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Reading for University or for Myself? Effects of Context and Beliefs about Science  
on College Students' Document Selection

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### Abstract

Previous research on document selection has found that college-level readers are generally able to differentiate trustworthy from less trustworthy sources. Yet, a preference for selecting trustworthy sources may depend on features of the reading situation and readers' beliefs in science. In the current study, college students were tasked with selecting documents for either a university assignment or a personal project (external context manipulation) using documents that varied in the type of source (i.e., a source with scientific expertise or a source with personal experiences) as a within-participants manipulation. Moreover, participants' beliefs about science and knowledge about how science works were assessed. In two experiments (N=165 and N=125), participants selected documents for further reading for four target topics. In Experiment 2, a personal condition was added that included mention of an external audience for the assignment. Like in previous studies, participants in both experiments preferred scientific-expertise sources over personal-experiences sources. However, their likelihood of selecting a personal-experiences source was higher in a personal context without an external audience (compared to university context). More positive beliefs about science as well as knowledge about how science works were associated with a lower probability of selecting sources with personal experiences. Experiment 2 replicated the results of Experiment 1 and extended the findings regarding external context. Although college-level readers generally prefer scientific sources, their selection of sources without scientific expertise also depends on the external reading context as well as on personal beliefs and knowledge about science.

Key words: selection of multiple documents; reading; context; implicit and explicit beliefs about science; knowledge about how science works

### **Educational impact and implications statement**

When university students select documents for further reading about science, the context in which they do this plays a role: If they are supposed to read for a school task, they select mainly sources featuring scientific expertise and fewer sources containing personal experiences than if they read for personal reasons. Moreover, their beliefs about science and their knowledge about how science works play a role: The more positively they regard science and the more knowledge they have about science, the less likely they are to select sources containing personal experiences over sources containing scientific expertise. Thus, these findings indicate the importance of fostering both knowledge and beliefs about science in education.

## **Reading for University or for myself? Effects of Context and Beliefs about Science on College Students' document selection**

### **Introduction**

Internet users search for diverse information types for many purposes. Often, they need information that is based on science or related to scientific findings. College students, for example, may need information about science in order to come to a personal decision, in order to research a personal project, or in order to prepare for an academic assignment. Yet, little is known about whether and how these contexts change college students' information processing behavior. By *context* we mean the broader setting in which one reads, which can potentially influence one's interpretation of the actual task. For example, the same task (e.g., write an overview) can occur in an academic context (e.g., write an overview of a topic for a school assignment) or in a personal context (e.g., write an overview of a topic for a personal project and/or in an e-mail to a friend).

One way that context can affect a reading task is through the selection of documents that one selects to read (Brand-Gruwel et al., 2009; Rouet & Britt, 2011). For instance, it is known that the position of a search result in the search engine result page (SERP) has a high impact on the selection probability such that the top-most documents are selected more often than others (top-link heuristic; e.g., Kammerer & Gerjets, 2014; Pan et al., 2007). Likewise, although it is known that upper secondary school students (on a college-preparatory track) generally select highly relevant documents and they also prefer documents with a high (as compared to low) author expertise (e.g., Bråten et al., 2018; McCrudden et al., 2016), the data so far rest mostly on academic types of tasks in which students are expected to select sources according to academic standards and norms (by *academic standards and norms* we refer to expectations for products at the university, such as giving credit to others' work by

citation and using reliable and expert-level sources). In a personal context, different standards and beliefs may drive the selection.

Based on recent theories and earlier research, the present paper addresses whether and how aspects of the context as well as a reader's own beliefs and knowledge about science play a role in determining which documents are selected for further reading. More precisely, we investigate the combined influence of context, beliefs about science, and knowledge about how science works on university students' propensity to select sources with personal experiences and no visible scientific expertise when searching about a science-related topic.

We start with a review of current knowledge about how the context of reading influences reading about science. Then, we address the selection of documents and the potential influence of beliefs about science and knowledge about how science works. Finally, we present two experiments on the effects of context, beliefs, and knowledge on the selection of documents for further reading about science.

### **The Context of Reading about Science**

For university students, the need for scientific information, and therefore the selection of documents for further reading, can occur in various contexts. For example, a university student might have an academic assignment to conduct a literature search to write a summary about a topic. Or this same student could search for information about the Covid-19 pandemic to decide whether or not they – or their relatives – should get a booster shot.

#### ***An analytic framework for analyzing context effects***

The RESOLV (REading as problem SOLVing) theory (Britt et al., 2018; Rouet et al., 2017) posits that most of our reading activity serves a specific purpose such as being transported to another world (fiction), being entertained or distracted (social media), passing an exam (career), or making political and health decisions (personal life reading). In that light, we do not read everything linearly or completely (i.e., from the first word to the final

word) but make decisions about what to read and how to read it.

According to RESOLV, these decisions are based on a *context model* and a *task model*. Readers create a *context model* using feature extraction of elements involving the external features (e.g., the task question<sup>1</sup> itself, the person presenting the task, the audience of the task, and any mentioned or inferable supports and obstacles – see also Table 1) and internal aspects of oneself within that context (e.g., knowledge, value, beliefs, skills). The elements that will be foregrounded will be partially dependent on the schema that gets activated for that task. Task schemata are acquired from many exposures to certain types of tasks within a situation or context. An activated task schema can then be used to create a representation of the goal state for the task and help to identify strategies and criteria for completing the task as well as values for the goal state to motivate engagement (called a *task model*).

The task model will drive reading decisions such as what to read, how to read, and when to stop. For example, writing an overview from multiple sources in a university context, where the assignment is from a professor for a science seminar, may activate a schema for summarizing science material and the task model would include criteria such as using expert sources. In contrast, when writing an overview in a personal context the external context does not necessarily activate the same criteria. For readers who value science and know about the scientific approach, a personal context may activate scientific criteria, while a reader without these beliefs and knowledge may have different criteria. Several studies have found that a reader's understanding of their task influences single and multiple document comprehension (e.g., Cerdán et al., 2019; List et al., 2019; Schoor et al., 2021).

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<sup>1</sup> Since the RESOLV framework assumes that a task encompasses more than the explicit instruction and certainly more than the specific question, we use the term “task question” when we refer to the specific question of what to do (e.g., write an overview, write an argumentation, read for understanding), and the term “task” is used to refer to other aspects of the task (e.g., criteria, resources).

### *The role of external factors in reading strategies and outcomes*

Research investigating external influences in reading has so far concentrated on broadly-defined reading purposes or on single aspects as specified in RESOLV (e.g., task questions, audience; see McCrudden & Schraw, 2007, for a review). Studies contrasting reading for study versus entertainment purposes found that the former led to more coherence-building inferences and better memory for the text, whereas reading for entertainment led to more associations and elaborations (e.g., Bohn-Gettler & Kendeou, 2014; Linderholm & van den Broek, 2002; Narvaez et al., 1999; Van den Broek et al., 2001). Van den Broek et al. (e.g., 1995, 2001) argued that in a reading-to-study context, readers set a higher standard for their understanding of the text (“standard of coherence”) than in an entertainment situation.

A study by Schoor et al. (2023) tested the effects of a university vs. a personal context scenario on university students' multiple-document reading behavior and their use of information in an essay. Consistent with RESOLV predictions, they found these external context scenarios involve different reading decisions: Readers in a university context more often switched texts, used more adversative connectors in their essay, more often used a corroborating expression in the essay, and more often explicitly addressed a discrepancy between texts than in a personal context. This suggests that readers in a university context have a different standard of establishing and communicating a representation of the content of the documents (e.g., Britt et al., 1999; Britt & Rouet, 2012). Moreover, readers spent more time on the task/essay page and more often wrote continuous text (instead of mere notes) in the university context than in the personal context. This suggests a different standard of presentation. However, the study by Schoor et al. (2023) did not address the selection of documents.

Another line of research has investigated whether the specific task or question that prompts students to read influences their reading processes and outcomes (e.g., Bråten &



Strømsø, 2010; Le Bigot & Rouet, 2007; Stadtler et al., 2014; Wiley & Voss, 1999). For example, readers provided with an argumentation task question scored better than readers reading for global understanding (Bråten & Strømsø, 2010). Some studies also found a benefit of argumentation task questions over summary task questions in terms of deep comprehension and transformation of information (e.g., Stadtler et al., 2014; Wiley & Voss, 1999), although the magnitude of the effect depends on readers' individual characteristics (e.g., Gil et al., 2010).

Studies based on specific task questions leave it to the participant to imagine in which context the task is supposed to occur, which may explain in part why the effects have been somewhat inconsistent from one study to another. Conversely, broad context manipulations such as "read for study" or "read for entertainment" involve the implicit manipulation of several context dimensions as specified in the RESOLV model outlined above. For example, when reading to study, the requester is usually a professor, the stakes are often high, the task question is to understand or learn the material, and the audience is the professor grading an assessment. In contrast, when reading for entertainment, the requester is the reader, the stakes are quite low, the task question is to kill time or for enjoyment, and there is no external audience. Thus, the construct of "purpose" in prior research is actually a multi-dimensional compound and it is unclear as of now which of these aspects (or which combination thereof) drives the observed effects.

The nature of the *audience* is yet another dimension often left implicit when asking students to write from sources. A hallmark of skilled argument writing is to rhetorically and linguistically frame one's essay to address the specific needs of the audience (i.e., *audience adaptation*, Ragoth, 1985), a skill challenging even for college-level writers (Felton et al., 2015; Nussbaum & Schraw, 2007; Ragoth, 1985; Wolfe et al., 2009). For example, college students who believed that including other side information was valuable included it more

frequently in their argument than those who did not believe it was valuable (Wolfe & Britt, 2008). This experiment did examine differences in the number of documents visited depending on the side assigned (i.e., audience), but participants examined the majority of documents regardless of the condition, probably because all the documents were relevant and came from an expert source. Thus, readers' perception of the audience may affect their inclusion of information in an essay, but it is yet to be examined whether this influence extends to their selection of sources for reading.

In summary, research has provided ample evidence that the external reading context influences mature readers' strategies and their use of information in text-based writing tasks. Yet, there is still a lot of work to be done disentangling the reading purposes effects with regard to RESOLV categories, regarding both external and internal factors.

***The role of readers' internal context for reading strategies and outcomes.***

College-level readers vary in their abilities and dispositions regarding reading, especially when dealing with multiple documents (e.g., Mahlow et al., 2020; Schoor et al., 2020). In terms of RESOLV, this set of internal variables are referred to as the “self” dimension of the context model. Prior research has found, among others, that epistemic beliefs (e.g., Barzilai & Eshet-Alkalai, 2015; Bråten et al., 2016), prior topic beliefs (e.g., Maier & Richter, 2016), and prior knowledge (e.g., Le Bigot & Rouet, 2007) influence readers' approach to multiple documents.

In comparison with "mainstream" variables such as topic knowledge or beliefs, readers' general dispositions regarding science have received less attention. Science-related beliefs include the extent to which one trusts science and its utility as a basis for their personal decisions. *Trust in science* has been in the focus of research on the public's understanding of science (Bauer et al., 2007), whereas the perceived *utility of science* has been assessed in

research on teacher education (Kiemer & Kollar, 2018, 2021; Parr & Timperley, 2008). To our knowledge, neither factor has been examined in the context of selecting documents for further reading. When working with documents, people will likely select information that they consider most relevant for their question at hand (Eccles & Wigfield, 2002; Kiemer & Kollar, 2021; Wigfield & Eccles, 2000). Since laypeople will likely not be able to assess the validity of scientific information based on an analysis of the methods used, they may instead make a decision based on who to trust (Bromme & Gierth, 2021; Bromme et al., 2010). As a result, their perception of trustworthiness and usefulness of science may affect their preference for sources with scientific expertise over other types of sources.

Whereas explicit beliefs are based on propositional reasoning (Gawronski & Bodenhausen, 2007) and may result from content *taught* in secondary and higher education courses, implicit beliefs are based on associations between concepts, for example between science and utility (e.g., Schoor & Schütz, 2021), and may be shaped by students' *experiences* both in and out of school. Consequently, implicit attitudes and beliefs often have predictive power over and above their explicit counterpart (Greenwald et al., 2009; Schnabel et al., 2008).

Science-related *knowledge* is considered in scientific literacy research. Scientific literacy includes knowledge about scientific concepts (i.e., content knowledge; e.g., Miller, 1983; OECD, 2016), knowledge about societal and policy issues related to science (e.g., Miller, 1983), and knowledge about how science works. This latter knowledge about “how scientific knowledge is produced” (Winterlin et al., 2022, p. 1) may be especially relevant when selecting documents for further reading about science because it may make readers appreciate the scientific approach and consequently make them prefer sources with scientific expertise.

The aforementioned Schoor et al. (2023) study found limited effects of two self-variables

(explicit belief in the utility of science and explicit trust in science) on essay writing on science topics. Yet, the self-variables beliefs about science and knowledge about how science works may interact with the external context to influence document selection. Based on the literature, while in a university context with salient academic standards, readers should be more likely to use academic standards than in a personal context. In a personal context, readers can select their own standards based on their personal values and experiences. Readers who value a scientific approach to knowledge and know more about how science works might use the same information standards in both an academic and a personal context. On the other hand, people with less positive beliefs about science and less knowledge about how science works might choose a different approach in a personal context, which might include relying on first-hand personal experience or personal opinion instead of scientific evidence, especially in the current “post-truth” situation (Barzilai & Chinn, 2020).

In the present two experiments, we thus focus on context effects on the selection of documents. More precisely, we suggest that external context and internal self-variables (i.e., beliefs about science and knowledge about how science works) influence the type of sources (i.e., expert sources) considered appropriate and therefore selected for further reading. As a first step and following Schoor et al. (2023), we will manipulate the task question independently from varying the broader external context scenario in order to disentangle the context compound. We intentionally allow stakes to vary with the broader context scenario because this is often the case in natural settings (and can be disentangled in later studies).

### **Selection of Documents for Reading**

In many if not most naturalistic reading situations, mature readers have to select the documents they intend to read before they can actually read them (Brand-Gruwel et al., 2009; Rouet & Britt, 2011). For instance, readers may browse through a stack of magazines,

they may look up book titles on a library shelf, or query a search engine. Early studies showed a strong preference for selecting documents on top of the SERP (Pan et al., 2007; Salmerón et al., 2013). For example, Pan et al. (2007) varied whether a SERP is displayed in the normal order or in the reversed order and compared attention to it (gaze behavior), selection (e.g., click on it), processing of it (reading times of the text), and/or task outcome. The preference for documents on top of the SERP was observed both when less relevant (e.g., Pan et al., 2007) and – although in an attenuated way – when less trustworthy documents were displayed at the top of the list (Kammerer & Gerjets, 2014). Although many studies use authentic SERPs, there are also other studies in which the display of sources was adjusted to the research emphasis (e.g., Kammerer & Gerjets, 2014; Lee & List, 2023). None of these studies, however, addressed how different contexts for a given task question influence the selection of documents.

According to RESOLV and other models, this document selection behavior should take place based on the to-be-solved problem (Brand-Gruwel et al., 2009) or the understanding of the task at hand in their task model (Rouet & Britt, 2011). The task model is assumed to guide not only the processing of documents (e.g., Cerdán et al., 2013; Cerdán et al., 2019; Schoor et al., 2021), but also the selection of documents for further reading.

Indeed, mature readers' top criterion for selecting documents is their relevance with respect to the content searched (e.g., Bråten et al., 2018; McCrudden et al., 2016; Salmerón et al., 2013; Savolainen & Kari, 2006). For example, Bråten et al. (2018) had 17-year-old school students select documents with more or less content relevance and more or less source expertise for writing a letter to an editor about a more or less familiar topic. They also varied whether students received additional instruction about source credibility. They found a strong effect of content relevance, independent from topic familiarity and instruction.

A second aspect investigated in document selection studies is source expertise. Upper

secondary school students (on a college-preparatory level) are generally able to judge documents and select documents with a high source expertise (e.g., Bråten et al., 2018; McCrudden et al., 2016; but this may not be true for younger students: see Macedo-Rouet et al., 2019). However, this was found for an academic setting (preparing a class presentation: McCrudden et al., 2016). For a scenario that could be considered more frequent in a personal setting (writing a letter to an editor), preference for high source expertise was found only in the condition with an instruction to focus on source credibility as compared to an instruction to focus on content appropriateness or a control condition (Bråten et al., 2018). Taken together, these two studies provide preliminary evidence that the context may influence document selection, but neither study examined the effect of context (class vs. real life) while holding the task question (prepare a presentation vs. write a letter) constant.

