Linking science with media and policy: the case of academics in Flanders, Belgium

Jonker, Hans; Vanlee, Florian

Published in:
Quantitative Science Studies

DOI:
10.1162/qss_a_00311

Publication date:
2024

Jonker, H., Vanlee, F. (2024). Linking science with media and policy: the case of academics in Flanders, Belgium. Quantitative Science Studies, Advance publication. https://doi.org/10.1162/qss_a_00311

Linking science with media and policy: the case of academics in Flanders, Belgium

Hans Jonker[1,2*], Florian Vanlee[3]

Hans.Jonker@vub.be

0000-0002-9923-440X

Florian.Vanlee@ugent.be

0000-0001-7384-0201

[1] Centre for R&D Monitoring (ECOOM), R&D Centraal, Vrije Universiteit Brussel, Belgium

[2] Brussels Institute for Social and Population Studies (BRISPO), (Research Cluster TOR), Department of Sociology (SOCI), Vrije Universiteit Brussel, Belgium

[3] Department of Communication Sciences, Universiteit Gent, Belgium

*Corresponding author

Abstract

There is a growing expectation for academics to *go public*, that is to actively engage with the media and supply policy advice for decision-makers. Data showing these interactions are scarce. By linking data from FRIS, BelgaPress and Overton, this study reveals a first snapshot of academics' media mentions and policy citations for all active academics from Dutch-speaking universities in Belgium. Explorative analysis reveals distinct sector differences, with academics from Social sciences, Medical and Health sciences being most visible. A small minority of mostly male academics featured very often in media as media figures, contrasted by much more discrete *policy pillars* whose publications got cited often, but featured hardly in traditional media.

Keywords: scientometrics; science-media interface; science-policy interface; Overton; societal impact

1 Introduction

Scholars, research institutes and universities are now expected to create more than just scientific insights. Apart from producing and circulating knowledge, scientific actors must increasingly pursue societal impacts too. Requests like these express an ongoing need to disseminate scientific knowledge or make it more accessible (Joubert & Weingart, 2019). Simultaneously, there is an expectation for context-specific and feasible policy advice and practitioner recommendations wherever possible (Bandola-Gill, 2019; Boswell & Smith, 2017). Nowadays, the responsibility of the research sector extends beyond *creating* sound knowledge to also include its *popularization* and its *application*. The increase in the number of assessment instruments aiming to capture these extra-academic benefits of research – such as the UK's *Research Excellence Framework* (REF), *Excellence in Research Australia* (ERA) or the Dutch *Standard Evaluation Protocol* (SEP) – demonstrates how past decades have witnessed institutionalizations of these formerly facultative demands (Kassab, 2019; Smit & Hessels, 2021). Regardless of whether the underlying idea is to legitimise or scrutinize public spending on research activities (Watermeyer & Chubb, 2018), growing numbers of academics must now consistently document and describe proofs of *societal impact* their work generates (Kassab, 2019; Smit & Hessels, 2021). Obviously, this is never a neutral process of objectively showing beneficial effects. Since most assessment instruments rely on self-reporting, impact is more often postulated than proved (Niederkrotenthaler et al., 2011; Watermeyer & Chubb, 2018). And while constructing *impact cases* is clearly a team effort, one exceptional scientist often spearheads the narrative (Dunlop, 2018). Hence, current systems encourage universities to prioritize stories of *heroic scientists* – usually male professors – transcending the confines of

academia (Dunlop, 2018). Therefore, existing operationalizations of societal impact in research evaluation are often premised on individualistic conceptions of science's extra-academic benefits.

Additionally, existing studies highlight assumptions about certain impact pathways' efficacy that remain unsupported by empirical data. Periodical evaluations by national research administrations (e.g. REF; SEP – see Kassab (2019), Smit and Hessels (2021)) and studies into academics' perceptions of their extra-scientific impact (e.g. Valinciute (2020), Fecher and Hebing (2021)) testify to the scientific communities' widespread conviction that the capacity to influence policymakers and governance actors relies on a sufficient degree of visibility in non-academic media. That is to say, there appears to be an assumption that the ongoing expectation to publicly share research findings is not just *commensurable* with the demand to weigh on policy, but also deems popularization as a *prerequisite* for effectively translating science into governance. However, this is not to suggest that popularization would *automatically* result in successful translation. The idea that popular recognition is a condition for policy attention was already central to Rae Goodell's (1977) conception of the *visible scientists* that emerged in the late 1970s. Nevertheless, the expectation to somehow influence policymakers is not the only reason scientists would lend their expertise to the public debate either, as there are intrinsic and institutional motivations for academics to seek interactions with journalists and other gatekeepers of popular attention (Dunwoody et al., 2009). When academics engage with popular media, their motivations include enhancing public scientific knowledge (Miller, 2001), providing context and nuance to news stories (Weigold, 2001) or seeking recognition as an individual (Dunwoody et al., 2009). The idea of eventual policy impact has clearly become a key narrative in science communication and popularization in the context of societal impact evaluation in research governance.

Nevertheless, empirical evidence of this presumed relation continues to lack (Fahy, 2017). As Weingart (2022, p. 292) points out: "Hardly anything is known about the intended effects of this [media] attention on the decisions of policymakers and administrators in government bureaucracies except for the plausible assumption that attention is also the standard currency in the political arena." To no small degree, this relates to the limited data available about scientists' mark on non-scholarly media and policy documents. Indeed, studies have long surveyed academics about their *interaction* with journalists (Dunwoody et al., 2009; Fecher & Hebing, 2021; Valinciute, 2020), without being able to complement those reports with large scale data on the actual *presence* of scientists in news media. However, advances in data collection and availability allow experiments with alternative indicators to explore science popularization, policy impacts and their interlinkages. As *traditional* proxies for science performance are being evaluated, new objects *outside* science in the strict sense are being explored from which impact of science on society could appear (Bornmann, 2013). Such *heterogenous couplings* (Costas et al., 2020) document interactions between science and society, but require investigations to explore their characteristics, uses and potential biases. The foregoing discussion raises prominent questions about how academics are mentioned in non-scholarly media and cited by policy. Approaching them as heterogenous couplings (Costas et al., 2020) can produce a first snapshot of the heterogeneity in the societal dissemination and institutional application of academic knowledge. This allows an exploration of academic profiles (e.g. seniority; discipline; gender) present in media and policy documents, revealing potential interlinkages between them.

