



## **CATO-2 Deliverable WP5.4-D01 Progress report on first year of WP 5.4**

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## Progress report on first year of WP5.4

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# 1 Executive Summary (public)

This document contains the progress report on the first quarter of the CATO-2 WP5.4 PhD project "Resistance of valid beliefs about CCS against low quality information". In addition, this document contains a detailed description of the research planned for WP5.4 written by senior (CATO-2) researchers from January 2010 on. The planned work for this work package is fundamental in nature, and aims to identify factors (i.e., communication procedures) that determine the resistance of valid beliefs about CCS against low quality information (e.g., in media reports) about potential consequences of CCS.



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## Distribution List

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## Document Change Record

(this section shows the historical versions, with a short description of the updates)

Version	Nr of pages	Short description of change	Pages



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## 2 Applicable/Reference documents and Abbreviations

### 2.1 Applicable Documents

(Applicable Documents, including their version, are documents that are the “legal” basis to the work performed)

	<b>Title</b>	<b>Doc nr</b>	<b>Version date</b>
AD-01	Beschikking (Subsidieverlening CATO-2 programma verplichtingnummer 1-6843)	ET/ED/9078040	2009.07.09
AD-02	Consortium Agreement	CATO-2-CA	2009.09.07
AD-03	Program Plan	CATO2-WP0.A-D.03	2009.09.29
AD-04	Program Plan Annex 2 Deliverables	CATO2-WP0.A-D03-Program-Plan-Annexes - Restricted.xls / Annex2-Deliverables	2010.05.31
AD-05	Program Plan Annex 3 PhD List	CATO2-WP0.A-D03- Program-Plan-Annexes - Restricted.xls / Annex3-PHD	2010.05.31

### 2.2 Reference Documents

(Reference Documents are referred to in the document)

	<b>Title</b>	<b>Doc nr</b>	<b>Issue/version</b>	<b>date</b>

### 2.3 Abbreviations

(this refers to abbreviations used in this document)

SP	Sub-program
WP	Work Package
EB	Executive Board
N/A	Not applicable

### **3 Progress report on the first quarter of WP 5.4**

Reporting period: from start (August 16<sup>th</sup> 2010) till August 31<sup>st</sup> 2010  
Work Package: 5.4  
WP leader: Prof. dr. Naomi Ellemers, Leiden University  
SP leader: Dr. Dancker Daamen, Leiden University  
Participants: Leiden University, DCMR, Shell

#### **Main objectives of WP5.4**

See the CATO-2 Program Plan, document CATO-2WP0.A-D.03, version 2009.09.29.

#### **Executive summary: progress report in the reporting period (August 16<sup>th</sup> 2010 till August 31<sup>st</sup> 2010)**

PhD student Charlotte Koot started working on this project on August 16<sup>th</sup> 2010. She has spent the first weeks of her appointment (August 16<sup>th</sup>-August 31<sup>st</sup>) getting acquainted with the topic of CCS and the relevant scientific literature.

#### **Key decisions taken (go - no go)**

None in this reporting period

#### **Main problems encountered (delays, ...)**

None

#### **Changes in work plan?**

No

#### **Patents applied for**

None

#### **Organizational aspects**

Charlotte Koot's PhD research within WP 5.4 is supervised by Naomi Ellemers (promotor) and Emma ter Mors (co-promotor).

#### Internal WP meetings held (results?)

Weekly WP 5.4 meetings at Leiden University, where progress and next steps in the WP5.4 implementation are discussed (usually Koot, Ellemers, and Ter Mors; occasionally accompanied by Daamen, Terwel, and/or De Vries)

#### Relevant meetings with external parties (results?)

None

#### Personnel changes

-Appointment of Charlotte Koot at CATO2 WP 5.4 (August 16<sup>th</sup> 2010-August 16<sup>th</sup> 2014)



