

Between Public Engagement and Discursive Repression

Media-Related Communication Risks for Scientists in the Context of Socio-Ecological Crises

Zwischen öffentlichem Engagement und diskursiver Repression

Risiken wissenschaftlicher Kommunikation in den Medien im Kontext sozial-ökologischer Krisen

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Abstract

This study examines how scientists in German-speaking countries experience public engagement in traditional and social media when communicating about socio-ecological crises and whether negative reactions in public discourse relate to their willingness to continue such engagement. We conducted an online survey of 138 scientists with varying levels of public engagement, recruited through professional networks such as Scientists4Future. Participants reported media engagement frequency, positive and negative experiences, perceived reputational harm, perceived organisational support, and willingness to continue engaging publicly. Among participants with relevant media experience, positive experiences predominated; however, 78.4% reported insults, whereas 29.9% reported physical threats or legal risks. Negative experiences were associated with greater perceived reputational harm, which in turn was negatively associated with willingness to continue public engagement. Perceived organisational support showed no significant main effect on willingness to engage; however, when scientists perceived stronger organisational support, reputational harm was less strongly associated with lower willingness to engage. These findings provide empirical insight into dynamics that may contribute to discursive repression, understood here as decentralised processes that increase the perceived professional costs of participation in contested public debates. Rather than hostility per se being directly associated with reduced engagement, reputational concerns appear central to scientists' engagement decisions.

Keywords

Science communication, public engagement, reputational risk, organisational support, socio-ecological crises

Impact statement

In this survey of 138 scientists, we found that negative reactions to their public engagement concerning socio-ecological crises are indirectly related to lower willingness to engage through perceived professional reputational risks. Such dynamics may contribute to processes we conceptualise as discursive repression, in which participation in contested public debate becomes professionally costly. In practical terms, this suggests that sustaining public engagement on socio-ecological crises cannot rely solely on individual resilience. Universities and research organisations can play an important role by providing visible institutional backing and support structures, such as legal advice or assistance in dealing with public attacks. Practitioners in science communication may therefore benefit from focusing not only on individual communication training but also on strengthening organisational support systems. The study is based on a non-representative sample from German-speaking countries, so the findings should not be assumed to generalise to all scientific fields or cultural contexts.

1 Introduction

In a world facing growing societal divisions, economic challenges, and the ongoing risks associated with socio-ecological crises such as climate change (OECD, 2021; Ripple et al., 2024), scientific expertise is increasingly called into question in public debates (e.g., OECD, 2021; Peters, 2024; Resende & Reinke de Buitrago, 2023). While overall levels of trust in scientists remain comparatively high in many countries (Bromme et al., 2022; Cologna et al., 2025; Mede et al., 2025), their independence and objectivity are more frequently scrutinised in politicised contexts. This pattern is particularly evident in some politically conservative milieus within Western societies, especially in politicised domains such as climate change, where scientific expertise is more often met with scepticism (Chinn et al., 2020; Cologna et al., 2025; Falkenberg et al., 2022). When addressing socio-environmental issues, scientists may therefore face accusations of bias or non-scientific activism; conversely, scientific authority may be strategically contested in public discourse, as illustrated by climate change denial, in which well-established scientific evidence is framed as controversial (Oreskes & Conway, 2010; van der Linden et al., 2017). Together, these dynamics point to persistent tensions between scientific expertise, political positioning, and public legitimacy.

While research has increasingly examined public perceptions of science and scientists' societal roles, empirical work has primarily focused on patterns of public trust and science communication (e.g., Cologna et al., 2025; Mede et al., 2025; Post et al., 2021), whereas comparatively less attention has been paid to the psychological consequences of public engagement for scientists themselves (Finnerty et al., 2026; Mede & Volk, 2026; Nogrady, 2021; Nölleke et al., 2023; van Eck, 2023).

This paper investigates the experiences of scientists in German-speaking countries who engage publicly with socio-ecological issues, providing empirical evidence on perceived challenges, reputational concerns, and their implications for continued engagement. German-speaking countries constitute a particularly informative context, as they combine strong cultural expectations regarding scientific neutrality (Ivanova et al., 2013; Kessler et al., 2022; Post et al., 2021) with relatively high levels of public trust in science (Bromme et al., 2022; Cologna et al., 2025). If scientists experience stress and reputational harm from public engagement even in this comparatively less contentious context, it would suggest that this phenomenon is not confined to highly polarised settings.

This paper makes three contributions: First, it advances the concept of discursive repression to describe the discourse environments in which scientists engage publicly on socio-ecological crises, characterised by delegitimising and hostile dynamics. Second, it provides an empirical account of how scientists experience public engagement in such contexts and how these experiences are associated with negative reactions and willingness to continue engaging publicly. Third, it examines the role of perceived organisational support as a contextual factor relevant to scientists' engagement decisions under conditions of contested public discourse.

1.1 Polarised discursive environments

Given escalating socio-ecological crises such as climate change and biodiversity loss, the demand for timely scientific input into public and political decision-making has increased (Gardner et al., 2021; Oreskes, 2020; Post et al., 2021). This demand places science in a structural tension between the norms of scientific caution and methodological rigor on the one hand, and external expectations for rapid, actionable, and publicly communicable insights on the other. Under such conditions, scientific knowledge is increasingly produced and communicated in contexts marked by heightened visibility, time pressure, and political salience (Gardner et al., 2021; Oreskes, 2020; Post et al., 2021). As a result, scientific statements are less likely to be received as neutral contributions to knowledge and are more often interpreted through political or ideological lenses (Falkenberg et al., 2022; Iyengar & Massey, 2018; Mede & Schäfer, 2020). These dynamics contribute to the politicisation of public discourse around science (e.g., van der Linden et al., 2017). In doing so, they shape the communication environment in which scientists engage publicly and increase their exposure to delegitimising interpretations (e.g., Mede & Schäfer, 2020) or external discursive pressure (e.g., Oreskes, 2020). This is particularly true in communication contexts characterised by populist styles and anti-elitist framing (Fairbrother, 2017; Falkenberg et al., 2022; Mede & Schäfer, 2020).

Populist forms of public communication tend to flourish in polarised discursive environments (Lamb et al., 2020; Moffitt, 2016; Resende & Reinke de Buitrago, 2023). Mede and Schäfer (2020) conceptualised such dynamics in the context of science communication as *science-related populism*, which frames science as part of an “unvirtuous academic elite” (p. 484) and contests its legitimacy in public decision-making. These dynamics became particularly salient during recent global crises, including the COVID-19 pandemic and the ongoing climate crisis, in which political polarisation, crisis-related uncertainty, and heightened demands for expert guidance intensified conflicts over authority, responsibility, and legitimacy (Cole et al., 2025; Falkenberg et al., 2022; Hoyer et al., 2023; Lawrence et al., 2024; Naushirvanov et al., 2022; Post et al., 2021). As a result, scientific expertise may be framed as partisan or interest-driven, with complex issues simplified and responsibility redirected towards expert actors (Lamb et al., 2020; Mede & Volk, 2026; Post et al., 2021). Scientific statements are thereby increasingly reinterpreted through antagonistic frames that draw attention away from scientific content towards perceived political positioning (Chinn et al., 2020; Iyengar & Massey, 2018; Mede & Schäfer, 2020; OECD, 2021).