### **The Present Experiments**

The present study represents an initial attempt towards disentangling the effects of context scenario (e.g., university vs. personal), task questions (read to write an overview vs. to write an opinion) and the specification of an audience. Two experiments examined the effects of external context and self-variables (i.e., beliefs and knowledge about science) on college students' selection of documents for further reading about science, more precisely on the source expertise of documents that are selected. Following the RESOLV model (Britt et al., 2018), we tested whether the same task question would yield different selection decisions depending on the external context scenario. Importantly, the experiments sought to take a first step toward specifying contextual effects by a) manipulating the task question independently from the contexts (Experiment 1), b) holding the task constant across contexts and disentangling the effects of audience (Experiment 2), and c) examining features of the “self” contextual dimension of the RESOLV model in relation with the other variables (both experiments).

In Experiment 1, two external context scenarios were contrasted: a university scenario, in which students were asked to read for a university seminar and a personal scenario, in which students were asked to read to prepare for a podcast. Furthermore, Experiment 1 manipulated the task question independently from the context. Drawing from the literature, we sought to contrast "summary" and "argumentation" kind of tasks. However, these tasks mostly belong to academic situations and are likely to make less sense when presented in a personal context. Thus, to make the tasks equally plausible in both contexts, we chose a slightly different wording, asking participants to read in order to "write an overview" or "write an opinion" about the topic of interest. We speculated that context effects may vary across tasks. For example, participants may have different interpretations of what an academic overview is compared to an overview in a personal context. In contrast, their interpretation of what it takes to "write an opinion" may be more similar across contexts. On the other hand, the reverse could be true if there is more variability in peoples' interpretation of "write an opinion."

Experiment 2 was conducted to further specify which aspects of the external context influence the selection of documents. Therefore, an additional personal-plus-audience scenario was added which was identical to the personal scenario except participants were explicitly told to write for an audience that values academic standards and norms.

In both experiments, students could select as many documents as they wanted from a SERP for further reading (see Figure 1). The manipulation of interest with regard to the SERP was source expertise: Four of the relevant documents had a source with scientific expertise (e.g., a professor of a relevant field), while another four had a source with personal experiences (e.g., the head of a support group). This manipulation extends prior research that contrasted people with high scientific expertise (e.g., professors of a relevant faculty) against people with lower explicit experience (both scientific and personal) in the field (e.g.,

journalists in the news department: e.g., Bråten et al., 2018; McCrudden et al., 2016).

In both experiments, knowledge about how science works and explicit and implicit beliefs about science were included as self-variables. We expected that knowledge and beliefs may not only have a direct effect on the source expertise of documents that are selected but also interact with the external context scenario. The following research questions were to be addressed:

1. Do university students prefer scientific-expertise sources over personal-experiences sources?
2. Given a task question, does the external reading context have an effect on the selection of documents with different source expertise?
3. Do the internal self-variables of beliefs about science and knowledge about how science works influence the selection of documents, and do they interact with other contextual dimensions?

In both experiments, generalized linear mixed models were applied, such that the selection of a document (yes/no) was predicted by source expertise (personal/scientific), context (university/personal[/personal-plus-audience]), and self-variables – depending on the research question.

### **Experiment 1**

Experiment 1 aimed to analyze the effects of two context scenarios and two self-variables on the source expertise of documents university students select for further reading. The task question was held constant across contexts. Two different task questions were used in each context (i.e., write an overview, write an opinion). Based on findings from a small pilot study we had expected an interaction of task question and context. Experiment 1 was preregistered at the Open Science Framework (OSF). The pre-registration document is available at <https://doi.org/10.17605/OSF.IO/C47VH>. With regard to the research questions,



we had the following hypotheses for Experiment 1. Hypotheses 1 and 5 were preregistered, the remaining hypotheses were – strictly speaking - researched only exploratorily.

### **RQ 1 Preference for scientific-expertise sources**

With regard to the first research question, we expected students to prefer expert sources over sources with less or without expertise (e.g., Bråten et al., 2018; McCrudden et al., 2016) and, thus, to prefer scientific-expertise sources over personal-experiences source.

Accordingly, our hypothesis was:

H1: The probability of selecting a document for further reading will be lower for sources with personal experiences as compared to sources with scientific expertise (*scientific-expertise hypothesis*).

This hypothesis was preregistered.

### **RQ 2 External context effect**

According to RESOLV (Rouet et al., 2017), the external context influences how a given task question is interpreted by activating context-relevant schema. Therefore, we expected that a university context will activate scientific schema and academic standards (i.e., select scientific-expertise sources). In contrast, for a personal context participants would have fewer context cues to activate their academic schema and standards. They would feel free to select more personal-experiences sources, than students in a university context with salient academic standards and norms. This led to our second hypothesis:

H2: There will be an interaction effect of source expertise with external context, such that in a personal context as compared to a university context the probability of selecting personal-experiences sources will be greater than that of selecting scientific-expertise sources (*personal-context personal-experiences hypothesis*).

### **RQ 3 Beliefs about science and knowledge about how science works and their**

### **interaction with context**

With regard to the third research question, according to RESOLV, readers interpret the task based on their beliefs and knowledge. In the case of selecting documents for further processing, participants' knowledge of science and beliefs in the methods of science (see Kiemer & Kollar, 2021; Nadelson et al., 2014; Schoor & Schütz, 2021) would lead to the activation and application of academic standards for selecting documents (i.e., expertise over personal experiences). Schoor et al. (2023) found effects of beliefs in science on time on task, mentioning of conflicting information, and text switching during essay writing, indicating effects of beliefs in science on academic standards for this kind of task. To the extent that readers have standards very different from scientific academic standards, we would expect these internal self-variables to influence the probability of selecting sources that have less or no scientific expertise:

H3: There will be interactions of source expertise with both effects of beliefs about science and of knowledge about how science works with source expertise such that more positive beliefs about science and more knowledge will make selecting documents with scientific expertise more likely than selecting documents with personal experiences (*self-variables hypothesis*).

In terms of an interaction of the external and internal context factors, Schoor et al. (2023) found some interaction effects of beliefs and external contextual factors with the belief effect being stronger for the university context. Based on RESOLV, beliefs and knowledge could lead to the activation of academic standards and schemata and to foregrounding relevant context features (e.g., for a science professor), thereby leading to a task model with the goal of scientific criteria for material selected. This could affect selection in the university context by decreasing the probability of selecting personal-experiences documents. On the other hand, if students have drastically different knowledge and beliefs from what is expected in a

university context, then we would expect students in the personal context to feel free to act according to their own values and standards, whereas students in the university context would follow academic standards. This should lead to a stronger influence of self-variables in the personal context than in the university context:

H4: There will be an interaction of context and source expertise with self-variables on the probability of selecting documents such that more positive beliefs about science and more knowledge reduce the probability of selecting documents with personal experiences as compared to documents with scientific expertise more in the personal context than in the university context (*self-variables-by-context hypothesis*).

### **Effects of the task question and its interaction with context**

It is an open question whether external context effects generalize across different task questions. A pilot study yielded preliminary indications of a possible interaction between task question, external context, and source expertise. Therefore, we also pre-registered the following hypothesis:

H5: There will be an interaction effect of external context, task question and source expertise such that in a personal context with an overview task question the probability of selecting documents with personal experiences (as compared to sources with scientific expertise) is higher as compared to an opinion task question, while there is no difference between task questions in the university context (*personal-context overview-task-question personal-experiences hypothesis*).

In addition, we explored the effect of the task question on source selection, that is the interaction of task question with source expertise (independent from the external context).

### **Method**

#### ***Sample***

Participants were 165 university students from a German university mainly enrolled in

teacher education (41.2%), psychology (10.9%), sociology (10.3%), economics (9.1%), educational science (8.5%), informatics (4.8%) or communication sciences (4.8%). They were 18 to 35 years old ( $M = 22.6$ ,  $SD = 2.96$ , 75.2% female) and on average in their 7<sup>th</sup> semester at the university ( $M = 6.3$ , Median = 5,  $SD = 4.17$ , Range: 1-17). They were recruited via university mailing lists, online courses, and social media groups related to the university. They received 10 € as an incentive.

The sample size was determined based on considerations about counterbalancing, feasibility, and possibilities to conduct confirmatory factor analyses on the beliefs questionnaires. The manipulation of external context and task question (2x2) as well as the counterbalancing of the order of the topics, the order of the titles in the SERP, and the combination of title and kind of source resulted in 32 conditions. If only five people participated in each condition, this added to a sample size of 160. This sample size allows confirmatory factor analyses for the belief questionnaires. Therefore, we checked with a power analysis (with GPower 3.1: Faul et al., 2009) whether this sample size would have enough power. Since the power estimation for generalized linear mixed models (GLMMs), which we conducted, is fairly complicated (Kumle et al., 2021), we calculated power for logistic regressions. With the present sample size, an odds ratio of 0.48 or 2.09, respectively, in a logistic regression can be detected with a power of 95%. GLMMs differ from logistic regression in the repeated measurement. Repeated measurement usually increases power dramatically. Thus, we consider the estimated effect sizes as conservative boundaries of the real effect sizes that can be detected with our sample size. Moreover, medium mean differences between groups and medium correlations ( $|\rho| = .28$ ) can be detected with a power of 95%.

### ***Design***

As independent variables, *external context* and *task question* were manipulated as

between-subject factors, and *source expertise* was manipulated as a within-subject factor. The participants were either introduced to a university scenario or to a personal scenario (external context manipulation) and received the task question of selecting documents for further reading in order to write an overview or an opinion essay (task question manipulation). Documents in the SERP had sources with either scientific expertise or personal experiences (source expertise manipulation). In addition, the order of target topics, the order of the sources in the SERP and whether a given title had a scientific expertise or a personal experiences sources were counterbalanced across participants. The participants were randomly assigned to one condition. The sub-sample sizes were n=41 (personal context – opinion task question), n=42 (personal context – overview task question), n=40 (university context – opinion task question), and n=42 (university context – overview task question), respectively.

### ***Procedure***

The experiment took place completely online. The participants had to register with their university e-mail address in order to ensure their status as a university student. They were randomly assigned to a condition and received a one-time URL providing access to the experiment. They were supposed to work through the experiment at a time of their choosing within one week. The system allowed them 5 hours to complete the experiment once they began in order to ensure that participants completed the experiment in one stretch.

On the first page of the material, the participants received information about the experiment and gave their informed consent (in accordance with APA human subjects principles, e.g. American Psychological Association, 2002). Then, demographics, prior topic beliefs, and self-reported prior knowledge of the topics covered in the experiment (plus some filler topics) were assessed, before the external context and task question manipulations were introduced. In order to ensure that the participants actively encoded their scenario (i.e., the

external context and task question manipulations), they were told that they would be asked to recall the scenario on the next page without the possibility of going back, which is what happened. Then participants had the opportunity to take a short break before working on the five (one practice and four target) topics. For each topic, participants received a question on the topic, for which they had to select documents for further reading, in order to later write a short essay (overview vs. opinion, depending on the task question condition). Importantly, the participants were not asked to actually read the documents or write an essay, but only to select documents as if they were to do so later. We did not, however, tell them that they would never have to read the documents or to write an essay. The question was identical across external context and task question conditions. After each topic, participants had the opportunity to take a short break. After all topics, several manipulation control measures as well as explicit beliefs about science and knowledge about how science works were assessed. The last measurements were implicit beliefs about science, because participants had to be routed to a different assessment environment for the indirect tests. The experiment took about one hour.

After finishing, participants were thanked and provided with a code, which they were supposed to report via e-mail in order to get a bank transfer of the money promised as incentive. They were informed that the titles and sources they read during the experiment were created only for the experiment. The experiment was part of a larger project (i.e., a series of studies), which had been approved by the local ethics committee.

### ***Material and Instruments***

**External Context and Task Question Manipulation.** The manipulation of external context was done in a way to increase the salience and importance of academic standards in the university context, while emphasizing the freedom to work based on one's own personal standards in the personal context. A prerequisite was that the actual task question could be

held constant across external contexts, and that the task question would involve an outcome (i.e., writing an essay). In order to achieve this, the participants were asked to work on a specific scenario. Table 1 provides an overview over all aspects of the different external context settings. The English translation of the exact instructions can be found in the preregistration document and in the Appendix.

In the personal context condition, the participants were told to imagine that they wanted to create their own podcast (*scenario*). They were told that their best friend (*requester*) had sent them suggestions for topics (see Figure 2) and that they would write overview/opinion essays (depending on the task question condition: *task question*) for themselves as a reminder (*purpose*). Then they were told that for each topic they would see a Google search result list (*materials*) from which they should select the documents they wanted to read.

In the university condition, the participants were asked to imagine that they attended a university seminar (*scenario*) given by the professor with who they wanted to write their final thesis. They wanted to make a good impression so that the professor would accept them for this thesis (*stakes, consequences*). During the seminar, their task question was to write either overview or opinion essays (depending on the task question condition: *task question*) over several generally understandable topics for a research project (*purpose*). The terms overview and opinion were defined as in the personal context. The participants were also told that their professors would read their essays (*audience*) and that this professor attaches great importance to science and scientifically sound work. Then, like in the personal context they were told that they would see for each topic a Google search result list (*materials*) from which they were supposed to select the documents they wanted to read. The computer environment mimicked the appearance of the learning management system of the university (see Figure 3).

**Search Engine Result Pages and Manipulation of Source Expertise.** Five topics (one

practice topic and four target topics) were chosen that were used in a prior study (Schoor et al., 2023). The topics were constructed in a way that they could be addressed by both scientific studies and personal experiences. Topics were selected from the domains of health, sports, or education and were potentially of interest to the general public. In the prior study, the participants were provided with two documents per target topic and had to actually write an overview essay based on a question that allegedly either their professor or their best friend asked them. In the present study, we focused on the selection stage of the information seeking process and provided the participants with the introductory question in the same way as in Schoor et al. (2023), but asked them to select documents for further reading. Of the eight target topics in the Schoor et al. (2023) study, we selected only four due to time constraints. Based on prior topic belief questions in the Schoor et al. (2023) study, we chose four topics for which the participants expressed the least extreme prior topic beliefs. The topics and corresponding questions for the present study are presented in Table 2.

For each topic, ten titles were created that could be the result of a search engine query on the respective question. Two of these titles were irrelevant to the question at hand but had keywords in common with the question. The two irrelevant titles were included to make it less obvious for the participants that the study was about the kind of sources they selected, that is to conceal the true intention of the study. Also, ten sources were created. The source included a fictitious author name with additional information about this person that either conveyed information about existing scientific expertise (e.g., head of a relevant institute, university professor of a relevant domain) or about personal experiences with this topic. The sources of the two irrelevant titles did not mention author expertise. The SERP was created by producing a random order of titles, then the sources of the two irrelevant titles were added, and then the other sources were added randomly to the titles. In order to account for potential unintended title effects, another version of the SERP was created by exchanging a



scientific-expertise source with a personal-experiences source and vice versa. To account for position effects, two more versions were created by splitting the list into two halves (documents 1-5 und 6-10) and reverse the block order (i.e., in versions 3 and 4, first documents 6-10 were presented and then documents 1-5). A sample screenshot can be seen in Figure 1. The participants were supposed to tick the checkbox in front of those documents that they wanted to select for further reading.

**Explicit and Implicit Beliefs about Science.** Beliefs about science were measured both as explicit and implicit beliefs. As explicit beliefs about science, both the perceived utility of science (Schoor & Schütz, 2021) and trust in science (Nadelson et al., 2014) were assessed. The perceived utility of science was assessed by means of a questionnaire comprising of two scales: the utility of science and the utility of personal experiences for individual decisions. For “individual decisions”, health-related decisions were given as an example. Each scale comprised four items that were answered on a 5-point Likert scale. Utility of science items included “Scientific knowledge is useful for individual decisions.”, “Scientific theories and findings are useful tools for making personal decisions.” Utility of personal experiences items included “Individual decisions should mainly be based on one’s own experiences or those of others.”, and “For making a good personal decision, one’s own or others’ experiences are irreplaceable.” In the current experiment, a confirmatory factor analysis (CFA) showed a good fit ( $\chi^2 = 28.33$ ,  $df = 19$ ,  $p = .077$ ; RMSEA=.06 [90% confidence interval: .00; .09]; CFI=.97; SRMR=.05). The internal consistencies of the scales were good (McDonald’s  $\omega^2$ : utility of science: .78; utility of personal experiences: .76). The two latent factors were not significantly correlated ( $r = -.10$ ,  $p = .336$ ).

Trust in science was measured by means of a German short version of Nadelson et al.’s

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<sup>2</sup> McDonald’s  $\omega$  is an alternative measure of internal consistency, accounting for many problems of Cronbach’s  $\alpha$  (McNeish, 2017). It was calculated with the R package *psych* (Revelle, 2020).

(2014) questionnaire, which included Items 5, 7, 9, 10, 11, 12, 14, and 15 from the original questionnaire (see Schoor & Schütz, 2021). Sample items are “We can trust scientists to share their discoveries even when they don’t like their findings.” and “We should trust the work of scientists.” (Nadelson et al., 2014, p. 86).

