How to Communicate Science to the Public?

Review Article

Topical Issue: Psychological Perspectives on Science Communication

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Recommendations for Effective Written Communication Derived From a Systematic Review

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Abstract: Communicating research findings to the public in a clear but engaging manner is challenging, yet central for maximizing their societal impact. This systematic review aimed to derive evidence-based strategies for science communication from experimental studies. Three databases were searched in December 2022. Experimental studies published in English or German were included if they tested the effect of providing written information about science to adults aged 16+ years by assessing the impact on at least one of four domains of science communication aims (understanding and knowledge, attitudes and trust, intention and behavior, engagement). A total of 171 publications were included. Derived strategies include avoiding jargon, carefully structuring texts, including citations and expert sources, being mindful about how and when to indicate conflict or uncertainty in science, using neutral language, and highlighting Open Science principles and replicability. They can be used to communicate science effectively to lay audiences, benefitting the society.

Keywords: science communication, scientific communication, trust in science, public engagement, media psychology

Communicating science to the public is central for maximizing its societal impact. Effective science communication can foster trust, assist public opinion formation, and support evidence-based decision-making (Fischhoff, 2019). This became especially evident during the COVID-19 pandemic. Understanding virus transmission paths predicted health outcomes (Gollust et al., 2020); trust in science increased adherence to public health measures (Bicchieri et al., 2021) and vaccination intentions (Casara et al., 2022). Similarly, climate literacy predicts climate change risk perception (Lee et al., 2015). Other motives for communicating science to the public include increased visibility (Bik et al., 2015) and meeting requirements of funding agencies and governmental institutions (Bundesministerium für Bildung und Forschung, 2019). However, communicating with the general public is a challenging task for which many scientists feel not appropriately trained (Genschow et al., 2023).

The perhaps biggest challenge is communicating science's inherent uncertainty, complexity, and tentativeness appropriately and with impact (Cooke et al., 2017). For example, during the COVID-19 pandemic, rapid dissemination of findings was crucial. Yet, laypeople often struggled to understand why information and recommendations changed quickly and why experts did not always agree on the interpretation of scientific results (Matta, 2020). Science communicators face the difficult task of presenting plain and clear narratives, while doing justice to this intricacy associated with science (IJzerman et al., 2020). The challenge is to communicate responsibly without overselling the findings and without eliciting unrealistic expectations (Lewis & Wai, 2021). How can science communication succeed in this task and effectively promote science-related understanding, engagement, attitudes, credibility, and trust, as well as beneficial behavior among the nonscience public?

https://doi.org/10.1027/2151-2604/a000572

Guidelines on written science communication already exist (e.g., Lewis & Wai, 2021; Stoll et al., 2022; Wissenschaft im Dialog & Bundesverband Hochschulkommunikation, 2016). What is missing, however, are concise and evidence-based guidelines on how to craft effective messages that accurately convey scientific knowledge. Thus, we aimed to provide evidence-based guidelines for how to communicate science effectively to lay audiences based on a systematic literature review. We specifically address the following four research questions:

How can writers communicate science to…

Research Question 1 (RQ1): promote *understanding* of scientific evidence, concepts, and methods, including promoting *knowledge* of scientific evidence and *scientific literacy*, reducing *misconceptions* and the belief in *myths*?

Research Question 2 (RQ2): promote a positive *attitude* toward and *trust* in science, *credibility* ascribed to scientific evidence, and *trustworthiness* ascribed to scientists?

Research Question 3 (RQ3): increase *acceptance* of scientific evidence, including the behavioral *intention*, for example, *make decisions* in line with scientific evidence and actual *behavior*?

Research Question 4 (RQ4): increase *engagement* with science, for example, by stimulating interest?

Although these aims might be interconnected, we will address them as separate outcomes because they might reflect different communication objectives (Ziegler & Fischer, 2020).