1.2 Discursive repression

Within these polarised communication contexts, digital media exacerbate conditions described as “infodemic” environments (Lim, 2023; see also Iyengar & Massey, 2018), fostering dynamics that can be conceptualised as *discursive repression* (Pascale, 2019; Shriver et al., 2018, 2019; cf. Mede & Volk, 2026). Building on prior analyses of delegitimation and suppression in public discourse (Pascale, 2019; Shriver et al., 2018, 2019), discursive repression refers to systemic processes within public discourse that repeatedly question and undermine the legitimacy,

motives, or credibility of particular actors or positions, notably scientists and experts in contested debates (Pascale, 2019; Peters, 2024; Shriver et al., 2018, 2019). Unlike open (e.g., Aktas et al., 2019) or covert forms of political repression (e.g., Marheinecke et al., 2024) and isolated instances of hate speech (e.g., Pascale, 2019), discursive repression operates through persistent, diffuse, and indirect mechanisms of delegitimisation.

Crucially, discursive repression, as conceptualised here, does not depend on institutionalised sanctions based on state authority or legal enforcement. It may instead be driven by media dynamics (Iyengar & Massey, 2018; Moffitt, 2016), political stakeholders (Pascale, 2019; Shriver et al., 2019), or transnational networks (Yilmaz et al., 2023) and operate as a structural feature of public discourse, rather than as a centrally coordinated practice (Mede & Volk, 2026; Pascale, 2019; Väli-verronen & Saikkonen, 2021; Yilmaz et al., 2023). While early research on repression in public communication and dissent focused primarily on authoritarian contexts (Shriver et al., 2018; Väli-verronen & Saikkonen, 2021), subsequent work demonstrates that such processes are not confined to undemocratic regimes but can also take hold in democratic societies through informal and decentralised mechanisms (Shriver et al., 2019; Yilmaz et al., 2023).

Under such conditions, discursive repression raises the reputational and psychological costs of public engagement, which may manifest in scientists' negative experiences in public discourse. Scientists who engage publicly may encounter recurring forms of delegitimisation, such as public shaming, intimidation, or persistent questioning of their motives and credibility, even in the absence of formal sanctions or coordinated exclusion (Mede et al., 2025; Nogrady, 2021; Nölleke et al., 2023; Peters, 2024; Väli-verronen & Saikkonen, 2021). These dynamics do not necessarily silence scientific voices outright (e.g., Cologna et al., 2025; van Eck, 2023). However, they can systematically constrain the conditions under which scientists perceive public engagement as viable or worthwhile (e.g., Mede & Volk, 2026; Peters, 2024). This constraining effect is particularly pronounced in polarised discourse environments (e.g., Chinn et al., 2020; Falkenberg et al., 2022) and digitally mediated communication contexts (e.g., Earl et al., 2022; Pascale, 2019). In this sense, discursive repression operates not as a mechanism of prohibition, but as a contextual pressure shaping engagement decisions by altering perceived risks and costs (Earl et al., 2022; Mede & Volk, 2026; Peters, 2024).

During the COVID-19 pandemic, scientists faced an unprecedented wave of threats and harassment, heightening reputational and safety concerns surrounding public engagement (Nogrady, 2021; Nölleke et al., 2023; Peters, 2024; Resende & Reinke de Buitrago, 2023). Such conditions can foster a “chilling effect” (e.g., Nölleke et al., 2023), prompting some scientists to practice forms of self-censorship (Norris, 2025; Väli-verronen & Saikkonen, 2021) as they weigh perceived risks against the potential benefits of contributing to public discourse (Mede & Volk, 2026; Norris, 2025; Peters, 2024). At the same time, empirical research suggests that experiences of public backlash and delegitimisation are widespread even below the threshold of overt threats (e.g., Nogrady, 2021; Peters, 2024), and that their consequences vary—ranging from strategic adaptation to selective withdrawal—depending on context and available support (Mede & Volk, 2026; Nölleke et al., 2023; Peters, 2024; Väli-verronen & Saikkonen, 2021).

Importantly, self-censorship and reputational risk should therefore not be understood as isolated or purely individual phenomena, but as outcomes of broader structural conditions, including institutional incentive structures and discursive dynamics (e.g., Gardner et al., 2021; Väliverronen & Saikkonen, 2021). From this perspective, discursive repression provides an analytical framework for interpreting experiences such as harassment, defamation, or marginalisation not as personal failures, but as manifestations of shifting power relations in the public sphere (Shriver et al., 2018, 2019; Väliverronen & Saikkonen, 2021).

1.3 Ivory Tower versus Activism Dilemma

Discursive repression in polarised discourse environments is associated with psychosocial strain among scientists (Das NETTZ et al., 2024; Nogrady, 2021; Nölleke et al., 2023). This strain may prompt scientists to adapt their engagement in anticipation of backlash or to withdraw from public discourse (Das NETTZ et al., 2024; Murunga et al., 2024; Väliverronen & Saikkonen, 2021). These responses are shaped not only by individual dispositions, but also by perceived contextual conditions, including the presence or absence of organisational support (Rose et al., 2020; Väliverronen & Saikkonen, 2021; van Eck, 2023). At a societal level, systematic science denial and misinformation can further distort public understanding and policy deliberation, sometimes with severe consequences for crisis response (Kessler et al., 2022; Logemann et al., 2025; Mendy et al., 2024; Naushirvanov et al., 2022; OECD, 2021).

Under such conditions, scientists increasingly face a dilemma between self-protection and public engagement (Mede & Volk, 2026; Murunga et al., 2024). Conceptual and empirical research suggests that public communication can be experienced as a tension between remaining within the perceived safety of the “ivory tower” (Fossen, 2025)—associated with traditional norms of neutrality and objectivity (van Eck et al., 2024)—and risking accusations of bias or loss of credibility when engaging publicly or politically (Dablander et al., 2024; Finnerty et al., 2026; van Eck, 2023). We refer to this constellation as the *Ivory Tower versus Activism Dilemma* (Finnerty et al., 2024; Finnerty, 2026; Fossen, 2025): remaining silent may risk rendering scientific expertise socially irrelevant (Gardner et al., 2021; Murunga et al., 2024), while public engagement may expose scientists to politicisation and reputational attack (Dablander et al., 2024; Mede & Volk, 2026; Väliverronen & Saikkonen, 2021).

1.4 The role of media

Traditional and social media play a central role in shaping the discursive conditions under which scientific expertise becomes publicly visible and contested (Allgaier, 2023; Väliverronen & Saikkonen, 2021). Traditional news outlets (e.g., newspapers, television) continue to have a comparatively high level of credibility (Fotopoulos, 2023; Chinn et al., 2020), but often frame scientific issues in ways that create false balance. This lends disproportionate visibility and legitimacy to marginal or dissenting viewpoints (Brüggemann & Engesser, 2017; Chinn et al., 2020; Logemann et al., 2025). Such framing may potentially diffuse into broader political discourse and contribute to shifts in policy trajectories (Loschke et al.,

2026). Social media platforms, while enabling direct communication between scientists and broader audiences (Allgaier, 2023; Peters, 2024), are characterised by high-speed diffusion (Iyengar & Massey, 2018; Treen et al., 2020), algorithmic amplification (Klinger et al., 2023; Treen et al., 2020), and heightened emotionalization (Cole et al., 2025; Klinger et al., 2023), which facilitate the spread of misinformation and polarising frames (Falkenberg et al., 2022; Logemann et al., 2025; Treen et al., 2020).