In the first place this requires a dependable overview of scientists. The case of Flanders is interesting because data on academics are freely available via the FRIS portal (*Flanders Research Information Space*, 2024). Additionally, it needs and extensive and navigable news media database. Here, the Belgian database BelgaPress (*BelgaPress*, 2024) provides detailed

data on the visibility of these academics in the media. Popular media exceed the written press off course, but we chose to focus on news media articles because it allows substantial amounts of data to be analysed relatively easily. And since 2019, the Overton database offers the possibility to investigate which academics worldwide can be found in policy documents, including those found in FRIS. The aim in this paper is therefore to explore the characteristics of Flemish academics in media and policy documents. The extent to which academics do or do not appear in popular media has not been explicitly examined to date, including its reliance on sectors and disciplines, as well as the role of individual researchers' characteristics. Moreover, it is far from certain that this form of visibility necessarily translates into policy impact.

2 Methods

2.1 Data collection

We scraped regional opensource data portal FRIS for all researchers active at one of five Dutch-speaking universities in Belgium in 2019, and logged their current (research group, departmental or faculty) affiliation(s), their starting year and total number of scientific publications (*Flanders Research Information Space*, 2024). Research performing organisations must periodically transfer information from their CRIS systems to this regional database (Neyens & Vancauwenbergh, 2021), ensuring dependable data quality. To focus primarily on research profiles, academics working for administrative units were omitted. This produced a database of 30226 individuals. Based on current affiliation, data were enriched with codes on sector and discipline, using the *Flemish Research Discipline Standard* (Vancauwenbergh & Poelmans, 2019) as a guideline. Next, data were gender-coded manually (reduced to female, male, undefined). Gender-neutral names were coded after individual validation. Finally,

seniority levels were added manually, based on publicly available information on institutional websites or social media profiles.

For data on news media mentions, we used the online BelgaPress database (*BelgaPress*, 2024). Belgian news agency *Belga* collects all articles published in Belgian newspapers and magazines daily, and its database allows exact search functions over a selected timeframe. As our dataset consisted of Dutch-speaking academics in Belgium, we only selected newspapers and magazines published in Dutch. More details and methodological arguments for this approach, alongside partial results from a pilot study have been reported elsewhere (Jonker et al., 2022). A strength of BelgaPress is its accurate search functions over a selected timeframe; a weakness is that specialised science magazines like EOS or *Wetenschap in Beeld* are omitted. Data were gathered from 1/01/2019 to 31/12/2019, as 2020 and further years would likely be atypical due to the covid-19 pandemic which is beyond the scope of the present study. We queried all full names of researchers and noted the amount of written press attention for each individual, excluding namesakes and removing duplicates. We chose to exclude researchers who appeared in non-academic capacities, such as those with a political mandate (n = 47), those in the full-time function of a non-academic organisation, institution or company (n = 22), and a rest category of journalists, lawyers, athletes, or celebrities (n = 12). Rectors[1] (n = 5) were also excluded because of their special mandate.

For data on policy document citations, we used the data portal Overton.io (*Overton*, 2024). A strength is its global, comprehensive coverage of policy documents in a broad sense, including (government) reports, clinical guidelines, legal documents, white papers and parliamentary transcripts (*Overton*, 2024). Overton's main weakness is its tendency to disproportionately

[1] Head of a university.

focus on relatively recent policy documents in English, primarily sourced from the United States, Canada, the United Kingdom, Japan, Germany, France, and Australia (see Szomszor and Adie (2022)). Additionally, a substantial portion of the database consists of policy documents from international governmental organizations (IGOs) such as the World Health Organization (WHO), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the World Bank, and the European Union (Szomszor & Adie, 2022).

In June 2021 we downloaded lists of all affiliated authors and their citations in worldwide policy-related documents for each Dutch-speaking university (and affiliated university hospital) in Belgium. We then deleted and merged duplicates, removed wrong affiliations and namesakes. The documented citation delay in policy-related documents in Overton (see: Fang et al., 2020; Szomszor & Adie, 2022) motivated our choice to compare a total number of policy citations in 2021 to media mentions in 2019, as to leave sufficient time for accumulation of policy document citations to occur.

2.2 Descriptives

The dataset used for this study had the following characteristics (see Table 1). Regarding media, 2451 of 30226 (8.1%) of active academics appeared once or more in the written press of 2019. Those academics who did appear in the media in 2019 did so with 5.6 (SD = 16.8) mentions on average. Compared to sector proportions at Flemish universities, academics from Social sciences (22.6% of university personnel vs 31.5% in the media) and Humanities and the Arts (10.2% vs 14.1%) were overrepresented in the written press of 2019, whereas academics working in Engineering and Technology (18.9% vs 9.7%) and Natural sciences (14.5% vs 10.3%) were underrepresented. Male academics (6.6 mentions (SD = 19.6) appeared on average twice as often in the written press than their female colleagues (3.3 mentions, SD = 5.2).

Almost two thirds (66.5%) of academics mentioned in the media were professors or emeriti. Predocs received slightly more media attention than postdocs in absolute numbers, but slightly less on average (2.6 mentions, SD = 4.0 vs 3.4 mentions, SD = 7.9). Almost half (47.5%) of academics mentioned in the media had produced a total of 51 publications or more. More than half (57.6%) of academics mentioned in the media had 11 or more years of experience in the academic system.

168 Table 1. Descriptive characteristics of active academics from FRIS, with sample mentioned in

169 media (> 0) and sample cited in policy (> 0).

Variables	$N_{FRIS2019}$		n_{media}				n_{policy}			
	N	%	n	%	M	SD	n	%	M	SD
Sector [a]										
NATU	4369	14.5	252	10.3	3.4	4.8	677	12.4	13.7	28.7
ENGI	5723	18.9	238	9.7	3.6	7.5	662	12.1	7.9	14.6
MEDI	7991	26.4	660	26.9	5.4	14.2	2230	40.9	13.0	32.3
AGRI	1231	4.1	70	2.9	2.9	2.5	241	4.4	20.7	38.1
SOCI	6829	22.6	772	31.5	7.4	20.9	1483	27.2	13.6	38.2
HUMA	3096	10.2	345	14.1	6.3	23.7	116	2.1	4.4	6.8
Other	987	3.3	114	4.7	3.3	4.4	43	0.8	3.1	4.6
Academic age										
< 1	–	–	37	1.5	2.6	4.2	34	0.6	3.2	3.7
1 – 5	–	–	446	18.2	2.8	4.4	795	17.6	3.9	6.3
6 – 10	–	–	558	22.8	3.4	5.1	1282	23.5	6.5	12.2
11 – 20	–	–	830	33.9	6.0	17.0	2209	40.5	13.5	29.8
21 – 50	–	–	575	23.5	9.6	26.7	1122	20.6	24.4	52.1
51 +	–	–	5	0.2	9.8	14.9	10	0.2	45,9	90.4
Gender										
Female	12404	41.0	729	29.7	3.3	5.2	2040	37.4	8.7	19.4
Male	16415	54.3	1722	70.3	6.6	19.6	3412	62.6	15.1	37.4
Undefined	1406	4.7	0	–	–	–	0	–	–	–
Seniority										
Predoc [b]	–	–	474	19.3	2.6	4.0	821	15.1	3.2	5.1
Postdoc	–	–	344	14.0	3.4	7.9	1167	21.4	6.0	10.1
Professor [c]	–	–	1496	61.0	6.9	20.3	3088	56.6	16.4	37.4
Emeritus	–	–	134	5.5	7.8	15.6	354	6.5	25.4	50.7
Undefined	–	–	3	0.1	2.7	2.1	22	0.4	4.9	6.8
Total publications (FRIS)										
0	9532	31.5	110	4.5	–	–	0	–	–	–
1 – 5	7798	25.8	253	10.3	–	–	390	7.2	–	–
6 – 10	2927	9.7	168	6.9	–	–	403	7.4	–	–
11 – 20	2759	9.1	263	10.7	–	–	651	11.9	–	–
21 – 50	3277	10.8	493	20.1	–	–	1330	24.4	–	–
51 – 100	1969	6.5	486	19.8	–	–	1173	21.5	–	–
100 +	1964	6.5	678	27.7	–	–	1505	27.6	–	–
Total										
Total	30226	100	2451	100	5.6	16.8	5452	100	12.7	32.0