Methods

We developed the protocol for this systematic review prior to conducting the search following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines (Page et al., 2021) and registered it on the Open Science Framework (OSF; https://osf.io/6qpcf) prior to retrieving the records. Raw data are available on the project's OSF page (https://osf.io/v3fjw/).

Inclusion and Exclusion Criteria

We defined eligibility criteria based on the PICO framework (Richardson et al., 1995; see Table E1 in the Electronic Supplementary Material, ESM 1, for the full list). In brief, we included empirical studies published in English or German focusing on adults aged 16+ years providing written information about scientific evidence, concepts, or the scientific method if they compared different information provision conditions to each other, or an information provision condition to providing no information. This also included pre–post comparisons. Studies had to target one or multiple outcomes: understanding, scientific literacy, misconceptions and belief in myths, attitudes toward science, trust in science, credibility, trustworthiness of scientists, acceptance of scientific evidence, intention to make decisions in line with scientific evidence, actual behavior, or engagement with science.

Search Strategy

We searched Web of Science, PubMed (incl. MEDLINE), and PsycInfo in December 2022. The search term included keywords related to science communication, the understanding of science and scientific concepts, attitude and trust toward science and scientists, the acceptance of scientific evidence and intention to act according to this evidence, and engagement with science. We adjusted the search terms for each database (see ESM 1). Searches were limited to title and abstract (PubMed, PsycInfo) and topic (Web of Science), respectively, with no restrictions on publication date. In addition, we conducted a backward and forward citation search of all initially included studies using Google Scholar, for which one of three authors screened the studies included in the search results (LMK, MSA, JF).

Study Selection

We exported all identified records into Endnote 20 and uploaded them to Covidence (Covidence Systematic Review Software, Veritas Health Innovation, Melbourne, Australia), which identified and deleted duplicates. Then, two of three authors (LMK, MSA, JF) independently screened the titles and abstracts. Finally, two of the three authors retrieved full texts of potentially relevant articles. In both steps, disagreements were resolved by discussion.

Data Extraction and Synthesis

We extracted study and sample characteristics and the main findings related to the research questions of this review. Two authors (LMK, MSA, JF) independently extracted studies identified through the database search. Disagreements were resolved by discussion. Since disagreements were minimal,

we limited extraction of data from studies identified through backward and forward citation searches to one author (LMK, MSA, or JF). We initially extracted recommendations by the study authors to guide the synthesis. However, many studies did not provide recommendations for practice (e.g., because this was not the aim of the research or because of inconsistent findings), and those that did varied substantially in the level of detail. Thus, we derived recommendations ourselves based on the statistical significance of main effects.

Quality Appraisal

We assessed the quality of included between-subjects studies with the Cochrane Risk of Bias 2.0 tool (Sterne et al., 2019). Based on bias due to randomization, deviations from the protocol, measurement, outcome selection, and reporting, we derived an overall risk of bias rating, varying between low risk, some concern, and high risk of bias. We assessed the quality of included studies with mixed or within-subjects designs based on the appropriateness of the design, randomized treatment order, prevention of carry-over effects, reporting of unbiased data, allocation concealment, blinding, incomplete outcome data, and selective outcome reporting (Ding et al., 2015). This tool does not provide instructions for deriving an overall study quality rating. One study used a pretest–posttest design; its quality was appraised with the Jonna Briggs Institute's (2017) checklist for analytical cross-sectional studies based on inclusion criteria, study participants and setting, the valid and reliable measurement of intervention and outcomes, the identification of confounders and how they were dealt with, and the use of appropriate statistical tests. Quality was appraised independently by two reviewers; disagreements were resolved by discussion.

Deviation From the Protocol

Some potentially relevant studies did not report main effects of manipulations but only interaction effects with effect modifiers, or only reported results descriptively without statistical tests. This prevented us from drawing meaningful conclusions regarding the research questions of this review. Therefore, we added the lack of reporting statistical main effects as an exclusion criterion during the screening process.