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### Deliverables due

Deliverable	Title	Due date	Status/remark
CATO2-WP5.4-D01	Progress report on first (quarter) of this PhD project (including detailed description of planned research written by senior researchers)	31/Aug/2010	Report delivered on August 31st, 2010. Public.
CATO2-WP5.4-D02	Progress report on the first year of this PhD project	31/Apr/2011	This PhD project started on August 16 <sup>th</sup> 2010. Accordingly, it would make sense to postpone the deliverable due date until 16/Aug/2011 Public
CATO2-WP5.4-D03	Paper on: Resistance of valid beliefs about CCS against low quality information	31/Aug/2011	Public
CATO2-WP5.4-D04	Paper on: Resistance of valid beliefs about CCS against low quality information	Year 3	Public
CATO2-WP5.4-D05	Paper on: Resistance of valid beliefs about CCS against low quality information	Year 4	Public
CATO2-WP5.4-D06	PhD thesis on: Resistance of valid beliefs about CCS against low quality information	Year 5	Public

### Workshops held, or expected

N/A

### Presentations and papers

N/A

### Presentations held: where, when, which subject?

N/A

### Presentations submitted

N/A



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**Presentations accepted: where, when, which subject?**

N/A

**Interviews given: where, when, published?**

N/A

**Papers submitted: title, journal, date**

N/A

**Papers accepted: title, journal, date**

N/A

**Need for actions / decisions by CATO management or Steering Committee**

None



## 4 Detailed description of planned work for WP 5.4

This section contains a detailed description of planned work for WP 5.4 written by senior (CATO-2) researchers from January 2010 on. The planned work for this work package is fundamental in nature, and aims to identify factors (i.e., communication procedures) that determine the resistance of valid beliefs about CCS against low quality information (e.g., in media reports) about potential consequences of CCS (for more information about WP 5.4, see the CATO-2 Program Plan, document CATO-2WP0.A-D.03, version 2009.09.29). The planned research will build on and extend knowledge acquired in the context of CATO-1 (e.g., De Best-Waldhober, Daamen & Faaij, 2006, 2009; De Best-Waldhober, Daamen, Hendriks, de Visser, Ramírez Ramírez, & Faaij, 2008; De Blécourt, 2008; Ter Mors, 2008; Ter Mors, Weenig, Ellemers, & Daamen, 2007, in press; Terwel, 2008; Terwel, Harinck, Ellemers, & Daamen, 2009a, 2009b, 2010a, 2010b) and will result in recommendations about formal communication about CCS. Note that this description of work planned concerns proposed research; adjustments may be made depending on progressed insights and outcomes of the studies.

### 4.1 Resistance of valid beliefs about CCS against low-quality information

Complex scientific and technological developments such as Carbon dioxide Capture and Storage (CCS) characterize modern society more and more. Public knowledge and awareness about these developments are an important factor in the successful implementation and use of these novel possibilities (see the meta-analysis by Bamberg & Möser, 2007). Public knowledge and awareness about CCS in the Netherlands has repeatedly been shown to be low, however; members of the general public are hardly aware of the existence of the technology (e.g., De Best-Waldhober et al., 2006, 2009; De Best-Waldhober et al., 2008; Pietzner, Schumann, Tvedt et al., 2010). Yet, even when people admit to have never heard of CCS, they nevertheless often declare an opinion about the technology when asked. Such uninformed opinions are referred to as *non-opinions* or *pseudo opinions* (cf. Converse, 1970), which are low-quality opinions that are not predictive for actual support for or opposition against CCS (e.g., De Best-Waldhober et al., 2006, 2009). Previous research in CATO-1 has shown that such uninformed CCS opinions are highly unstable and can easily be changed by new (low-quality) information articulating unfounded concerns or even incorrect lay opinions (De Best-Waldhober et al., 2006, 2009; De Blécourt, 2008). Experimental work by De Blécourt (2008), for instance, showed that the provision of erroneous information on risks (i.e., vivid media information on the Lake Nyos disaster) changed uninformed opinions regarding CO<sub>2</sub> storage substantially. Informed opinions in this study (i.e., opinions formed via an Information-Choice Questionnaire), by contrast, proved to be much more immune to novel information. In sum, the opinions of the general public regarding CCS can be expected to be relatively open for novel information and can be expected to be subjective to change. In the present project we propose that communication that contains factual information about CCS should enable people to close their minds about the technology and in this way enhance the resistance of their valid beliefs about the consequences of CCS against subsequent low-quality (media) information (cf. De Best Waldhober et al., 2006, 2008, 2009; Ter Mors, Terwel, Daamen et al., submitted for publication).

