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# Competitive Performativity of (Academic) Social Networks.
# The subjectivation of Competition on ResearchGate, Google Scholar and Twitter

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# Competitive Performativity of (Academic) Social Networks.

## The subjectivation of Competition on ResearchGate, Google Scholar and Twitter

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## Abstract

This paper develops a better understanding of the explicit and implicit implications of the academic field's competitization, with a specific focus on the role that academic social networks and platforms (ASNPs) play in this process. By applying a mixed-methods approach combining a structural analysis and a questionnaire study, we compare ResearchGate, Google Scholar and Twitter and ask how and to what extent they contribute to the competitive subjectivation of their users. Therefore, we differentiate between suggested and enacted subjectivation, i.e., different levels of amplifying the self-perception of a 'competitive self.' We particularly find that ResearchGate, which is used by about two thirds of our respondents, offers a broad variety of tools for competitive subjectivation, yet all three ASNPs support the metric logic of individual research evaluation. Concerning differences in age, gender and disciplinary background, our results show that ASNPs are used more by younger and male researchers and these groups also perceive their work more competitively and act more competitively. While metric research evaluation is assessed as most important in the natural sciences and economics and rather unimportant in the humanities, social scientists especially perceive their work and their relation to colleagues in a competitive context.

**Keywords:** academic social networks; competition; subjectivation; ResearchGate; Google Scholar; Austria

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# 1 Introduction

The academic system has undergone three important transformations in recent decades: *internationalization* and a *quantification*, both of which have led to *competitization* within the field. The trend towards internationalization rests on the increased mobility of researchers as well as the simplified academic communication in light of digitization. Quantification is visible in the rapid expansion of academic rankings and bibliometric indices for institutions and individual researchers, especially since the 2000s (Espeland and Sauder, 2016; e.g. Wilsdon et al., 2015). The advent of (academic) social networks and platforms (hereafter ASNPs) such as Google Scholar (2004), Twitter (2006), Academia.edu (2008), ResearchGate (2008) and Loop (2015) is a result and a catalyst of these three developments through facilitating the international comparison of scholars, expanding the metric logic with new indicators and inducing new forms of competitive subjectification.

This paper examines ASNPs from the perspective of competition research. While we aim to develop a better understanding of the implications that competitization has on the academic field, this paper's primary contribution is empirical. Therefore, we *first* provide a detailed analysis of how competition is organized on the ASNPs RG (hereafter RG), Google Scholar (hereafter GS) and Twitter. *Second*, we conduct a questionnaire study with researchers from different academic disciplines in Austria to examine how active engagement on RG, GS and Twitter impacts on the self-perception, research practices and performance of researchers and provide a comparative account across disciplines. We have chosen biology, economics, sociology and historical science and assume that these disciplines represent different traditions of publication and have been exposed to varying degrees of competitization, where the use of metrics and quantitative methods of research evaluation is more common in the natural sciences and within the social sciences particularly in economics (Hammarfelt and Rushforth, 2017).

The remainder of the paper is structured as follows: Section 2 introduces our theoretical approach and relates our paper to recent literature in the fields of competition research, subjectivation studies, research on ASNPs and valuation studies. Section 3 provides our empirical approach and the methodological approach of our questionnaire study. In section 4, we show the main results from our analysis of ASNPs and how they promote competition. In section 5, we discuss the results from our questionnaire study on platform use and their implications for Austrian researchers, while section 6 offers concluding remarks.

# 2 Research Questions and Theoretical Approach

## 2.1 The rise of competition in academia

Competition in academia has recently become a much-researched field, not least due to the general expansion of competition research. Scholars from different disciplinary backgrounds postulate an era of competition since the 1980s, where many social fields and different aspects of life are increasingly organized and structured by competition (e.g., Davies, 2017; Jessop, 2016). In this regard, scholars focus on how competitive agency of universities is constructed (Hasse and Krücken, 2013; Musselin, 2018), the concepts of the entrepreneurial university and academic capitalism (Münch, 2014; Slaughter and Rhoades, 2004), the role and impact of rankings (Brankovic et al., 2018; Espeland and Sauder, 2016) and competitive research funding (Himanen and Puuska, 2022; Osório and Bornmann, 2022), different forms of evaluation practices across countries and disciplines (Hammarfelt, 2017), the performative impact that the quantification of impact and reputation has on the research practice of individual researchers (van Dalen and Henkens, 2012) and the business model of academic publishers (Pühringer et al., 2021).