Results

Overview of Studies

We included 171 publications comprising 246 relevant studies (see Figure 1). Sample sizes ranged from 26 to

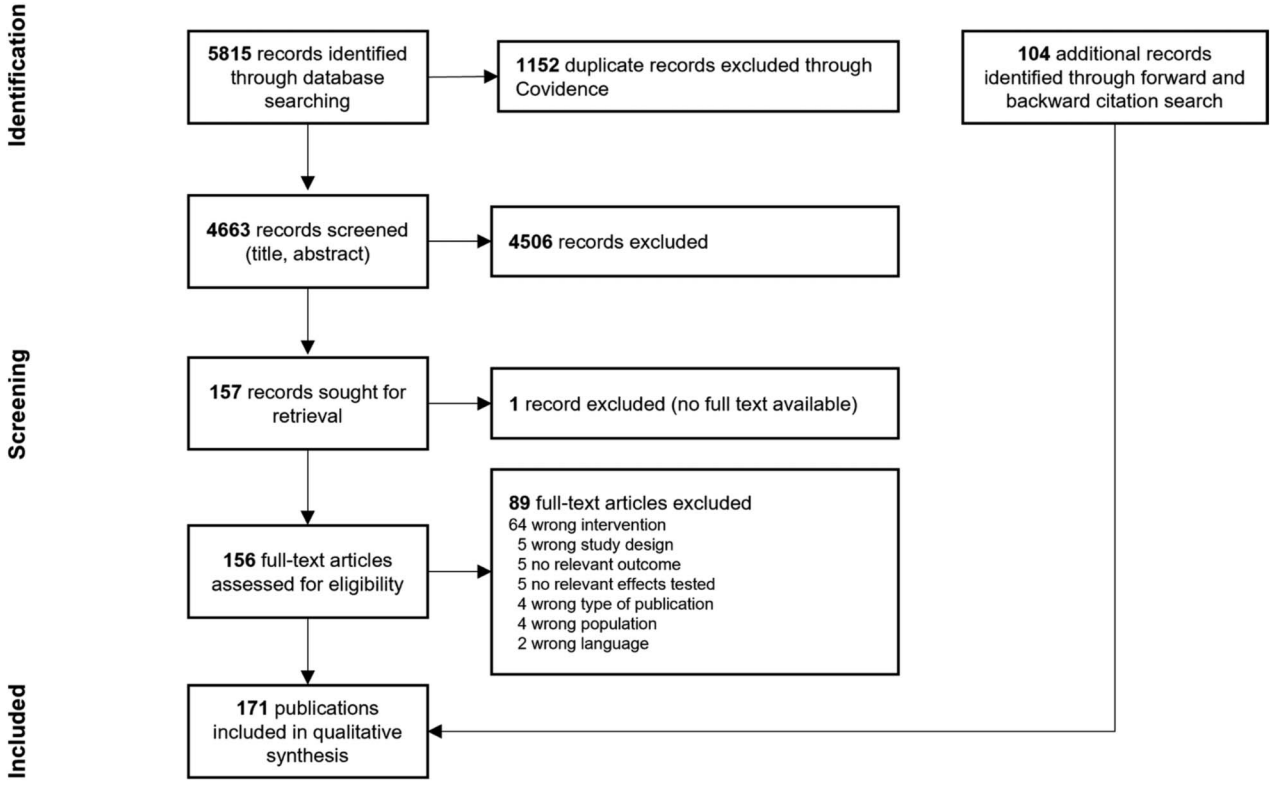

Figure 1. PRISMA flowchart of included studies.

10,239 participants. Studies typically used general population (e.g., recruited via MTurk or another panel provider) or student samples. Only a very small number of studies included populations of professionals, such as science communicators, teachers, or doctors. Most studies addressed climate change and global warming, health-related topics including COVID-19, and psychology and neuroscience. Studies most commonly investigated trust in science and scientists, although outcomes and manipulations were highly diverse. Most studies did not adhere to open science principles. The raw data file on the OSF (https://osf.io/v3fjw/) lists details on study and sample characteristics.