The proposed research project aims to identify elements of communication procedures that affect the degree to which people feel able to form an opinion and close their minds about CCS; or in, social-psychological terms, the degree to which people feel able to achieve a state of *cognitive closure* when forming opinions towards CCS. We approach *cognitive closure* as a

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cognitive end-state in which new opinions are firmly crystallized and certain (i.e., 'closed'), as opposed to flexible and less certain (i.e., 'open'). In our examination of precursors of cognitive closure we use a broad definition of cognitive closure that encompasses both subjective (e.g., *opinion* certainty; the subjective sense of conviction or validity about one's attitude or opinion; Festinger, 1950, 1954), behavioral (e.g., *decisiveness*; the degree to which people arrive at definite conclusions, endorsement of measures, adoption of technology), and potentially also psychophysiological (e.g., blood pressure, galvanic skin response; Roets, Van Hiel, Cornelis, & Soetens, 2008) indicators of this phenomenon.

Closed opinions among other things can be expected to more strongly guide future information processing, to be more stable over time, more resistant against persuasion and new (low-quality) information, and more predictive of future behavior than open opinions (cf. Chaiken, Liberman, & Eagly, 1989; Krosnick & Petty, 1995; Kruglanski & Webster, 1996; Kruglanski, Webster, & Klem, 1993; Petty & Cacioppo, 1986). In other words, closed opinions indicate completed information processing and opinion formation (cf. the permanence tendency or 'freezing', Kruglanski & Webster, 1996), whereas open opinions are easily changed and less predictive for future actions. Accordingly, it is highly relevant to examine the factors that determine whether or not people reach cognitive closure. Previous research has mainly focused on implications of individual and situational variations in people's *need* for cognitive closure (e.g., Kruglanski 1989, 1990, Kruglanski & Webster 1991, 1996; Webster & Kruglanski, 1994), however. The present research extends this previous work, as we argue that the extent to which people actually achieve cognitive closure regarding CCS not only depends on their motivation for closure, but also on their *perceived ability* to achieve such closure (cf. Bar-Tal 1994; Bar-Tal, Kishon-Radin, & Tabak, 1997; Roets & Soetens, 2010; Roets & Van Hiel, 2007; Ter Mors, 2008). That is, we argue that cognitive closure is a state that results from subjectively *perceived ability* to arrive at definite conclusions. We thus aim to advance existing insights by considering cognitive closure not as an individual difference variable referring to a motivational *need* (as an independent variable), but by examining cognitive closure as an end state indicating the extent to which this need is *fulfilled* (i.e. as a dependent variable).

To our knowledge, very few studies to date have systematically addressed the ability to achieve cognitive closure (cf. Roets & Van Hiel, 2007), let alone that these studies have examined the factors that may tap into this ability. The current work aims to fill this gap. We propose that when people process information in order to form opinions about CCS, which is the situation that we examine in the present research, communication-related factors such as information content, information source, and information context affect people's perceived ability to reach cognitive closure and in this way affect actual closure. This research project contributes to the social-psychological literature and to CATO-2 as we plan to systematically examine each of these aspects of information provision as potential precursors of cognitive closure. This is relevant to the development of effective communications about CCS, which typically use specific types of information content, sources, and contexts. Based on theoretical insights and previous research, there is good reason to suspect that common communication practices may not be optimally effective (or can even be counter-productive) in facilitating the achievement of cognitive closure. We will now outline the main issues that we plan to address in three lines of research, with the aim of empirically testing which types of content, sources and context in information provision about CCS are most likely to enhance vs. hinder people's ability to achieve cognitive closure.