In the present experiment, a CFA showed an acceptable fit ( $\chi^2 = 42.49$ ,  $df = 20$ ,  $p = .002$ ; RMSEA=.08 [90% confidence interval: .05; .12]; CFI=.93; SRMR=.05). The scale had a very good internal consistency (McDonald’s  $\omega$ : .86). For these three scales (utility of science, utility of personal experiences, trust in science), the z-standardized mean of items was used.

As measures of implicit beliefs about science, two implicit association tests (IAT; e.g., Greenwald et al., 2003; Rudolph et al., 2008) were applied (Schoor & Schütz, 2021). One was supposed to cover the associations of science with utility, the other with trustworthiness. In IATs implicit associations are measured by comparing different reaction times. Participants have to correctly classify words from two lists (target list and evaluation list) into one of two categories as fast as possible by pressing a key on the left or right side of the keyboard (usually I and E are used). After training blocks, participants have to classify both lists at the same time, with the direction of the evaluation list being switched after half of the trials.

For both IATs, the classical IAT design was used contrasting science (“Wissenschaft”) with opinion (“Ansichtssache”) in the target list. The evaluation dimension was different for the two IATs in order to mirror the association of science with either utility or trustworthiness. For both IATs, a score (D score) was calculated with the scoring algorithm by Greenwald et al. (2003). In this score, 0 represents a balanced association of science with utility and inutility or trustworthiness and untrustworthiness. Positive values indicate a stronger association of science with utility or trustworthiness, while negative values indicate

a stronger association of science with inutility or untrustworthiness. Following the procedure by Greenwald et al. (2003), data were checked for participants who had more than 10% of trials with a latency of less than 300 ms; however this did not apply to any of the participants. Due to technical failure, there were no data for implicit utility for four participants (resulting in an N of 161 for analyses with this measure) and for implicit trust in science for six participants (resulting N= 159).

In Schoor and Schütz's (2021) study, both IATs had good psychometric qualities and predictive validity. In order to calculate internal consistencies for the present experiment, the IAT trials were divided into four quarters and D scores were built for each of these quarters, following the procedure by Buttrick et al. (2020). In the present experiment, the internal consistencies were  $\omega = .87$  (utility) and  $\omega = .81$  (trust), respectively. These values are in the upper tail of the typical range with the IAT (Nosek et al., 2007; Schnabel et al., 2008) and comparable to the internal consistencies in Schoor and Schütz's (2021) study.

**Knowledge about How Science Works.** Knowledge about how science works was assessed in a scenario-based test (Schoor & Schütz, 2021). The test covers methodological questions of the natural or social sciences that is part of a general knowledge basis and relevant for socio-scientific issues, and *not* methodological knowledge from all possible scientific disciplines or specialized knowledge (such as knowledge about specific analysis methods like ANOVA or t-test). The test includes nine scenarios that a scientist can find themselves in (the gender of the scenario scientist was alternated across scenarios), covering research design, probability, double-blind procedure, kinds of studies (meta-analysis), significance, falsification principle, peer review, operationalization, and generalizability. For each scenario, the correct option has to be chosen from four alternatives. The number of correctly solved scenarios was summed up, resulting in a maximum score of 9. For the analyses, the z-standardized score was used. Internal consistency of this measure was low

( $\omega = .37$ ), yet knowledge measures are usually not supposed to be internally consistent, since different knowledge aspects are asked for (see, for example, Taber, 2018). Nevertheless, it makes sense to calculate a sum score (e.g., Edelsbrunner, 2022). Support for the validity of the interpretation of the score stems from (in part unpublished) data from a previous study (Schoor, in press). In this study, bachelor students had significantly lower scores than master students' ( $M_{\text{Bachelor}} = 4.84$ ,  $SD_{\text{Bachelor}} = 1.88$ ,  $M_{\text{Master}} = 6.12$ ,  $SD_{\text{Master}} = 1.54$ ,  $t = 3.91$ ,  $df = 31.3$ ,  $p < .001$ ). The number of methods courses taken was significantly and positively related to knowledge ( $r = .16$ ,  $p < .05$ ).

**Manipulation Control Questions.** In order to control the effects of the manipulations of external context and expertise of the source as well as the perceived relevance of the titles provided in the SERP, several manipulation control questions were posed at the end of the experiment. More specifically, we asked the participants to rate the importance of several aspects for their work within the experiment (see the Appendix for the English translation of the questions), for which we expected differences across external context conditions. In addition, we asked several questions regarding their acceptance of the respective scenario (see the Appendix for the English translation of the questions), for which we expected no differences across external context conditions. Moreover, we asked participants to rate the scientific expertise and personal experiences of each of the provided sources and to rate the relevance of the titles provided in the SERP to the question.

### ***Data Analysis***

The data were analyzed by means of generalized linear mixed models with the R package *lmerTest* (Kuznetsova et al., 2017). The logit link function within the binomial family and the “bobyqa” optimizer were used. In all models, the probability of selecting a given document was predicted.

In order to analyze the data with regard to H1 (*scientific-expertise hypothesis*), the

probability of selecting a document was predicted by its source expertise (scientific vs. personal, with “scientific” being the reference category). For H2 (*personal-context personal-experiences hypothesis*), main and interaction effects of source expertise and external context (university vs. personal, reference category university) were included. For H3 (*self-variables hypothesis*) and H4 (*self-variables-by-context hypothesis*), a separate model was calculated for each self-variable. For H3 the probability of selecting a document was predicted by the self-variable, source expertise, and their interaction. For H4, additionally the external context and its two-way and three-way interactions with the self-variable and source expertise were included. For H5 (*personal-context overview-task personal-experiences hypothesis*), predictors were source expertise, external context, task question, and all possible interactions. To explore effects of the task independently from context, predictors were source expertise, task question, and their interaction.

In all models, the probability of selecting a given document was additionally predicted by random effects for the person and the title (which also includes potential topic effects) as well as fixed effects for the position of the document in the SERP (1-10) and the position of the topic in the experiment (1-4) to control for these variables.

### ***Transparency and Openness***

We report how we determined our samples size, all data exclusions (if any), all manipulations, and all measures in the experiment, and we follow Journal Article Reporting Standards (Kazak, 2018). The data that support the findings of this experiment have been deposited in the OSF at <https://doi.org/10.17605/OSF.IO/BQ478>. Materials and analysis code for this experiment are available by emailing the corresponding author. The code for the analysis of IAT data is available at <https://doi.org/10.17605/OSF.IO/KFVWT>. The data were analyzed using R, version 4.0.4 (R Core Team, 2021) and the packages *lmerTest*, version 3.1-3 (Kuznetsova et al., 2017) and *psych*, version 2.0.12 (Revelle, 2020). Graphics

were generated with the package *ggplot2*, version 3.3.3 (Wickham, 2016). CFAs were calculated with Mplus 8.6 (Muthén & Muthén, 1998-2017). The experiment's design, hypotheses (partly), and analysis plan were preregistered (see <https://doi.org/10.17605/OSF.IO/C47VH>).

## **Results**

The number of documents selected by topic, source expertise, task question, and external context are displayed in Table 3. Descriptive data and intercorrelations of self-variables can be found in Tables 4 and 5. Manipulation control questions revealed that the external context manipulation had an effect on the importance ratings of several aspects regarding work, that the scenario situation was equally familiar across conditions, and that the manipulation of source expertise and title relevance worked as designed. For more details regarding manipulation control see the Appendix.

### ***RQ 1 Preference for scientific-expertise sources***

With regard to H1 (scientific-expertise hypothesis), there was a significant effect of source expertise on the probability of selecting a document: Documents with a personal-experiences source had a significantly lower chance of being selected than scientific-expertise sources (OR = 0.07,  $p < .001$ ). Moreover, documents at the top of the SERP had a higher probability of being selected than documents at the end of the list (OR = 0.92,  $p < .001$ ). The effect of topic position was not significant. Thus, H1 was confirmed.

### ***RQ2 External context effect***

With regard to external context effects, we found that in a personal context as compared to a university context the probability of selecting personal-experiences sources as compared to scientific-expertise sources was higher (OR = 2.16,  $p < .001$ ), confirming H2.

### ***RQ3 Beliefs about science and knowledge about how science works***

In the last research question, the effect of self-variables on the selection of documents

was addressed. The main results for H3 (self-variables hypothesis) are displayed in Table 6. All self-variables were related to the probability of selecting personal-experiences sources in a meaningful manner: The more positive the beliefs about science, the lower the probability of selecting personal-experiences sources as compared to scientific-expertise sources (explicit utility of science:  $OR = 0.60, p < .001$ ; explicit trust in science:  $OR = 0.76, p < .001$ ; implicit utility of science:  $OR = 0.39, p < .001$ ; implicit trust in science :  $OR = 0.14, p < .001$ ), and the more positive the perceived utility of personal experiences the higher the probability of selecting personal-experiences sources as compared to scientific-expertise sources ( $OR = 1.31, p < .001$ ). Additional exploratory analyses on the interplay of implicit and explicit utility of and trust in science, which indicate that implicit beliefs and explicit beliefs predict the selection of personal-experiences sources independently and additively, are reported in the Appendix. In addition, the more knowledge students had about how science works, the lower their probability of selecting personal-experiences sources as compared to scientific-expertise sources was ( $OR = 0.51, p < .001$ ). All effects stayed significant when type I error inflation was controlled for using the Bonferroni correction. Thus, H3 was confirmed.

In order to research our assumption that the personal context allows more freedom and therefore self-variables become more important (H4), we checked whether the probability of selecting personal-experiences sources as compared to scientific-expertise sources was especially influenced by self-variables in the personal context (i.e., a three-way interaction of self-variable, source expertise, and external context). For explicit ( $OR = 0.69, p = .014$ ) and implicit utility of science ( $OR = 0.32, p < .001$ ), this was the case, meaning that the probability of selecting a personal-experiences source as compared to a scientific-expertise source was lowered more in the personal context than in the university context when the perceived utility of science was higher. Figure 4 illustrates this interaction for explicit utility

of science. In the case of implicit utility of science, the interaction effect of belief and source expertise (reported in the previous paragraph) was not significant anymore, indicating that it might trace back only to the personal context, which would be in line with our assumption of more freedom to follow own norms and values in the personal context. When correcting for type I error inflation, only the effect of implicit utility of science stayed significant. For (explicit) utility of personal experiences (OR = 1.07,  $p = .639$ ), explicit trust in science (OR = 0.83,  $p = .200$ ), implicit trust in science (OR = 0.54,  $p = .174$ ), and knowledge about how science works (OR = 1.26,  $p = .122$ ) there was no additional three-way interaction. Thus, H4 was only partly confirmed.

#### ***Effects of the task question and its interaction with context***

With regard to H5 (personal-context overview-task-question personal-experiences hypothesis), the expected three-way interaction of external context, task question, and source expertise was not significant (OR = 1.32,  $p = .342$ , see Figure 5). Yet, there was a significant interaction of task question with source expertise (OR = 0.63,  $p = .001$ ). This means that students selected less likely sources with personal experiences for overview tasks as compared to opinion tasks.

#### **Discussion**

Experiment 1 replicated the finding that college-level students value high-expertise sources (e.g., Bråten et al., 2018; McCrudden et al., 2016) and extended it to a comparison with sources featuring personal experiences. Moreover, the data supported our predicted interaction between the external context and participants' preference for some types of documents such that in a personal context, personal-experiences sources were more likely to be selected. This finding supports the RESOLV theoretical assumption that external reading contexts can provide implicit cues to relevance, in addition to the cues provided by the explicit task statement (Britt et al., 2018). In addition, the internal reading context - as



represented by beliefs about science and knowledge about how science works - consistently influenced the probability of selecting personal-experiences sources as compared to scientific-expertise sources. However, the external context manipulation was rather broad with several aspects varied at the same time. Moreover, most analyses were conducted in an exploratory manner. These limitations were addressed in Experiment 2.

There was an effect of the task question on the type of sources that participants selected. Participants preferred scientific-expertise sources for overview tasks, while opinion tasks increased the selection of personal-experiences sources. Yet, Experiment 1 did not show any interaction between the task question and the external context. Therefore, and in order to have a feasible number of conditions, we dropped the task question manipulation for Experiment 2 (i.e., holding the task question constant).

## **Experiment 2**

The aim of Experiment 2 was to replicate the findings of Experiment 1 with regard to the effect of external context, source expertise, and beliefs and knowledge about science on the selection of documents for further reading. In addition, the experiment aimed to further specify effects of the external context. We examined whether the university context effects were due to participants' expectations that their task product would be read by an audience with high academic standards. To that aim, a new personal context was created. In this new personal context, we introduced an audience that highly valued science and scientifically sound work. Thus, the new personal-plus-audience context was more comparable to the university context than the old personal context (see Table 1). Since it was created based on the old personal context by adding an audience, we nevertheless decided to label it “personal-plus-audience” context. The experiment and all hypotheses were preregistered at OSF (see <https://doi.org/10.17605/OSF.IO/BVYD3>).

### **RQ 1 Preference for scientific-expertise sources**

We expected to replicate the effect found in Experiment 1 that students prefer scientific-expertise sources over sources without personal experiences:

H1: There will be a main effect of source expertise such that the probability of selecting a document for further reading is lower for sources with personal experiences as compared to sources with scientific expertise (replication of previous finding - *scientific-expertise hypothesis*).

### **RQ 2 External context effect**

With regard to external context effects, we first expected to replicate our finding from Experiment 1 that in a university context, students follow academic standards and are less likely to select sources with personal experiences without scientific expertise. Moreover, we expected that the change in the new personal-plus-audience context manipulation would lead to behavior that is more similar to the one in the university context, because there is an audience who highly values scientific sources. Thus, we expected the standards for source selection in the personal-plus-audience context to be more similar to those in the university context. This led to the following two hypotheses:

H2a: There will be an interaction of external context and source expertise such that in the university context the probability of selecting sources with personal experiences (as compared to scientific-expertise sources) will be lower than in the personal context without an audience (i.e., the “old” personal context; replication of previous finding – *university-context scientific-expertise hypothesis*).

H2b: There will be an interaction of external context and source expertise such that in the new personal-plus-audience context the probability of selecting sources with personal experiences (as compared to scientific-expertise sources) will be lower than in the (old) personal context (*personal-plus-audience-context scientific-expertise*

*hypothesis*).

### **RQ 3 Beliefs about science and knowledge about how science works and their interaction with external context**

With regard to the third research question, we expected to replicate all the findings from Experiment 1. That is, we expected all self-variables to influence the probability of selecting personal-experiences sources as compared to scientific-expertise sources (H3), and, for explicit and implicit utility of science, that this effect will be especially pronounced in the personal context (H4):

H3: Explicit and implicit beliefs about science and knowledge about how science works are related to the probability of selecting sources with personal experiences as follows: There will be an interaction of source expertise with the following variables such that the higher the value of the variable, the lower the probability of selecting personal-experiences sources as compared to sources with scientific expertise (except for H3.2 / utility of personal experiences, for which a higher probability of selecting personal-experiences sources was expected):

H3.1: explicit utility of science (replication of previous finding, *explicit-utility scientific-expertise hypothesis*)

H3.2: utility of personal experiences (replication of previous finding, *utility-experiences personal-experiences hypothesis*)

H3.3: explicit trust in science (replication of previous finding, *explicit-trust scientific-expertise hypothesis*)

H3.4: implicit utility of science (replication of previous finding, *implicit-utility scientific-expertise hypothesis*)

H3.5: implicit trust in science (replication of previous finding, *implicit-trust scientific-expertise hypothesis*)

H3.6: knowledge about how science works (replication of previous finding,  
*knowledge scientific-expertise hypothesis*)

H4: There will be an interaction of explicit and implicit utility of science with external context and source expertise such that:

H4.1: the higher the perceived explicit utility of science, the lower the probability of selecting personal-experiences sources (as compared to sources with scientific expertise) in the (old) personal context as compared to the university context (replication of previous finding, *explicit-utility personal-context scientific-expertise hypothesis*),

H4.2: the higher the implicit utility of science, the lower the probability of selecting personal-experiences sources (as compared to sources with scientific expertise) in the (old) personal context as compared to the university context (replication of previous finding, *implicit-utility personal-context scientific-expertise hypothesis*).

## Method

### Sample

Participants were 125 university students<sup>3</sup> of a German university mainly enrolled in teacher education (34.4%) or a bachelor's (36.8%) or master's program (27.2%) in psychology (10.4%), educational science (9.6%), politics (8.0%), communication sciences (6.4%), sociology (6.4%), economics (5.6%), or other arts/humanities (12.0%). They were 19 to 33 years old ( $M = 23.6$ ,  $SD = 3.04$ , 69.6% female) and on average in their 8<sup>th</sup> semester at the university ( $M = 7.7$ , Median = 8,  $SD = 3.57$ , Range: 1-17). The participants were recruited via university mailing lists, social media groups related to the university, and

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<sup>3</sup> Two of the participants indicated that they had learned German for less than 8 years (i.e., for 5 years). Since the pattern of results did not change when they were excluded, they were not excluded in contrast to the procedure outlined in the preregistration document.

online lectures and seminars. They received 10 € as an incentive.