Quality Appraisal

We present the detailed results of the quality appraisal in ESM 1. In brief, 190 studies used a between-subjects design. Most of these studies received an overall rating of *some concerns* (89.5%), which were most often related to a lack of a preregistered data analysis plan, leading to a potential bias in the selection of the reported result (83.2%), or bias due to missing outcome data (50.5%).

Fifty-five studies used a within-subjects or mixed study design. Most concerns were related to potential carry-over effects between conditions (98.2%) or potentially incomplete outcome data due to a lack of a preregistered data analysis plan (85.5%). For the one study with a single-group pretest–posttest design, concerns were related to missing description of eligibility criteria and study participants and a potential risk for unidentified confounding factors.

Recommendations for Effective Written Science Communication

In the following (see also Table 1), we present recommendations for effective written science communication derived from the reviewed literature; we only present recommendations for which there was sufficient evidence, that is, at least two independent studies providing concurrent findings and no or only a small number of contradictory findings for at least one science communication aim. Due to the large number of potential outcomes and interventions studied, as well as many mixed results, we provide a narrative synthesis of all included studies in ESM 2.

Avoid Jargon

Instead of using technical terms and jargon, we recommend using simple language. Ideally, lay terms should replace technical terms. If technical terms are necessary, we recommend explaining them in a glossary. This strategy is linked to improved perceived understanding (Kerwer, Stoll, et al., 2021; Rhodes et al., 2014; Shulman et al., 2020), perceived ability to make use of the presented information (Kerwer, Chasiotis, et al., 2021; Kerwer, Stoll, et al., 2021), more positive attitudes toward science, increased risk perception, stronger behavioral intentions in line with the presented evidence (Bullock & Shulman, 2021), and increased support for government and public action (Bullock et al., 2019). However, readers might expect jargon in texts written by scientists. Accordingly, the use of simple language has been linked to reduced perceived expertise (Zimmermann & Jucks, 2018).

Implement a Clear Structure

We furthermore recommend carefully crafting structure. This applies to short and simple sentences but also to paragraphs and the text as a whole, for example, by using subheadings. Structure might promote perceived (Groothuis et al., 2021; Scharrer et al., 2012; Schnepf et al., 2021; Yaros, 2006) and actual understanding (Kerwer, Chasiotis, et al., 2021).

Include Citations and Reliable Expert Sources

Including citations to relevant publications or referencing expert sources might foster positive attitudes toward science (Thiebach et al., 2015), promote trust in science (Bromme et al., 2015; Corner & Hahn, 2009; Thiebach et al., 2015; Thomm & Bromme, 2012; Thon & Jucks, 2017), and increase willingness to act (Palm et al., 2020). However, citations can make a text more difficult to parse and so might impair perceived understanding (Thiebach et al., 2015).

Provide Information About a Study's Methods

Providing information about a study's methods might increase trust in science (Bromme et al., 2015; Thomm & Bromme, 2012).

Provide Statistical/Numerical Facts

Stating statistical or numerical facts might promote factual knowledge about the addressed topic (Negrete & Lartigue, 2010). Providing a list of facts seems as effective (Flemming et al., 2018) or even more effective (Negrete & Lartigue, 2010) than stories in conveying knowledge. Finally, combining statistical information with a narrative might be more effective than either component alone (Nan et al., 2015).