Note [a]. Natural sciences (NATU), Engineering and Technology (ENGI), Medical and Health sciences (MEDI), Agricultural and Veterinary sciences (AGRI), Social sciences (SOCI), Humanities and the Arts (HUMA), based on Vancauwenbergh and Poelmans (2019). [b] Includes medical doctors (MD). [c] Includes guest professors.

Regarding policy documents, 5452 of 30226 (18.0%) academics' publications got cited at least once according to Overton, with 12.7 (SD = 32.0) citations on average. Compared to sector proportions at Flemish universities, academics from Medical and Health sciences (26.4% of university personnel vs 40.9% in cited in policy) and Social sciences (22.6% vs 27.2%) were overrepresented in policy documents. Academics from Engineering and Technology (18.9% vs 12.1%) and Humanities and the Arts (10.2% vs 2.1%) were underrepresented in policy documents. Publications of male academics (15.1 citations (SD = 37.4)) got cited on average almost twice as often in policy-related documents than publications of their female colleagues (8.7 citations, SD = 19.4). Almost two thirds (63.1%) of academics cited in policy documents were professors or emeriti. As seniority increases to professorship, the proportion of academics cited in policy documents increases. Almost half (49.1%) of academics had produced a total of 51 publications or more. Almost two thirds (61.3%) of academics cited in policy documents had 11 or more years of experience in the academic system.

To find factors determining media visibility (n = 2451) and cited research in policy documents (n = 5452), two negative binomial regressions were run. We chose to work with these models even though both media and policy counts were characterised by major yet meaningful outliers, incrementally removing the outliers would almost completely erode both variables. Both predictions were based on data on research sector, gender (0 = male; 1 = female), academic age and total number of scientific publications, as provided by FRIS.

3 Results

The first negative binomial regression for media (see Table 2) was found to be significant (Likelihood Ratio $Chi^2 = 704.327(12)$, $p < .001$). For every extra scientific publication published, the probability of getting mentioned once a year in the media is 0.04% ($p = .078$). For every added year of experience in the academic system, the probability of getting mentioned once a year in the media is 0.3% ($p < .001$). Professors' probability of being mentioned once a year in the written press is 71.7% ($p < .001$) with emeriti as a reference group, significantly more compared to postdocs (1.276 ($p = .069$)) and predocs (1.133 ($p = .368$)). For male academics, there is a predicted increase of 59.2% ($p < .001$) in yearly media mentions with female academics as a reference category. Compared to academics from HUMA, academics from other sectors appeared significantly less in the media, apart from academics from SOCI (1.103; $p = .171$).

Table 2. Negative binomial regression model for media mentions (dependent), sectors, gender, experience and publications (n = 2451).

	Exp(β)	**95% CI**	
		Lower	Upper
Intercept	1.724***	1.274	2.333
Sector			
Other	.710**	.557	.907
NATU	.552***	.459	.666
ENGI	.506***	.417	.613
MEDI	.780**	.672	.906
AGRI	.457***	.336	.621
SOCI	1.103	.959	1.270
HUMA	1	–	–
Experience			
Academic age	1.032***	1.026	1.038
Gender			
Male	1.592***	1.436	1.766
Female	1	–	–
Publications			
Total publications	1.000	1.000	1.001
Seniority			
Predoc	1.133	.861	1.486
Postdoc	1.276	.966	1.659
Professor	1.717***	1.376	2.127
Emeritus	1	–	–

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. Deviance = 2632.728. df = 2435. AIC = 13087.940.

The second negative binomial regression for policy (see Table 3) was found to be significant (Likelihood Ratio $Chi^2 = 3436.974(12)$, $p < .001$). For every extra scientific publication published, the probability of getting cited once in policy documents is 0.5% ($p < .001$). For every added year of experience in the academic system, the probability of getting cited once in policy documents is 3.1% ($p < .001$). Professors' predicted policy citations is decreased with 7.0% ($p = .242$) with emeriti as a reference group, more compared to postdocs (.716 ($p < .001$)) and predocs (.456 ($p < .001$)). For male academics, there is a predicted increase of 12.1% ($p < .001$) in policy citations compared to female academics. Compared to academics from

HUMA, academics from other sectors were cited significantly more in policy documents, especially academics from AGRI (3.329; $p < .001$) and SOCI (3.332; $p < .001$).

Table 3. Negative binomial regression model for policy citations (dependent), sectors, gender, experience and publications (n = 5452).