Within such media environments, public engagement exposes scientists to increased visibility, scrutiny, and discursive contestation (Peters, 2024; Väliverronen & Saikkonen, 2021), thereby raising the reputational and psychological costs associated with participation in contentious debates (Mede & Volk, 2026; Murunga et al., 2024; Nogrady, 2021). In combination with frequently negative or conflict-oriented media coverage of science (Schäfer et al., 2024), these conditions can contribute to anticipatory restraint and selective disengagement, reinforcing broader dynamics of discursive repression, including science-related populism and systematic science denial (Mede & Schäfer, 2020; Mendy et al., 2024; Väliverronen & Saikkonen, 2021). As a result, media structures do not merely transmit public debates but actively shape the perceived risks and viability of scientific public engagement (Murunga et al., 2024; Peters, 2024), complicating scientists' decisions to participate in contested discursive environments (Finnerty, 2026).

1.5 Hypotheses

Against this backdrop, we derived the following directional hypotheses from theory. Because the study was not preregistered, the analyses cannot be considered strictly confirmatory; accordingly, the findings are interpreted cautiously (Wagenmakers et al., 2012).

Hypothesis 1: More frequent public engagement on socio-ecological crises through traditional and social media is positively associated with negative experiences in public discourse.

Hypothesis 2: Negative experiences in public discourse are associated with reduced willingness to continue public engagement in traditional and social media.

Hypothesis 3: Perceived organisational support after negative experiences in public discourse is positively associated with willingness to continue public engagement through traditional and social media.

2 Methods

2.1 Participants

Participants were recruited through the German, Austrian, and Swiss channels of Scientists4Future (S4F), via an invitation posted in Germany's Psychologists for Future (Psy4F) Signal channel, and through members of related research institutions and professional networks engaged in socio-ecological research and public engagement. Data were collected from April to June 2024. The study involved an anonymous online survey of adult participants. No intervention, deception, or collection of identifiable personal data was involved. Participation was voluntary, and informed consent was obtained at the beginning of the questionnaire.

Of the 182 individuals who accessed the survey link, seven declined participation. Eligibility required self-reported employment in scientific research and earning at least part of one's income from scientific work. After excluding cases not meeting the eligibility criteria, the final sample comprised 138 participants (51.4% men, 44.2% women, 4.3% non-binary). We stopped recruiting when the planned recruitment period (mid-April to mid-June 2024) ended and additional outreach through the targeted networks yielded no further participants. Although the study was guided by theory-derived directional hypotheses, it was not preregistered. We therefore interpret the analyses as primarily aimed at estimating associations and assessing consistency with these expectations, rather than as strict confirmatory tests. With the final sample ($N = 138$), correlations of approximately $|r| \geq .17$ would reach statistical significance at $\alpha = .05$ (two-tailed). A sensitivity analysis conducted in G*Power (Faul et al., 2007) indicates about 81% power to detect a population correlation of $\rho = .24$ under these settings.

Participants primarily worked in Germany (71.2%) or Austria (24.6%), with one respondent each working in Belgium, France, Sweden, and Switzerland. Among respondents, 84% earned their full income from scientific employment; the majority were natural scientists (54.3%), followed by social scientists (33.3%) and humanists (11.6%). The majority (55.4%) were employed at universities and 27.5% at research institutes; others worked for NGOs (5.8%), government advisory bodies, industry, and think tanks (2.2% each) or research funding bodies (0.7%). Regarding roles, 30.4% were professors, 27.5% research associates on temporary contracts, 13.8% research associates on permanent contracts, 11.6% project leaders, 3.6% project team members, 2.9% scholarship holders, and 1.4% lecturers. Additionally, 90.6% indicated that research was part of their role, 57.2% were involved in teaching, 49.3% in counselling, and 55.1% in public relations. More than half (55.8%) reported being active with S4F or NGOs such as WWF, Amnesty International, or Greenpeace, while 50.7% were involved in the climate movement, 10.1% were political party members, and 2.9% held political office.

2.2 Measures

2.2.1 Topics

Participants indicated the topics on which they had given interviews or expressed their views publicly in traditional media or on social platforms, choosing one or

more of the following topics: Climate Crisis, Biodiversity Crisis, Planetary Limits, Migration, Social Climate, Social Justice, War and Human Rights, (Trans-)Gender, or Other Topics. The predefined categories were developed through expert judgment within the author team to support content-valid coverage of salient domains of public scientific engagement in socio-ecological and politically contested debates (Haynes et al., 1995). The list included core ecological crisis domains reflected in the planetary-boundaries literature, such as climate change, biodiversity loss, and planetary boundaries (Richardson et al., 2023), as well as societal issues in which scientific expertise often enters politically contested public discourse, such as migration, social justice, war, human rights, and gender (Scheufele, 2014). Because the list was not intended to be exhaustive, participants could select multiple categories and specify additional topics in an open-text field.

2.2.2 Social media platforms

Participants were asked which social platforms they used to post or express their views, selecting one or more of the following social media platforms: Facebook, X, Instagram, TikTok, LinkedIn, Snapchat, YouTube, Bluesky, or Other.

2.2.3 Frequency of media engagement

Participants rated how frequently they gave interviews in traditional media or posted on social media platforms on an eight-point ordinal scale referring to the past 12 months. Response options ranged from never to every day and were recoded on a scale from 0 to 7: 0 = never, 1 = once a year or less, 2 = a few times per year, 3 = once a month, 4 = two to three times per month, 5 = once a week, 6 = several times per week, 7 = every day.

2.2.4 Experiences with interviews and social media posts

Participants rated their experiences separately for traditional media interviews and for social media posts using two single-item ratings on a scale from 1 (completely negative) to 6 (completely positive). In addition, they completed seven items assessing positive experiences (six items were informed by reports summarized in Nogrady, 2021, supplemented with the item “Publicly taking a stance led to positive feedback”; the full list of items is provided in Table S1 in the Supplementary Material [SM]) and ten items assessing negative experiences (e.g., “Attacks on my scientific reputation”; full list of items is provided in Table S2). Four of the negative-experience items were informed by Nogrady (2021) and supplemented with six self-developed items. The additional items were generated based on the first and second authors’ media-related experiences and were informed by established behavioural taxonomies of workplace bullying that differentiate person-related, work-related, and physically intimidating negative acts (Einarsen et al., 2009).

Unlike the two single-item ratings, the items on positive and negative experiences did not explicitly distinguish between traditional media and social media. Respondents were asked to evaluate these experiences over the past twelve months using a slider bar ranging from 0 to 100, indicating the percentage of instances in which each statement applied to them.

Exploratory factor analyses (EFAs) were conducted separately for the positive and negative experience item sets to assess dimensionality. Analyses used principal axis

factor analysis in SPSS 29 with listwise deletion of cases with missing item responses and oblique rotation (direct oblimin) to allow correlated factors (Fabrigar et al., 1999). Factor retention was evaluated using Horn's parallel analysis (implemented in *R*; seed = 1953125; 500 random datasets; 95th-percentile criterion; Horn, 1965; Hayton et al., 2004) and the Kaiser criterion (eigenvalues > 1; Kaiser, 1960). Items were retained if their primary loading was at least .50 and cross-loadings were below .25 (Flora & Flake, 2017). Items not meeting these criteria were excluded from scale construction and are reported in Tables S1–S2 in the SM.