Ensure That Consensus or Conflict Statements Accurately Reflect the Evidence

Readers seem to be sensitive to statements indicating scientific consensus or conflict, and adjust their perceptions accordingly (Bolsen & Druckman, 2018; Cook et al., 2017; Goldberg et al., 2019, 2022; Imundo & Rapp, 2022; Johnson,

Table 1. Summary of recommendations for effective written science communication derived from the included studies

Recommendation	Evidence for impact on the following aims	Potential caveats	Evidence for no impact regarding aims (see ESM 2 for a synthesis)	Mixed evidence (see ESM 2 for a synthesis)
Avoid jargon. Instead, use simple language. Explain technical terms (e.g., in a glossary) or replace them with lay terms.	Perceived understanding; perceived ability make use of presented information, attitudes; caution, worry, concern, and risk perception, intention; support for government and public action	Simple language might reduce perceived expertise of scientists, while jargon might increase their ascribed benevolence and integrity.	Trust in science	Factual knowledge or belief in misconceptions; perceived study quality; engagement with science
Implement a clear structure for sentences, paragraphs and texts (e.g., including subheadings).	Perceived understanding; factual knowledge or belief in misconceptions			
Include citations and reliable expert sources.	Attitude; trust in science; intention	Citations might make text more difficult to parse and subsequently reduce perceived understanding.	Factual knowledge or belief in misconceptions	
Provide information about a study's methods.	Trust in science		Factual knowledge or belief in misconceptions; intention	
Provide (statistical/ numeric) facts. Narratives often do not provide an additional advantage.	Factual knowledge or belief in misconceptions			Caution, worry, concern and risk perception; trust in science; trust in scientists
Ensure that statements about consensus or conflict accurately reflect the evidence. Include a consensus statement, if expert agreement is very high. Only present conflicting evidence, if there is indeed disagreement within the scientific community, and reflect the proportion of pro and contra views in the amount of presented evidence.	Confidence, certainty, and perceived quality of research or argument; consensus and conflict; trust in scientists; acceptance of scientific evidence; interest; engagement	Consensus improves trust in scientists while conflict reduces trust.		Factual knowledge or belief in misconceptions; attitudes; caution, worry, concern and risk perception; trust in science; intention; support for government and public action
Use lexical hedges (e.g., might, can) to indicate uncertainty. Carefully select expressions to indicate uncertainty.	Perceived (lack of) causality; confidence, certainty and perceived quality of research or argument; caution, worry, concern and risk perception	Hedged language may reduce behavioral intentions.		Factual knowledge or belief in misconceptions; attitudes; trust in science, trust in scientists; intention; donation intentions and behavior
Clearly state caveats and limitations, if applicable. Be careful in emphasizing them, if they have minor impact on the conclusions of the study. Be mindful of readers' sensitivity to framing.	Confidence, certainty, and perceived quality of research or argument; attitudes		Perceived informativeness; perceived understanding; intention; interest	Caution, worry, concern, and risk perception
Use direct expressions of causality or strength of association to indicate a causal link – but only if a causal link indeed exists.	Factual knowledge or belief in misconceptions; trust in scientists			

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Table 1. (Continued)

Recommendation	Evidence for impact on the following aims	Potential caveats	Evidence for no impact regarding aims (see ESM 2 for a synthesis)	Mixed evidence (see ESM 2 for a synthesis)
Be mindful of the tone. Aggressive language is generally perceived negatively. Also using an overly positive or enthusiastic language may backfire. A neutral tone is advisable.	Confidence, certainty, and perceived quality of research or argument; attitudes; trust in scientists		Caution, worry, concern, and risk perception; intention; support for policy and government action	Trust in science; engagement with science
Highlight Open Science (e.g., replications) principles, if applicable. Framing a lack of replicability as a crisis, however, may have negative impact, so be mindful of framing the need for and impact of engaging in Open Science.	Trust in science; trust in scientists	Learning about unsuccessful replications decreases trust in scientists, while learning about successful replications increases trust in scientists.		Engagement with science