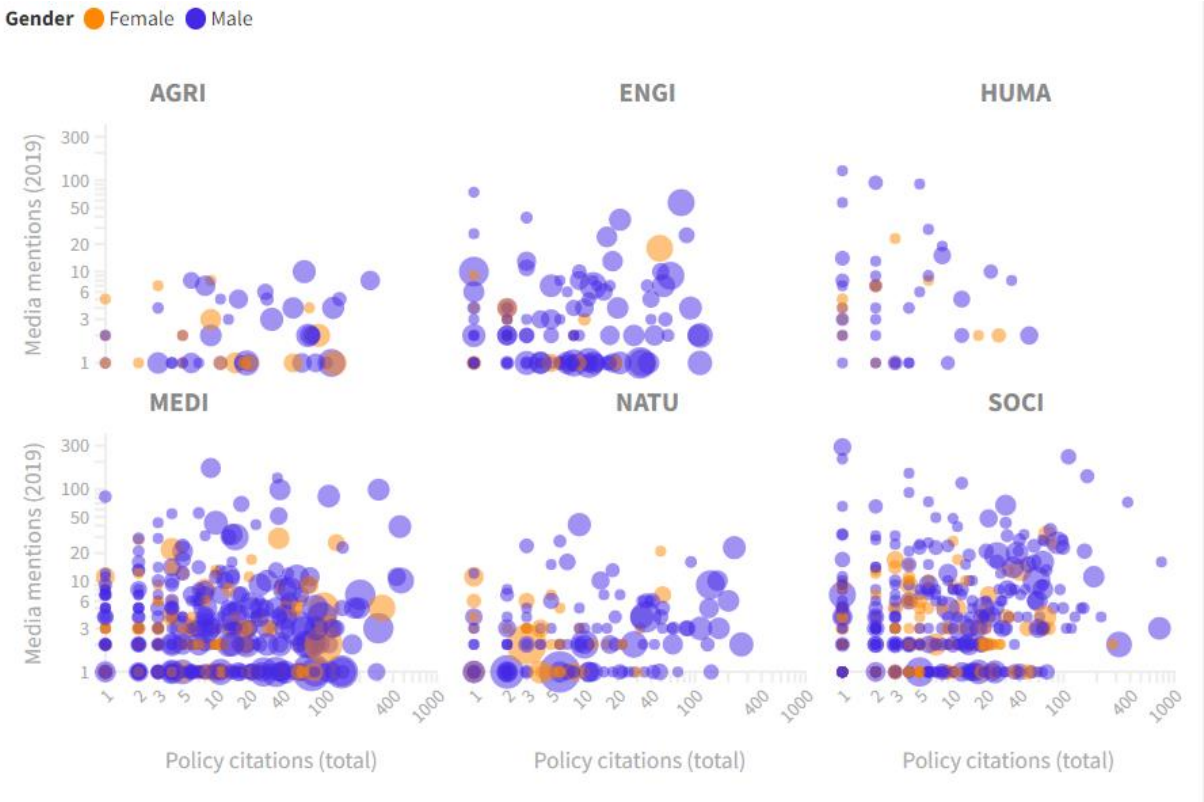
	Exp(β)	**95% CI**	
		Lower	Upper
Intercept	1.866***	1.438	2.422
Sector			
Other	.895	.600	1.335
NATU	2.662***	2.132	3.323
ENGI	1.414**	1.130	1.769
MEDI	2.378***	1.924	2.940
AGRI	3.329***	2.604	4.257
SOCI	3.332***	2.693	4.124
HUMA	1	–	–
Experience			
Academic age	1.031***	1.027	1.035
Gender			
Male	1.121***	1.054	1.194
Female	1	–	–
Publications			
Total publications	1.005***	1.004	1.005
Seniority			
Predoc	.456***	.391	.533
Postdoc	.716***	.621	.826
Professor	.930	.824	1.050
Emeritus	1	–	–

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. Deviance = 6393.632. df = 5416. AIC = 35494.582.

Results show highly skewed distributions for both media mentions and policy citations (see Figure 1), with the outliers being predominantly male academics in SOCI and MEDI (and HUMA for media). Only a handful of male academics from SOCI and MEDI accomplished both high media mentions and policy citations. The data show that most academics either appeared more frequently in the media and were less cited in policy documents, or were cited more in policy documents and appeared less in the media.

Results also reveal that media mentions and policy citations clearly vary by academic sector. This is clearly illustrated by academics from AGRI, who were clearly cited in policy documents but barely attracted media attention. Moreover, the policy citations model predicts a strong significant effect (3.320; $p < .001$) for academics active in this relatively small sector (4.1% in Flanders; Table 1). In contrast, HUMA academics were visible mainly in the media, but their publications were scarcely cited in policy documents. Academics active in ENGI and NATU sectors were present in media and policy, but to a much lesser extent compared to other sectors.

Figure 1. Flemish academics' media mentions and policy citations by academic sector (logarithmic scale), coloured by gender. One dot stands for one academic visible in at least media or policy (n = 6605). Dot size stands for total publications. Chart created with Flourish.



As visibility clearly varies by academic sector, Spearman's correlations were calculated between total scientific publications, media mentions and policy citations per sector (see

Table 4). Positive correlations between publications and policy citations seem significantly stronger compared to publications and media mentions (see Figure S2 in Supplementary materials). Academics who had published more, saw their research being moderately more cited in policy documents, with the relatively strongest correlations for academics from MEDI (ρ = .(548(2412), $p < .001$) and AGRI (ρ = .561(257), $p < .001$). The relationship between publishing more and receiving popular media attention appears to be positive as well for academics in different sectors (see Figure S1 in Supplementary materials), but much weaker. The weaker and non-significant correlations for academics working in NATU (ρ = .087(781), p = .014), ENGI (ρ = .040(773), p = .269) and HUMA (ρ = .090(413), p = .067) show no overall tendency to either increase or decrease for the total amount of publications. Finally, the relationship between media mentions and policy citations shows to be rather negative for most sectors. Hence, media mentions (policy citations) tend to decrease as policy citations (media mentions) rise.

Table 4. Spearman's correlations between publications, media mentions and policy citations per sector.

Sector	ρ Publications media	ρ Publications policy	ρ Media policy
NATU (n = 783)	.087	.355***	-.146***
ENGI (n = 775)	.040	.432***	-.212***
MEDI (n = 2415)	.120***	.548***	-.057**
AGRI (n = 259)	.190**	.561***	.009
SOCI (n = 1806)	.159***	.405***	-.180***
HUMA (n = 415)	.090	.263***	-.340***
Other (n = 152)	-.216**	.532***	-.640***
Total (n = 6605)	.042***	.455***	-.237***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

4 Discussion

This study produces a first snapshot of academics' media presence and policy impact in the case for Flemish academics, based on FRIS data. It is a first attempt to collect media mentions and

policy citations for academics at the scale of universities. The question here is who appears in the written press, who gets cited in policy documents, and what the extent is to which media attention leads to policy impact. Several factors at micro and macro level interact here, that explain the variance in both proxies for visibility. This study points to the importance of following results for discussion: 1) the limited presence of researchers in both proxies of visibility, 2) how both proxies are characterised by outliers with hardly any overlap, 3) the embeddedness of visibility in distinct sectors, and 4) the role of individual researchers.