This increase of competition in academia has been observed at different scales and for different actors (Krücken, 2021; Musselin, 2018; Osório and Bornmann, 2022). Competition occurs at individual (scholars compete for grants, jobs, positions in committees, positions in journals, scores, visibility), institutional (universities compete for students, grants, high positions in rankings, visibility) and national (nations compete for knowledge hubs) levels (see figure 1). Borrowing a term by Arora-Jonsson et al. (2021: 224), we refer to this myriad of competitions in which contemporary scholars find themselves in as an 'academic competition ecology.' Based on this rich literature on the role of competition in academia, we are especially interested in the performativity of ASNP in academia.
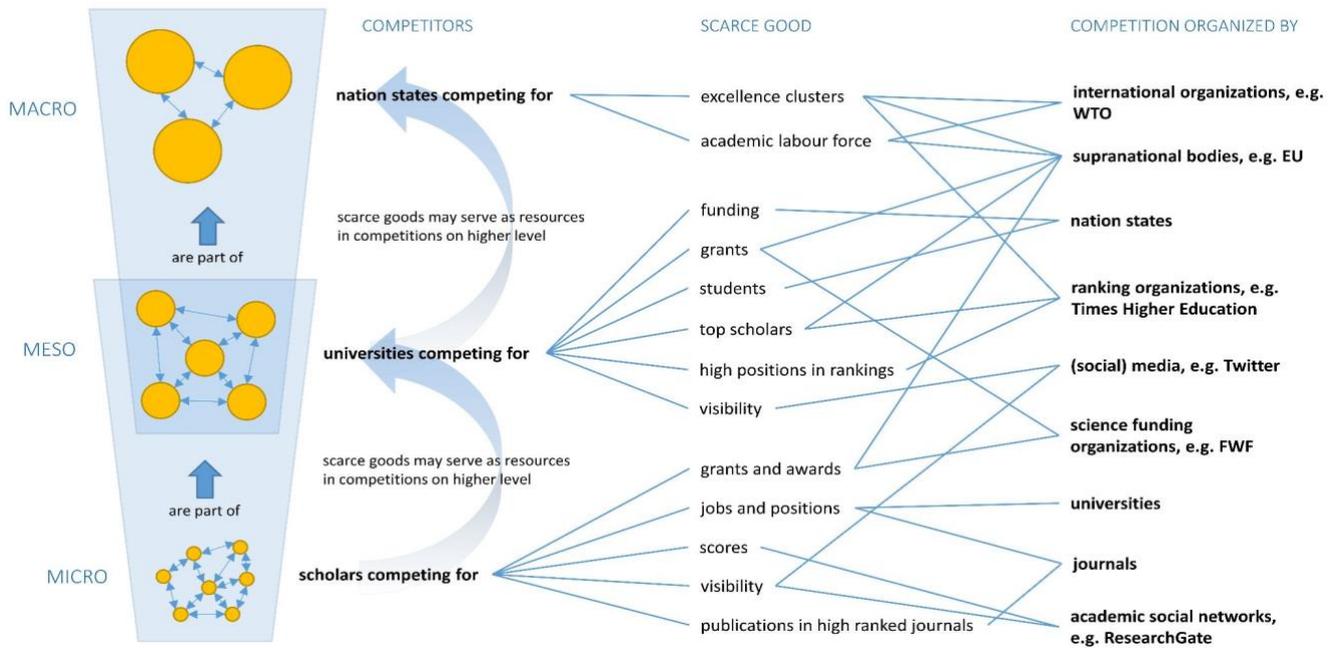
*Figure 1: Academic competition ecology: Nested competitions and their connections in academia*

## The case of Austria

The development of Austria's academic system reflects many international developments in internationalization and quantification as well as the spread of competitive formats, following the logic of new public management (Huisman, 2009; Kreissl et al., 2018). At the organizational level, Austria introduced several reforms meant to improve the quality and productivity of universities and researchers over the last three decades. While the 1993 University Organization Act first increased the autonomy of universities from the Ministry of Science and Education, the later 2002 University Act (UG 2002) marked a particularly important and far-reaching reform of the Austrian higher education system (Gornitzka and Maassen, 2017; Winckler, 2012). Within the context of the Bologna Strategy, the UG 2002 strengthened university financial and organizational autonomy and modified the organizational framework of higher education management at the Ministry of Science and Education. Austria introduced several management tools of excellence orientation such as external quality assurance, audits and *knowledge balance sheets*, which continue to be used as a basis for triannual performance agreement negotiations between universities and the Ministry. While these reforms reflect an overall trend of the competitization of academic institutions, they have also intensified competition at the individual researcher level. Over the last two decades, the number of third-party funded researchers ('Projektmitarbeiter:innen') in