2018; Kerr et al., 2022; Kobayashi, 2018; Kohl et al., 2016; Landrum et al., 2021; Løhre et al., 2019; Myers et al., 2015; Rode et al., 2021; Shi et al., 2023; Steijaert et al., 2021; Van der Linden et al., 2019; Van der Linden, Clarke, et al., 2015; Van der Linden, Leiserowitz, et al., 2015). One of the most frequently tested consensus messages was that "97% of climate scientists agree that humans are causing climate change." Indeed, consensus messages might only be effective if expert agreement is very high, that is, at about 90% or higher. Across many studies, consensus and conflict affected the confidence that readers place in findings and the perceived certainty and quality of research or argument (Chinn et al., 2018; Dunwoody & Kohl, 2017) as well as trust in scientists (Chinn & Sol Hart, 2022; Cook et al., 2017; Corner & Hahn, 2009; Gretton et al., 2021; Hendriks et al., 2023; Kortenkamp & Basten, 2015; Martins et al., 2018; Mayweg-Paus & Jucks, 2018), acceptance of scientific evidence (Chinn & Sol Hart, 2022; Howe et al., 2019), interest (Brown Jarreau, 2014; Chinn & Sol Hart, 2022), and engagement with science (Chinn & Sol Hart, 2022). Generally, consensus portrays science more favorably, increasing trust in scientists, while conflict portrays science more negatively, reducing trust in scientists. Accordingly, we recommend that conflicting evidence is only presented if it indeed reflects ongoing discussions in the scientific community. Furthermore, the proportion and contextualization of pro and contra arguments or views should accurately reflect the available evidence (*weight-of-evidence*).

Carefully Select Expressions to Indicate Uncertainty

The most frequently tested way to indicate uncertainty in texts were lexical hedges (e.g., *might*, *can*) and direct statements about uncertainty inherent in science: Readers seem sensitive to both, lowering perceived causality (Adams et al., 2017; Condit & Parrott, 2004), ratings of confidence, certainty and perceived research or argument quality (Budescu et al., 2009; Budescu et al., 2012, 2014; Ratcliff et al., 2024), and increasing caution, worry, concern, and risk perception (Knoblauch et al., 2018; Markon & Lemyre, 2013). Accordingly, we recommend using lexical hedges and other indicators for uncertainty carefully.

Clearly and Mindfully State Caveats and Limitations

Readers' confidence, perceived certainty, and perceived quality of research or argument may be reduced by presenting caveats and limitations (Bott et al., 2019; Hendriks & Jucks, 2020; Kimmerle et al., 2015). Readers were also sensitive to positive versus negative framing or gain versus loss framing. These indirect indicators of uncertainty also fostered more negative attitudes toward science (Achterberg, 2014; Luong et al., 2019).

Indicate Causal Links Explicitly

Readers seem sensitive to expressions indicating causal links (e.g., *X causes*) or statements indicating the strength of an association; accordingly, these should only be used in ways accurately reflecting actual causal links. Expressions of causality or strength of association might increase factual knowledge, reduce belief in misconceptions (Bergquist et al., 2022; Dahlstrom, 2010), and improve trust in scientists (Dahlstrom, 2010).

Communicate in a Neutral Tone

In science communication, readers seem to mostly expect a neutral tone. Aggressive language was generally perceived negatively. Also using overly positive or

enthusiastic language may backfire. Tone may impact confidence, certainty, and perceived quality of research or argument (Chinn & Sol Hart, 2022; Corbett & Durfee, 2004; Kobayashi, 2018), attitudes toward science (Yuan & Lu, 2020), and trust in scientists (L. König & Jucks, 2019, 2020; Yuan et al., 2019).

Highlight Open Science Principles if They Were Applied

Open Science and especially highlighting replications and reformed research practices increased trust in science (Ebersole et al., 2016; Ophir & Jamieson, 2021; Song et al., 2022; Wingen et al., 2020) and scientists (Altenmüller et al., 2021; Ebersole et al., 2016; Hendriks et al., 2020; Song et al., 2022), as well as engagement with science (Altenmüller et al., 2021). On the other hand, learning about failed replications had negative effects. Also, framing a lack of replicability as a crisis in science had a negative impact. Thus, we recommend being mindful of how to frame the need for and impact of engaging in Open Science practices to avoid undesired outcomes.