The target sample size of 120 was determined based again on considerations about counterbalancing, feasibility, and possibilities to conduct confirmatory factor analyses on the beliefs questionnaires. A power analysis (with GPower 3.1: Faul et al., 2009) for a logistic regression again provided conservative boundaries for real effect sizes for the GLMMs. With the present sample size, an odds ratio of 0.42 or 2.37, respectively, in a logistic regression can be detected with a power of 95%. After reaching the target sample size, recruiting was stopped, and already registered participants got the opportunity to finish the experiment within one week (see procedure). Thus, the final sample size of 125 was reached.

### ***Design***

As independent variables, *external context* was manipulated as a between-subjects factor, and *source expertise* was manipulated as a within-subjects factor. With regard to the external context manipulation, the participants were either introduced to the university scenario, the personal scenario, or the personal-plus-audience scenario. The documents in the SERP were manipulated such that their sources had either scientific expertise or personal experiences (source expertise manipulation). In Experiment 2, the task question was kept constant. We chose to keep the overview task question, because in Experiment 1 for this task question there was a descriptively larger external context effect than for the opinion task question (see Figure 5). As in Experiment 1, the order of the sources in the SERP, the order of target topics, and whether a given title of a SERP document had a scientific-expertise or a personal-experiences source were counterbalanced across participants. The participants were randomly assigned to one condition. The sub-sample sizes were  $n=41$  (university context),  $n=40$  (personal context), and  $n=44$  (personal-plus-audience context), respectively.

### ***Procedure***

The procedure was the same as in Experiment 1.

### ***Material and Instruments***

**External Context Manipulation.** The university context and the personal context were the same as in Experiment 1. In addition, the personal-plus-audience context was implemented (see also Table 1). This external context scenario was introduced in almost the same way as the personal context scenario, with one difference: The participants were told that the audience of their podcast highly values science and scientifically sound work, and that their audience would read the short texts they were allegedly supposed to write (i.e., they would prepare the “show notes” for the podcast, that is the short description of each podcast episode). Thus, in the personal-plus-audience context, the importance of academic standards was emphasized while keeping the rest of the personal context. Therefore, the personal-plus-audience context was assumed to be more similar to the university context than the original personal context. The English translation of the exact wording of the instructions is included in the preregistration document and in the Appendix.

**Search Engine Result Pages and Manipulation of source expertise.** The same material as in Experiment 1 was used.

**Explicit and Implicit Beliefs about Science.** Explicit beliefs and implicit beliefs about science were measured in the same way as in Experiment 1. In Experiment 2, the CFA for the two explicit utility scales showed a very good fit ( $\chi^2 = 23.04$ ,  $df = 19$ ,  $p = .235$ ; RMSEA=.04 [90% confidence interval: .00; .09]; CFI=.99; SRMR=.05). The two latent factors were not significantly correlated ( $r = -.16$ ,  $p = .151$ ). The internal consistencies of the scales were very good (McDonald’s  $\omega$ : utility of science: .78; utility of personal experiences: .87). For explicit trust in science, the CFA showed an acceptable fit ( $\chi^2 = 44.65$ ,  $df = 20$ ,  $p = .001$ ; RMSEA=.10 [90% confidence interval: .06; .14]; CFI=.91; SRMR=.06). The scale had a very good internal consistency (McDonald’s  $\omega$ : .85). For the three scales of explicit beliefs (utility of science, utility of personal experiences, trust in science), the z-standardized mean

of items was used.

With regard to the implicit beliefs about science, data from one (utility) and three (trust) participants were excluded because more than 10% of trials had a latency of less than 300 ms (Greenwald et al., 2003). Due to technical failure, there are no data for three participants, resulting in an N of 121 for implicit utility and an N of 119 for implicit trust in science. The internal consistencies were  $\omega = .89$  (utility) and  $\omega = .80$  (trust), respectively.

**Knowledge about How Science Works.** Knowledge about how science works was assessed in the same way as in Experiment 1. In this Experiment, internal consistency was  $\omega = .58$ .

**Manipulation Control Questions.** The manipulation control questions of Experiment 1 were also administered in Experiment 2.

### ***Data Analysis***

The data were analyzed in the same way as in Experiment 1, with a few exceptions: There was a third external context condition (i.e., “university”, “personal”, and “personal-plus-audience”), and the reference category was changed to “personal”, except for H4 (interaction of utility of science with context and source expertise), for which the reference category “university” was applied for reasons of comparison with Experiment 1.

### ***Transparency and Openness***

We report how we determined our samples size, all data exclusions (if any), all manipulations, and all measures in the experiment, and we follow Journal Article Reporting Standards (Kazak, 2018). The data that support the findings of this experiment have been deposited in the OSF at <https://doi.org/10.17605/OSF.IO/Y6U2J>. Materials and analysis code for this experiment are available by emailing the corresponding author. The code for the analysis of IAT data is available at <https://doi.org/10.17605/OSF.IO/2UD5V>. The data were analyzed using R, version 4.0.4 (R Core Team, 2021) and the packages *lmerTest*,

version 3.1-3 (Kuznetsova et al., 2017) and *psych*, version 2.0.12 (Revelle, 2020). Graphics were generated with the package *ggplot2*, version 3.3.3 (Wickham, 2016). CFAs were calculated with Mplus 8.6 (Muthén & Muthén, 1998-2017). The experiment's design, hypotheses, and analysis plan were preregistered; see <https://doi.org/10.17605/OSF.IO/BVYD3>.

## **Results**

Descriptive statistics on the sources selected per topic and on individual difference variables can be found in Tables 7 and 8, respectively. Zero-order correlations of individual difference variables are presented in Table 9. The manipulation control questions revealed that the external context manipulation had an effect on the importance ratings, that the scenario situation was equally familiar across conditions, and that the manipulation of source expertise and title relevance worked. See the Appendix for details regarding manipulation control.

### ***RQ 1 Preference for scientific-expertise sources***

As expected, based on H1 (the scientific-expertise hypothesis), the probability for a source to be selected was significantly lower for personal-experiences sources than for scientific-expertise sources (OR = 0.10,  $p < .001$ ).

### ***RQ 2 External context effect***

The probability of selecting personal-experiences sources as compared to scientific-expertise sources was significantly reduced in the university context as compared to the personal context (OR = 0.16,  $p < .001$ ), confirming H2a (university-context scientific-expertise hypothesis). Thus, we were able to replicate the results of Experiment 1.

Also, the probability of selecting personal-experiences sources (as compared to scientific-expertise sources) was significantly reduced in the personal-plus-audience context as compared to the personal context (OR = 0.41,  $p < .001$ ), confirming H2b (personal-plus-



audience-context scientific-expertise hypothesis). In addition, a main effect for external context was found such that in both the personal-plus-audience context (OR = 2.12,  $p < .001$ ) and the university context (OR = 2.89,  $p < .001$ ), the probability of selecting any document was higher than in the personal context. The results for this research question are illustrated in Figure 6.

As an exploratory analysis, we compared the personal-plus-audience condition to the other two external context conditions. We found that the probability of selecting personal-experiences sources as compared to scientific-expertise sources was significantly reduced in the university context as compared to the personal-plus-audience context (OR = 0.40,  $p < .001$ ). Moreover, the probability of selecting personal-experiences sources as compared to scientific-expertise sources was significantly increased in the personal context as compared to the personal-plus-audience context (OR = 2.44,  $p < .001$ ). Thus, the personal-plus-audience context lies in between the other external context conditions.

### ***RQ 3 Beliefs about science and knowledge about how science works***

The results on Hypotheses 3.1-6 are presented in Table 10. The more participants explicitly or implicitly believed science to be useful, the lower was their probability of selecting sources with personal experiences as compared to scientific-expertise sources (OR = 0.73,  $p < .001$ , and OR = 0.49,  $p < .001$ ), thus confirming H3.1 (explicit-utility scientific-expertise hypothesis) and H3.4 (implicit-utility scientific-expertise hypothesis). In contrast, the more participants believed personal experiences to be useful, the more likely they were to select personal-experiences sources as compared to scientific-expertise sources (OR = 1.75,  $p < .001$ ), which confirms H3.2 (utility-experiences personal-experiences hypothesis). Also, the more knowledge participants had about how science works, the less likely they were to select personal-experiences sources as compared to scientific-expertise sources (OR = 0.51,  $p < .001$ ), thus confirming H3.6 (knowledge scientific-expertise hypothesis). These

effects stayed significant when Bonferroni correction for type I error inflation was applied. H3.3 (explicit-trust scientific-expertise hypothesis) and H3.5 (implicit-trust scientific-expertise hypothesis) could not be confirmed. That is, the interaction effects of self-variables with source expertise were replicated for implicit and explicit utility of science and for knowledge about how science works, but not for implicit and explicit trust in science. Analyses combining implicit and explicit beliefs about science as predictors are again reported in the Appendix.

We had expected that the influence of explicit and implicit utility of science on the probability of selecting personal-experiences sources as compared to scientific-expertise sources would be greater in the personal context (H4). However, as Table 10 shows, these findings of Experiment 1 could not be replicated in Experiment 2. None of the self-variables interacted with the personal context in predicting the probability of selecting personal-experiences sources as compared to scientific-expertise sources.

## **Discussion**

Experiment 2 replicated most of the findings from Experiment 1: University students preferred scientific-expertise sources over personal-experiences sources and the probability of selecting personal-experiences sources as compared to scientific-expertise sources was lower in the university context than in the personal context. In addition, Experiment 2 brought an important specification to the external-context effect. When the personal context included an audience that values scientifically sound work, the probability of selecting personal-experiences sources (as compared to scientific-expertise sources) was reduced as compared to a personal context without an external audience. This additional finding highlights the specific role of the expected audience as part of readers' context models (Britt et al., 2018). Knowing that the outcome of reading will be shared with others seems to affect readers' standards for selecting information. Yet, there still remains a gap between the

personal-plus-audience condition and the university condition. We will discuss this point more extensively in the General Discussion.

Experiment 2 also replicated most of the effects that were found for self-variables in Experiment 1. Although the findings could not be replicated for trust, we did find that participants who found science more useful, considered personal experiences less useful and participants who knew more about science were less likely to select sources with personal experiences in contrast to sources with high scientific expertise on the topic. We could not, however, replicate Experiment 1's finding that this effect was stronger in the personal context. The data do not support any specific explanation for this inconsistency. However, sampling differences, a lack of sensitivity of the instruments, or a lack of robustness of effects may all have contributed. We return to this in the General discussion.

### **General Discussion**

The main goal of the present studies was to investigate whether the context for reading influences what university students consider "good" information as they select documents to work with. More specifically we examined whether and under what circumstances students might select not only scientific-expertise sources but sources with personal experiences and no visible scientific expertise. While topics and to-be answered questions were kept constant, the external context was varied. In Experiment 1, a university context and a personal context were contrasted. In Experiment 2, a second personal context involving an audience with high science values and standards was introduced. In both studies, additionally, the internal context was considered by assessing students' implicit and explicit beliefs about science (i.e., the perceived utility of science and their trust in science) as well as their knowledge about how science works as predictors.

Across both reported studies, university students showed a strong preference for scientific-expertise sources in contrast to personal-experiences sources. This result replicates

prior findings that students generally prefer documents with high author expertise (e.g., Bråten et al., 2018; McCrudden et al., 2016) and extends it to the comparison with sources that have personal experiences. Yet, the present studies bring the important specification that students' preferences are qualified by the external context and their beliefs and knowledge about science (Britt et al., 2018). Experiment 2 also strongly suggests that the higher standards observed in university types of contexts may be related to the audience, i.e., the third party to whom the outcome will be communicated.

### **Effects of the External Context on the Standard for Source Quality**

In both experiments, participants were more likely to select personal-experiences sources for further reading about science in a personal context without an external audience than in a university context. The university context, as embodied in the task instructions, featured a professor and a typical academic purpose: to read in order to gather information and prepare to share it with the professor and fellow students. This is consistent with the view that the external reading context (not just the task question per se) activates standards that make some sources look more or less relevant than others (Britt et al., 2018). It is likely that these standards were not activated to the same extent in the personal/no audience context, leaving more leeway for participants' personal and implicit selection criteria. Clearly, scientific-expertise sources did have high relevance also in the personal context scenario, but authors claiming personal experiences on the topic looked more appealing to participants than in the university context. It should be noted that our data say nothing about participants' intended use of the information, or about their reading strategies had they been allowed to actually open the documents. However, since sharing personal experiences is an important aspect of the discourse in the Internet (e.g., Scott & Gershoff, 2021; Van Bavel Jay et al., 2021), making choices is a vital skill in this information-cluttered world, and the findings shed some light on this critical component of online reading strategies.

The data are in line with the RESOLV theory assumption that the physical and social context shapes task understanding and subsequent reading decisions and outcomes (Rouet et al., 2017). In the present studies, the external context scenario shaped participants' understanding of how appropriate non-scientific-expertise sources are, that is their standard for source quality. Although the data are based on students' choice of documents descriptions, not their actual reading of the documents, they suggest that in the university context, either the requester (a professor) or the specific audience (knowing that the outcome of reading will be shared with others) affects students' standards for selecting information. This is an important step toward understanding the factors that contribute to shaping readers' standards of coherence (Van den Broek et al., 1995). Reading purposes are construed from a rich set of cues beyond the task instructions that students are assigned. These cues are usually perceived as compounds (context schemata, Rouet et al., 2017) but they may each inform readers' decisions when selecting information for further processing.

Experiment 2 not only replicated the findings with regard to external context effects, but also showed that a specific dimension of the external context as specified by the RESOLV theory, namely the audience, plays a key role in students' standards for source quality. Experiment 2 showed that if there is an audience for which scientific sources are important, students take this into account, almost to the same extent as in a university context. An exploratory analysis revealed that there continues to be a difference between the university context and the personal-plus-audience context with regard to document selection. We can only speculate which of the external context features drove this effect: differences in the stakes (need to make a good impression vs. no stakes), requester (professor vs. friend), purpose (research project vs. podcast), and/or audience (professor vs. podcast audience).

Our findings complement prior findings on external context effects when reading and writing about multiple documents (Schoor et al., 2023). Schoor et al. (2023) found that in a

university context, students more often compared texts with each other, used adversative connectors and addressed the discrepancy between texts in an essay. Thus, they consider it more important to convey a complete and accurate picture, in terms of theory: a documents model (e.g., Britt & Rouet, 2012). Moreover, they also follow a higher standard for the presentation of the information in the essay. The present experiments add to this by tackling the selection phase that takes place before the processing of multiple documents (e.g., Brand-Gruwel et al., 2009; Rouet & Britt, 2011). Both of the present experiments suggest that the same task question is interpreted rather differently in different context scenario settings. Experiment 1 additionally showed that this was independent of the actual task question. Thus, the present experiments provide indirect evidence for task models and complement prior studies that directly addressed the role of task models (e.g., Cerdán et al., 2019; Schoor et al., 2021).

### **Effects of Beliefs about Science and Knowledge about How Science Works on the Standard for Source Quality**

Across both Experiments, we found a consistent influence of beliefs about science and knowledge about how science works on the probability of selecting personal-experiences sources. Specifically, the more positive the beliefs about science and the more knowledge readers had, the less likely they were to select personal-experiences sources as compared to scientific-expertise sources. Whereas in Experiment 1 these were exploratory findings, we were able to replicate the results for explicit utility of personal experiences, explicit and implicit utility of science, and knowledge about how science works in Experiment 2. We could not replicate the effects for explicit and implicit trust in science.

Moreover, we had expected these self-variables to play a greater role in a personal context which provides more freedom with regard to the standards to follow than a university context. In line with this assumption, we found for both the explicit and the

implicit perceived utility of science stronger effects in the personal context in Experiment 1. Yet, we could not replicate this interaction effect in Experiment 2.

The data do not support any specific explanation at this stage for why we could not replicate the effects of explicit and implicit trust in science or the interaction effect of implicit and explicit utility of science with the personal context. One reason, of course, may be that these effects were not robust. The effect of explicit trust in science might not be robust, because the measure was not ideal (see Limitations section). Regarding the interaction effect of the context with utility of science, the specific design chosen for the present experiments may not have been ideal, since it only enables analyses in comparison with personal-experience sources, and not the effect of the perceived utility of science on the choice of scientific-expertise sources per se. Moreover, we do not know how students intended to use the selected documents. Even students who consider science useful may select documents with personal experiences, although they may want to use them differently. Further studies are needed to get a more robust picture of how individual perceptions of science may affect students' information selection strategies and use of information.