Austria nearly doubled from 5,700 (winter term 2005) to 10,500 (winter term 2020) (BMBWF, 2021). This expansion shows the increased impact of third-party funding, which is organized competitively by research funding organizations and has also exacerbated the precarious working conditions of (young) researchers in Austria. Hence, in 2021, about 80% of the scientific personnel at Austrian universities had fixed-term employment contracts, a percentage much higher than in almost every other European country (see Aarnikoivu et al., 2019; Frølich et al., 2018).

### 2.2    *The subjectivation of competition*

In the last two decades, many scholars have been concerned with how competition gets subjectified by the involved competitors, i.e., to what extent actors understand themselves and others as competitors and actually act competitively (Bröckling, 2016; Reckwitz, 2020). However, few studies address competitive subjectivation in the academic world: It may translate into understanding oneself as an *academic entrepreneur* (Peter, 2017), practices of comparing oneself with colleagues (Hammarfelt et al., 2016), incorporating the principle of publish-or-perish (Carson et al., 2013; van Dalen and Henkens, 2012) or maximizing scientific output by splitting publications into least publishable units (Peter, 2017). To address this research gap, we examine how and to what extent scholars—being embedded in academic competition ecology—experience competitive subjectivation on ASNPs.

Following the useful differentiation of 'double empiricism' in recent studies on subjectivation (e.g., Bosančić et al., 2019), we are interested in two sides of the competitive subjectivation on ASNPs: (a) How ASNPs and related practices and discourses offer and suggest modes of subjectivity to scholars, especially notions of an 'competitive self', and (b) which subjectivities they actually adapt in their everyday academic life. This differentiation considers the insight of constructivist competition research, which claims that the organization of competition does not necessarily lead to competitive behavior (Brankovic et al., 2018). Thus, even though scholars are addressed as competitors by ASNPs, they may not accept this labelling or may even question it.

Therefore, we aim to empirically examine to what extent scholars who use ASNPs understand themselves and other scholars as competitors and, thus, to what extent academic social networks actually have a performative effect on the current state of the academic world.

### 2.3   ASNP as competitive platforms

The structure and evaluation logic of online platforms is essential to how scholars use ASNPs in the context of competition and, thus, a third important theoretical reference. There has been increasing scholarly interest over the past decade in how and by whom ASNPs are used and what effects they have on their users (Muscanell and Utz, 2017; Plantin et al., 2018; Utz and Muscanell, 2018), although studies about academics' views on and interpretations of ASNPs are still rare (Jordan, 2019: 12). In fact, only a few studies explicitly research *competitive* aspects of ASNPs, including Utz and Muscanell (2018), who study feelings of envy and pride while using platforms. In another study, Hammarfelt et al. (2016) examine how neoliberal ideas about markets and competition shape the conception and enactment of research as a game on ASNPs and how profiles are technologies of the professional self. Moreover, Komljenovic (2019) studies how ASNP metrics enhance competition, while Duffy and Pooley (2017) examine how these networks lead to the self-branding of scholars. Regarding competitive subjectivation, we are particularly interested in specific structural elements of online platforms, namely *profiles, statistics/metrics* and *request/notifications*. These elements are especially relevant, since, as different scholars have described, ASNPs are a new, hybrid type of online platforms that

combine publication databases with more profile-oriented social media sites (Francke and Hammarfelt, 2022: 1; Hammarfelt et al., 2016; Komljenovic, 2019). Hence, this paper pays special attention to how structural ASNP elements co-produce competitive subjectivities, i.e., scholars as competitors.

### 2.4   Valuation of scientific work, metrics and the competitive self

A fourth and final theoretical reference for this paper is the growing scholarly work in the field of valuation studies, in particular on the valuation of scientific productivity. Scholars are not only interested in *value*, but also increasingly in the *practices* and *technologies of valuation* of scientific work and in how metrics, rankings and scores can be used as 'judgment devices' or 'calculative devices' (Callon, 2021; Hammarfelt, 2017). A key finding relevant to this paper is that these valuation devices and practices do not measure the independent quality of social entities, but rather co-construct these measured entities by qualifying them (Callon, 2021). Following this line of thought, this paper is not interested in how accurately valuation practices and devices measure scientific productivity, but rather examines them as essential elements in the construction and performativity of competition, i.e., as *competition devices*.

