

The influence of (in)congruence of communicator expertise and trustworthiness on acceptance of CCS technologies

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Abstract

For public acceptance of CCS technologies, acceptance of messages of proponents of CCS is necessary. Research suggests that this message acceptance may depend on characteristics of communicators such as expertise and trustworthiness. The present experimental study investigates the influence of internal (in)congruence of communicator expertise and trustworthiness on message acceptance when people are sufficiently motivated and able to process this message. The first hypothesis was that incongruence of communicator characteristics (low expertise, high trustworthiness; or high expertise, low trustworthiness) leads to message quality expectations that are neither positive nor negative, whereas congruence of communicator characteristics leads to clear positive (high expertise, high trustworthiness, or clear negative (low expertise, low trustworthiness) message quality expectations. The second hypothesis was that the influence of communicator characteristics (expertise and trustworthiness) on message acceptance is more pronounced when these characteristics are congruent than when these characteristics are incongruent. Both hypothesis received support from the data. The results are discussed in terms of their theoretical as well as their practical implications.

Keywords: CCS, public acceptance, communication

Theoretical background

For successful implementation of CO₂ Capture and Storage (CCS) technologies, the creation of societal acceptance is a crucial precondition. CCS technologies may be applauded by the scientific community, but without acceptance of the general public, large-scale implementation of CCS technologies is unlikely. It therefore is important to examine the factors that determine public acceptance of CCS technologies.

Although one might expect that the majority of the general public will form an attitude (opinion) towards CCS technologies based on a careful, critical examination of information about CCS, this is unlikely to happen in practice. There are two reasons for this. First of all, people may not be particularly motivated to do so, for example because they are not interested in the topic or because they believe their opinion does not matter. Second, and more importantly, the majority of the general public is likely to lack the ability to critically examine information about CCS, since this information will be too complex and difficult to process for most people. Research by De Best-Waldhober and Daamen [1] has shown that most people do not even have the most basic knowledge necessary to evaluate CCS: for instance only 62 percent of a sample of the Dutch general public was able to indicate on a multiple choice scale that CO₂ is a Greenhouse Gas. Research from the field of psychology has shown that people are unlikely to critically process information if they lack the ability or the motivation to do so [2, 3]. Instead of critically processing the available information, people often use simple “rules of thumb” to decide what they think of an issue. One of the rules of thumb that is often used, is that information from experts is accurate. Whenever people perceive a communicator to be an expert, they tend to form positive expectations about the quality

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of the message (information) of the communicator, and as a consequence of this they are more willing to accept this message rather thoughtlessly (“CCS should be implemented”).

Although the majority of the general public will not be motivated and/or able to critically process information about CCS, part of the general public will be motivated and able to do so. What we want to show in the present study is that even when people *are* sufficiently motivated and able to critically process information about CCS, characteristics of communicators can influence message quality expectations and message acceptance, be it in a more indirect way than when people lack the motivation or ability to do so. We propose, based on Chaiken & Maheswaran [4], that in this case people do carefully process the information they receive from communicators, but that the nature of their thoughts is influenced by communicator characteristics. For example, when a communicator is an expert, people may form positive message quality expectations. As a consequence, when carefully examining the message of the communicator, people’s thoughts (cognitive responses) about this message are likely to be positive and they eventually may be more prone to agree with the message of the communicator.

Although a lot of experimental research has been done to establish the influence of a single characteristic of a communicator on message acceptance, relatively little research has addressed the influence of multiple characteristics of a communicator on message acceptance. In our opinion, investigating multiple characteristics is relevant, since in our daily lives people often use multiple characteristics of a communicator to form expectations about the message of this communicator. When relevant multiple characteristics are internally positively congruent (e.g. a proponent of CCS is perceived to be both high on expertise and trustworthiness), people will form a clear positive expectation of the quality of the message. When relevant multiple characteristics are internally negatively congruent (e.g. a proponent of CCS is perceived to be both low on expertise and trustworthiness), people will form a clear negative expectation of the quality of the message. In sum, when relevant multiple communicator characteristics are congruent, people will form a clear positive or negative expectation about the quality of the message of the communicator, just like in the studies on the influence of single communicator characteristics.