To our knowledge, this is the first evidence that beliefs about science influence decisions regarding selection of multiple documents for reading about science. This finding is in line with both theories about beliefs (e.g., Reasoned Action Approach: Fishbein & Ajzen, 2010) and findings on the public's understanding of science (e.g., Retzbach et al., 2011). For example, it is in line with a recent finding that people who trust more in science also comply more with Covid-19 prevention guidelines (Plohl & Musil, 2021). With regard to reading and writing about multiple documents (Schoor et al., 2023), students with more positive beliefs about science seem to have a higher standard for a documents model as indicated by more text switches, a better memory for sources and a better memory for discrepancies. Yet, the results of Schoor et al. (2023) were not as consistent as the results in the present

experiments and rather suggested that more positive beliefs support the application of academic standards in a university context, while the present results suggest either that more positive beliefs support academic standards in a personal context (Experiment 1) or a general impact of beliefs about science independent from the external context (Experiment 2).

Moreover, the findings on the impact of implicit beliefs about science add to the existing evidence that implicit beliefs predict outcomes over and above the contribution of their explicit counterparts (e.g., Greenwald et al., 2009; Schnabel et al., 2008; Schoor & Schütz, 2021). It seems that implicit beliefs have an even higher predictive power than explicit beliefs. This is in line with the assumption that explicit and implicit beliefs are based on different psychological processes and experiences (Gawronski & Bodenhausen, 2007). This also explains the usually weak correlations between implicit and explicit beliefs (Hofmann et al., 2005; Nosek, 2007). To our knowledge, the present results are the first to show that both implicit and explicit beliefs about science contribute to how readers approach multiple documents about science. Thus, it adds to the growing literature on individual differences that play a role for multiple document comprehension, such as epistemic beliefs, prior topic beliefs, interest, working memory capacity, or (single text) reading skills (e.g., Barzilai & Strømsø, 2018; Hahnel et al., 2021; List, 2021; Mahlow et al., 2020; Schoor et al., 2020).

### **Consequences for Future Research and Educational Practice**

The current findings largely confirm the assumptions of the RESOLV theory as summarized in the theoretical section: the external and internal context shapes reading decisions. The two experiments contribute to further specifying the “self” dimension of the theory (Britt et al., 2018). When reading about science, beliefs about science and knowledge about how science works are important predictors of readers’ perceptions of information relevance. Moreover, several open questions remain that should be addressed by further research. First, RESOLV suggests several broad dimensions of the physical and social



context that are supposed to influence task understanding, reading decisions, and outcomes. These need to be further specified. As the results of Experiment 2 suggest, audience explains part of the differences between external contexts in the present studies, but there was still a difference between the university context and the personal-plus-audience context that was not yet explained. Thus, further research could address which external context features (or which combination of context features) are responsible for differences found across external contexts as implemented in the present studies, but also with regard to the well-studied reading purposes such as “reading for study” versus “reading for entertainment”.

Moreover, future research could address the mechanism that the RESOLV theory supposes for how external context translates into reading decisions: that the task understanding differs in different external contexts. Prior research has shown that task understanding shapes reading decisions and outcome both in single (Cerdán et al., 2013; Cerdán et al., 2019) and multiple text comprehension (Schoor et al., 2021), but the link between external context differences and task understanding has not been empirically shown. We suggested that standards (e.g., for source quality) play a role, but these standards were not measured explicitly in the present experiments.

From a practical and educational point of view, the present results may be seen both as concerning and promising. As a possible source of concern, university students tend to accept non-scientific-expertise sources more often when reading for personal purposes compared to reading for academic purposes or for science-savvy audiences. In other words, they seem to “lower their guard” when reading for themselves. Quite obviously, science experts cannot and should not always be seen as a golden standard when searching information online, but laypersons' lack of awareness of source reliability may increase their vulnerability to misinformation (Ecker et al., 2022). The results are nevertheless promising, because both better knowledge about how science works and more positive beliefs about

science seem to mitigate this effect. As a consequence, it might help to educate students not only with regard to academic principles and norms, but also to convince them of their value (i.e., change their beliefs). It has long been assumed that better factual knowledge about science would improve beliefs about science (e.g., Bauer et al., 2007). Yet, the assumption that raising the public's understanding of science would make people hold more positive beliefs about science was given up (Bauer et al., 2007), although there are relations between knowledge about science and beliefs about science (e.g., Nadelson et al., 2014; Retzbach et al., 2015). While it is unclear whether improving one's knowledge about how science works might vaccinate readers against anti-scientific (mis-)information, there is evidence at least for a relationship between these constructs (Retzbach et al., 2015; Schoor, in press; Schoor & Schütz, 2021).

### **Limitations**

The present experiments have several limitations that restrict the scope of our findings. First, the participants were university students, which precludes a generalization to non-college educated young adults. It may be assumed that educational attainment could affect users' consideration for personal-experiences sources when reading about science.

In addition, the external context scenarios that were realized in the present research are three examples from a universe of possible scenarios within each of these external contexts. It is of course possible to think of university context scenarios without an external audience, with low stakes, or without salient academic standards. On the other hand, it is likely that there are personal context scenarios with high stakes, salient academic standards, or with evaluation taking place. The present scenarios were chosen with the aim to maximize the contrast between the personal and the university context scenarios, as an initial step toward investigating more detailed external context features. Experiment 2 started to disentangle these effects by introducing a specific audience to the personal context. Yet, we fully

acknowledge that our external-context manipulations in both Experiments did not vary only one RESOLV category at a time. The problem is that natural and authentic contexts always come as a compound. Varying only one category of RESOLV when creating the context scenarios often ended in very weird scenarios that we did not expect to work as external-context manipulation. Thus, further studies are necessary to get a full picture of contextual influences on online readers' strategies.

Moreover, in the present experiments the external context manipulation was only based on scenarios. That is, the participants were still in the same real context, namely participating in a scientific experiment from home. Although this confirms that mature readers can simulate different reading contexts and purposes (e.g., Narvaez et al., 1999; Van den Broek et al., 2001), experiments investigating reading strategies in authentic contexts would be needed to further support our theoretical assumptions. We also cannot exclude the alternative interpretation that the participants responded to the more or less explicit instructions and not to activated context schemata.

As another limitation, the search engine results page (SERP) used in the experiments differed from a typical SERP. The entries featured a title, an author name, and an occupation (Figure 1), which mainstream search engines do not. Conversely, our entries omitted the short document excerpt and URL typically featured in authentic search engines. Yet, the URL either necessitates a strong knowledge about sources or does not provide relevant source information. Given that it was the aim of the present study to research context effects on the selection of the kind of sources, we decided to slightly alter the usual display. Instead of a URL, we provided source information (author name and occupation). Our title provides more information about the content of the document than a usual title would, therefore we omitted the document excerpt. We did not provide participants with the opportunity to start reading the document, which may not be typical behavior with SERPs. Thus, authentic

search environments provide users with other means to assess the relevance of an entry (e.g., taking a quick look at the document), which may eventually affect their selections. Yet, it was not the aim of the present study to research an authentic SERP, but to focus on a single aspect of the selection process, which the present design allowed us.

The measure of trust in science might also not have been optimal. The scale includes items that may not measure trust in science but beliefs about who trusts in science (“People who understand science more have more trust in science”), or items that we today know should be phrased more tentatively (e.g., “We should trust that scientists are being honest in their work.” might be better phrased “I trust that scientists are being honest in their work”).<sup>4</sup> Yet, to our knowledge this scale is the only psychometrically assessed German scale of trust in science that has more than a single item.

Last but not least, the interpretation of results in terms of standards that we offer is only one possible explanation, although one that we consider the most plausible and that is backed up by theory (Britt et al., 2018; Rouet et al., 2017). Yet, in the end we do not know whether college-level readers really apply different standards depending on the context they work in or whether they had other reasons to select the documents that they selected. Further studies may want to include think-aloud methods to catch the reasons for selecting documents, or include the use of the selected information in a product in order to see whether the students intend to indeed use the information from personal-experiences source and for which objective.

## **Conclusion**

In a world of abundant information, it is important to know what rationale students use when selecting documents for further reading. The present studies provide first evidence for how the external context, beliefs about science, and knowledge about how science works

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<sup>4</sup> We thank an anonymous reviewer for these thoughts.

influence reading decisions, that is decisions to select documents for further reading. Thus, they support the recently proposed RESOLV theory and suggest that readers take not only personal beliefs and knowledge into account when selecting documents for reading about science, but also consider constraints and affordances of the contextual situation. Hence, they also point to potential difficulties in educationally addressing current phenomena of post-truth and science skepticism (Barzilai & Chinn, 2020).

## References

- American Psychological Association. (2002). Ethical principles of psychologists and code of conduct. *American Psychologist*, 57(12), 1060-1073. <https://doi.org/10.1037/0003-066X.57.12.1060>
- Baron, R., & Kenny, D. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173-1182.
- Barzilai, S., & Chinn, C. A. (2020). A review of educational responses to the “post-truth” condition: Four lenses on “post-truth” problems. *Educational Psychologist*, 55(3), 107-119. <https://doi.org/10.1080/00461520.2020.1786388>
- Barzilai, S., & Eshet-Alkalai, Y. (2015). The role of epistemic perspectives in comprehension of multiple author viewpoints. *Learning and Instruction*, 36, 86-103. <https://doi.org/10.1016/j.learninstruc.2014.12.003>
- Barzilai, S., & Strømsø, H. I. (2018). Individual differences in multiple document comprehension. In J. L. G. Braasch, I. Bråten, & M. T. McCrudden (Eds.), *Handbook of multiple source use* (pp. 99-116). Routledge.
- Bauer, M. W., Allum, N., & Miller, S. (2007). What can we learn from 25 years of PUS survey research? Liberating and expanding the agenda. *Public Understanding of Science*, 16(1), 79-95. <https://doi.org/10.1177/0963662506071287>
- Bohn-Gettler, C. M., & Kendeou, P. (2014). The interplay of reader goals, working memory, and text structure during reading. *Contemporary Educational Psychology*, 39(3), 206-219. <https://doi.org/10.1016/j.cedpsych.2014.05.003>
- Brand-Gruwel, S., Wopereis, I., & Walraven, A. (2009). A descriptive model of information problem solving while using internet. *Computers & Education*, 53(4), 1207-1217. <https://doi.org/10.1016/j.compedu.2009.06.004>

- Bråten, I., McCrudden, M. T., Stang Lund, E., Brante, E. W., & Strømsø, H. I. (2018). Task-oriented learning with multiple documents: Effects of topic familiarity, author expertise, and content relevance on document selection, processing, and use. *Reading Research Quarterly*, 53(3), 345-365. <https://doi.org/10.1002/rrq.197>
- Bråten, I., & Strømsø, H. I. (2010). Effects of task instruction and personal epistemology on the understanding of multiple texts about climate change. *Discourse Processes*, 47(1), 1-31. <https://doi.org/10.1080/01638530902959646>
- Bråten, I., Strømsø, H. I., & Ferguson, L. E. (2016). The role of epistemic beliefs in the comprehension of single and multiple texts. In P. Afflerbach (Ed.), *Handbook of individual differences in reading. Reader, text and context* (pp. 67-79). Routledge.
- Britt, M. A., Perfetti, C. A., Sandak, R., & Rouet, J.-F. (1999). Content integration and source separation in learning from multiple texts. In S. R. Goldman, A. C. Graesser, & P. Van den Broek (Eds.), *Narrative, comprehension, causality, and coherence: Essays in honor of Tom Trabasso* (pp. 209-233). Erlbaum.
- Britt, M. A., & Rouet, J.-F. (2012). Learning with multiple documents: Component skills and their acquisition. In J. R. Kirby & M. J. Lawson (Eds.), *Enhancing the quality of learning: Dispositions, instruction, and learning processes* (pp. 276-314). Cambridge University Press.
- Britt, M. A., Rouet, J.-F., & Durik, A. M. (2018). *Literacy beyond text comprehension. A theory of purposeful reading*. Routledge.
- Bromme, R., & Gierth, L. (2021). Rationality and the public understanding of science. In M. Knauff & W. Spohn (Eds.), *The Handbook of Rationality* (pp. 767-776). MIT Press.
- Bromme, R., Kienhues, D., & Porsch, T. (2010). Who knows what and who can we believe? Epistemological beliefs are beliefs about knowledge (mostly) to be attained from others. In L. D. Bendixen & F. C. Feucht (Eds.), *Personal epistemology in the classroom:*

- Theory, research, and implications for practice* (pp. 163-193). Cambridge University Press. <https://doi.org/10.1017/CBO9780511691904.006>
- Buttrick, N., Axt, J., Ebersole, C. R., & Huband, J. (2020). Re-assessing the incremental predictive validity of Implicit Association Tests. *Journal of Experimental Social Psychology*, 88, 103941. <https://doi.org/10.1016/j.jesp.2019.103941>
- Cerdán, R., Gilabert, R., & Vidal-Abarca, E. (2013). Self-generated explanations on the question demands are not always helpful. *The Spanish Journal of Psychology*, 16. <https://doi.org/10.1017/sjp.2013.45>
- Cerdán, R., Pérez, A., Vidal-Abarca, E., & Rouet, J.-F. (2019). To answer questions from text, one has to understand what the question is asking: differential effects of question aids as a function of comprehension skill. *Reading and Writing*, 32(8), 2111-2124. <https://doi.org/10.1007/s11145-019-09943-w>
- Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, 53(1), 109-132.
- Ecker, U. K. H., Lewandowsky, S., Cook, J., Schmid, P., Fazio, L. K., Brashier, N., Kendeou, P., Vraga, E. K., & Amazeen, M. A. (2022). The psychological drivers of misinformation belief and its resistance to correction. *Nature Reviews Psychology*, 1(1), 13-29. <https://doi.org/10.1038/s44159-021-00006-y>
- Edelsbrunner, P. A. (2022). A model and its fit lie in the eye of the beholder: Long live the sum score. *Frontiers in Psychology*, 13, 986767. <https://doi.org/10.3389/fpsyg.2022.986767>
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G\*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41(4), 1149-1160.



- Felton, M., Crowell, A., & Liu, T. (2015). Arguing to agree: Mitigating my-side bias through consensus-seeking dialogue. *Written Communication, 32*(3), 317-331.  
<https://doi.org/10.1177/0741088315590788>
- Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior. The Reasoned Action Approach*. Psychology Press.
- Gawronski, B., & Bodenhausen, G. V. (2007). Unraveling the processes underlying evaluation: Attitudes from the perspective of the APE model. *Social Cognition, 25*(5), 687-717. <https://doi.org/10.1521/soco.2007.25.5.687>
- Gil, L., Bråten, I., Vidal-Abarca, E., & Strømsø, H. I. (2010). Summary versus argument tasks when working with multiple documents: Which is better for whom? *Contemporary Educational Psychology, 35*(3), 157-173. <https://doi.org/10.1016/j.cedpsych.2009.11.002>
- Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the Implicit Association Test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology, 85*(2), 197-216. <https://doi.org/10.1037/0022-3514.85.2.197>
- Greenwald, A. G., Poehlman, T. A., Uhlmann, E. L., & Banaji, M. R. (2009). Understanding and using the Implicit Association Test: III. Meta-analysis of predictive validity. *Journal of Personality and Social Psychology, 97*(1), 17-41. <https://doi.org/10.1037/a0015575>
- Hahnel, C., Goldhammer, F., Kroehne, U., Mahlow, N., Artelt, C., & Schoor, C. (2021). Automated and controlled processes in comprehending multiple documents. *Studies in Higher Education, 46*(10), 2074-2086. <https://doi.org/10.1080/03075079.2021.1953333>
- Hofmann, W., Gawronski, B., Gschwendner, T., Le, H., & Schmitt, M. (2005). A meta-analysis on the correlation between the Implicit Association Test and explicit self-report measures. *Personality and Social Psychology Bulletin, 31*(10), 1369-1385.  
<https://doi.org/10.1177/0146167205275613>

- Kammerer, Y., & Gerjets, P. (2014). The role of search result position and source trustworthiness in the selection of web search results when using a list or a grid interface. *International Journal of Human-Computer Interaction*, 30(3), 177-191.  
<https://doi.org/10.1080/10447318.2013.846790>
- Kazak, A. E. (2018). Editorial: Journal article reporting standards. *American Psychologist*, 73(1), 1-2. <https://doi.org/10.1037/amp0000263>
- Kiemer, K., & Kollar, I. (2018). Evidence-based reasoning of pre-service teachers: A script perspective. In J. Kay & R. Luckin (Eds.), *Rethinking learning in the digital age. Making the learning sciences count, 13th International Conference of the Learning Sciences (ICLS) 2018, Vol. 2* (pp. 1037-1040). International Society of the Learning Sciences.
- Kiemer, K., & Kollar, I. (2021). Source selection and source use as a basis for evidence-informed teaching. *Zeitschrift für Pädagogische Psychologie*, 35(2-3), 127-141.  
<https://doi.org/10.1024/1010-0652/a000302>
- Kumle, L., Võ, M. L. H., & Draschkow, D. (2021). Estimating power in (generalized) linear mixed models: An open introduction and tutorial in R. *Behavior Research Methods*, 53(6), 2528-2543. <https://doi.org/10.3758/s13428-021-01546-0>
- Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). lmerTest: Tests in linear mixed effects models. *Journal of Statistical Software*, 82(13), 1-26.  
<https://doi.org/10.18637/jss.v082.i13>
- Le Bigot, L., & Rouet, J.-F. (2007). The impact of presentation format, task assignment, and prior knowledge on students' comprehension of multiple online documents. *Journal of Literacy Research*, 39(4), 445-470. <https://doi.org/10.1080/10862960701675317>
- Lee, H. Y., & List, A. (2023). The role of relevance determinations in multiple text reading and writing: an investigation of the MD-TRACE. *Discourse Processes*, 60(1), 42-72.  
<https://doi.org/10.1080/0163853X.2022.2159741>

