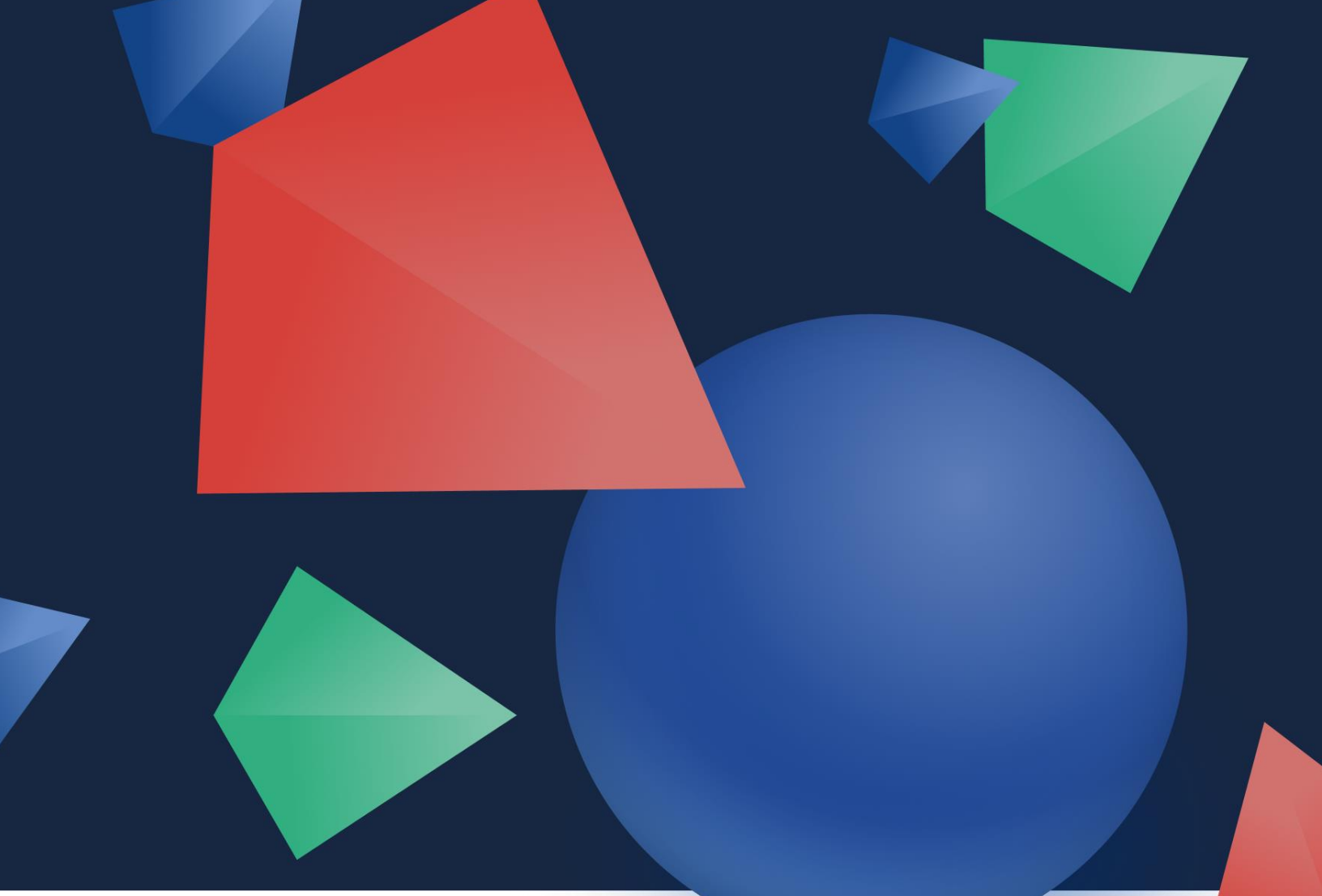

IPIE
International Panel on the Information Environment

Strategies for Improving the Global Information Environment

Results from a Systematic Review and Meta-Analysis

Summary for Policymakers 2023.1

SYNOPSIS

This *IPIE Summary for Policymakers* presents the main findings of two *IPIE Synthesis Reports* that examine countermeasures to misinformation on social media platforms. These analyses proceed with a collection of scholarly articles about misinformation on social media platforms—one of the largest such collections to date—with 4,798 peer-reviewed publications.

The first report is a formal systematic review (SR2023.1) that examines the subset of peer-reviewed articles, 588 in total, that use evidence in the analysis of countermeasures for mitigating the effects of misleading information, disinformation, and a range of related phenomena broadly described as misinformation.