For positive experiences, parallel analysis suggested two factors; however, the second factor did not meet the Kaiser criterion. We therefore retained a parsimonious one-factor solution comprising four items (McDonald's $\omega = .81$). Negative experiences yielded a two-factor solution: one factor reflecting physical threats/legal risks (five items; McDonald's $\omega = .94$) and a second factor representing insults (two items; Spearman–Brown coefficient [SB] = .89).

For subsequent analyses, we conceptualised the retained items as reflective indicators of the underlying experience dimensions (Bollen & Lennox, 1991; Jarvis et al., 2003) and computed unit-weighted mean scores for each scale, treating the percentage ratings as continuous measures, to preserve the original response metric.

2.2.5 Organisational support

A single item assessed perceived support from respondents' organisations after negative experiences related to public engagement (1 = does not apply, 4 = does apply). Respondents could additionally indicate that their organisation had not been informed about the incident.

2.2.6 Reputational harm

Eight items were developed to measure whether respondents felt their political or societal engagement harmed their scientific reputation (e.g., "My involvement has impacted my scientific credibility in the media"; 1 = does not apply at all, 6 = applies completely). The full list of items is provided in Table S3. We again performed exploratory factor analyses with principal axis factor analysis and oblique rotation to assess the dimensionality of items, applying the same extraction and retention criteria as described above. Reputational harm emerged as a unidimensional construct with six items (McDonald's $\omega = .84$).

2.2.7 Stress

Stress among those who reported negative experiences with giving interviews or posting on social platforms was measured via negative affectivity and psychosomatic complaints. Negative affectivity was assessed using seven items from the Positive and Negative Affect Schedule (PANAS; Krohne et al., 1996; McDonald's $\omega = .93$; e.g., "annoyed," "frightened," "irritated"), following the instruction, "How did these negative consequences make you feel?" Respondents answered using a slider bar ranging from 0 to 100.

We additionally examined the dimensionality of the seven PANAS items using a one-factor confirmatory factor analysis in lavaan (Rosseel, 2012), estimated with robust standard errors and a scaled chi-square test ($n = 91$ participants reporting negative experiences). Relative to commonly used fit benchmarks (CFI/TLI $\geq .95$,

SRMR $\leq .08$, and RMSEA $\leq .06$, with RMSEA $\geq .10$ indicating poor fit; Hu & Bentler, 1999), model fit was suboptimal, $\chi^2(14) = 31.70$, $p = .004$, robust CFI = .92, robust TLI = .88, SRMR = .055, and robust RMSEA = .172, 90% CI [.092, .252]. Overall, fit did not meet conventional criteria. We therefore inspected modification indices for the one-factor PANAS model. Modification indices of at least 10 suggested three residual covariances: PANAS4 with PANAS5, PANAS5 with PANAS7, and PANAS4 with PANAS6. Freely estimating these covariances improved model fit, scaled $\chi^2(11) = 17.89$, $p = .084$, robust CFI = .973, robust TLI = .949, SRMR = .049, and robust RMSEA = .114, 90% CI [.000, .206]. The revised model showed significantly better fit than the original model, $\Delta\chi^2(3) = 11.07$, $p = .011$, and no remaining modification indices exceeded 10. Because the residual covariances were added post hoc, the respecified model should be interpreted cautiously.

Psychosomatic complaints were measured with two items adapted from Mohr et al. (2005), each rated on a 0–100 slider scale (SB = .83): “I experienced psychosomatic problems (e.g., tension, sleep disorders)” and “I had to think about it constantly, at work and at home.” The full list of items is provided in Table S4.

2.2.8 Willingness to engage publicly

Two items measured how previous experiences influenced participants’ willingness to give interviews and post on social media (1 = “My willingness has strongly decreased” to 5 = “My willingness has strongly increased”). Both variables were strongly correlated ($r = .66$), indicating substantial shared variance. Given their conceptual overlap as indicators of general public engagement readiness and their adequate two-item reliability (SB = .79), the two items were combined into a single composite reflecting overall willingness to engage publicly.

2.3 Statistical analyses

We first summarized the data using descriptive statistics and zero-order associations. Hypotheses were tested using repeated-measures ANOVAs for mean differences and multiple regression models predicting willingness to engage from negative experiences and reputational harm, with gender, tenure, media activity frequency, and positive experiences included as covariates. In addition, we estimated an exploratory manifest-variable mediation model equivalent to PROCESS Model 4 (Hayes, 2022) in R using lavaan (Rosseel, 2012) to examine whether reputational harm statistically accounted for the association between negative experiences and willingness. Indirect effects were evaluated using bias-corrected bootstrap confidence intervals based on 5,000 resamples. Missing data were handled via pairwise deletion for correlations and full-information maximum likelihood (FIML) in the structural models (Hayes, 2022; Rosseel, 2012). For CFAs, model fit was evaluated using χ^2 , CFI, TLI, SRMR, and RMSEA (Hu & Bentler, 1999; Rosseel, 2012; Hayes, 2022).

3 Results

3.1 Descriptive results and correlations

Table 1 presents descriptive statistics and correlations among the study variables. Additional descriptive information about communication contexts is provided in the SM: Figure S1 displays the topics addressed in scientists' public communications, with climate change being the most frequently discussed subject. Figure S2 shows the social media platforms used for public engagement, with LinkedIn being the most frequently used platform.

Participants reported expressing opinions more frequently on social media ($M = 2.64, SD = 2.12$) than in traditional media ($M = 1.57, SD = 1.53; F(1, 128) = 34.65, p < .001, \eta^2 = .21$), while they rated their experiences with traditional media more positively ($M = 4.33, SD = 0.96$) than those on social media ($M = 3.82, SD = 0.89; F(1, 104) = 19.49, p < .001, \eta^2 = .16$).

Among scientists who had given interviews or posted on social media ($n = 105; 76.09\%$), all reported at least one positive experience (100%). In contrast, 78.4% reported having experienced insults, and 29.9% reported physical threats/legal risks. These proportions differed significantly across experience types ($F(2, 95) = 111.38, p < .001, \eta^2 = .701$), indicating that fewer participants reported insults than positive experiences, and fewer participants reported physical threats/legal risks than insults.

Overall, positive experiences were reported more frequently than either type of negative experiences ($F(2, 95) = 280.27, p < .001, \eta^2 = .86$). However, as shown in Figure 1, scientists also reported that, on average, 20.80% ($SD = 26.43$) of their interviews or social media posts were followed by insults. Additionally, an average of 2.27% ($SD = 11.08$) of their interviews or social media posts were followed by physical threats/legal risks. These findings support Hypothesis 1: Greater public engagement on socio-ecological crises is associated with more frequent repressive responses.

Positive experiences were significantly correlated with willingness to engage publicly through interviews or social media posts, whereas past negative experiences (insults and physical threats/legal risks) were not. Both forms of negative experiences, however, were significantly and positively correlated with reputational harm, which, in turn, was significantly and positively correlated with psychological strain, as indicated by negative affectivity and psychosomatic complaints. Furthermore, reputational harm was significantly linked to a lower willingness to engage further in public discourse through interviews or social media posts.