### *Information content and cognitive closure: effects of the use of analogies in communication about CCS*

The first question that we plan to examine in WP5.4 is how the content of the CCS information provided affects people's perceived ability to achieve cognitive closure about CCS and in this way affects their resistance against subsequent erroneous media information. More specifically, we

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plan to examine the effects of the use of analogies in communication about CCS on (the ability to achieve) cognitive closure.

When experts communicate to the public about novel technologies, they often use analogies in which they compare aspects of the novel technology to already existing and familiar natural or industrial phenomena. In the case of CCS, for example, transportation of CO<sub>2</sub> can be compared with transportation of natural gas for household use, and storage of CO<sub>2</sub> in depleted gas reservoirs can be compared with the existence of natural CO<sub>2</sub> reservoirs (e.g., Gough, Taylor, & Shackley, 2002; Itaoka, Okuda, Saito, & Akai; 2009. For overviews of natural and industrial CCS analogues see Lewicki, Birkholzer, & Tsang, 2007; NASCENT, 2005). The use of analogies is thought to be an effective educational tool that can be used to communicate to the public what scientists and stakeholders know and do not know. The basic idea underlying the use of analogies is that they show the public that the novel technology is feasible and to build confidence in the long term effectiveness and safety of the technology. The mere fact that not only proponents of novel technologies, but also critics are eager to use analogies in their communication further illustrates the expected power attached to this strategy. In the case of CCS, a well-known example is the way in which critics of the technology have tried to illustrate the risks associated with storage of CO<sub>2</sub> in depleted gasfields in the Netherlands by drawing an – unwarranted – parallel with the situation in Lake Nyos in Cameroon, where the accumulation of gas in a mountain crater led to a disaster.

Despite the widespread use of analogies in expert communication about novel technologies and associated risks, very little is known about the effectiveness of this communication strategy in terms of facilitating the achievement of cognitive closure, or the conditions under which this is most likely to be achieved. This is why we plan to examine whether and how analogies enable lay people to form an opinion about (aspects of) CCS (i.e., whether analogies increase people's perceived ability to achieve cognitive closure about CCS) and in this way affect the extent to which they are open to additional information that becomes available at a later stage. Prior work suggests that laypeople's perceptions of specific risks are influenced by dimensions such as *familiarity* with the hazard, scientific *knowledge* about the implications of these risks, and the *likelihood of a catastrophe* (Fischhoff, Slovic, Lichtenstein, Read and Comb, 1978; Slovic, 1986; 1987; 1992; 2000). On the basis of these findings with respect to risk perceptions, our main prediction is that analogies should increase people's perceived ability to achieve cognitive closure (and actual closure) about CCS to the extent that they provide people with relevant information about (one, or more) of these relevant risk dimensions. An industrial analogy describing CO<sub>2</sub> transport through pipelines as being comparable to the familiar technique of using pipelines for the transportation of natural gas in the Netherlands, for instance, is expected to increase people's perceived ability achieve cognitive closure (compared to the situation in which the transportation of CO<sub>2</sub> is described without reference to this analogy, or when the analogy offered is less familiar). We expect this to be the case because the reference to a familiar technology that is associated with acceptable risks provides a frame of reference to determine the acceptability of the risks of CO<sub>2</sub> transport, and it makes the technology look less new. To the extent that such analogies indeed enable people to achieve cognitive closure on (aspects of) CCS, the opinions that result should be more robust against novel information and make people less vulnerable to external persuasion attempts that follow. In other words, when the inclusion of an analogy as part of high-quality communication enables people to achieve valid beliefs about CCS, which we predict to be the case, these beliefs should be relatively immune to subsequently provided erroneous media information. However, it is as yet unclear which dimensions of these analogies are most likely to elicit the ability to achieve cognitive closure about CCS (e.g., familiarity vs. likelihood of a catastrophe), whether this depends on type of concern people have (e.g., health risks vs. economic risks), or whether different types of analogies need to be combined to be optimally effective. This will be the main focus of a first set of studies planned for WP 5.4.