The second report is a meta-analysis (SR2023.2) that aggregates the findings of the empirical studies about raising the accuracy, believability, credibility, and trustworthiness of social media. It focusses on 43 experiments from 18 publications that meet high standards for generalizable knowledge.

Which design solutions mitigate the impact of misinformation on social media platforms, according to the latest scientific research?

1. There is an emerging scientific consensus that content labels and corrective information can mitigate misinformation on social media.

   Other mitigation strategies may be viable, but there is less consensus about their effectiveness.

2. Improving knowledge about the global information environment requires:

   a) more research from countries around the world,
   b) about user experiences in languages other than English,
   c) with genuine access to social media data from firms,
   d) that allows scientists to standardize measures and definitions for robustly reporting the results of independent research.

Advancing research will help to ensure confidence when evaluating policy and design interventions that have the potential to improve the global information environment.

INTRODUCTION

Misinformation on digital platforms is a problem impacting the global information environment. Researchers from around the world agree about the need for more focus and methodological rigor in the study of the global information environment [1]–[3]. Because the connection between exposure to an information operation and changes in behavior is not always clear, research on the effects of exposure to misinformation requires higher-quality data than technology firms currently provide [4], [5]. Moreover, more research on the efficacy of proposed countermeasures, especially on combinations of interventions by creators and consumers of online misinformation is needed [6], [7].

Two IPIE reports, *Countermeasures for Mitigating Digital Misinformation: A Systematic Review* (SR2023.1) and *Platform Responses to Misinformation: A Meta-Analysis of Data* (SR2023.2), address this knowledge gap by identifying and analyzing interventions that may be effective in mitigating the impact of misinformation. The systematic review reveals what kinds of countermeasures are endorsed by the research. The meta-analysis provides empirical tests of confidence in the effects of those countermeasures. Together, these reports reveal which countermeasures are endorsed by the research literature, and which of those endorsed countermeasures have been tested and validated.

There is no universally shared definition of misinformation, nor a standardized operationalization of it as a concept. To be inclusive, over a decade of research on a set of related problems of misinformation, propaganda, disinformation, and fake news was interrogated with two research questions.

1. Which countermeasures are most effective in mitigating the impact of misinformation on digital platforms, according to the latest scientific research?
2. How has research published in peer-reviewed journals covering countermeasures for mitigating misinformation on social media platforms developed over time and across disciplines?

In total, 588 peer-review publications from a collection of 4,798 peer reviewed papers on misinformation meet the criteria for a systematic review according to best practices in scientific inquiry. This allows for an aggregation of current knowledge and identification of limitations, blind spots, and domains that require new research.

Most studies propose some countermeasures to mitigate against misinformation, but less than one-fifth of them report a measurable impact for what is proposed.

RESULTS

FINDING 1.

Content labels and corrective information reduce the effects of misinformation on users' perceptions.

A meta-analysis is a research process for synthesizing and aggregating the findings of many, independent studies, using statistical methods to calculate overall effects from multiple data sources. The meta-analysis examines 43 experiments from 18 peer-reviewed articles selected because of their rigorous evidence reporting. This method demonstrates growing scientific consensus about two solutions: (1) content labeling and (2) publishing corrective information materials.

Table 1 provides details and examples of the most prominent countermeasures tested across scientific literature. Most are plausible interventions, but with uncertain effects. Light orange cells indicate the of interventions that were endorsed through a systematic review of the literature. Dark orange cells indicate the interventions that have been kinds additionally validated through meta-analysis.

Table 1. Strategies for Improving the Global Information Environment.