When relevant characteristics of a communicator are incongruent, we believe a situation different from the single characteristics studies develops. A proponent of CCS may be perceived to be high in expertise, but not very trustworthy. Also a proponent of CCS may be perceived to be highly trustworthy, but low in expertise. What we want to show in the present study is that when communicator characteristics are incongruent, it will be unclear to people what message quality to expect from a communicator. In contrast to situations in which communicator characteristics are congruent, people will have message quality expectations that are neither positive, nor negative. We believe that this (un)clarity of message quality expectations resulting from in(congruence) of communicator characteristics influences message acceptance.

In the present study we focus on two communicator characteristics that are either congruent or incongruent: expertise and trustworthiness. *Expertise* refers to ‘the extent to which a speaker is perceived to be capable of making correct assertions’, and *trustworthiness* refers to ‘the degree of confidence in the communicator’s intent to communicate the assertions he considers most valid’ [5: p. 21]. A reason to choose these characteristics is that research from Priester and Petty [6] has shown that recipients consider each of these characteristics to be highly informational and relevant for inferences of message quality. Moreover, it can be assumed that expertise and trustworthiness are equally informative to derive conclusions about message quality [6, 7].

We predict that when communicator expertise and trustworthiness are both either low or high (congruent), people will have clear positive or clear negative expectations about the message quality and that these expectations will differ from neutral. In contrast, when communicator expertise and trustworthiness are incongruent (low expertise, high trustworthiness or high expertise, low trustworthiness), we predict that people’s expectations of message quality will be neither positive nor negative, and that these expectations will not differ from neutral (H1).

Subsequently we predict that communicator expertise and trustworthiness will influence message acceptance more when these characteristics are congruent, than when they are incongruent. That is,

if people do not know what message quality to expect from a communicator, they will have to rely stronger on their own judgment of the message, compared to people who do have clear positive or clear negative message quality expectations and who can let these expectations guide their judgment of this message. In terms of message acceptance (cognitive responses and attitude change), we expect that compared to messages of communicators with incongruent characteristics, messages of a communicators low in expertise and trustworthiness will be less accepted, whereas messages of communicators high in expertise and trustworthiness will be more accepted (H2).

Method

Participants and design

A total of 100 students of Leiden University participated in the study for money or course credits and were randomly allocated to one of the four conditions of the 2 (expertise: low vs. high) x 2 (trustworthiness: low vs. high) experimental design: 1. low expertise, low trustworthiness 2. high expertise, high trustworthiness 3. low expertise, high trustworthiness 4. high expertise, low trustworthiness. Note that in two conditions communicator characteristics are congruent, whereas in the other conditions these characteristics are incongruent.

Procedure

On arrival at the laboratory, participants were led to an experimental cubicle containing a computer. All experimental materials were presented on screen. First we provided participants a brief introduction to CCS technology. This introduction about CCS was positively framed, in order to make sure that participants would be motivated to critically process information about CCS. Then we measured participants' attitudes towards large-scale implementation of CCS for the first time (t1). Next, we asked participants to read a bogus report consisting of 8 anticipated positive and 8 anticipated negative consequences of large-scale implementation of CCS technology in the Netherlands. The report actually was written by the researchers of the present study and it was based on expert information. The report was exactly the same for all participants and wording was neutral. Participants were led to believe that this report came from an organization (communicator) that, among other organizations, had been asked to write this report. We told participants that we could not provide them the name of the organization, but that we could provide a description of the organization. Subsequently, we described the organization as being either an expert in the field or not, and having been proved to be trustworthy in the past or not. We also informed participants that the organization was either positive or negative about large-scale implementation of CCS (counterbalanced): thus participants were led to believe that the organization was either a proponent or an opponent of implementation of CCS. This information, combined with the information in the report (which was identical for all participants) constituted the message from the communicator. After participants had read the report, we measured their attitudes towards large-scale implementation of CCS for the second time (t2). Subsequently, we asked participants to write down all the thoughts (cognitive responses) they had had while reading the report. At the end of the experiment, we thanked and debriefed the participants.