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*Information source and cognitive closure: How source characteristics implying informational relevance vs. self-relevance impact on the likelihood that information provided will facilitate the achievement of cognitive closure.*

In a second set of studies planned for WP5.4, we will examine characteristics of the source providing information about CCS as a potential factor that influences the ability to achieve cognitive closure. In our previous CATO-1 research we have shown that the expected *motives* of the source in arguing for CCS (e.g., as benefiting public interest vs. commercial interest) and the amount of *trust* placed in the source determine whether or not people are willing to accept the information provided by that source (e.g., Ter Mors, 2008; Ter Mors, Weenig, Ellemers, & Daamen, 2007; in press; Terwel, Harinck, Ellemers, & Daamen, 2009a, 2009b, 2010, in press). In the proposed research we plan to extend these insights, by focusing on the achievement of cognitive closure as a result of source characteristics, and comparing whether this is facilitated when the identity of the source implies that the information provided is relevant to the technology (e.g., by an expert), or that the information provided is relevant to the self (e.g., by someone like me).

Based on existing insights on opinion formation one might argue that people are better able to achieve cognitive closure when source characteristics imply that high quality information relevant to CCS technology is made available (e.g., due to the fact that the source is an expert, see also Ter Mors, 2008; Ter Mors et al., in press). Indeed, a common recommendation is that public communications should emphasize the expert nature, high quality, and completeness of the information they provide (e.g., by referring to scientific insights, providing technical details, or making available extended reports). We introduce the perspective of social identity and self-categorization which focuses on different ways people can be categorized in relation to the self (cf. Ellemers, 2010a, 2010b; Ellemers & Haslam, in press; Ellemers, Spears, & Doosje, 1999, 2002; Haslam & Ellemers, in press). Such categorization processes affect the way people communicate with others and interpret other people's communications (e.g., Ellemers, 2001; Harinck & Ellemers, 2006; Petronio, Ellemers, Giles, & Gallois, 1998). Existing insights on shared identities as an important factor in social influence (Turner, 1991) would suggest that – while people may judge this type of information as high quality – this does not necessarily imply that it will help them achieve cognitive closure in forming their own opinions about CCS. That is, emphasizing the special expertise of the information source increases the chances that this source is seen as different from the self (i.e., as an outgroup member; Barreto & Ellemers, 2003; Ellemers, & Van Knippenberg, 1997). Despite the high quality of the information provided by such a source, the categorization of the source as an outgroup representative likely makes this information seem less relevant for the self (cf., Ellemers, De Gilder, & Haslam, 2004; Haslam, O'Brien, Jetten, Vormedal, & Penna, 2005; Turner, 1991). Following this line of reasoning, we predict that when the same CCS information is provided by a source that is seen as similar to the self (a prototypical ingroup member, such as a neighbourhood 'opinion leader', or a homeowners representative; cf. Spears, Ellemers, & Doosje, 2009) this enhances the conviction that this is the information that addresses concerns relevant to the self, and thus increases the likelihood that cognitive closure about CCS is achieved, compared to the situation in which this information is conveyed by an expert source (who is seen as representing an outgroup of experts). We plan to test this prediction in a second set of studies, to examine whether and when emphasizing the expert status of the source of information may hinder rather than facilitate the achievement of cognitive closure.

*Information context and cognitive closure: the effects of processing goals and focused vs. casual information provision on the achievement of cognitive closure*

As a third relevant aspect of public communications about CCS we plan to address the context in which relevant information is provided as a factor that may either hinder or enhance the achievement of cognitive closure about CCS. Current CCS communication practices often are

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associated with political decision making regarding the implementation of technology, where it is considered important by policy makers and stakeholders to inform the public and to collect their opinions before a certain deadline. In the present studies we propose that such a context of *decision-making*, where lay people are urged to make up their minds about CCS, may impede rather than facilitate the achievement of cognitive closure. This for one reason is likely to be the case because, due to the general desire to see the self as a self-determined, free agent (Deci & Ryan, 1985), external requests to make up one's mind easily elicit reactance, decreasing the likelihood that people actually achieve cognitive closure as they actively seek to keep their options about CCS open (Webster & Kruglanski, 1997). Another important reason why a context of decision-making impedes the achievement of cognitive closure may be that such a context negatively affects people's ability to make up their minds. We propose that this is the case due to the perceived importance of the decision that has to be made, the stress associated with the desire to make a 'correct' decision, and the decision deadline implying that some time pressure is involved in processing the information provided. Thus, we predict that even identical CCS information coming from the same source is more likely to result in the achievement of cognitive closure when this is offered in the context of learning and public education than when a decision making goal is explicitly activated. The present work contributes to the literature as we predict that this is not just the case because a decision-making goal impedes people's need to achieve closure (i.e., reactance), but also because such a goal affects their perceived ability to achieve such a state of closure (i.e., information processing).