4.1 Going public: breaking a norm of invisibility?

While there is a widespread emphasis on science communication to the public by universities, research institutes and policymakers (Joubert & Weingart, 2019), the data presented in this study show that only a minority of researchers go public. Less than one fifth (18.0%; cf. Table 1) of academics' publications were cited in policy documents, and only a small minority (8.1%; cf. Table 1) of researchers appear in domestic written news media. As even less academics succeed at solidifying a habitual presence in newspaper reporting, the results of this study seemingly confirm previous observations regarding the preference given to heroic scientists (Cairney & Oliver, 2018; Dunlop, 2018); an excellent scientist + demonstratable impact = good PR for the institution, increasing the public understanding of science in the process. This study highlights not a widespread practice of visibility, but rather a widespread phenomenon of invisibility. At first glance, these results might suggest that the invisibility of many reinforces the heroism of a few – at the expense of the invisibility of many others – indicating *winners* and *losers* in the context of an *attention economy* (Franck, 1999). However, this assumes that everyone aims to gain visibility. An alternative explanation is that many scientists simply do not want to go public and thus exclude themselves from this practice. Both explanations involve different considerations: 1) if scientists go public, the whereabouts of the Matthew's effects

(Merton, 1968) come into question, and 2) in a scenario where invisibility is common, the reason behind scientists not actively pursuing visibility become apparent.

Perhaps not every academic is eager to seek publicity with new findings and insights, regardless of the policy efforts to encourage them to do so. Indeed, popular science communication to a wide, *lay* audience deviates from an implicit norm in the scientific community, as Weingart (2022) argues. Communicating science in the narrow sense – where reporting to peers forms the bedrock of the system – differs from science communication in the broad sense, where scientists (should) address the public directly. In the first case, a degree of due process and peer review is involved, whereas this mechanism is skipped when science communication is practiced in the broader sense (Bucchi, 1996). Hence, not all scientists feel equipped to participate in this fundamentally different form of communication (Weingart, 2022). In a general sense, the results of this exploratory analyses give empirical credibility to the suggestion that hesitancy among scientists to seek publicity outside of the scholarly environment is more widespread than often assumed. This, in turn, troubles the considerable emphasis policymakers and research administrators have continued to place on science communication and popularisation since the turn of the century (Miller, 2001). On an institutional level, the expansion of science's publics is fuelled by a logic of PR, where "the task is no longer to merely inform the public via press releases about new advances in research but to forge a brand of the university, to create an institutional identity through PR in order to convince policymakers of its unique value." (Weingart, 2022, p. 292). This *medialisation of science* highlights a conflict, Weingart (2022) argues: because of its paradoxical nature, a meticulous logic of *organized scepticism* to produce solid knowledge (*truth*) meets a more flashing logic of *looks good* (*news*) to gain trust of stakeholders (Gioia & Corley, 2002). The clashing of media logic with scientific logic (see Grafström et al. (2022, pp. 4-5) for a detailed overview) is

important to explain resistance or scepticism amongst researchers to engage with the media (Peters, 2012); this is illustrated in this study by a small minority of only 8.1% of active researchers who actively engage with the media, while a majority of 91.9% remained silent in the written press.

Regarding policy citations, the results show a higher prevalence compared to the written press; with almost one fifth (18.0%) of researchers getting cited at least once in policy documents. With the relationship being quite weak between prominence in popular media and policy citations, it seems that gaining media visibility works under a distinct set of principles than achieving policy impact. When it comes to policy impact, citations to scientific publications are a passive and bibliometric pursuit. On the other hand, obtaining media attention necessitates a more active and deliberate approach towards engaging with journalists, and a willingness to answer ad hoc questions not necessarily related to one's own expertise.

4.2 From media visibility to policy use: media stars or policy pillars?

Results from this study show that coupling high media prominence with high policy impact is very exceptional: only a few academics (out of 30226 active ones) were able to combine a relatively high media visibility with a relatively high number of publications cited by policymakers. One medical professor for instance, was appointed by the government as chairperson of scientific committees responsible for several disease outbreaks in the past. He gained public visibility due to his (controversial) opinion pieces and tweets on a wide variety of topics. Another case is a professor in the social sciences, who writes two-weekly columns about economic issues. A third case is a mediagenic professor in the social sciences with a specific communication talent of turning things that everyone already knows into refreshing new insights.

This study highlights it is more common for researchers to distinguish themselves either in terms of their media presence or in terms of their policy recognition. On the media side, the results of this study point to the well-known figure of the *public intellectual* or *celebrity scientist*. Previous studies demonstrated that these are most likely older (Greenwood & Riordan, 2001) male academics (Fahy & Lewenstein, 2021), that often rank among a scientific elite (Boltanski & Maldidier, 1970; Dudo, 2012; Jensen et al., 2008; Peters, 2013). They have an accessible communication style (Goodell, 1977), and habitually comment on topics beyond their area of expertise in the strict sense (Bucchi & Trench, 2016). This can attract criticism from their peers (Fahy & Lewenstein, 2021), breaking a technocratic norm of *stick to what you know*. Of course, a highly visible scientist is not necessarily a celebrity (Bucchi, 2014). Some highly visible scientists (temporarily) rise to prominence because their expertise matches a hot topic but who do not choose to become celebrities. These should be distinguished from those who have a capacity to use (or exploit) media logic to draw media attention to themselves (van Krieken, 2018), engage in self-promotional activities on social media (Duffy & Pooley, 2017; Hall, 2014), blur their professional and private lives (Fahy & Lewenstein, 2021), and manage media attention for strategic purposes (Bucchi, 2014; Fahy & Lewenstein, 2021; Olesk, 2021; Peters, 2013). Closer investigation of these media stars in this study, shows that these high media mentions were anchored in columns, where academics were given the space to produce opinions on a weekly basis on potentially any topic. Although it is noteworthy to mention that the results of this study do not point to public intellectuals active in NATU, ENGI and AGRI, it would be misleading to assume that public intellectuals are restricted by disciplinary boundaries, as they by definition transcend these boundaries and are able to translate their expertise to potentially any topic (Jensen et al., 2008).

On the policy side, a much more discreet policy expert reveals itself. These *policy pillars*, mostly from MEDI, are highly cited in policy documents, with two economics professors – both in the top 5% of economists worldwide (*Top 10% Authors (Last 10 Years Publications), as of May 2023*, 2024) – forming distinct outliers. These academics may not leak intimate details about their private life into the press but influence policies *behind the scenes*. One of them, for example, founded a research institute on policy-oriented research and socio-economic development of regions, the other has been an advisor for many international institutions and governments. This is one possible explanation, though it remains unclear what strategies, practices or policies have fostered closer links between these academics and policymaking. Concluding, researchers' characteristics – especially regarding those who are featured the media frequently – are important, but there are also other factors that determine the extent to which researchers receive or do not receive the attention of media and policy, not in the least sector and disciplinary differences.