A central characteristic of valuation practices and devices in academia, and especially relevant for competition, is their quantifying approach via metrics, which make the measured units, e.g. publications, scholars or universities comparable and evaluable (Francke and Hammarfelt, 2022: 4; Jordan, 2019; Musselin, 2018; Peter, 2017). Generally, the rise of the 'metric tide' (Wilsdon et al., 2015) in academia has led to a globally standardized stratification scheme for academic institutions and researchers alike. In this vein, impact factors, standardized bibliometric indices such as citation impacts or the h-index as well as university rankings enforce and institutionalize competition among universities and also researchers. Moreover, ASNP metrics make competition more visible by presenting comparative information to users, e.g., by reminding them of their colleagues' performance and their own relative position (Hammarfelt et al., 2016; Musselin, 2018: 672; Utz and Muscanell, 2018). While bibliometrics play an essential role in the evaluation of scientific work in academia, they also encourage competitive subjectivation by enabling self-monitoring

and self-surveillance (Komljenovic, 2019), putting pressure on scientists to publish (Francke and Hammarfelt, 2022; Sigl et al., 2020), influencing their affective state (Burrows, 2012) and leading to entrepreneurial and self-promotional attitudes (Duffy and Pooley, 2017). Since we are interested in this relation between metrics as a structural element of ASNPs and academic subjects, we ask what impact does the visibility of metrics and competitors have on the competitive subjectivation?

Thus, our paper's main inquiry is how ASNPs as competition devices suggest competitive subjectivities to their users through their structural elements of profiles, statistics/metrics and requests/notifications, and to what extent users actually adopt these competitive subjectivities.

## 3   Empirical Approach

Platform selection for the study was based on a comparative and contrastive research strategy. GS is by far the most static platform: Based on its huge database that comprises different forms of scholarly output (e.g. articles, books, working papers, reports), a personal account increases the researcher visibility in the scientific community and provides basic features such as assigning co-authors, including five main research areas and merging research output. By contrast, Twitter is one of the most important social media sites and mainly aims to facilitate communication and enables sharing news and thoughts among its users. While Twitter is not primarily aimed at an academic audience, the platform is increasingly used to communicate research output, calls for papers or discuss recent scholarly findings and offers features for active exchange (i.e., following and tweeting). Recent studies have reported a correlation between active participation on Twitter (number of Tweets) and scientific impact measured in citations (Luc et al., 2021; Ortega, 2016) as well as an ambiguous impact of personal and professional self-disclosure of academic on Twitter (Zhang and Lu, 2022). Thus, for researchers, a Twitter account could serve as a tool for academic exchange but also as a strategic option to

improve one`s individual scientific metrics. RG aims to combine the main features of static academic platforms like GS with interactive communication tools. It provides users with extensive opportunities to design their individual profile page and promises to increase their visibility. Furthermore, RG enables uploading various forms of research output (including posters, presentations and data sets). However, it also provides several communication and interaction tools for engaging with other researchers, automatically suggests research by authors with similar research interests and offers a job market tool.

Our study rests on two methodological pillars: *First*, in order to study how RG, GS and Twitter as competition devices suggest competitive subjectivities, we conducted a detailed study of their structural elements, i.e., *profiles*, *statistics/metrics* and *requests/notifications*. The goal of this structural platform analysis was to develop a better understanding of the role that ASNPs play in the process of the subjectivation of competition and thus their impact on constructing a 'competitive self.'

*Second*, in order to study to what extent the users actually adopt these competitive subjectivities, we gathered primary data from a questionnaire study conducted among a full sample of Austrian scientists in four research fields: biology, economics, sociology and historical science. These four disciplines have been confronted with varying degrees of the ecologies of competition and thus represent a broad spectrum for a comparative analysis of competitive subjectivation. We collected primary data by designing a questionnaire and forwarding it to all scientists (see the appendix for a full list of institutes) with Austrian affiliations starting from master-degree level. After an initial pre-test in April 2022, we collected data in June and July 2022. The link to the online anonymized questionnaire was connected to a serial number in order to exclude multiple participations per scientist. Scientists working at universities of applied sciences (Fachhochschulen) or