Dependent measures

Expected message quality

Participants indicated on 7- point scales (-3 = *not at all*, 3 = *very much*) to what extent they expected the report of the communicator to be complete and valuable. Responses to these items were averaged to form one expected quality measure ($r = .66$). A higher score on this measure indicates a higher expected message quality.

Message acceptance: cognitive responses

Participants were given 3 minutes to list all thoughts they had had while reading the report about CCS. Two independent raters subsequently rated these cognitive responses towards CCS as expressing negative, positive or neutral evaluations of implementation of CCS. Agreement of the

raters was high ($r = .92$). The negative and positive cognitive responses were subsequently combined in such a way, that a measure of correspondence between participants' cognitive responses and the message of the communicator was created³. A higher correspondence score indicates higher acceptance of the message of the communicator.

Message acceptance: attitude change

Participants indicated twice (t_1, t_2) on 7- point scales (1 = *not at all*, 7 = *very much*) to what extent they considered large-scaled implementation of CO₂ storage attractive, desirable, interesting, important, effective, appeasing, and alarming (recoded item). Responses to these items were averaged to form one attitude measure ($\alpha_{t_1} = .81, \alpha_{t_2} = .82$)³. Attitude t_1 then was subtracted from attitude t_2 to create a measure of attitude change. Attitude change was subsequently recoded in such a way, that a measure of correspondence between participant's attitude change and the message of the communicator was created⁴. A higher correspondence score indicates a stronger correspondence between participant's attitude change and the message of the communicator (higher acceptance of the message of the communicator).

Manipulation checks

Participants rated on 7-point scales (1 = *not at all*, 7 = *very much*) whether they considered the communicator to be an expert and experienced in the field of Greenhouse gasses and technology; responses to these two items were averaged to form one expertise measure ($r = .89$). A higher score indicates higher perceived expertise.

As a check of the perceived trustworthiness of the source, participants indicated on 7-point scales (1 = *not at all*, 7 = *very much*) whether they considered the communicator to be honest, open, and biased (recoded); responses to these items were averaged to form a trustworthiness measure ($\alpha = .81$). Higher scores indicate higher perceived trustworthiness.

To make sure participants were sufficiently motivated to process information about CCS, after the general introduction of CCS we asked them to rate on a 7- point scale (1 = *not at all*, 7 = *very much*) to what extent they considered the information they had read to be interesting.

Results

Manipulation checks

An analysis of variance (ANOVA) on the expertise measure yielded the expected expertise main effect, $F(1,96) = 114.96, p < .001, \eta^2 = .55$. As intended, participants in the high expertise conditions regarded the message source as possessing greater expertise ($M = 5.28, SD = .97$) than participants in the low expertise conditions ($M = 2.97, SD = 1.16$). This means that the expertise manipulation was successful.

An ANOVA on the trustworthiness measure yielded the expected trustworthiness main effect, $F(1,96) = 67.59, p < .001, \eta^2 = .41$. As intended, participants in the high trustworthiness conditions regarded the message source as possessing greater trustworthiness ($M = 5.18, SD = .87$) than participants in the low trustworthiness conditions ($M = 3.63, SD = 1.00$). Thus, the trustworthiness manipulation was successful.

As intended, participants considered the general introduction about CCS to be interesting, $M = 5.28, SD = 1.29$. This means participants were indeed motivated to process information about CCS.

Expected message quality

Multiple t-tests of expected message quality against the neutral scale midpoint of the scale indicated that only the two quality scores of the congruent communicator conditions significantly differed from zero (p 's $< .001$), whereas both quality scores of the incongruent communicator conditions did not differ from the scale midpoint (p 's $> .75$), see Table 1 for average scores. This means that only when expertise and trustworthiness of a communicator were congruently low or high, participants did have a clear (negative or positive) message quality expectation. In contrast, participants in the

³ Detailed information can be provided by the first author on request

conditions in which communicators were respectively low in expertise and high in trustworthiness or high in expertise and low in trustworthiness did not know what message quality to expect from this communicator (Table 1). In conclusion, the data support hypothesis 1: when people are faced with a communicator with incongruent characteristics, they find it hard to decide what message quality to expect from this communicator and message quality expectations are neither negative nor positive.