In this context of decision making, communication procedures about CCS further tend to provide all relevant information in a concentrated fashion. This happens for instance in information meetings to inform local citizens of upcoming developments in their neighborhood. While this type of procedure is intended to ensure that people have access to all relevant information before they are required to make up their minds, there is good reason to suspect that this may paradoxically have adverse effects on the actual achievement of cognitive closure because it puts even more strain on people's ability (and motivation) to achieve cognitive closure. When all relevant information is provided at once in the context of a public decision making procedure about CCS, we argue that people may not only become distrustful about the motives and one-sided persuasion attempts of parties involved in this information provision (cf. Eagly, Wood, & Chaiken, 1978; Petty & Cacioppo, 1979; Ter Mors, 2008; Ter Mors et al., 2007; Terwel et al., in press), but also are actively made aware of the complexity and far-reaching consequences of the decision that is pending. Given that people are typically only able to consciously process a limited amount of information in a rational decision making procedure (and actually seem better at complex decision making through unconscious implicit information processing; see Dijksterhuis, 2004; Dijksterhuis, Bos, Nordgren, & Van Baaren, 2006) they are likely to become insecure about their ability to handle large quantities of complex information. Thus, when a large quantity of relevant information about CCS is made available all at once, this in itself can make people reluctant to commit themselves to a particular position because they feel unable to make up their minds. This is why we argue that the provision of all the information that is relevant to CCS in a concentrated fashion may actually be less likely to result in the achievement of cognitive closure than information that is offered in a more dispersed fashion, for instance as an ongoing information log. Moreover, we predict this in particular to be the case in a context of decision-making compared to a context of learning and public education. We plan to examine these predictions in a third set of studies.

## 4.2 Method

A survey and a series of experiments are planned to address the research questions with regard to the ability to achieve cognitive closure about CCS. Three research lines are planned that focus on communication-related precursors of cognitive closure: information content, context, and sources respectively. The experiments in these lines will all have the same basic design:

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Research participants will be exposed to different procedures of information provision (i.e., experimental variations in information content, information source, and/or information content) where they will receive information on (aspects of) CCS. Subsequently they indicate their perceived ability to achieve cognitive closure with an adapted version of an existing measure (AAC; Roets & Soetens, 2010), and their actual closure (e.g., certainty: Fazio & Zanna, 1978; openness to novel information; decisiveness). Our experiments will also include a behavioral measure of cognitive closure where we put the robustness of participants' beliefs about (aspects) of CCS to the test. More specifically, we will extract low-quality information about CCS from our CATO-2 media log (e.g., a news paper article that contains a personal opinion without scientific argument or a scientifically incorrect argument) which will be presented to our research participants to test the resistance of their beliefs and the extent to which they have closed their minds for novel information.

We further will assess (with psychophysiological measures) the degree of stress raised by different types of communication procedures, but also the actual degree to which information is processed (e.g., reading time, cued recall), and check how people perceive the content of the information provided (e.g., subjective helpfulness of analogies provided), the source providing the information (e.g., categorization as an ingroup vs. outgroup member), and the context in which the information is provided (e.g., activation of decision making vs. educational goals, time pressure experienced). Further, in our studies we consider the possibility that the effects of the communication-related factors on the ability to achieve cognitive closure may depend on chronic or situational variations in the need to achieve cognitive closure by having our participants fill out a Need for Cognitive Closure scale (Webster & Kruglanski, 1994; Dutch version by Cratylus, 1995; revised by Roets and Van Hiel, 2007). Finally, in specific studies, additional (dependent) measures include the revised perceived information quality (Ter Mors 2008; Ter Mors et al., in press) and risk dimensions (Savadori, Savio, Nicotra, Rumiati, Finucane et al., 2004).