4.3 Sector differences: some sectors offer easier pathways to visibility

Although going public might not be embedded in the scientific community (Weingart, 2022), this study highlights how certain sectors offer easier pathways to visibility. More dominant sectors can be distinguished for more discrete disciplines here: while academics from SOCI, MEDI and HUMA appear relatively more in the media, this appears to be much less clear for academics from AGRI and ENGI. In turn, academics' publications from AGRI, SOCI and MEDI are relatively more reflected in policy, while publications from HUMA are hardly cited in policy documents. An explanation may lay in the existence of distinct logics, where the science-media interface has different norms and rules than the science-policy interface. Researchers whose studies focus on certain themes that often appear in news cycles (like economics or politics) or are core competences of certain policy domains (such as agricultural

sciences or medical sciences (see: Fang et al. (2020); (Szomszor & Adie, 2022)) are by definition more likely to gain visibility in one of the two domains. This illustrates that there is great variation in policy sensitivity across sectors and institutions (Li et al., 2022). Overlap is certainly possible but nevertheless seems rare. In addition, there are other elements that may or may not give certain individuals a structural advantage compared to other colleagues.

4.4 The role of the researcher: who are the established experts?

Apart from the disciplinary discrepancies that characterise media attention and policy citations, this study also highlights how individual characteristics can decide whether academics can step out of anonymity. Experience (seniority) plays a crucial role in this (Boltanski & Maldidier, 1970; Greenwood & Riordan, 2001; Jensen et al., 2008). The relatively low explanatory power of publications – especially in the case of media mentions – lies in the fact that this study compares all academics, more specifically across academic ages and experiences. Hence, the fact that only a minority of academics in Flanders is visible in media and policy is largely explained by the relatively large presence of academics who have barely published, as more than half (57.5% cf. Table 1) of academics in the dataset have published 5 publications or less. At the very beginning of their career, academics will hardly have any output and will obviously be less visible to journalists and policymakers, while established experts are clearly favoured in media and are naturally more citable in policy documents, as there is more expertise to call on and more material to cite. As experience and expertise grows, an increase in publications will most probably have the strongest effect on visibility in the beginning of the career, while the effect flattens out at astronomic numbers of publications.

However, it is not those who have published the most in the academic system who emerge from this study as *impact heroes* (Dunlop, 2018). Publishing more scientific output has a slightly stronger effect citation counts in policy documents (see Table 3) than getting media attention

(Table 2). The link between publishing more and getting more cited in policy documents is evidently much more direct, while media interactions are likely explained by other factors, such as personality characteristics (Fahy, 2017; Goodell, 1977), time availability (Peters, 2008; Valinciute, 2020), willingness (Besley et al., 2019), topicality, controversy and successful interactions with journalists in the past (Bond & Hubner, 2022; Jensen et al., 2008). It is therefore not strange to assume that journalists are not that interested in the latest publication rather than the opinion of a seasoned academic with known expertise on current affairs topics.

Furthermore, the fact that fewer women were found in both media and policy documents and female public intellectuals are absent in these results could have several explanations. A recent study of German professors (Puttmann et al., 2022) has highlighted how the risk of publicity is perceived to be higher for female academics, where (online) hostility may be more severe. Moreover, Puttmann et al. (2022) found a similar result for younger researchers. If women are younger than men in the same segment of their academic careers, are less present in certain academic sectors (most notably STEM) due to gender expectations, their share declines as academic hierarchy rises (cf. the *leaky pipeline* (Clark Blickenstaff, 2006)). As media seem to favour well-known established experts and men are profiled as experts more frequently (Niemi & Pitkanen, 2017), structural factors then cause fewer female academics to be covered in the media. Here another a case of the Matthew effect (Bucchi, 2014) emerges, where the unknown (female) experts remain unknown with journalists, while already visible (male) experts become more popular with the wider public every year.

Regardless of gender, a *junior effect* can be noticed: with almost a fifth (19.0%; cf. Table 1) media coverage of junior researchers, they clearly stand out to journalists even though they have little experience. This raises questions about distinctive approaches in the supervision of research: do supervisors function as a gatekeeper and opt to attend to queries by journalists

themselves (as coordinator of the research) or pass it on to junior research in question with the hands-on research expertise appropriate for the topic at hand.

These findings are also relevant in the context of research evaluation. At least part of the push away from traditional bibliometric indicators is driven by the need for a more holistic view of scientific excellence (Sivertsen & Meijer, 2020; Smit & Hessels, 2021), where science communication through mainstream media is habitually suggested as a proxy for societal impact (Fecher & Hebing, 2021; Kassab, 2019). If the growing belief that science should be *open*, *public* and *impactful* is to be rewarded in some way, it raises the question of how to deal with these structural effects when certain subjects, disciplines and sectors structurally offer easier pathways to visibility. If the promise of alternative indicators is increased inclusion in research evaluation, then simply counting media mentions and policy citations is not a desirable strategy, as this broadening of indicators will be biased and would paradoxically replicate existing inequalities in academia.

4.5 Limitations

This paper has several limitations. Firstly, the information in FRIS depends on universities supplying their data in current research information systems (CRIS). This means that the list of active researchers in 2019 is likely not exhaustive. In 49 cases, no scientific publications were supplied even though this was expected due to the existence of policy citations. These cases were queried in Web of Science to supply the total number of scientific publications. The question also arises to what extent FRIS publications are consistent to large databases such as Web of Science or Scopus. In 736 cases, the start date had to be corrected as it was earlier than expected. These cases were corrected with date of first publication.

Secondly, due to the relative high media concentration in Flanders (Hendrickx & Ranaivoson, 2019), some newspaper articles had the exact same content even though the newspaper was different. Because of the duopoly in the newspaper market in Flanders, content within the same press house is often recycled. Therefore, not every media mention is an equally *substantial* mention (see: Jonker et al. (2022)); this means that high media profiles are likely to be slightly inflated. Additionally, 2019 was an election year, with increased demand for social science expertise.

Thirdly, Overton states in their search engine that its underlying database OpenAlex is missing around 20% of author affiliations, especially for researchers that do not use persistent identifiers, and research before 2009 becomes harder to find. Another important implication of is how Overton tends to index policy documents, and which documents it entails in terms of publication year, source type and source region (see: Szomszor and Adie (2022) for a detailed analysis on various aspects of the database). We used name matching to link FRIS academics to authors cited, where small errors cannot be avoided entirely. These factors mean that the proportion of Flemish academics cited in Overton is likely to be slightly higher. A more general limitation is that a policy document citing a publication is only one aspect of the broader concept of attention of policymakers for scientific studies. Lastly, further research can look at how policy documents cite (which) academic publications, as this might differ from academic citing behaviour. Further research could also look at the content of media – and policy documents.

Data availability

Data from FRIS is open-sourced and can be found here. An anonymized and limited dataset is available here (Jonker & Derom, 2024). BelgaPress and Overton are commercial databases that provided access to their platforms. The authors did not use unaggregated BelgaPress and

Overton data. Enquiries about the raw unaggregated data should be directed to the proprietary owners of BelgaPress and Overton.

