependable
Honest	—	—	—	—	—	Dishonest
Reliable	—	—	—	—	—	Unreliable
Sincere	—	—	—	—	—	Insincere
Trustworthy	—	—	—	—	—	Untrustworthy

Expertise

Expert	—	—	—	—	—	Not an expert
Experienced	—	—	—	—	—	Inexperienced
Knowledgeable	—	—	—	—	—	Unknowledgeable
Qualified	—	—	—	—	—	Unqualified
Skilled	—	—	—	—	—	Unskilled

Appendix B

Health-related websites' credibility scales developed by Hong [13]

Factor	strongly agree				strongly disagree		
	1	2	3	4	5	6	7
Fairness	—	—	—	—	—	—	—
This page provides information that is neutral	—	—	—	—	—	—	—
This page provides information that is not balanced	—	—	—	—	—	—	—
This page is biased in the information it provides	—	—	—	—	—	—	—
This page is slanted in the information it provides	—	—	—	—	—	—	—
This page is even-handed in presenting information	—	—	—	—	—	—	—
Depth	—	—	—	—	—	—	—
This page does not provide in-depth information	—	—	—	—	—	—	—
This page is not comprehensive	—	—	—	—	—	—	—
This page offers everything you need to know on the topic	—	—	—	—	—	—	—
Goodwill	—	—	—	—	—	—	—
This page has my interests at heart	—	—	—	—	—	—	—
This page is uncaring about its visitors	—	—	—	—	—	—	—
This page is not concerned about its visitors	—	—	—	—	—	—	—
Trust/Expertise	—	—	—	—	—	—	—
This page appears to have experts on the topic discussed	—	—	—	—	—	—	—
This page is ethical	—	—	—	—	—	—	—
This page appears to be a leader in its area of specialty	—	—	—	—	—	—	—
This page is not trustworthy	—	—	—	—	—	—	—