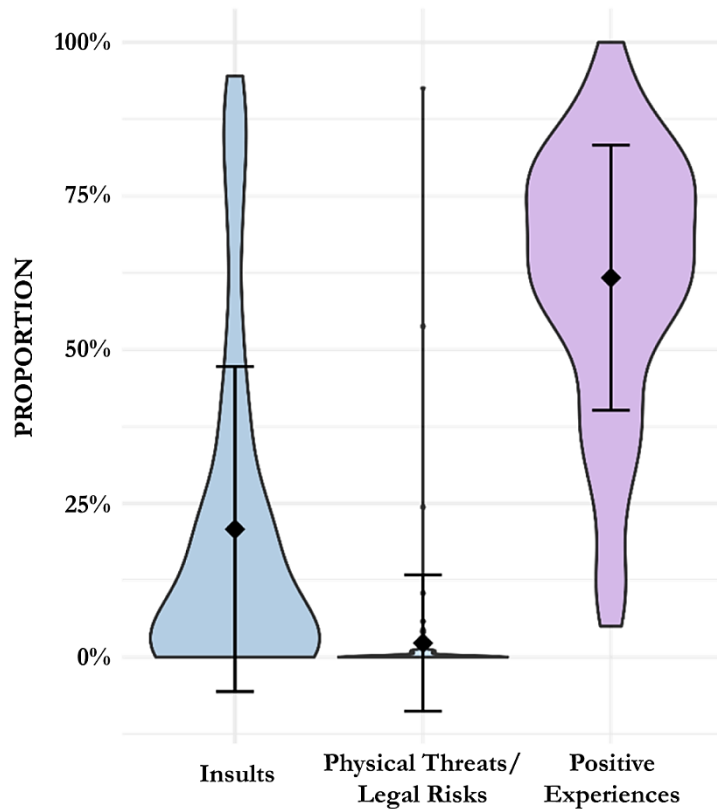
Table 1
Descriptive statistics and correlations among study variables

	<i>M</i>	<i>SD</i>	Range	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Gender	0.54	0.5	0–1														
2 Tenure	0.47	0.5	0–1	.178**													
3 Field	—	—	—	.023	.000												
4 Freq. of Interviews	1.57	1.53	0–7	.259**	.302***	.000											
5 Freq. of Posts	2.64	2.12	0–7	.234**	.139	.009	.349***										
6 Experiences with Traditional Media Overall	4.33	0.96	1–6	.230**	.313**	.000	.291**	.141									
7 Experiences with Social Media Overall	3.82	0.89	1–6	-.045	-.020	.000	-.067	.117	.138								
8 Insults	20.8	26.43	1–100	.197*	.115	.000	.385***	.496***	.063	-.303**							
9 Physical Threats/ Legal Risks	2.27	11.08	1–100	.129	.234**	.010	.393***	.124	.049	-.194*	.433***						
10 Positive Experiences	61.7	21.56	1–100	.205**	.169*	.004	.245**	.289**	.482***	.238**	.192	.162					
11 Reputational Harm	1.9	0.96	1–6	.242**	.048	.000	.198*	.052	-.158	-.380***	.474***	.274**	.027				
12 Psychosomatic Complaints	10.26	21.27	0–100	.092	.262**	.000	.385***	.166	.030	-.134	.466***	.319**	.212**	.371***			
13 Negative Affectivity	19.53	22.79	0–100	.020	.111	.018	.271**	.152	-.133	-.317**	.656***	.182*	.081	.443***	.610***		
14 Organisational Support	2.43	1.16	1–4	-.159	-.093	.000	.192	.037	.069	-.010	-.064	.143	.184	-.180	-.039	-.007	
15 Willingness for Interviews/Posts	2.99	0.8	1–5	-.041	.111	.000	.019	.169	.203*	.303**	-.076	-.020	.392***	-.315**	.026	-.182*	.245*

Note. Spearman’s ρ correlations. Associations involving Field (nominal) are reported as χ^2 effect sizes from Kruskal–Wallis tests. Pairwise deletion was used for missing data ($n = 50–129$); Gender (0 = female; 1 = male); Tenure (0 = no; 1 = yes); Field (1 = Natural Sciences; 2 = Social Sciences; 3 = Humanities). *** $p \leq .001$; ** $p \leq .05$; * $p \leq .10$.

Figure 1

Violin plots showing the reported percentages of public statements followed by insults, threats/legal risks, or positive experiences in traditional and social media.



Note. Violin plots display the distributions of responses using kernel density estimation (width indicates density); diamonds represent means, and vertical bars represent standard deviations. Participants indicated the proportion of their public statements associated with each type of experience on a 0–100 slider scale. Sample sizes vary due to missing data: $n = 97$ for insults and physical threats/legal risks; $n = 98$ for positive experiences.

3.2 Regression, mediation, and moderation analyses

To test Hypothesis 2, we performed regression analyses controlling for gender, tenure, frequency of media engagement, and positive experiences. Tenure was derived from academic rank and coded as 1 (tenured) versus 0 (not tenured); Model 1 in Table 2 reports the results. Neither physical threats/legal risks nor insults were significantly associated with lower willingness to engage. We repeated the analyses with reputational harm replacing the negative-experience variables (Model 2). Reputational harm was significantly associated with lower willingness to engage after accounting for positive experiences. Therefore, Hypothesis 2 received partial support, as reputational harm—but not direct negative experiences—was associated with lower willingness to engage publicly.

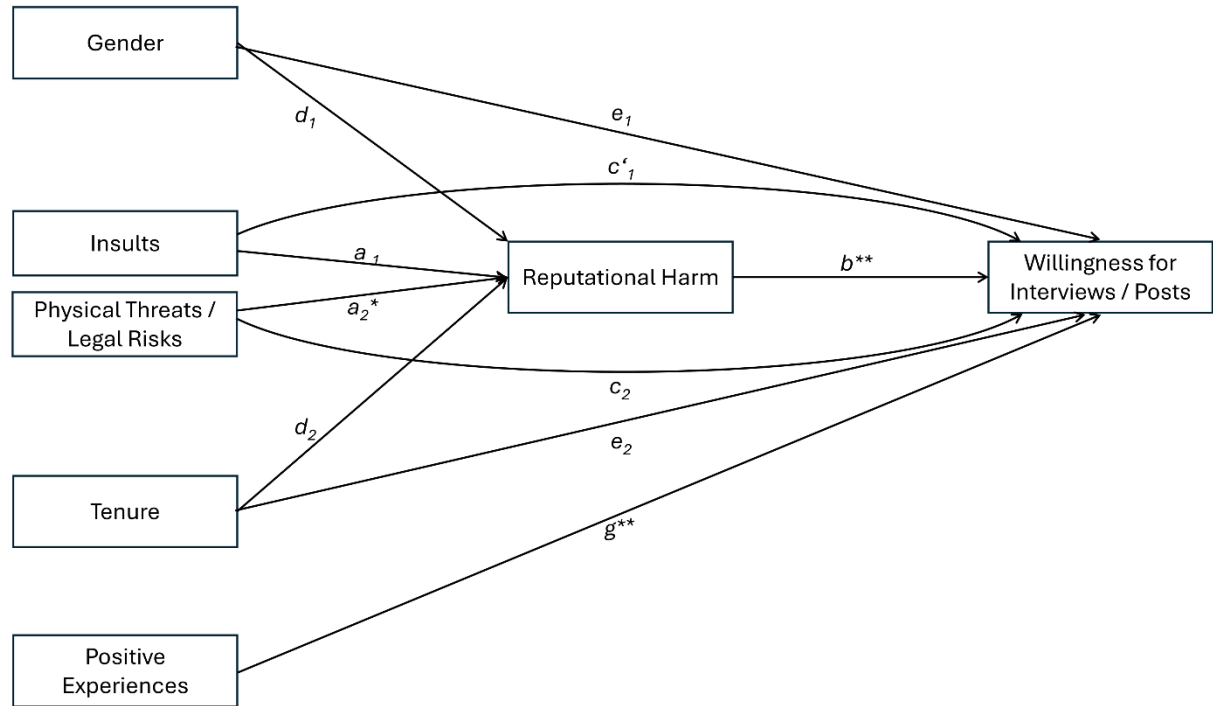
Table 2
Regression predicting willingness to give interviews or post on social media from negative experiences (Model 1) and reputational harm (Model 2).