- Linderholm, T., & van den Broek, P. (2002). The effects of reading purpose and working memory capacity on the processing of expository text. *Journal of Educational Psychology, 94*(4), 778-784. <https://doi.org/10.1037/0022-0663.94.4.778>
- List, A. (2021). Investigating the cognitive affective engagement model of learning from multiple texts: A structural equation modeling approach. *Reading Research Quarterly, 56*(4), 781-817. <https://doi.org/10.1002/rrq.361>
- List, A., Du, H., & Wang, Y. (2019). Understanding students' perceptions of task assignments. *Contemporary Educational Psychology, 59*, 101801. <https://doi.org/10.1016/j.cedpsych.2019.101801>
- Macedo-Rouet, M., Potocki, A., Scharrer, L., Ros, C., Stadtler, M., Salmerón, L., & Rouet, J.-F. (2019). How good is this page? Benefits and limits of prompting on adolescents' evaluation of web information quality. *Reading Research Quarterly, 54*(3), 299-321. <https://doi.org/10.1002/rrq.241>
- Mahlow, N., Hahnel, C., Kroehne, U., Artelt, C., Goldhammer, F., & Schoor, C. (2020). More than (single) text comprehension? On university students' understanding of multiple documents. *Frontiers in Psychology, 11*, 562450. <https://doi.org/10.3389/fpsyg.2020.562450>
- Maier, J., & Richter, T. (2016). Effects of text-belief consistency and reading task on the strategic validation of multiple texts. *European Journal of Psychology of Education, 31*(4), 479-497. <https://doi.org/10.1007/s10212-015-0270-9>
- McCrudden, M. T., & Schraw, G. (2007). Relevance and goal-focusing in text processing. *Educational Psychology Review, 19*(2), 113-139. <http://dx.doi.org/10.1007/s10648-006-9010-7>
- McCrudden, M. T., Stenseth, T., Bråten, I., & Strømsø, H. I. (2016). The effects of topic familiarity, author expertise, and content relevance on Norwegian students' document

selection: A mixed methods study. *Journal of Educational Psychology*, 108(2), 147-162.

<https://doi.org/10.1037/edu0000057>

McNeish, D. (2017). Thanks coefficient alpha, we'll take it from here. *Psychological*

*Methods*. <https://doi.org/10.1037/met0000144>

Miller, J. D. (1983). Scientific literacy: A conceptual and empirical review. *Daedalus*,

112(2), 29-48. <http://www.jstor.org/stable/20024852>

Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus user's guide* (Eighth ed.). Muthén &

Muthén. [http://statmodel.com/download/usersguide/MplusUserGuideVer\\_8.pdf](http://statmodel.com/download/usersguide/MplusUserGuideVer_8.pdf)

Nadelson, L., Jorcyk, C., Yang, D., Jarratt Smith, M., Matson, S., Cornell, K., & Husting, V.

(2014). I just don't trust them: The development and validation of an assessment

instrument to measure trust in science and scientists. *School Science and Mathematics*,

114(2), 76-86. <https://doi.org/10.1111/ssm.12051>

Narvaez, D., van den Broek, P., & Ruiz, A. B. (1999). The influence of reading purpose on

inference generation and comprehension in reading. *Journal of Educational Psychology*,

91(3), 488-496. <https://doi.org/10.1037/0022-0663.91.3.488>

Nosek, B. A. (2007). Implicit–explicit relations. *Current Directions in Psychological*

*Science*, 16(2), 65-69. <https://doi.org/10.1111/j.1467-8721.2007.00477.x>

Nosek, B. A., Greenwald, A. G., & Banaji, M. R. (2007). The implicit association test at age

7: A methodological and conceptual review. In J. A. Bargh (Ed.), *Frontiers of social*

*psychology. Social psychology and the unconscious: The automaticity of higher mental*

*processes* (pp. 262-292). Psychology Press.

Nussbaum, E. M., & Schraw, G. (2007). Promoting argument-counterargument integration

in students' writing. *The Journal of Experimental Education*, 76(1), 59-92.

<http://www.jstor.org/stable/20157471>

- OECD (2016). *PISA 2015 assessment and analytical framework: Science, reading, mathematics and financial literacy*. Paris: OECD Publishing.
- Pan, B., Hembrooke, H., Joachims, T., Lorigo, L., Gay, G., & Granka, L. (2007). In Google we trust: Users' decisions on rank, position, and relevance. *Journal of Computer-Mediated Communication*, 12(3), 801-823. <https://doi.org/doi:10.1111/j.1083-6101.2007.00351.x>
- Parr, J. M., & Timperley, H. S. (2008). Teachers, schools and using evidence: Considerations of preparedness. *Assessment in Education: Principles, Policy & Practice*, 15(1), 57-71. <https://doi.org/10.1080/09695940701876151>
- Plohl, N., & Musil, B. (2021). Modeling compliance with COVID-19 prevention guidelines: the critical role of trust in science. *Psychology, Health & Medicine*, 26(1), 1-12. <https://doi.org/10.1080/13548506.2020.1772988>
- R Core Team (2021). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing. <https://www.R-project.org/>
- Rafoth, B. A. (1985). Audience adaptation in the essays of proficient and nonproficient freshman writers. *Research in the Teaching of English*, 19(3), 237-253. <http://www.jstor.org/stable/40171048>
- Retzbach, A., Marschall, J., Rahnke, M., Otto, L., & Maier, M. (2011). Public understanding of science and the perception of nanotechnology: the roles of interest in science, methodological knowledge, epistemological beliefs, and beliefs about science. *Journal of Nanoparticle Research*, 13(12), 6231-6244. <https://doi.org/10.1007/s11051-011-0582-x>
- Retzbach, J., Otto, L., & Maier, M. (2015). Measuring the perceived uncertainty of scientific evidence and its relationship to engagement with science. *Public Understanding of Science*, 25(6), 638-655. <https://doi.org/10.1177/0963662515575253>

- Revelle, W. (2020). *psych: Procedures for Personality and Psychological Research*.  
<https://CRAN.R-project.org/package=psych>
- Rouet, J.-F., & Britt, M. A. (2011). Relevance processes in multiple documents comprehension. In M. McCrudden, J. P. Magliano, & G. J. Schraw (Eds.), *Text relevance and learning from text* (pp. 19-52). Information Age.
- Rouet, J.-F., Britt, M. A., & Durik, A. M. (2017). RESOLV: Readers' representation of reading contexts and tasks. *Educational Psychologist*, 52(3), 200-215.  
<https://doi.org/10.1080/00461520.2017.1329015>
- Rudolph, A., Schröder-Abé, M., Schütz, A., Gregg, A. P., & Sedikides, C. (2008). Through a glass, less darkly? *European Journal of Psychological Assessment*, 24(4), 273-281.  
<https://doi.org/10.1027/1015-5759.24.4.273>
- Salmerón, L., Kammerer, Y., & García-Carrión, P. (2013). Searching the Web for conflicting topics: Page and user factors. *Computers in Human Behavior*, 29(6), 2161-2171. <https://doi.org/10.1016/j.chb.2013.04.034>
- Savolainen, R., & Kari, J. (2006). User-defined relevance criteria in web searching. *Journal of Documentation*, 62(6), 685-707. <https://doi.org/10.1108/00220410610714921>
- Schnabel, K., Asendorpf, J. B., & Greenwald, A. G. (2008). Assessment of individual differences in implicit cognition. A review of IAT measures. *European Journal of Psychological Assessment*, 24(4), 210-217. <https://doi.org/10.1027/1015-5759.24.4.210>
- Schoor, C. (in press). University students' beliefs about science and their relationship with knowledge about science. *European Journal of Psychology of Education*.  
<https://doi.org/10.1007/s10212-023-00724-2>
- Schoor, C., Hahnel, C., Mahlow, N., Klagges, J., Kroehne, U., Goldhammer, F., & Artelt, C. (2020). Multiple document comprehension of university students. Test development and relations to person and process characteristics. In O. Zlatkin-Troitschanskaia & H. A.

- Pant (Eds.), *Student Learning in German Higher Education. Innovative measurement approaches and research results* (pp. 221-240). Springer. [https://doi.org/10.1007/978-3-658-27886-1\\_11](https://doi.org/10.1007/978-3-658-27886-1_11)
- Schoor, C., Rouet, J.-F., Artelt, C., Mahlow, N., Hahnel, C., Kroehne, U., & Goldhammer, F. (2021). Readers' perceived task demands and their relation to multiple document comprehension strategies and outcome. *Learning and Individual Differences, 88*, 102018. <https://doi.org/10.1016/j.lindif.2021.102018>
- Schoor, C., Rouet, J.-F., & Britt, M. A. (2023). Effects of context and discrepancy when reading multiple documents. *Reading & Writing, 36*, 1111-1143. <https://doi.org/10.1007/s11145-022-10321-2>
- Schoor, C., & Schütz, A. (2021). Science-utility and science-trust associations and how they relate to knowledge about how science works. *PLOS ONE, 16*(12), e0260586. <https://doi.org/10.1371/journal.pone.0260586>
- Scott, J. K., & Gershoff, E. T. (2021). Trust in expert versus lay comments in online articles about spanking and car seat safety. *Journal of Family Psychology, 35*(3), 399-409. <https://doi.org/10.1037/fam0000784>
- Stadtler, M., Scharrer, L., Skodzik, T., & Bromme, R. (2014). Comprehending multiple documents on scientific controversies: Effects of reading goals and signaling rhetorical relationships. *Discourse Processes, 51*(1-2), 93-116. <https://doi.org/10.1080/0163853x.2013.855535>
- Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education, 48*(6), 1273-1296. <https://doi.org/10.1007/s11165-016-9602-2>
- Van Bavel Jay, J., Reinero Diego, A., Spring, V., Harris Elizabeth, A., & Duke, A. (2021). Speaking my truth: Why personal experiences can bridge divides but mislead.

*Proceedings of the National Academy of Sciences*, 118(8), e2100280118.

<https://doi.org/10.1073/pnas.2100280118>

Van den Broek, P., Lorch, R. F., Linderholm, T., & Gustafson, M. (2001). The effects of readers' goals on inference generation and memory for texts. *Memory & Cognition*, 29(8), 1081-1087. <https://doi.org/10.3758/bf03206376>

Van den Broek, P., Ridsen, K., & Husebye-Hartmann, E. (1995). The role of readers' standards for coherence in the generation of inferences during reading. In R. F. Lorch & E. J. O'Brien (Eds.), *Sources of coherence in reading* (pp. 353-373). Lawrence Erlbaum Associates, Inc.

Wickham, H. (2016). *ggplot2: Elegant Graphics for Data Analysis*. New York: Springer.  
<https://ggplot2.tidyverse.org>

Wigfield, A., & Eccles, J. S. (2000). Expectancy-value theory of achievement motivation. *Contemporary Educational Psychology*, 25(1), 68-81.  
<https://doi.org/10.1006/ceps.1999.1015>

Wiley, J., & Voss, J. F. (1999). Constructing arguments from multiple sources: Tasks that promote understanding and not just memory for text. *Journal of Educational Psychology*, 91(2), 301-311. <https://doi.org/10.1037/0022-0663.91.2.301>

Winterlin, F., Hendriks, F., Mede, N. G., Bromme, R., Metag, J., & Schäfer, M. S. (2022). Predicting public trust in science: The role of basic orientations toward science, perceived trustworthiness of scientists, and experiences with science. *Frontiers in Communication*, 6, 822757. <https://doi.org/10.3389/fcomm.2021.822757>

Wolfe, C. R., & Britt, M. A. (2008). The locus of the myside bias in written argumentation. *Thinking & Reasoning*, 14(1), 1-27. <https://doi.org/10.1080/13546780701527674>



Wolfe, C. R., Britt, M. A., & Butler, J. A. (2009). Argumentation schema and the myside bias in written argumentation. *Written Communication*, 26(2), 183-209.

<https://doi.org/10.1177/0741088309333019>

Table 1. Overview Over the Different Context Scenarios in the Studies.

	University	Personal	Personal-plus-audience
Scenario	University seminar	Create own podcast	Create own podcast
Request			
Task question	Experiment 1: Overview / opinion (depending on condition).	Experiment 1: Overview / opinion (depending on condition).	
	Experiment 2: Overview	Experiment 2: Overview	Experiment 2: Overview
Criteria	Academic standards	No information / own criteria	Academic standards
Stakes, consequences	Need to make a good impression	--	--
Purpose	Written product for a research project	Written product as a reminder for oneself	Written product as show notes of the podcast
Constraints		No other resources than system provided	
Requester			
Role	Professor	Best friend	Best friend

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Audience			
Role	Professor	Self	Podcast audience
Support & Obstacles			
Setting/place	At home like working for university	At home like looking up information for personal reasons	At home like looking up information for personal reasons
Experimental setting	Instructions in formal speech (German “Sie”). Used words such as “science” or “scientific.”	Instructions in informal speech (German “du”). Did not use words such as “science” or “scientific.”	Instructions in informal speech (German “du”). Did not use words such as “science” or “scientific.”
Materials	Provided search engine result lists		

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*Note.* The personal-plus-audience context was implemented only in Experiment 2.

*Table 2.* Topics and corresponding questions.

Topic	Question
Infrasound	Does wind turbines and infrasound have a negative effect on sleep quality?
Aspartame	Are sweeteners such as Aspartame in the amounts contained in food harmless to health?
Drugs	Does a positive and stimulating environment have a preventive effect on adolescent drug use?
Media	Does the consumption of violent media promote violent behavior?
Toys	How many toys should children own?

*Note.* “Infrasound” was a practice topic, the other four were target topics.

Table 3. Number of documents selected in Experiment 1 by topic, source expertise, task question, and context.

		University context						Personal context					
		Opinion (n=40)			Overview (n=42)			Opinion (n=41)			Overview (n=42)		
Topic	Source	Scient.	Pers.	Irr.	Scient.	Pers.	Irr.	Scient.	Pers.	Irr.	Scient.	Pers.	Irr.
	Aspartam		3.05	0.65	0.15	2.81	0.62	0.05	2.63	0.93	0.17	2.79	0.90
	e	(1.11)	(0.89)	(0.48)	(1.04)	(0.99)	(0.31)	(1.18)	(1.01)	(0.38)	(1.18)	(1.03)	(0.15)
Drugs		3.05	0.82	0.07	3.21	0.43	0.00	3.00	1.20	0.02	3.33	1.29	0.07
		(1.13)	(1.11)	(0.27)	(0.92)	(0.74)	(0.00)	(0.97)	(1.27)	(0.16)	(0.79)	(1.42)	(0.26)
Media		3.05	1.20	0.05	3.10	0.64	0.10	2.85	1.24	0.20	3.07	1.29	0.07
		(1.11)	(1.09)	(0.22)	(1.08)	(1.01)	(0.37)	(1.13)	(1.20)	(0.46)	(1.07)	(1.15)	(0.26)
Toys		3.05	1.40	0.00	3.14	1.00	0.02	2.73	1.46	0.15	2.88	1.45	0.12
		(1.11)	(1.24)	(0.00)	(1.14)	(1.06)	(0.15)	(1.14)	(1.07)	(0.36)	(1.25)	(1.33)	(0.33)
All topics		12.20	4.08	0.28	12.26	2.69	0.17	11.22	4.83	0.54	12.07	4.93	0.29
		(3.59)	(3.41)	(0.64)	(3.24)	(2.53)	(0.79)	(3.19)	(3.37)	(0.95)	(3.50)	(4.01)	(0.64)

*Note.* Per topic, four documents had a scientific expertise source (scient.), four a personal experiences source (pers.), and two were irrelevant

(irr.).

*Table 4.* Descriptives of individual difference variables in Experiment 1.

	Scale Range	M (SD)
<b>Explicit beliefs</b>		
Utility of science	1-5	4.26 (0.55)
Utility of personal experiences	1-5	3.34 (0.69)
Trust in science	1-5	3.55 (0.60)
<b>Implicit beliefs</b>		
Utility of science	-2 - 2	0.25 (0.46)
Trust in science	-2 - 2	0.20 (0.34)
<b>Knowledge</b>		
Knowledge about how science works	0 - 9	5.70 (1.59)

Table 5. Zero order correlations of individual difference variables in Experiment 1.