Consensus		Countermeasures	Examples
Endorsed	Validated	Content labeling–Labeling posts, accounts, and stories with tags about fact-checking, funding, or advertising, or any other forms of tagging or flagging, including providing further context without the user having to click through to receive the additional information.	A platform adds a "disputed" label to a user post, or a platform labels posts by state media with a "warning" sign.
		Corrective information–An organization, platform, or individual provides accurate information without regard to whether users have preconceptions about it.	Governments, private enterprises, or users publicly debunk a rumor or conspiracy on social media in a separate, unlinked piece of content.
		Content or account moderation–Taking down or marking content; using human or algorithmic moderation to suspend and block accounts.	YouTube downranks content, or Twitter reduces interactions with accounts that users don't follow.
		Information & media literacy–Educating users to identify misinformation by giving them tips or suggestions or by training them.	Facebook offers Tips to Spot False News, including "be skeptical of headlines," "look closely at the URL," and "investigate the source."
Uncertain		Advertisement policy–Modifying the advertisement policy of the platform, which often adds a user-facing component to the advertising mechanisms.	Facebook requires the "Paid for by" label or introduces an information button for advertisements.
		Content reporting–Changing how users report potential misinformation on a platform.	TikTok introduces a "misinformation" option in the content reporting options.
		Content user sharing–Targeting the distribution of misleading content by users.	WhatsApp limits opportunities to forward a message, or Pinterest prevents pinning or saving posts.
		Disclosure–Informing a user that they have come in contact, shared, or interacted with misinformation.	Reddit tells users they have interacted with misinformation.
		Redirection–Redirecting users to additional information, accounts, or posts, usually by taking users to different content or by overlaying accurate information and alerts.	Instagram shows content from local health authorities when users search for COVID-19 information, or Facebook and Twitter introduce election hubs before the election period.
		Security or verification–Increasing or decreasing the security or verification requirements on a platform.	Twitter's protection program for political officials.
		Self-fact-checking–Providing users with an opportunity to fact-check information for themselves.	A platform offers users an opportunity to interact with fact-checkers to verify the information they consume using private messages.

***Note**: Light orange cells indicate the kinds of interventions that were endorsed through the systematic review (SR2023.1) of the literature. Dark orange cells indicate the interventions that have been additionally validated through meta-analysis (SR2023.2). Cells with no color indicate plausible interventions with uncertain effects.*

***Source**: [2], [3], [6].*

To improve the global information environment, a great deal of work must be done to understand misinformation and design effective countermeasures. In the meantime, the evidence is incomplete, and results should be read with caution. Different studies interpret countermeasures differently. This fact, along with differences in study design, makes it difficult to compare the exact effects of all the proposed countermeasures.

FINDING 2.

More cross-national, multilingual, and systematic research is needed.

The scholarship needs to develop more standardized measures and definitions and focus on misinformation. Of the 4,798 peer review publications in peer review journals, only 588 were empirical, and worked with evidence about countermeasures to misinformation. Of those, only 18 tested countermeasures in ways that allow for the aggregation of knowledge. Researchers should report more robust statistical tests, especially when validating countermeasures, so that generalizations can be made across studies.

Some plausible countermeasures are understudied. Information & media literacy campaigns, or redirecting users to accurate information, are strategies that receive much less attention, especially in the health and physical sciences. The bulk of the research on countermeasures to misinformation is conducted in the social and behavioral sciences, though content moderation is actively tested by researchers in the physical sciences, including computer science and engineering.

These findings do not vary by geography: there appears to be no difference in reported results by the country or region in which studies were run or in which researchers work. However, research published in English pays insufficient attention to the problem beyond a few Western countries. One of the critical next steps for both systematic reviews and meta-analysis is to incorporate research findings published in languages other than English, by researchers around the world, with data about users who consume content in other languages.

Unfortunately, relatively few research publications test specific countermeasures they propose using real-world data. Some of the solutions offered in the literature are too broad to guide policy.

CONCLUSION

A systematic review of the research reveals broad endorsement for four strategies for improving the global information environment. A meta-analysis of research validates two of them: there is an emerging scientific consensus that content

labels and corrective information reduce the effects of misinformation on users' perceptions. Other mitigation strategies may be plausible, but there is less consensus about their effectiveness. An expansive evaluation of additional interventions would allow for an even more confident selection of the best ways to improve the global information environment.

Although the definitions of misinformation differ slightly between studies, they were consistent in operationalizing the perception of information before and after an experimental treatment. They all focused on aspects of information perception, such as accuracy, believability, credibility, and trustworthiness.

To combat the spread of misinformation, a great deal of work must be done to understand how to address its implications and design to improve the global information environment. In the meantime, evidence about many proposed design and policy solutions is incomplete, and results should be read with caution. Studies are designed differently, making it difficult to estimate the exact effects of many plausible countermeasures.

Researchers need to develop more standardized measures and definitions, focus on misinformation outside Western contexts, and provide more robust reporting when testing countermeasures. Doing so will ensure the dissemination of reliable evidence about how to improve the global information environment.

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Declaration of Interests

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The International Panel on the Information Environment (IPIE) is an independent and global science organization committed to providing the most actionable scientific knowledge about threats to the world's information environment. Based in Switzerland, the mission of the IPIE is to provide policymakers, industry, and civil society with independent scientific assessments on the global information environment by organizing, evaluating, and elevating research, with the broad aim of improving the global information environment. Hundreds of researchers from around the world contribute to the IPIE's reports.

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