Predictor	Model 1 (Insults, Physical Threats/Legal Risks)					Model 2 (Reputational Harm)				
	<i>b</i>	<i>SE</i>	β	95% CI(β)	<i>t</i>	<i>p</i>	<i>b</i>	<i>SE</i>	β	95% CI(β)
Gender	-0.202	0.181	-0.13	[-0.36, 0.10]	-1.116	.268	-0.146	0.187	-0.09	[-0.33, 0.14]
Tenure	0.262	0.185	0.17	[-0.07, 0.41]	1.419	.160	0.273	0.189	0.17	[-0.07, 0.41]
Frequency of Interviews/Posts	0.071	0.116	0.09	[-0.20, 0.37]	0.614	.541	0.082	0.101	0.10	[-0.14, 0.35]
Positive Experiences	0.265	0.098	0.31	[0.08, 0.54]	2.700	.009	0.226	0.095	0.28	[0.04, 0.51]
Insults	-0.048	0.111	-0.06	[-0.35, 0.23]	-0.432	.667	—	—	—	—
Physical Threats/Legal Risks	-0.027	0.154	-0.02	[-0.26, 0.22]	-0.173	.863	—	—	—	—
Reputational Harm	—	—	—	—	—	—	-0.270	0.100	-0.31	[-0.54, -0.08]

Note. Model 1: $R^2 = .148$, $F(6, 72) = 2.091$, $p = .065$; $n = 79$. Model 2: $R^2 = .229$, $F(5, 63) = 3.732$, $p = .005$; $n = 69$. Gender coded 0 = female, 1 = male; Tenure coded 0 = no, 1 = yes.

Figure 2

Mediation model predicting willingness to give interviews or post on social media platforms.



Note. All estimated paths, including non-significant coefficients, are reported in Table S5 of the SM.
** $p \leq .01$; * $p \leq .05$.

To test whether negative experiences are indirectly related to willingness to engage publicly via reputational harm, we estimated the mediation model described in the Methods section. We modelled the two forms of negative experiences simultaneously (insults and physical threats/legal risks). Although physical threats/legal risks were rare, we retained both predictors because they were correlated; excluding one could have biased the estimated association of the other with the outcomes (Antonakis et al., 2010). This allowed us to estimate the unique associations of each type of negative experience with reputational harm and willingness to engage. Figure 2 displays the conceptual model and highlights the significant paths. The corresponding coefficients are reported in Table S5.

Reputational harm was negatively related to willingness ($b = -0.332, p = .005$), and positive experiences were positively related to willingness ($g = 0.012, p < .001$). The indirect effect via reputational harm was small but statistically significant for physical threats/legal risks ($a_2 \times b = -0.004, p = .047$), whereas the indirect effect for insults was not significant. Explained variance was $R^2 = .351$ (reputational harm) and $R^2 = .278$ (willingness; $N = 138$).

We repeated the analyses without demographic covariates; Table S6 displays the coefficients. The pattern of results was similar: reputational harm was negatively related to willingness ($b = -0.336, p = .005$), positive experiences were positively

related to willingness ($g = 0.012, p < .001$), and the indirect effect was significant for physical threats/legal risks ($a_2 \times b = -0.004, p = .039$) but not for insults.

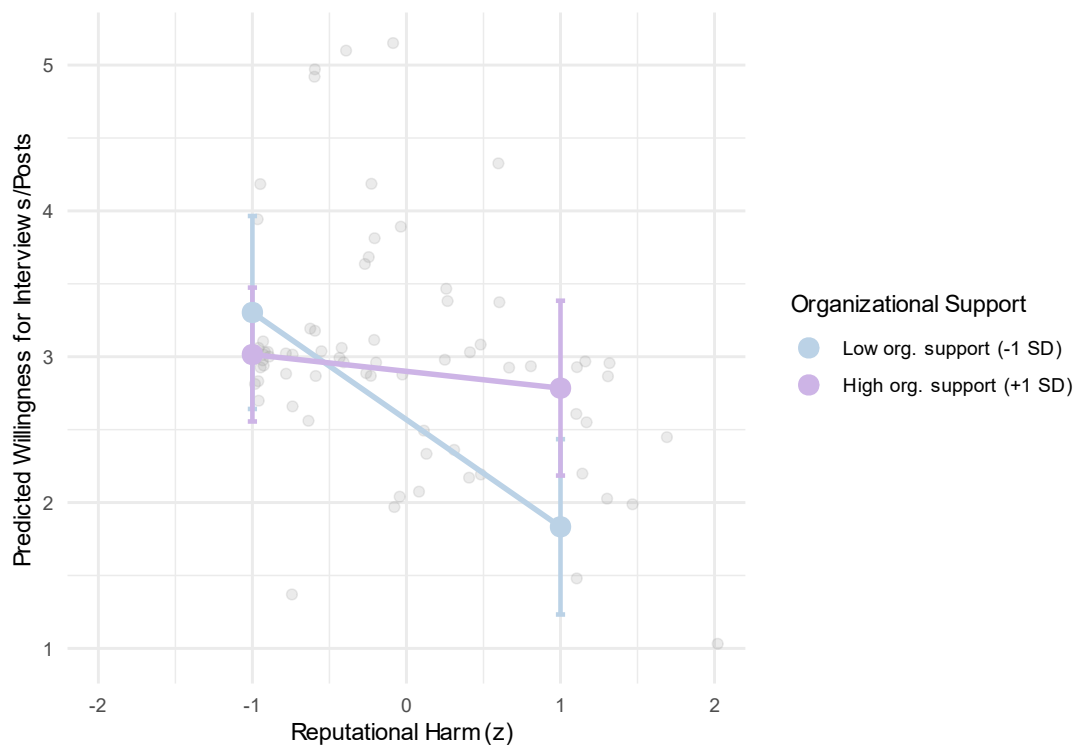
Explained variance was $R^2 = .338$ (reputational harm) and $R^2 = .261$ (willingness; $n = 98$), respectively.