**Table 1: Demographics of respondents**

| Gender distribution [%] | | | |
|---|---|---|---|
| female | male | divers | not reported |

| Academic Position [%] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Full Professor | Associate Professor | Assistant Professor | Senior Scientist | Senior Lecturer | Post-Doc | Project Staff | Lecturer | Prae-Doc |
| 16 | 11 | 8 | 10 | 4 | 19 | 10 | 7 | 19 |

| Discipline [%] | | | | |
|---|---|---|---|---|
| Social Sciences | Economics | Natural Sciences | Humanities | other |
| 30,77 | 17,85 | 35,08 | 23,38 | 0,92 |

| Age distribution [%] | | | | |
|---|---|---|---|---|
| <35 | 36-45 | 46-55 | 56-65 | >65 |
| 28 | 32 | 21 | 13 | 6 |

comparable Austrian research institutes were excluded from the sample. In sum, we identified 2,809 scientists affiliated with Austrian universities in the four fields and invited them to join our survey. The gross response rate was 14.7%, while the net response rate was 13.5%. Table 1 provides the demographics of the participating sample.

The questionnaire primarily focused on how individual researchers use ASNPs in their everyday work (see the full questionnaire in appendix 1). We asked for personal assessments of the impact that these networks have on research practices and general stratification logics in academia. More specifically, we were interested in how and to what extent researchers interpret the role of ASNPs in fostering individual competitive behavior. Therefore, we used rating scales as well as open questions and distinguished between active and non-active ASNP users. Furthermore, we asked the participants for their overall evaluation of metrics and rankings in science. Finally, we conducted comparative analyses of researchers with regard to different career phases, sociodemographics and academic disciplines.

# 4 Platforms, metrics and academic evaluation

In order to elaborate on how ASNPs propose certain modes of subjectivation to their users and, hence, perform a competitive subject, we analyzed the central structural elements of the platforms.[2] We distinguish between three platform elements that contribute differently to how they suggest certain modes of subjectivation: profiles, statistics/metrics and requests/notifications. While our main focus is on RG, given how pronounced its structural elements are, we provide a comparative and contrastive perspective with the two notably different platforms GS and Twitter.

## 4.1 Profiles

The three platforms allow users to shape their own profiles in distinct ways. RG profile pages enable users to present themselves and their work, which includes adding a photo and describing their research work in their own words. The descriptions often resemble short

CVs, including current research projects, institutional affiliations and research interests (see figure 2). In addition, the users' activities are summarized and they can use ready-made forms to provide information on education, institutional affiliations, journal positions, grants and awards and memberships. A summary of the user's attributes in the form of a 'business card' can be found at the top of the profile page, along with an indication of how often it has been viewed in the past week.
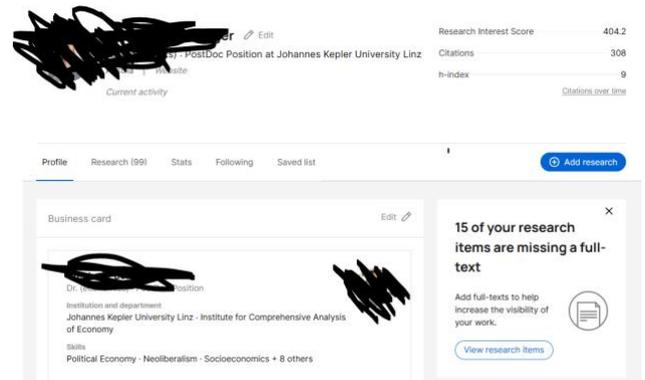


*Figure 2: ResearchGate profile of XXX*

By contrast, GS and Twitter profiles can only be shaped in a limited way. Both platforms allow for adding a photo, website link, institutional affiliation(s) and a few keywords on research interests. However, the profiles are much less like self-presentations, which, on Twitter, is more the result of the tweets posted, the sum of which conveys an impression of the user.