Discussion

Science is frequently communicated to lay audiences. Yet, communicators may feel that they fail because many people do not trust in science or act in line with scientific evidence (Bromme et al., 2022). Rather than assuming that the audience is incapable of understanding science, communicators may need to realize that their communication was suboptimal and adjust the way in which they communicate to laypeople (Seethaler et al., 2019). This systematic review provides a list of 11 evidence-based science communication strategies to influence understanding and knowledge, attitudes and trust, intention and behavior, and engagement.

Our review extends available reviews on science communication. First, it includes studies that were conducted during the COVID-19 pandemic on pandemic-related topics (e.g., vaccination, mask wearing). Second, it provides a more nuanced understanding of several strategies in the context of written science communication. For instance, a meta-analysis previously suggested that narratives were effective in increasing related beliefs, attitudes, intentions, and behaviors (Braddock & Dillard, 2016). This may have contributed to the notion that science communication should employ narratives. However, when comparing narratives to fact lists or statistical evidence, narratives might in fact not be the preferred communication strategy, at least when the aim is to convey knowledge or to promote trust (Lazić & Žeželj, 2021). Narratives consist of various components, which may contribute to their effectiveness (e.g., content, form, context; de Graaf et al., 2016) and exert differential impact on the various aims of science communication (Zebregs et al., 2015). These need to be studied systematically in future research. Finally, the present systematic review corroborates prior research on the Gateway Belief Model, which postulates that perceived scientific agreement is key for promoting pro-science attitudes and supporting public action (Van der Linden, 2021; see also van Stekelenburg et al., 2022, for a meta-analysis).

Many studies included in this review focused on emotionally and politically charged topics such as climate change and COVID-19. Studies on these issues are important due to the consequences of not acting in line with scientific evidence for individual, population, and planetary health. However, people may react differently to topics that are not as politically or morally charged; strategies for communicating about less controversial topics (e.g., diet myths, see L. M. König, 2023) might thus be somewhat different from strategies for communicating about controversial topics (cf. Chan & Albarracín, 2023). Furthermore, there are important gaps in the literature regarding the effects of the suggested strategies on many science communication aims. For instance, the impact of including references or expert sources and explaining a study's methods have rarely been studied, especially regarding engagement. Recommendations may thus change when more research becomes available.

With 171 publications included, this systematic review provides a comprehensive summary of the evidence base for effective science communication. However, several limitations need to be acknowledged. Most importantly, the evidence was often mixed, with many effects not replicating well across studies. Mostly, this meant that some studies reported a significant effect in a consistent direction, while others reported nonsignificant findings (e.g., regarding potential effects of communicating consensus on knowledge). In some cases, however, the direction of effects flipped (e.g., regarding whether positive language increased or decreased trust in science; these effects are discussed in detail in the narrative synthesis in ESM 2). More research is needed to explain these mixed effects. To account for this heterogeneity, we only derived recommendations where evidence was sufficiently homogeneous for at least one of the outcomes. Importantly, we derived recommendations from a narrative synthesis of the literature (see ESM 2), not individual studies, because their aim was not always to directly inform science communication practice. Also, study quality was variable, and many studies had small samples and were likely underpowered to detect the typically small effects in social science. Finally, most studies did not adhere to Open

Science principles, which are linked to increased scientific rigor and transparency (Dienlin et al., 2021).