Acknowledgements

This paper is an substantially extended version of a conference paper, submitted to the STI 2023 conference (Jonker & Vanlee, 2023). The authors thank Euan Adie for access to Overton and the helpful correspondence.

Author contributions

Conceptualization: HJ, FV; Formal Analysis: HJ. Investigation: HJ. Methodology: HJ. Supervision: FV. Visualization: HJ. Writing – original draft: HJ, FV. Writing – review & editing: HJ, FV.

Competing interest

The authors declare no competing interests.

Funding information

This research received no external funding.

5 References

Bandola-Gill, J. (2019). Between relevance and excellence? Research impact agenda and the production of policy knowledge. *Science and Public Policy, 46*(6), 895-905. https://doi.org/10.1093/scipol/scz037

BelgaPress. (2024). Belga. https://belga.press/

Besley, J. C., O'Hara, K., & Dudo, A. (2019). Strategic science communication as planned behavior: Understanding scientists' willingness to choose specific tactics. *PLoS One, 14*(10), e0224039. https://doi.org/10.1371/journal.pone.0224039

Boltanski, L., & Maldidier, P. (1970). Carriere scientifique, morale scientifique et vulgarisation. *Social Science Information, 9*(3), 99-118. https://doi.org/10.1177/053901847000900304

Bond, R., & Hubner, A. Y. (2022). I Am a Scientist... Ask Me Anything: explicating the role of past behavioral attitudes on scientists' future public engagement intentions. *Journal of Science Communication, 21*(07). https://doi.org/10.22323/2.21070202

Bornmann, L. (2013). What is societal impact of research and how can it be assessed? A literature survey. *Journal of the American Society for information science and technology, 64*(2), 217-233. https://doi.org/10.1002/asi.22803

Boswell, C., & Smith, K. (2017). Rethinking policy 'impact': four models of research-policy relations. *Palgrave Communications, 3*(1), 1-10. https://doi.org/10.1057/s41599-017-0042-z

Bucchi, M. (1996, Oct). When scientists turn to the public: alternative routes in science communication. *Public Understanding of Science, 5*(4), 375-394. https://doi.org/10.1088/0963-6625/5/4/005

Bucchi, M. (2014). Norms, competition and visibility in contemporary science: The legacy of Robert K. Merton. *Journal of Classical Sociology, 15*(3), 233-252. https://doi.org/10.1177/1468795x14558766

Bucchi, M., & Trench, B. (2016). Science Communication and Science in Society: A Conceptual Review in Ten Keywords. *Italian Journal of Science & Technology Studies, 7*(2), 151-168. http://www.tecnoscienza.net/index.php/tsj/article/view/277/181

Cairney, P., & Oliver, K. (2018). How Should Academics Engage in Policymaking to Achieve Impact? *Political Studies Review, 18*(2), 228-244. https://doi.org/10.1177/1478929918807714

Clark Blickenstaff, J. (2006, Oct). Women and science careers: leaky pipeline or gender filter? *Gender and Education, 17*(4), 369-386. https://doi.org/10.1080/09540250500145072

Costas, R., de Rijcke, S., & Marres, N. (2020). "Heterogeneous couplings": Operationalizing network perspectives to study science-society interactions through social media metrics. *Journal of the Association for Information Science and Technology, 72*(5), 595-610. https://doi.org/10.1002/asi.24427

Dudo, A. (2012). Toward a Model of Scientists' Public Communication Activity [Article]. *SCIENCE COMMUNICATION, 35*(4), 476-501. https://doi.org/10.1177/1075547012460845

Duffy, B. E., & Pooley, J. D. (2017, Jan). "Facebook for Academics": The Convergence of Self-Branding and Social Media Logic on Academia.edu. *Social Media + Society, 3*(1). https://doi.org/10.1177/2056305117696523

Dunlop, C. A. (2018, Sep). The political economy of politics and international studies impact: REF2014 case analysis. *British Politics, 13*(3), 270-294. https://doi.org/10.1057/s41293-018-0084-x

Dunwoody, S., Brossard, D., & Dudo, A. (2009, Jun). Socialization or Rewards? Predicting U.S. Scientist-Media Interactions. *Journalism & Mass Communication Quarterly, 86*(2), 299-314. https://doi.org/10.1177/107769900908600203

Fahy, D. (2017, Nov). Historical moments in public understanding of science: 1977, The Visible Scientists identifies a new scientist for the mass media age. *Public Underst Sci, 26*(8), 1019-1024. https://doi.org/10.1177/0963662517732909

Fahy, D., & Lewenstein, B. (2021). Scientists in popular culture: The making of celebrities. In M. Bucchi & B. Trench (Eds.), *Routledge Handbook of Public Communication of Science and Technology* (3 ed., pp. 99-112). Routledge. https://doi.org/https://doi.org/10.4324/9781003039242

Fang, Z., Dudek, J., Noyons, E., & Costas, R. (2020). *Science cited in policy documents: Evidence from the Overton database* Altmetrics conference, http://altmetrics.org/wp-content/uploads/2020/11/02_submission_Fang_Dudek_Noyons_Costas-altmetrics20.pdf

Fecher, B., & Hebing, M. (2021). How do researchers approach societal impact? *PLoS One, 16*(7), e0254006. https://doi.org/10.1371/journal.pone.0254006

Flanders Research Information Space. (2024). Flemish Government: Department of Economy, Science & Innovation. https://www.researchportal.be/en

Franck, G. (1999, Oct). Scientific Communication--A Vanity Fair? *Science, 286*(5437), 53-55. https://doi.org/10.1126/science.286.5437.53

Gioia, D. A., & Corley, K. G. (2002). Being Good Versus Looking Good: Business School Rankings and the Circean Transformation From Substance to Image. *Academy of Management Learning & Education, 1*(1), 107-120. https://doi.org/10.5465/amle.2002.7373729

Goodell, R. (1977). The Visible Scientists. *The Sciences, 17*(1), 6-9. https://doi.org/10.1002/j.2326-1951.1977.tb01494.x

Grafström, M., Brechensbauer, A., & Jonsson, A. (2022). Communicating science through competing logics and a science-art lens. *Journal of Science Communication, 21*(07). https://doi.org/10.22323/2.21070401

Greenwood, M. R. C., & Riordan, D. G. (2001, Sep). Civic Scientist/Civic Duty. *Science Communication 23*(1), 28-40. https://doi.org/10.1177/1075547001023001003

Hall, N. (2014, Jul). The Kardashian index: a measure of discrepant social media profile for scientists. *Genome Biol, 15*(7), 424. https://doi.org/10.1186/s13059-014-0424-0