In general, profile pages allow users to present themselves to the academic community, promote their image and influence the perception of their research activities. However, this raises the question of how the user wants to appear and how the researcher avatar should be designed. Thus, users are addressed as active subjects who must shape their own presentation and communicate themselves to a scientific public. Beyond these opportunities for shaping one's own profile, the individual profile logic also fundamentally reproduces a conception of science that can be found on university websites, CVs and in the idea of individual authorship; namely, that science and knowledge production is an individual matter (Ullrich, 2019). In sum, profiles are a

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[2] Like other social platforms, academic ones are constantly subject to changes, which also means that the suggested forms of subjectivation are often slightly modified. Interestingly, a fundamental change in the metrics displayed on ResearchGate took place in July 2022. The RG Score, introduced in 2012 and a key metric since then, was abolished

and replaced by the existing *Research Interest*. The company justified the change with a stronger responsibility in the use of research metrics, a more holistic approach to the evaluation of research output and the non-transparency of the RG Score (RG email, April 2022 "Why we're removing the RG Score").

key element in the establishment of the user's visibility in the scientific community.

## 4.2    *Statistics and metrics*

Metrics are another key structural element of ASNPs and appear in many different places on the platforms. Upon visiting the RG homepage, users are immediately confronted with their own metrics: A text box titled 'Stats on your research' shows the changes from last week and links to the *stats page*, where statistical values for publications such as reads, citations, recommendations, mentions and research interests are displayed and can be differentiated: Which aspects of my research interest score have changed? This page also shows the metric and visual representation that most strongly establishes a comparative relationship to other scientists: the comparison of the user's own research interest with that of other researchers and the user's competitive position in this comparison (see figure 3). The user's research interest score can be compared with different categories of users. In each case, the page indicates one's relative position, which also implicitly promotes a hierarchical order of science. A separate page is dedicated to these comparisons: 'How your Research interest compares. See how much interest your research items are getting compared to the work of other researchers on RG.' Moreover, similar to platforms like Facebook or Instagram—and particularly similar to the target group logic in marketing—detailed information on readers can be displayed and broken down by country, discipline, academic position or institution. A statistical history visually displays the development of the user's scores with graphs. This makes it possible to identify patterns and directions of development over the course of weeks, months and years, to assign them to individual publications and to differentiate divergent developments; for example, if a rising research interest curve is not reflected in a rising citation curve, which allows for analyzing one's own scientific output by means of self-tracking. While these metrics on the stats page can only be viewed by oneself, the metrics on the *scores page* and the *profile page*, i.e., research interests, h-index and citations, are also accessible to other users, who can thus check the scientific impact and 'value' of other scholars.
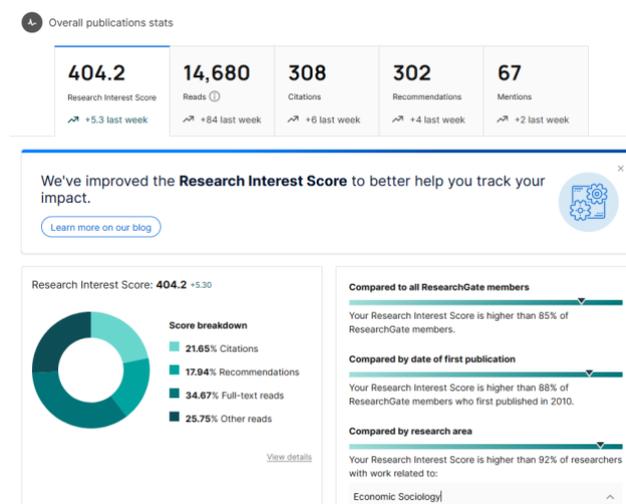


**Figure 3: Differentiated comparison with the scientific community of XXX**

GS, which is designed along the lines of the standard Google search engine, does not display metrics as immediately and prominently as RG; however, the two platforms share many of the same metrics—especially on the individual profile pages, where h-index and citations of scholars can be displayed over time. This also applies to individual publications on GS, where the number of citations can be viewed over time and which are displayed on the profile pages sorted by the number of citations. On the other hand, because Twitter is not an actual *academic* social network, it contains no academic metrics at all. Like other social platforms, it shows the number of followers and 'likes,' as well as Retweets (shares). In addition, users can display statistics on their own posts on detailed pages, such as the number of impressions, interactions, profile visits and new followers as a result of the post. Thus, as with RG, users can track their own performance.

In sum, ASNPs provide a plurality of statistics and metrics that enable self-tracking as well as the statistical categorization of other scholars to varying degrees. Crucially, comparison between oneself and the scientific community is enabled and encouraged, especially on RG. The massive visibility of metrics on these platforms suggests a subjectivation that is, on the one hand, oriented towards an identification with these scores, understanding them as an expression of one's own and others' work and value and, on the other hand, oriented towards universal, context-free comparability and equivalence of scientific work.