	(2)	(3)	(4)	(5)	(6)
(1) explicit utility of science	-.13	.38***	.26**	.20**	.29***
(2) explicit utility of personal experiences		-.20**	-.05	-.03	-.11
(3) explicit trust in science			.11	.14	.07
(4) implicit utility of science				.63***	.14
(5) implicit trust in science					.16*
(6) knowledge about how science works					

Note. \*\*  $p < .01$ ; \*\*\*  $p < .001$



Table 6. Interaction effects of individual difference variables with source expertise predicting the probability of selecting a source in Experiment 1.

	Probability of selecting personal experiences source (odds ratio)
<b>Explicit beliefs</b>	
Utility of science	0.60 <sup>***a</sup>
Utility of personal experiences	1.31 <sup>***b</sup>
Trust in science	0.76 <sup>***a</sup>
<b>Implicit beliefs</b>	
Utility of science	0.39 <sup>***a</sup>
Trust in science	0.14 <sup>***a</sup>
<b>Knowledge</b>	
Knowledge about how science works	0.51 <sup>***a</sup>

Note. <sup>\*\*\*</sup>  $p < .001$ . <sup>a</sup> Effect stayed significant at  $p < .001$  when Bonferroni correction was applied. <sup>b</sup> Effect stayed significant at  $p < .01$  when Bonferroni correction was applied. One model per individual difference variable and dependent variable was calculated (i.e., the table reports on 6 models). Explicit beliefs and knowledge were z-standardized.  $\beta =$  standardized coefficients. Probability of selecting personal experiences source is technically an interaction effect.

Table 7. Number of documents selected by topic, source expertise, and context in Experiment 2.

Topic \ Source	University (n=41)			Personal (n=40)			Personal-plus-audience (n=44)		
	Scient.	Pers.	Irr.	Scient.	Pers.	Irr.	Scient.	Pers.	Irr.
Aspartame	3.00	0.76	0.05	2.25	1.00	0.30	2.91	0.80	0.11
	(1.18)	(0.97)	(0.22)	(1.17)	(0.99)	(0.65)	(0.98)	(0.85)	(0.32)
Drugs	3.41	0.78	0.00	2.78	1.35	0.12	3.18	1.07	0.05
	(1.05)	(1.04)	(0.00)	(1.12)	(1.35)	(0.40)	(0.95)	(1.07)	(0.21)
Media	3.12	0.68	0.05	2.45	1.23	0.12	3.09	1.39	0.07
	(1.12)	(0.93)	(0.22)	(1.18)	(1.03)	(0.33)	(1.14)	(1.19)	(0.25)
Toys	3.12	0.88	0.10	2.28	1.30	0.15	2.86	1.18	0.07
	(1.10)	(1.08)	(0.30)	(1.24)	(0.97)	(0.36)	(1.09)	(1.08)	(0.25)
Sum all	12.66	3.10	0.20	9.75	4.88	0.70	12.05	4.43	0.30
topics	(3.75)	(3.25)	(0.40)	(3.75)	(3.08)	(1.11)	(2.87)	(2.98)	(0.63)

*Note.* Per topic, four documents had a scientific expertise source (scient.), four a personal experiences source (pers.), and two were irrelevant (irr.).

*Table 8.* Descriptives of individual difference variables in Experiment 2.

	Scale Range	M (SD)
<b>Explicit beliefs</b>		
Utility of science	1-5	4.31 (0.53)
Utility of personal experiences	1-5	3.39 (0.81)
Trust in science	1-5	3.50 (0.65)
<b>Implicit beliefs</b>		
Utility of science	-2 - 2	0.37 (0.43)
Trust in science	-2 - 2	0.24 (0.34)
<b>Knowledge</b>		
Knowledge on how science works	0 - 9	5.62 (1.73)

Table 9. Zero order correlations of individual difference variables in Experiment 2.

	(2)	(3)	(4)	(5)	(6)
(1) explicit utility of science	-.15	.38***	-.06	.07	.11
(2) explicit utility of personal experiences		-.13	-.07	-.15	-.01
(3) explicit trust in science			.06	.15	-.10
(4) implicit utility of science				.64***	.18
(5) implicit trust in science					.15
(6) knowledge on how science works					

Note. \*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 10. Interaction effects of individual difference variables with source expertise (A) and context (B) predicting the probability of selecting a source in Experiment 2.

	A	B
	Probability of selecting personal-experiences source (odds ratio)	Probability of selecting personal-experiences source in personal context (odds ratio)
<b>Explicit beliefs</b>		
Utility of science	0.73***	0.95
Utility of personal experiences	1.75***	0.90
Trust in science	0.99	0.94
<b>Implicit beliefs</b>		
Utility of science	0.49***	1.47
Trust in science	0.63	1.59
<b>Knowledge</b>		
Knowledge about how science works	0.51***	1.16

Note. \*\*\*  $p < .001$ . Significant effects stayed significant at  $p < .001$  when Bonferroni correction was applied. One model per individual difference variable and dependent variable was calculated (i.e., the table reports on 12 models). Explicit beliefs and knowledge about how science works were z-standardized. Technically, column A reports a two-way interaction effect, column B a three-way interaction effect.

## Figures

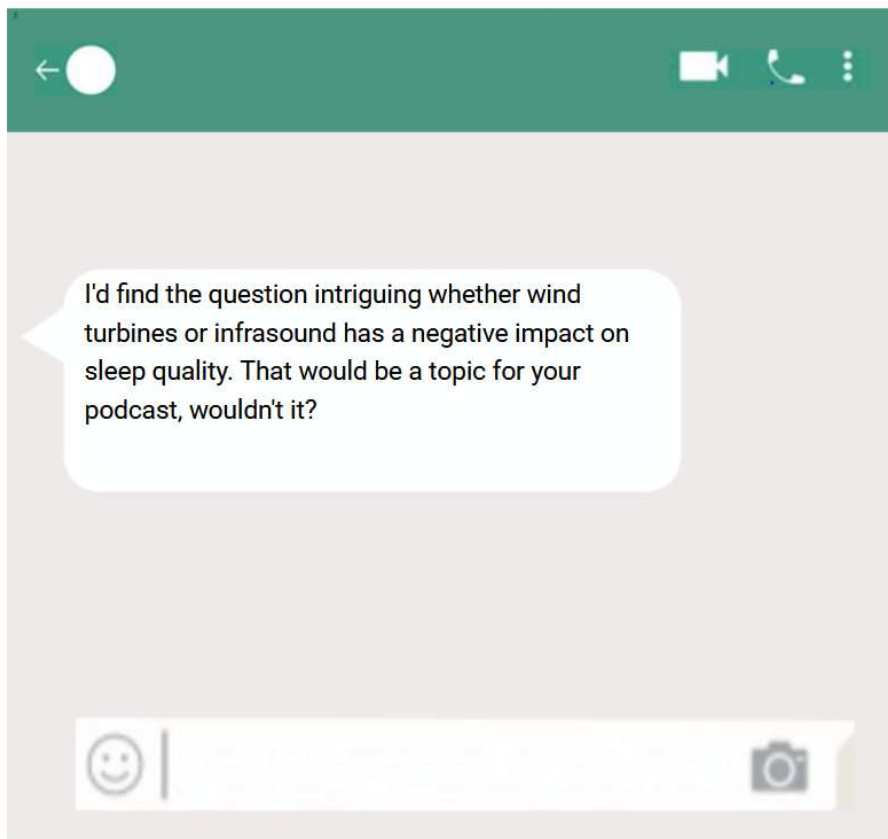
Figure 1. Search Engine Result Page. English translation of practice topic.

Question	Search results
	<p>Please select texts by ticking the box:</p> <ul style="list-style-type: none"><li><input type="checkbox"/> <a href="#">Wind steals sleep</a> by Theodor Leußner, last lighthouse keeper of Germany</li><li><input type="checkbox"/> <a href="#">Noise emissions from wind turbines</a> by Konstantin Delventhal, speaker of a support group on sleep problems</li><li><input type="checkbox"/> <a href="#">Effects of wind turbines on the environment and health</a> by Samantha Beer, chairwoman of the German Society for Sleep Research</li><li><input type="checkbox"/> <a href="#">Infrasound and low-frequency sound - an issue for health protection in Germany?</a> by Arnold Hoffleit, Professor of Sleep Medicine at the University Hospital of Cologne</li><li><input type="checkbox"/> <a href="#">Noise from wind turbines and the brain</a> by Carl Stöber, sleep researcher at the German Center for Healthy Sleep</li><li><input type="checkbox"/> <a href="#">Sleeping disturbances with high wind force</a> by Marianne Holste, meteorologist and wind power expert</li><li><input type="checkbox"/> <a href="#">Infrasound from wind turbines: Effects on health</a> by Wilma Röhrig, resident of a large wind farm</li><li><input type="checkbox"/> <a href="#">Health aspects of wind turbines and infrasound</a> by Evelyn Meinke, spokesperson of the Sleep Research Network</li><li><input type="checkbox"/> <a href="#">An overview of the infrasound generated by wind turbines</a> by Jenny Janson, Anti-wind power activist</li><li><input type="checkbox"/> <a href="#">Effects of wind farms on sleep quality and health</a> by Lennard Nellessen, works next to a wind farm</li></ul>

Figure 2. Computer Environment in the Personal Context. English translation of practice topic.



Your best friend has written:



Please consider how much time you want to invest and therefore how many or few documents you want to select to read on this question.

Please switch to the Search Results tab to select the texts and/or to continue. Click on the Question tab to return here.

Figure 3. Computer Environment in the University Context. English translation of practice topic.

Question   Search results

Your professor has written:

Navigation

Start

- Dashboard
- Info about VC
- My Courses

### Research Project - Overview Texts

For our research project in the seminar, please write a short text on the question of whether wind turbines or infrasound has a negative impact on sleep quality.

Please consider how much time you want to invest and therefore how many or few documents you want to select to read on this question.

Please switch to the Search Results tab to select the texts and/or to continue. Click on the Question tab to return here.



Figure 4. Experiment 1: Results on the interaction of explicit utility of science, external context, and source expertise, predicting the probability of selecting a document.

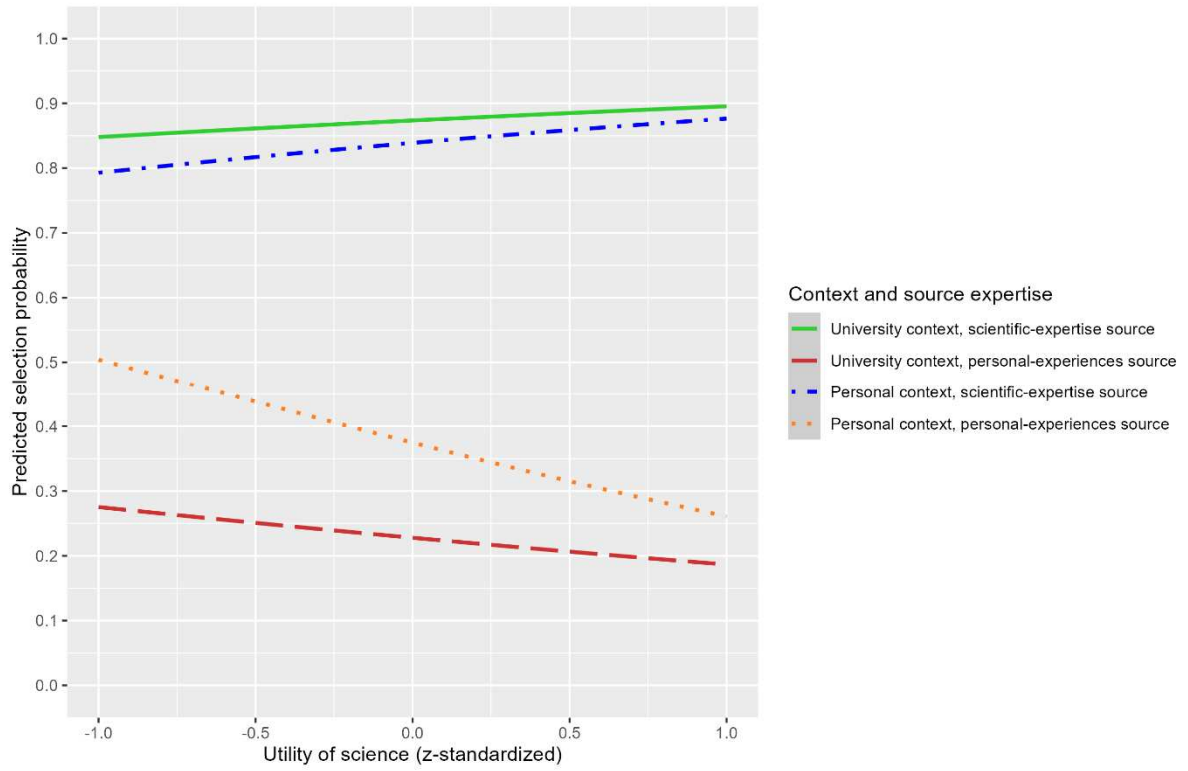


Figure 5. Experiment 1: Probability of selecting a source depending on source expertise, task question, and external context. Error bars represent confidence intervals ( $1.96 \times$  standard error).

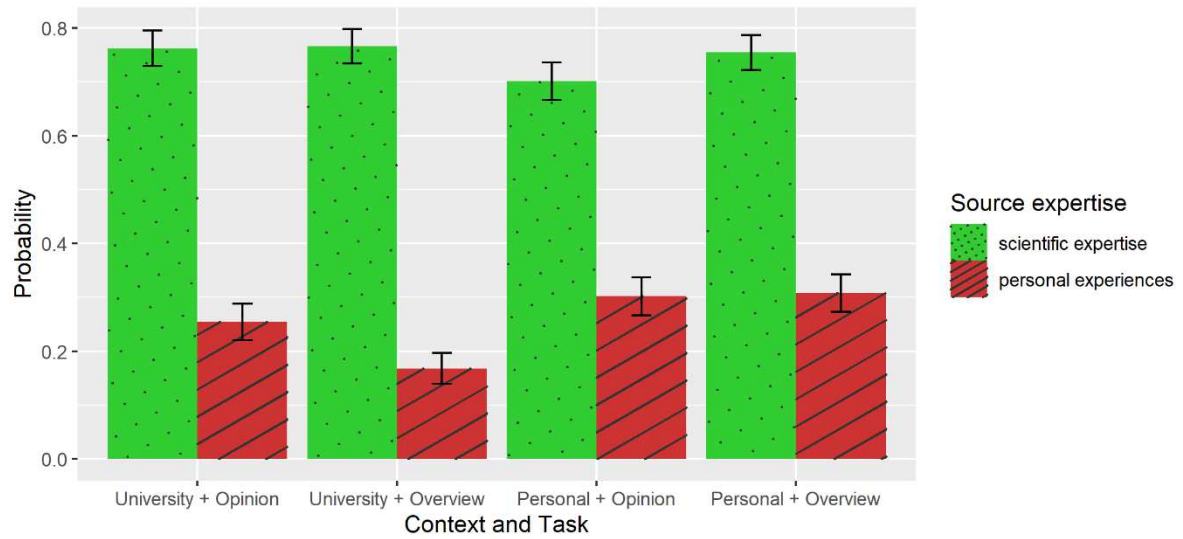
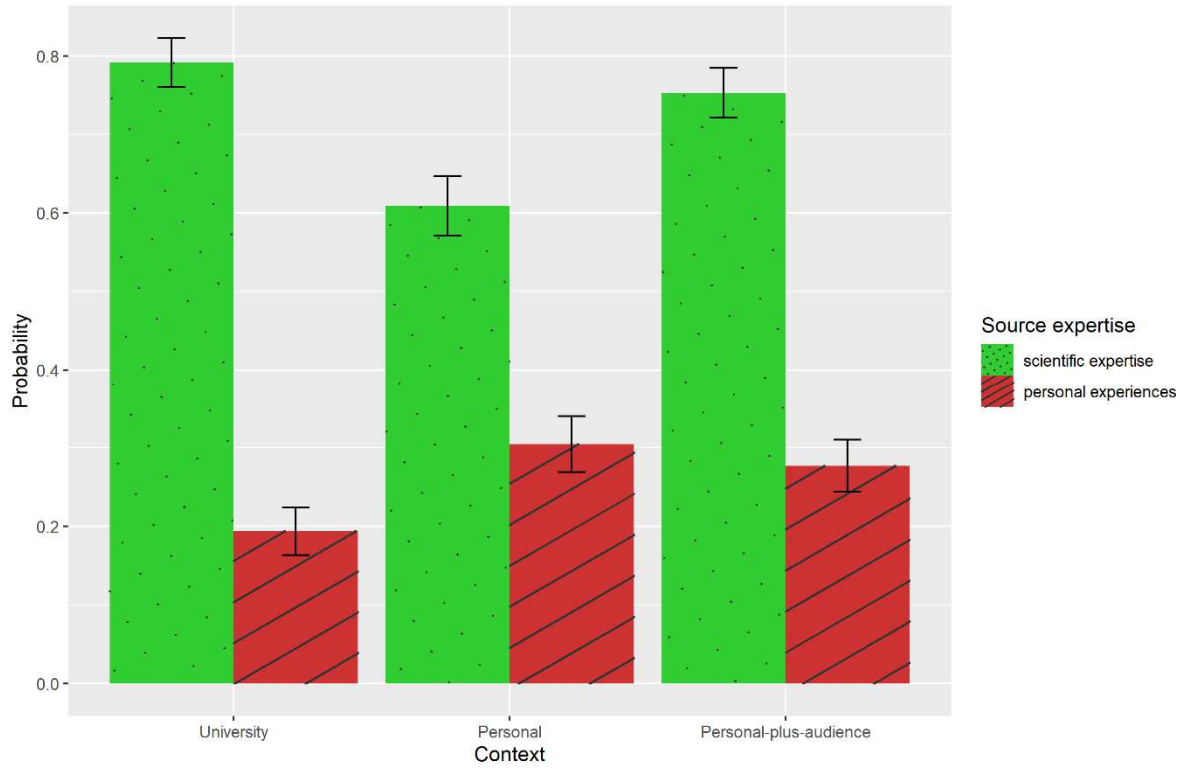


Figure 6. Experiment 2: Probability of selecting a source depending on source expertise and context. Error bars represent confidence intervals ( $1.96 \times$  standard error).