### *Information content and cognitive closure*

In the first set of studies we plan to examine whether and how the use of analogies in communication about the novel technology of CCS increases people's ability to achieve cognitive closure. Study 1a will be a survey in which we examine how lay people rate different aspects of CCS (e.g., capture, transport, storage) on risk dimensions such as familiarity with the hazard and catastrophic potential (see Savadori et al., 2004). This study aims to identify the risk dimensions that predict lay people's estimates of the risks of (aspects of) CCS most, and to identify the main concerns that people have. In Study 1b we will examine whether the use of an analogy that provides information on one or more relevant risk dimensions increases the perceived ability to achieve cognitive closure (and actual closure) about CCS. In this experimental study two groups of participants (Information content: control vs. analogy) will receive information about (aspects of) CCS. Depending on experimental condition, the CCS information that participants receive is accompanied by an analogy (analogy condition) or not (control condition). The analogy that we will use in this study will be developed and pre-tested in a pilot study, and will contain information about (one or more) of the relevant risk dimensions that are identified in Study 1a. Participants subsequently will be asked to fill out the main dependent measures which are ability to achieve cognitive closure (Roets & Soetens, 2010), cognitive closure (e.g., certainty: Fazio & Zanna, 1978; openness to novel information; decisiveness), and ratings of CCS aspects on relevant risk dimensions (Savadori et al., 2004). Study 1c aims to replicate and extend findings of Study 1b. In this experimental study which follows the design of Study 1b we further address the processes underlying the effects observed in Study 1b. More specifically, we examine whether analogies indeed increase people's perceived ability to achieve cognitive closure about CCS to the extent that they inform people on relevant risk dimensions. To examine this, in Study 1c we cross information content (control vs. analogy, as in Study 1b) with information relevance (i.e., we activate different risk dimensions in participants; a risk dimension that matches vs. that mismatches the information provided in the analogy). Main dependent variables in this study will

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be identical to that in Study 1b, except that in Study 1c we additionally test the resistance of participants' beliefs about CCS against novel media information.

### *Information source and cognitive closure*

The basic procedure in this second set of studies is similar to the set-up in the first set of studies, except that this time we will keep the content of the information provided identical, but compare the effects of different alleged sources of this CCS information. In Study 2a we plan to examine whether explicitly presenting a certified expert (prototypical outgroup member) vs. lay-person (prototypical ingroup member) as the source of the information provided impacts upon the likelihood that people perceive the source as relevant to the topic under consideration vs. relevant to the self, and affects their ability to reach cognitive closure. In Study 2b we will examine whether the specific individual providing the information is crucial or whether the source of the information can also be conveyed more implicitly (i.e., through the medium in which the information is presented). In this study we will cross individual identity (prototypical in-group vs. out-group member) with different publication media, namely by comparing effects of the same CCS information printed in the form of a formal research report (relevant to the topic) or as an informal communication in a local newsletter (relevant to the self). In Study 2c different types of source characteristics will be combined to examine whether the risk of having a high quality source categorized as less self-relevant can be countered by explicitly indicating that this source is a prototypical in-group member (e.g., a physicist who also lives in the neighborhood).

### *Information context and cognitive closure*

In the final set of studies we plan to examine whether identical CCS information provided by the same source impacts differently on the achievement of cognitive closure depending on the context in which it is provided. With similar procedures as used in the first two sets of studies, Study 3a will test whether the activation of an educational vs. decision making goal impacts on the ability (and need) to achieve cognitive closure about CCS. Study 3b will examine the effects of concentrated vs. dispersed information provision on the ability (and need) to achieve cognitive closure about CCS. Study 3c will cross these two contextual aspects to examine the combined and interactive effects of goal activation (educational vs. decision making) and information provision (dispersed vs. concentrated).

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