Because we hypothesized that organisational support represents a contextual resource that may buffer the negative association between reputational harm and willingness to engage (Hypothesis 3), we regressed willingness to engage on reputational harm (RH), organisational support (OS), their interaction, and covariates (Table S8).

Tenure positively predicted willingness ($b = 0.623, p = .014$). Reputational harm was negatively associated with willingness ($b = -0.430, p = .002$), whereas organisational support showed no main effect ($b = 0.149, p = .205$). The RH $\times$ OS interaction was significant ($b = 0.306, p = .034; R^2 = .484$), indicating that the negative association between reputational harm and willingness was attenuated at higher levels of perceived support (see Figure 3). Simple slope analyses showed a significant negative association between reputational harm and willingness at low organisational support ($-1 SD; b = -0.736, SE = 0.207, p = .001$), but not at high support ($+1 SD; b = -0.124, SE = 0.172, p = .477$).

Figure 3

Interaction between organisational support and reputational harm predicting willingness to give interviews or post on social media platforms.



Note. Lines represent predicted values of willingness to give interviews or post on social media platforms at low ($-1 SD$) and high ($+1 SD$) levels of organisational support. Points represent observed values.

Following reviewers' suggestions, we additionally tested tenure as an alternative moderator to examine whether potential buffering effects reflect organisational context rather than career stage (Table S9). Tenure predicted willingness ($b = 0.621, p = .019$), whereas neither reputational harm ($b = -0.163, p = .504$) nor the $RH \times$ tenure interaction ($b = -0.296, p = .294$) was significant ($R^2 = .431$). Other predictors, including gender, media activity frequency, positive experiences, insults, and physical threats/legal risks, were not significant ($ps \geq .198$). Together, these findings suggest that the buffering pattern is specific to perceived organisational support rather than reflecting differences in career stage.

4 Discussion

This study examined how scientists in German-speaking countries experience public engagement, particularly in the context of socio-ecological crises such as climate change and biodiversity loss. The findings indicate that public engagement is associated with both opportunities and challenges. Scientists reported predominantly positive experiences with public engagement through traditional and social media. At the same time, they also reported negative experiences, including insults and physical threats or legal risks, as well as perceived reputational harm and psychological strain. Such hostility can function as a significant psychosocial stressor (cf. Marheinecke et al., 2024), especially in digital environments (Das NETTZ et al., 2024; Nogrady, 2021). Importantly, our analyses further suggest that the association between negative experiences and willingness to engage publicly is mediated by perceived reputational harm, which appears to carry more weight than the experiences themselves.

Consistent with Hypothesis 1, a substantial proportion of scientists reported negative responses to their public engagement, with 78.4% experiencing insults and 29.9% reporting physical threats or legal risks. Public communication on socio-ecological crises exposes scientists to hostile reactions as documented in international reports of harassment (Nogrady, 2021; Nölleke et al., 2023; Peters, 2024). We conceptualise these dynamics as discursive repression—persistent and often decentralized discursive processes that may undermine the credibility of scientific actors in contested public debates. Rather than constituting formal censorship, such dynamics function as a social boundary that raises the psychosocial costs of participation (e.g., Fladmoe & Nadim, 2017).

Hypothesis 2 received partial support. Contrary to expectations that negative experiences are related to lower willingness to engage publicly, insults and physical threats or legal risks were not significantly associated with willingness to continue engagement. Instead, reputational harm emerged as a significant factor linking negative experiences to engagement decisions. Negative experiences were positively associated with perceived reputational harm, which in turn was negatively associated with willingness to engage publicly, even after controlling for gender, tenure, media activity frequency, and positive experiences. Thus, disengagement may function as a strategic response to mitigate perceived professional risks in contested discursive environments (Finnerty, 2026; Murunga et al., 2024). In academic environments, where career advancement and funding are linked to perceived credibility and scientific integrity, challenges to professional standing carry more weight than personal insults (Allgaier, 2023; Oreskes, 2020; Peters, 2024).

The mediation analyses indicated that physical threats or legal risks were indirectly associated with reduced willingness to engage publicly via reputational harm, whereas insults were not. This suggests that not all forms of negative experiences carry the same weight for engagement decisions. More severe forms of hostility, although less frequent, appear to be more consequential insofar as they translate into reputational concerns, whereas more common but less severe experiences such as insults did not show a statistically reliable indirect effect.

These findings refine the notion of a “chilling effect” in scientific communication (Nölleke et al., 2023; Välierronen & Saikkonen, 2021). Rather than hostility per se leading directly to disengagement, withdrawal appears more likely when hostile experiences translate into concerns about professional reputation. In academic contexts, reputation is closely tied to credibility, funding prospects, and career advancement, meaning that scientists often prioritize collegial approval and the maintenance of scientific authority over public visibility (Oreskes, 2020; Peters, 2024). From this perspective, discursive repression in democratic public discourse appears to operate primarily through reputational mechanisms that increase the perceived professional risks of public engagement (e.g., Murunga et al., 2024) and may thereby become consequential for individual scientists’ engagement decisions.

The findings underscore that physical threats or legal risks—although reported by fewer participants than insults—are not negligible (Mede & Volk, 2026; Nogrady, 2021). Their indirect association with disengagement via reputational harm suggests that less frequent but more severe experiences may carry disproportionate influence on engagement decisions by heightening concerns about professional standing. This pattern is consistent with theoretical accounts of chilling effects suggesting that self-restraint increases with the personalization and perceived severity of threats (Penney, 2021).

The results also provide empirical insight into the Ivory Tower versus Activism Dilemma (Finnerty et al., 2024; Finnerty, 2026). Scientists who communicate publicly face a structural tension: remaining silent may limit the societal relevance of scientific knowledge (Gardner et al., 2021; Murunga et al., 2024), while active engagement may expose them to politicization, reputational criticism, or accusations of bias (e.g., van Eck, 2023). Our findings suggest that this dilemma is reflected in engagement decisions, as scientists weigh the perceived safety of the “ivory tower” against the risk of perceived loss of scientific authority (Finnerty, 2026). Reputational concerns appear to play a key role in how scientists navigate this tension between professional protection and public communication (Finnerty et al., 2026; Murunga et al., 2024).

The media environment is a contextual factor shaping these experiences. Participants reported posting more frequently on social media than giving interviews in traditional media, yet they evaluated traditional media experiences more positively. Social media was associated with more frequent insults, consistent with research showing that digital media amplify emotional and polarised interactions (Allgaier, 2023; Fotopoulos, 2023; Peters, 2024). At the same time, traditional media may contribute to discursive tensions through practices such as false balance, where scientific consensus is framed as controversy and minority viewpoints receive disproportionate visibility (Brüggemann & Engesser, 2017; Chinn et al., 2020;

Logemann et al., 2025). The 2023 controversy over Germany's Building Energy Act illustrates how repeated ideological and personalising frames can transform a technical policy debate into a partisan conflict (Loschke et al., 2026). From a discursive-repression perspective, such framing dynamics may make public engagement appear increasingly risky to experts.