## Appendix

### English Translation of Task Instructions

#### *Experiment 1*

**University context – overview task.** Imagine you are attending a seminar of the professor with who you want to write your final thesis (Bachelor thesis, Master thesis). You want to make a good impression on him/her so that he/she accepts you. Being able to write your thesis with her/him is extremely important to you. You also know that she/he attaches great importance to science and scientifically sound work.

During the seminar you will work on a small research project. In preparation you will have to write short texts on 5 generally understandable topics in which you give an overview of the topic. By "overview" the following is meant: You summarize which persons represent which position with which reasons. This means that you describe who represents which contents.

For each of the topics, you will see a Google search result list. Then, you are supposed to select the documents that you want to read for this task. You can choose as many or few documents as seems reasonable to you. So, think about how much time you want to invest and how many or few documents you want to select.

Please remember this scenario. On the next page you will be asked what you will do, why you should do it and what you should write. You cannot return to the current page.

**University context – opinion task.** Imagine you are attending a seminar of the professor with whom you want to write your final thesis (Bachelor thesis, Master thesis). You want to make a good impression on him/her so that he/she accepts you. Being able to write your thesis with her/him is extremely important to you. You also know that she/he attaches great importance to science and scientifically sound work.

During the seminar you will work on a small research project. In preparation you will

have to write short texts on 5 generally understandable topics in which you comment on the respective question. By "comment" we mean the following: You write what your position is on the question and give reasons for it. You may also use texts from other people for this purpose.

For each of the topics, you will see a Google search result list. Then, you are supposed to select the documents that you want to read for this task. You can choose as many or few documents as seems reasonable to you. So, think about how much time you want to invest and how many or few documents you want to select.

Please remember this scenario. On the next page you will be asked what you will do, why you should do it and what you should write. You cannot return to the current page.

### ***Experiment 2***

**University context.** Imagine you are attending a seminar of the professor with whom you want to write your final thesis (Bachelor thesis, Master thesis). You want to make a good impression on him/her so that he/she accepts you. Being able to write your thesis with her/him is extremely important to you. You also know that she/he attaches great importance to science and scientifically sound work.

During the seminar you will work on a small research project. In preparation you will have to write short texts on 5 generally understandable topics in which you give an overview of the topic. By "overview" the following is meant: You summarize which persons represent which position with which reasons. This means that you describe who represents which contents. Your professor will read your texts.

For each of the topics, you will see a Google search result list. There, you may select the documents that you want to read for this task. You can choose as many or few documents as seems reasonable to you. So, think about how much time you want to invest and how many or few documents you want to select.

Please remember this scenario. On the next page you will be asked what you will do, why you should do it and what you should write. You cannot return to the current page.

**Personal context.** Imagine you are thinking about producing your own podcast on interesting topics. You have support for the technical side, now it's all about the content. There is no right or wrong. You can bring in your own ideas, depending on what is important to you.

Before you actually start writing the content for the podcast, you think about a few topics that your best friend has suggested to you that you might include in the podcast. In total there are now 5 suggested topics. In order not to forget what you thought, you write a short overview for yourself about each topic. By "overview" we mean: You summarize which persons represent which positions with which reasons. That means you describe who represents which contents.

For each of the topics, you will see a Google search result list. There, you may select the documents that you want to read for this task. You can choose as many or few documents as seems reasonable to you. So, think about how much time you want to invest and how many or few documents you want to select.

Please remember this scenario. On the next page you will be asked what you will do, why you should do it and what you should write. You cannot return to the current page.

**Personal-plus-audience context.** Imagine you are producing your own podcast on interesting topics. You have support for the technical side, now it's all about the content. You know that many of your audience also listen to other science podcasts (e.g., the Coronavirus update by NDR Info with Christian Drosten and Sandra Ciesek). Therefore, you know that they attach great importance to science and scientifically sound work.

Before you actually start writing the content for the podcast, you think about a few topics that your best friend has suggested to you that you want to include in the podcast. In total

there are now 5 suggested topics. For these topics you write a short overview that will be published together with the actual podcast episode and that will give potential listeners an overview of what to expect (i.e., the shownotes). By "overview" we mean: You summarize which persons represent which positions with which reasons. That means you describe who represents which contents.

For each of the topics, you will see a Google search result list. There, you may select the documents that you want to read for this task. You can choose as many or few documents as seems reasonable to you. So, think about how much time you want to invest and how many or few documents you want to select.

Please remember this scenario. On the next page you will be asked what you will do, why you should do it and what you should write. You cannot return to the current page.

## **Results of Manipulation Control**

### ***Experiment 1***

**Importance.** For these measures, differences between external context scenarios (i.e., personal vs. university) were expected. All results point in the expected direction and most of them were significant (see Table A1).

*Table A1.* Means, Standard Deviations and t Test results for Importance Questions in Experiment 1.

	University	Personal	t (df)
It was important for me to deliver a good result here.	4.07 (1.03)	3.89 (0.83)	-1.25 (155.05)
It was important for me to make a good impression here.	3.79 (1.14)	3.28 (1.16)	-2.88 (163) **
It was important for me to work here on a scientific basis.	4.44 (0.74)	4.14 (0.83)	-2.41 (161.32) *
It was important for me to bring in my own values here.	2.70 (1.35)	3.64 (1.14)	4.84 (158.1) ***
It was important for me to work here in a way that others approve of the way I work.	3.48 (1.17)	3.24 (1.25)	-1.25 (162.56)
I worked here as if other people were evaluating my work.	4.044 (1.07)	3.61 (1.25)	-2.33 (159.88) *

*Note.* \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

**Scenario control questions.** Before these questions, the respective scenario was repeated for the participants. No differences across conditions were expected. The results are depicted in Table A2.



*Table A2.* Frequencies of Responses to Scenario Control Questions by External Context and Task Question in Experiment 1.

	University opinion	University overview	Personal opinion	Personal overview	X <sup>2</sup> (df)
Did you think of this scenario while selecting the texts?					X <sup>2</sup> = 21.87 (12) *
Not at all	4	5	0	2	
Rarely	9	6	6	10	
now and then	10	7	8	15	
often	11	14	9	9	
all the time	6	10	18	6	
How familiar is such a situation to you?					X <sup>2</sup> = 18.17 (12)
very unknown	2	3	5	5	
rather unknown	11	17	17	17	
neither-nor	7	2	4	6	
rather known	15	11	14	13	
very known	5	9	1	1	
During the selection of the texts, did you act as if you were actually in such a situation?					X <sup>2</sup> = 10.11 (12)

I did not behave at all as if I were in such a situation.	1	0	2	2
Most of the time I did not behave as if I were in such a situation.	2	3	1	4
From time to time, I behaved as if I were in such a situation.	5	8	3	7
Most of the time I behaved like in such a situation.	16	21	19	19
I behaved all the time like in such a situation.	16	10	16	10

Note. \*  $p < .05$

**Expertise Ratings.** The mean differences of expertise ratings per source category are displayed in Table A3.

Table A3. Means, Standard Deviations and Paired t Test Results for Expertise Ratings in Experiment 1.

Rating	Scientific-expertise source	Personal-experiences source	t (df)
perceived scientific expertise	4.44 (0.68)	2.14 (0.95)	-102.21 (2639) ***
perceived personal experiences	2.54 (1.05)	3.82 (1.09)	42.694 (2639) ***

Note. \*\*\*  $p < .001$

Participants rated every source on a 5-point Likert scale (1-5) with regard to both their perceived scientific expertise and their personal experiences. Additionally, linear mixed models were calculated in which the respective expertise rating was predicted by random effects for the participant and the source, and fixed effects for the topic and the expertise of the source. The effect of a scientific-expertise source as compared to a personal-experiences was  $\beta = .81$  ( $p < .001$ ) for perceived scientific expertise and  $\beta = -.51$  ( $p < .001$ ) for perceived personal experiences.

**Title Ratings.** The mean relevance rating of titles on a 5-point Likert scale were 3.99 ( $SD = 1.02$ ) for relevant titles and 1.80 ( $SD = 1.09$ ) for irrelevant titles. A linear mixed model with random effects for person and title and fixed effects for topic and relevance revealed a relevance effect of  $\beta = .65$  ( $p < .001$ ).

### ***Experiment 2***

**Importance.** For these measures, differences between the university context and the (old) personal context were expected. The (new) personal-plus-audience context was expected to be in between the two other conditions. Differences were tested by means of several linear models. All results point in the expected direction and most of them were significant on the 5% level (see Table A4).

Table A4. Means, Standard Deviations, and Significant Differences for Importance

Questions in Experiment 2.

	University (U)	Personal (P)	Personal-plus- audience (PPA)	Significant Differences
It was important for me to deliver a good result here.	4.17 (0.70)	3.60 (1.06)	3.8 (0.82)	U > P U > PPA P = PPA
It was important for me to make a good impression here.	3.78 (0.91)	3.00 (1.20)	3.39 (1.04)	U > P U = PPA P = PPA
It was important for me to work here on a scientific basis.	4.39 (0.80)	4.08 (0.83)	4.36 (0.75)	U = P U = PPA P = PPA
It was important for me to bring in my own values here.	2.56 (1.43)	3.42 (1.24)	3.18 (1.50)	U < P U < PPA P = PPA
It was important for me to work here in a way that others approve of the way I work.	3.61(1.00)	2.83 (1.36)	3.36 (1.31)	U > P U = PPA P < PPA
I worked here as if other people were evaluating my work.	3.88 (1.12)	3.45 (1.20)	3.68 (1.18)	U = P U = PPA P = PPA

*Note.* < and > indicate significant differences between external context conditions. =

indicates no significant difference between conditions.

**Scenario control questions.** Before these questions, the respective scenario was repeated for the participants. No differences across conditions were expected. The results are depicted in Table A5.

Table A5. Frequencies of Responses to Scenario Control Questions by External Context in Experiment 2.

	University	Personal	Personal-plus- audience	X <sup>2</sup> (df)
Did you think of this scenario while selecting the texts?				X <sup>2</sup> = 4.17 (8)
Not at all	2	3	2	
Rarely	5	6	3	
now and then	15	13	17	
often	12	13	11	
all the time	7	5	11	
How familiar is such a situation to you?				X <sup>2</sup> = 13.63 (8)
very unknown	2	11	6	
rather unknown	16	12	19	
neither-nor	5	8	9	
rather known	14	8	8	
very known	4	1	2	
During the selection of the texts, did you act as if you were actually in such a situation?				X <sup>2</sup> = 8.98 (8)

I did not behave at all as if I were in such a situation.	2	3	1
Most of the time I did not behave as if I were in such a situation.	1	0	2
From time to time, I behaved as if I were in such a situation.	4	9	7
Most of the time I behaved like in such a situation.	15	19	19
I behaved all the time like in such a situation.	19	9	15

Note. \*  $p < .05$

**Expertise Ratings.** The mean differences of expertise ratings per source category are displayed in Table A6.

Table A6. Means, Standard Deviations and Paired t Test Results for Expertise Ratings in Experiment 2.

Rating	Scientific-expertise source	Personal-experiences source	t (df)
perceived scientific expertise	4.47 (0.68)	2.20 (1.03)	-82.75 (1999) ***
perceived personal experiences	2.67 (1.12)	3.81 (1.10)	32.26 (1999) ***

Note. \*\*\*  $p < .001$

Participants rated every source on a 5-point Likert scale (1-5) with regard to both their perceived scientific expertise and their personal experiences. Additionally, linear mixed models were calculated in which the respective expertise rating was predicted by random effects for the participant and the source, and fixed effects for the topic and the expertise of the source. The effect of a scientific-expertise source as compared to a personal-experiences was  $\beta = .79$  ( $p < .001$ ) for perceived scientific expertise and  $\beta = -.46$  ( $p < .001$ ) for perceived personal experiences.

**Title Ratings.** The mean relevance rating of titles on a 5-point Likert scale were 3.95 ( $SD = 1.04$ ) for relevant titles and 1.88 ( $SD = 1.19$ ) for irrelevant titles. A linear mixed model with random effects for person and title and fixed effects for topic and relevance revealed a relevance effect of  $\beta = .61$  ( $p < .001$ ).

### **Combined Analyses of Explicit and Implicit Beliefs About Science**

In additional exploratory analyses, we analyzed the combined contribution of implicit and explicit beliefs about science to the prediction of personal-experiences sources selection. We report the results for Experiment 1 in Table A7.

Results on models including corresponding implicit and explicit beliefs (Models 1 and 2) revealed for both models that implicit beliefs predicted the probability of selecting personal-experiences sources (as compared to scientific-expertise sources) completely above the effect of the corresponding explicit belief.



Table A7. Probability of selecting personal-experiences source (odds ratio) predicted by explicit and implicit beliefs about science in Experiment 1.

	Probability of selecting personal experiences source (odds ratio)				
	Model 1	Model 2	Model 3	Model 4	Model 5
<b>Explicit beliefs</b>					
Utility of science	0.65***		0.62***		0.70***
Trust in science		0.83*	0.92		0.94
<b>Implicit beliefs</b>					
Utility of science	0.49***			0.85	1.01
Trust in science		0.15***		0.17***	0.19***

Note. \*  $p < .05$ ; \*\*\*  $p < .001$ . Explicit beliefs were z-standardized. Odds ratios for interaction term of belief by source expertise. Additionally included in the models: random effects for person and title, fixed effects for the position of the topic and position of the document in the SERP, main effects of source expertise and beliefs.

In Models 3-6, we analyzed whether both trust in science and utility of science independently predicted the probability of selecting personal-experiences sources. If trust was necessary for perceived utility, the effect of trust on the selection of personal-experiences sources might be partly or fully mediated by utility of science. For explicit beliefs (Model 3), results indicate a full mediation of the effect of explicit trust by explicit utility (Baron & Kenny, 1986). However, Models 4 and 5 reveal that for implicit beliefs, the relationship seems to be reversed.

Also in Experiment 2, we analyzed whether implicit and explicit beliefs incrementally predicted the probability of selecting personal-experiences sources, and whether trust would provide additional predictive information when utility was already included (Table A8).

*Table A8.* Probability of selecting personal-experiences source (odds ratio) predicted by explicit and implicit beliefs about science in Experiment 2.

	Probability of selecting personal-experiences source (odds ratio)				
	Model 1	Model 2	Model 3	Model 4	Model 5
<b>Explicit beliefs</b>					
Utility of science	0.71 <sup>***</sup>		0.70 <sup>***</sup>		0.68 <sup>***</sup>
Trust in science		1.12	1.14		1.21 <sup>*</sup>
<b>Implicit beliefs</b>					
Utility of science	0.47 <sup>***</sup>			0.42 <sup>***</sup>	0.36 <sup>***</sup>
Trust in science		0.60 <sup>*</sup>		1.51	1.67

*Note.* <sup>\*</sup>  $p < .05$ ; <sup>\*\*\*</sup>  $p < .001$ . Explicit beliefs were z-standardized. Odds ratios for interaction term of belief by source expertise. Additionally included in the models: random effects for person and title, fixed effects for the position of the topic and position of the document in the SERP, main effects of source expertise and beliefs.

We were able to replicate the finding from Experiment 1 that explicit and implicit beliefs independently predicted the probability of selecting personal-experiences sources for utility of science (Model 1), but not for trust in science (Model 2). Trust was no significant predictor when utility of science was controlled for (explicit: Model 3; implicit: Model 4), which replicates the findings on explicit beliefs in Experiment 1.