Table 1. *Effects of expertise and trustworthiness of a communicator on average scores and standard deviations of Expected message quality and Message acceptance.*

Expertise	Trustworthiness	Expected message quality		Message acceptance			
		<i>M</i>	<i>SD</i>	Cognitive responses		Attitude change	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Low	Low	-.92 _a	1.12	-.19 _a	.40	-.19 _a	.67
	high	-.05 _b	1.18	-.11 _b	.50	.16 _{ab}	.64
High	Low	-.08 _b	1.21	-.07 _b	.37	.16 _{ab}	.75
	High	1.05 _c	1.01	.25 _c	.46	.24 _b	.75

Note Within each column, means with different subscripts differ significantly from each other ($p < .05$).

Message acceptance: cognitive responses

Multiple contrast analyses on the measure that indicated whether participants' cognitive responses corresponded with the message of the communicator showed that the average scores in the congruent conditions differed in the expected direction from the average scores in the incongruent conditions. Participants' cognitive responses corresponded *less* with the messages of communicators that were low in expertise and trustworthiness, than with the messages of communicators with incongruent characteristics. Furthermore, participants' cognitive responses corresponded *more* with the messages of communicators high in expertise and trustworthiness, than with the messages of communicators with incongruent characteristics (Table 1). In other words, compared to the incongruent conditions, the messages of communicators low in expertise and trustworthiness were less accepted, and the messages of communicators high in expertise and trustworthiness were better accepted. These results are in accordance with hypothesis 2. It appears that message acceptance is more likely to be influenced by characteristics of a communicator when these characteristics are congruent than when these characteristics are incongruent.

Message acceptance: attitude change

The pattern of average scores on the attitude change correspondence measure resembles the pattern of the cognitive responses and therefore provides additional support for Hypothesis 2 (Table 1). In the incongruent communicator conditions, attitude change towards CCS corresponded either less (in the case of low expertise and low trustworthiness) or more (in the case of high expertise and high trustworthiness) with the message of the communicator than in the congruent communicator conditions. Like the results on the cognitive responses, it appears that message acceptance (and acceptance of CCS) is more likely to be influenced by characteristics of a communicator when these characteristics are congruent with each other than when these characteristics are incongruent. However, multiple contrast analyses on the attitude change index revealed that the differences in attitude change between the congruent and incongruent conditions were too small to be significant. Although the pattern on the attitude change correspondence measure provides some evidence for hypothesis 2, strong conclusions can not be drawn based on the results of this measure.

Conclusion and discussion

The results of the present study clearly show, that even when people are sufficiently motivated and able to critically process information, characteristics of communicators influence message quality expectations and message acceptance. Incongruence of communicator characteristics leads to message quality expectations that are neither positive nor negative, whereas congruence of communicator expectations leads to clear (positive or negative) message quality expectations. As a consequence, message acceptance depends less on communicator characteristics if these characteristics are incongruent than if these characteristics are congruent.

An implication for proponents of CCS is, that if they want their message to be accepted, it might be necessary that they are perceived positively on multiple characteristics. The present study clearly shows that the effect of one positive characteristic may be nullified if it is accompanied with an equally strong negative characteristic. Thus it may not be sufficient to be perceived an expert in the field when the general public does not at the same time ascribe trustworthiness to a proponent.

Finally, it should be noted that the same message acceptance mechanism that is described for proponents of CCS holds for opponents of CCS. The general public is likely to lack the ability to critically examine available information and will rely on characteristics of communicators to judge message quality of both proponents *and* opponents of CCS. If opponents of CCS are perceived to be both experts and trustworthy, their messages are as likely to be accepted as messages from proponents of CCS with similar characteristics.

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