Consistent with Hypothesis 3, institutional support emerged as a meaningful contextual factor in scientists' engagement decisions. While perceived organisational support showed no significant main effect on willingness to engage, it significantly moderated the association between reputational harm and willingness. When scientists perceived higher levels of institutional support, reputational harm was no longer associated with lower willingness to engage. In contrast, tenure did not show a comparable buffering interaction. While our finding that tenured scientists are generally more willing to engage publicly aligns with international evidence indicating that senior academics often perceive a higher degree of professional security (Dablander et al., 2024), our analyses further suggest that institutional backing—rather than career stage alone—may mitigate withdrawal. Organisations that encourage public engagement should therefore provide visible and reliable support structures, including clear communication policies, standardised procedures for crisis management, and explicit institutional backing against harassment (Dyke & Monbiot, 2024; Mede & Volk, 2026; Murunga et al., 2024; Rose et al., 2020; Väliaverronen & Saikkonen, 2021).

Finally, the results point to implications for scientists' psychological well-being. Negative experiences and reputational harm were associated with higher levels of psychosomatic complaints and negative affectivity, acting as psychosocial stressors that can undermine psychosocial well-being and professional identity (Mede & Volk, 2026). These findings align with research on stress and emotional strain—including anxiety and distress—among scientists who become publicly visible in polarised debates (Murunga et al., 2024; Nogrady, 2021). Institutional mental health resources, specialized psychological care, and peer support structures tailored to scientists engaged in public communication may help mitigate these burdens and support long-term engagement (Mede & Volk, 2026; Nogrady, 2021).

4.1 Limitations and outlook

This study is based on cross-sectional data from a relatively small, non-representative sample of scientists with varying levels of public engagement in German-speaking countries. While the focus on this subgroup was deliberate, the sample limits generalizability and may reflect regional or disciplinary dynamics. Scientists communicating about socio-ecological crises may also operate in particularly politicized public debates, which could shape the responses they encounter, meaning that exposure to hostility may differ from other scientific domains. Because some measures were applicable only to participants with relevant media experience or negative experiences, and because of item nonresponse, sample sizes also varied across analyses; findings based on smaller analytic samples should therefore be interpreted with particular caution. Moreover, the study does not directly measure discursive repression as a structural property of public discourse. Rather, it examines experiences that may illustrate mechanisms consistent with this concept.

The cross-sectional design precludes causal inference; reputational concerns may reduce engagement, but reduced engagement could also shape perceived reputational risk. Longitudinal and experimental designs are needed to examine directionality and the longer-term career implications of reputational exposure. Additionally, the frequency scale for interviews and social media posts contained a minor redundancy: the response options “0 = never” and “1 = once a year or less” were both anchored to the past 12 months, rendering “less than once a year” logically indistinguishable from “never”. While the variable was used descriptively and as a covariate, this redundancy may have introduced measurement ambiguity, particularly at the lower end of the scale. Because this variable was also included as a covariate, this ambiguity may have introduced additional noise into the statistical control and potentially attenuated its effects.

In addition, willingness to engage was operationalized as a combined measure across interviews in traditional media and posts on social media platforms. Negative experiences on social media may therefore influence willingness to post more strongly than willingness to give interviews in traditional media. Future research should consider distinguishing these communication channels more explicitly when examining engagement decisions.

Importantly, the sample represents an intentionally engaged subgroup of scientists who communicate publicly on socio-ecological crises. Rather than claiming representativeness, the study examines this group as an exploratory indicator of emerging communication risks in public discourse. The findings provide insights into structural challenges that warrant further investigation in broader and more diverse samples.

Beyond institutional measures, policy reforms could foster better conditions for scientific engagement. Integrating public engagement into funding and evaluation criteria may incentivize participation and help normalize outreach as a core academic activity (Murunga et al., 2024; Stilgoe et al., 2014). Expanding legal and digital protections against coordinated harassment and disinformation campaigns may reduce exposure risks (Mede & Volk, 2026; Tøsse, 2013). Policy measures addressing false balance in science reporting and promoting constructive journalism could strengthen the integrity of public discourse (Allgaier, 2023; Brüggemann & Engesser, 2017; Logemann et al., 2025). Public trust initiatives and media literacy programs may support informed democratic deliberation in fragmented media landscapes (Allgaier, 2023; Cole et al., 2025; Dyke & Monbiot, 2024).

These findings underscore the need for conceptual and empirical attention to discursive repression as a decentralized structural feature of public discourse in democratic societies. While repression has often been associated with authoritarian regimes (e.g., Marheinecke et al., 2024; Shriver et al., 2018), our results are consistent with prior research suggesting that similar dynamics may also arise in liberal democracies through delegitimization, strategic framing, or reputational discrediting, amplified by media logic and platform dynamics (Ellefsen, 2021; Pascale, 2019; Shriver et al., 2018). Such dynamics may marginalize expert voices without formal censorship, raising the psychological and reputational costs of participation (Mede & Volk, 2026; Peters, 2024). Distinguishing discursive repression from adjacent concepts such as cancel culture (Norris, 2025) is therefore important. Whereas cancel culture typically targets individuals for perceived norm violations,

discursive repression describes broader structural pressures that may discourage engagement in contested domains by increasing reputational vulnerability (Pascale, 2019; Väliverrönen & Saikkonen, 2021). Recognizing this distinction helps clarify how subtle forms of marginalization may occur without explicit sanctions.

Finally, while aggregate public trust in science remains high in German-speaking countries (e.g., Cologna et al., 2025), this overall picture may obscure more nuanced discursive dynamics. High levels of support for science-based policymaking may, in part, reflect a preference for clear and unambiguous information rather than scientific complexity, which can render trust more fragile when uncertainties are communicated (Post et al., 2021). In addition, patterns of differentiated trust have been observed among supporters of populist parties; in these contexts, science-related populism frames scientific expertise as part of an “unvirtuous academic elite” (e.g., Mede & Schäfer, 2020, p. 484). Against this backdrop, our findings indicate that even in high-trust environments, exposure to hostility may be more widespread than aggregate indicators of trust might suggest. At the same time, these experiences occurred at a relatively low average frequency, suggesting that infrequent but salient events may nevertheless be psychologically consequential and contribute to chilling effects and self-censorship (Nölleke et al., 2023; Väliverrönen & Saikkonen, 2021). Furthermore, networks such as Scientists4Future likely entail a selection bias toward scientists with a greater interest in public engagement (Dablander et al., 2024; Finnerty et al., 2024), who may differ from other scientists in both exposure and coping.

4.2 Conclusion

As science continues to play a central role in addressing ongoing and escalating socio-ecological crises, understanding the conditions under which scientists participate in public discourse becomes increasingly important. The present findings suggest that negative experiences do not necessarily translate directly into reduced willingness to engage publicly. Rather, their association with engagement decisions appears to operate partly through concerns about professional reputation. In this sense, the study provides empirical insight into the concept of discursive repression by illustrating how reputational dynamics in contested public debates may shape scientists’ public communication even in democratic contexts. While direct intimidation was reported relatively rarely, perceived reputational harm was associated with lower willingness to engage publicly, particularly where institutional support was perceived as limited. Taken together, these results highlight the importance of examining how reputational risks, institutional environments, and broader communication contexts interact in shaping scientists’ engagement decisions in periods of intensified societal debate over scientific knowledge.

5 Open science statement

The data, code, and questionnaire are publicly available at https://osf.io/82kdf/-overview?view_only=6fbb6ab272e345da83acd34d1b680a48. We confirm that we have reported all measures, conditions, data exclusions, and how we determined our sample size.



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