Hendrickx, J., & Ranaivoson, H. (2019). Why and how higher media concentration equals lower news diversity – The Mediahuis case. *Journalism, 22*(11), 2800-2815. https://doi.org/10.1177/1464884919894138

Jensen, P., Rouquier, J.-B., Kreimer, P., & Croissant, Y. (2008). Scientists who engage with society perform better academically. *Science and Public Policy, 35*(7), 527-541. https://doi.org/10.3152/030234208x329130

Jonker, H., & Derom, D. (2024). *Dataset for Linking Science with Media and Policy* (Version Academics active in 2019). https://doi.org/10.5281/zenodo.10610197

Jonker, H., & Vanlee, F. (2023). *A first snapshot of academics' media mentions and policy citations in Flanders Belgium* 27th International Conference on Science, Technology and Innovation Indicators (STI 2023), Leiden. https://doi.org/10.55835/6442efd82b1a2c347a02812e

Jonker, H., Vanlee, F., & Ysebaert, W. (2022). Societal impact of university research in the written press: media attention in the context of SIUR and the open science agenda among social scientists in Flanders, Belgium. *Scientometrics, 127*(12), 7289-7306. https://doi.org/10.1007/s11192-022-04374-x

Joubert, M., & Weingart, P. (2019). The conflation of motives of science communication — causes, consequences, remedies. *Journal of Science Communication, 18*(03), Y01. https://doi.org/10.22323/2.18030401

Kassab, O. (2019). Does public outreach impede research performance? Exploring the 'researcher's dilemma' in a sustainability research center. *Science and Public Policy, 46*(5), 710-720. https://doi.org/10.1093/scipol/scz024

Li, Y., Mao, J., Zhang, L., Wang, D., Shen, S., & Huang, Y. (2022, Sep). How scientific research incorporates policy: an examination using the case of China's science and technology evaluation system. *Scientometrics, 127*(9), 5283-5306. https://doi.org/10.1007/s11192-021-04215-3

Merton, R. K. (1968). *Social theory and social structure*. Simon and Schuster. https://archive.org/details/robert_k_merton_social_theory_and_social_structure

Miller, S. (2001). Public understanding of science at the crossroads. *Public Understanding of Science, 10*(1), 115-120. https://doi.org/https://doi.org/10.3109/a036859

Neyens, E., & Vancauwenbergh, S. (2021). Towards a Semantic Interoperable Flemish Research Information Space: Development and Implementation of a Flemish Application Profile for Research Datasets. *International Journal of Digital Curation, 16*(1). https://doi.org/10.2218/ijdc.v16i1.762

Niederkrotenthaler, T., Dorner, T. E., & Maier, M. (2011, Jul). Development of a practical tool to measure the impact of publications on the society based on focus group discussions with scientists. *BMC Public Health, 11*(1), 588. https://doi.org/10.1186/1471-2458-11-588

Niemi, M. K., & Pitkanen, V. (2017, Apr). Gendered use of experts in the media: Analysis of the gender gap in Finnish news journalism. *Public Underst Sci, 26*(3), 355-368. https://doi.org/10.1177/0963662515621470

Olesk, A. (2021). The types of visible scientists. *Journal of Science Communication, 20*(02), A06. https://doi.org/10.22323/2.20020206

Overton. (2024). Overton.io. https://www.overton.io/

Peters, H. P. (2008). Scientists as public experts. In M. Bucchi & B. Trench (Eds.), *Handbook of Public Communication of Science and Technology* (1 ed., pp. 145-160). Routledge. https://www.taylorfrancis.com/chapters/edit/10.4324/9780203928240-15/scientists-public-experts-hans-peter-peters

Peters, H. P. (2012). Scientific Sources and the Mass Media: Forms and Consequences of Medialization. In S. Rödder, M. Franzen, & P. Weingart (Eds.), *The Sciences' Media Connection –Public Communication and its Repercussions* (Vol. 28, pp. 217-239). Springer. https://doi.org/10.1007/978-94-007-2085-5_11

Peters, H. P. (2013, Aug). Gap between science and media revisited: scientists as public communicators. *PNAS, 110*(Suppl 3), 14102-14109. https://doi.org/10.1073/pnas.1212745110

Puttmann, V., Ruhose, J., & Thomsen, S. L. (2022, Dec). Academics' Attitudes Toward Engaging in Public Discussions: Experimental Evidence on the Impact of Engagement Conditions. *Res High Educ*, 1-24. https://doi.org/10.1007/s11162-022-09725-4

Sivertsen, G., & Meijer, I. (2020). Normal versus extraordinary societal impact: how to understand, evaluate, and improve research activities in their relations to society? *Research Evaluation, 29*(1), 66-70. https://doi.org/10.1093/reseval/rvz032

Smit, J. P., & Hessels, L. K. (2021). The production of scientific and societal value in research evaluation: a review of societal impact assessment methods. *Research Evaluation, 30*(3), 323-335. https://doi.org/10.1093/reseval/rvab002

Szomszor, M., & Adie, E. (2022). Overton: A bibliometric database of policy document citations. *Quantitative Science Studies, 3*(3), 624-650. https://doi.org/10.1162/qss_a_00204

Top 10% Authors (Last 10 Years Publications), as of May 2023. (2024). RePEc. Retrieved 30/06/2023 from https://ideas.repec.org/top/top.person.all10.html

Valinciute, A. (2020, Apr). Lithuanian scientists' behavior and views on science communication. *Public Underst Sci, 29*(3), 353-362. https://doi.org/10.1177/0963662520907001

van Krieken, R. (2018). *Celebrity Society* (2 ed.). Routledge. https://doi.org/10.4324/9781315100814

Vancauwenbergh, S., & Poelmans, H. (2019, Jan). The creation of the Flemish research discipline list, an important step forward in harmonising research information (systems). *Procedia Computer Science, 146*, 265-278. https://doi.org/10.1016/j.procs.2019.01.075

Watermeyer, R., & Chubb, J. (2018). Evaluating 'impact' in the UK's Research Excellence Framework (REF): liminality, looseness and new modalities of scholarly distinction. *Studies in Higher Education, 44*(9), 1554-1566. https://doi.org/10.1080/03075079.2018.1455082

Weigold, M. F. (2001). Communicating science: A review of the literature. *Science Communication 23*(2), 164-193. https://doi.org/https://doi.org/10.1177/1075547001023002005

Weingart, P. (2022, Apr). Trust or attention? Medialization of science revisited. *Public Underst Sci, 31*(3), 288-296. https://doi.org/10.1177/09636625211070888

Jonker, H., Vanlee, F. (2024). Linking science with media and policy: the case of academics in Flanders, Belgium. Quantitative Science Studies, Advance publication. https://doi.org/10.1162/qss_a_00311

707