Furthermore, the field of science communication is interdisciplinary, and boundaries to other disciplines such as environmental or health communication are ill defined. This leads to a variety in terms used to describe interventions. It is thus possible that we missed some relevant articles, despite trying to counteract this through extensive forward and backward citation searches. For instance, we only identified a small number of papers studying interventions to debunk misinformation, despite the topic being heavily debated in research (Chan & Albarracín, 2023). The debunking literature often does not directly refer to science communication, potentially because of its narrow focus on refutation. Moreover, interventions are often domain-specific (e.g., consensus messaging related to climate change), and many interventions (e.g., framing effects) were tested only in a small number of studies.

This systematic review focused on text-based communication. However, a wide range of media is used for science communication (Fontaine et al., 2019), many of which also use visual formats such as videos or infographics. These channels can be as effective as texts (Weiß & König, 2023) but may reach different audiences, for example, regarding demographics (Auxier & Anderson, 2021). We assume that the derived recommendations extend to any form of speech- or text-based medium, yet more research is needed on how to visually communicate science to complement our recommendations.

Potential harms and benefits of the strategies need to be carefully weighted. For example, including sources promotes trust in science but also reduces perceived understanding. Furthermore, what is considered a *desirable* outcome of science communication crucially depends on context and aim. For example, while the default aim is often to increase trust in science (e.g., to empower laypeople to make sensible decisions), increasing skepticism can also be considered a favorable outcome (e.g., regarding failed replications or understanding the uncertainties inherent to the scientific method; see Gustafson & Rice, 2020). Thus, science communicators need to be mindful of the diverse effects that certain terms or statements may have on laypeople's perceptions and judgments and align their strategy with the desired outcomes.

Furthermore, effects of the identified strategies likely interact with personal characteristics such as political ideology (e.g., Chinn & Sol Hart, 2021), beliefs about and trust in science (e.g., Achterberg, 2014), prior attitudes (e.g., Budescu et al., 2014), knowledge (e.g., Hendriks et al., 2020), and numeracy (e.g., Sol Hart, 2013). To maximize impact, authors should consider the specific audience for tailoring the communication to their needs and expectations (Luong et al., 2019). Demographic characteristics beyond age and gender (e.g., education, income, ethnicity), however, were seldom tested as potential moderators. Different strategies might be needed to reach underserved populations and promote their interest in and engagement with science (see, e.g., Humm & Schrögel, 2020).

Science communication can promote accurate scientific knowledge, pro-science attitudes, trust in science and scientists, and mobilizing evidence-based behavior – an important basis for individuals' and societies' ability to appropriately and effectively navigate a complex and challenging world. To achieve these aims, the communication needs to be carefully and intentionally crafted. By adhering to the recommendations derived from the empirical literature, the effectiveness of science communication can likely be improved to benefit the society.

Electronic Supplementary Materials

The electronic supplementary material is available with the online version of the article at https://doi.org/10.1027/2151-2604/a000572

ESM 1. Supplementary tables.

ESM 2. Narrative synthesis of the findings.

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History
Received August 15, 2023
Revision received December 8, 2023
Accepted December 8, 2023
Published online September 6, 2024

Acknowledgments
We thank Tobias Wingen for his comments on the review protocol and on earlier versions of the manuscript and Eefje Agteren, Marlene Engelbrecht, Caro Faggio Del Giglio, Armin Goffin, Hannes Jahnel, Victoria Martens, Liza Mungard, and Anna Veninga for their valuable support in preparing the manuscript.

Authorship
Laura M. König, conceptualization, data curation, formal analysis, investigation, methodology, project administration, writing – original draft. Marlene S. Altenmüller, investigation, methodology, resources, writing – review & editing. Julian Fick, investigation, methodology, writing – review & editing. Jan Crusius, conceptualization, methodology, resources, writing – review & editing. Oliver Genschow, conceptualization, methodology, writing – review & editing. Melanie Sauerland, conceptualization, methodology, resources, writing – review & editing. All authors approved the final version of the article.

Open Data
The systematic was preregistered on the Open Science Framework: https://osf.io/6qpcf.

Raw data are available from the Open Science Framework: https://osf.io/v3fjw/ (König et al., 2023).

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