## 4.3    *Requests and notifications*

The first two structural ASNP elements are amplified by a third element: the requests and notifications which

pop up on different pages of the platforms. Again, this is especially true for RG. The first thing that stands out is the large number of emails with requests and notifications that this platform sends to its users; for example, about achievements, publications by other scientists, new research from one's own network and, notably, the aforementioned weekly statistical reports. This *report of the week* lets users track weekly changes to their metrics, making the growth of their RG scores regularly visible. Moreover, users are asked to contribute to this growth with prompts: 'Increase your impact.' Suggestions are provided, including adding full texts or linking to the user's own RG profile from an external site. This option for improving one's own visibility is detailed in the platform's *Help Center* under the title 'How to use SEO [Search Engine Optimization] to improve the visibility of your research.' Noting that 'it is becoming more and more important for researchers to improve the visibility of their work,' the site recommends linking from other websites which 'can get up to 5 times more publication reads,' adding a profile photo because 'publications on profiles with photos get 50% more reads,' completing the profile because 'publications on profiles with complete About sections get up to 150% more reads,' confirming authorship of one's publications and adding full-texts, abstracts and other data. Notifications and a notification feed are another platform feature: The notifications page continuously informs the user about news, including the new 'report of the week,' when a milestone in reads or citations is reached ('Your research items reached 1,500 reads') or when other scientists follow the user's own updates. However, outstanding 'achievements' are also mentioned: 'With xx new reads, your research items were the most read research items from your department.' Upon achieving these milestones, the user is awarded a graphic medal with the words 'Great job, XXX' and can also share these achievements on social media.
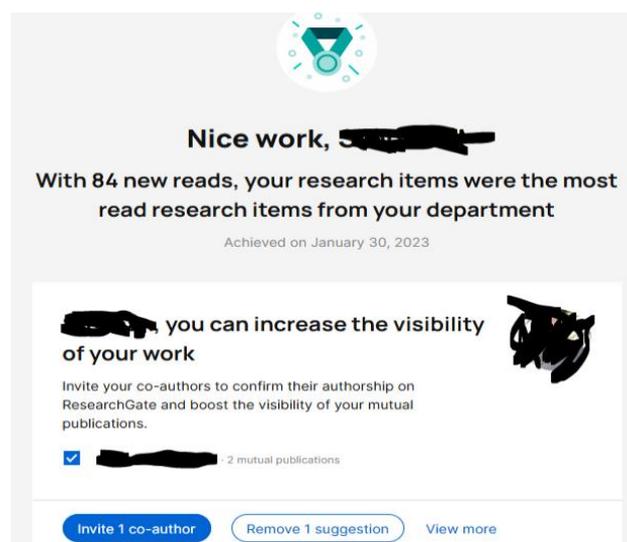


*Figure 4: The weekly statistical report for XXX*

Notifications are also present on GS, but to a much lesser extent; for example, 'Alerts' can be activated to provide notifications about new publications, citations of individual scholars or about certain topics and search terms. However, the user must actively set these and, unlike RG, GS does not provide notifications about new followers or reads, nor requests to increase one's own visibility or add to the user's profile. By contrast, an essential component of Twitter is its notifications about interactions with one's own posts, mentions and new followers. Nevertheless, Twitter also does currently not request users to improve their own profile or gain more visibility.

Overall, these ASNP requests and notifications encourage an active subject to various extents, while introducing elements of gamification and establishing a certain temporality. The regularity of the requests and notifications should not only help the users make themselves more visible, but also establishes the visibility of the platforms themselves and binds the users to the platform.

In sum, the three structural elements of the platforms encourage self-presenting, active and individual subjects identifying with the presented scores, constantly comparing themselves with other scholars and striving for greater visibility. As shown, the three platforms exhibit these elements to varying degrees according to their basic orientation. In the following section, we examine whether and to what extent this suggested subjectivity is actually embraced by scholars.

# 5 Competition and platform usage among academics

Our questionnaire study's objective was to develop a better understanding of ASNP use in order to examine to what extent competitive subjectivation is enacted on these platforms. Therefore, our *first* step was to ask about using or not using specific ASNPs, as well as users' specific interactions, practices and routines along with the overall evaluation of the role that metrics and rankings play in academia. In a *second* step, we specifically examined the competitive subjectivation on ASNP and used five questions to measure the level of competitive behavior associated with ASNP use. Finally, we also checked whether competitive behavior differed between academic disciplines, gender, age and academic status.

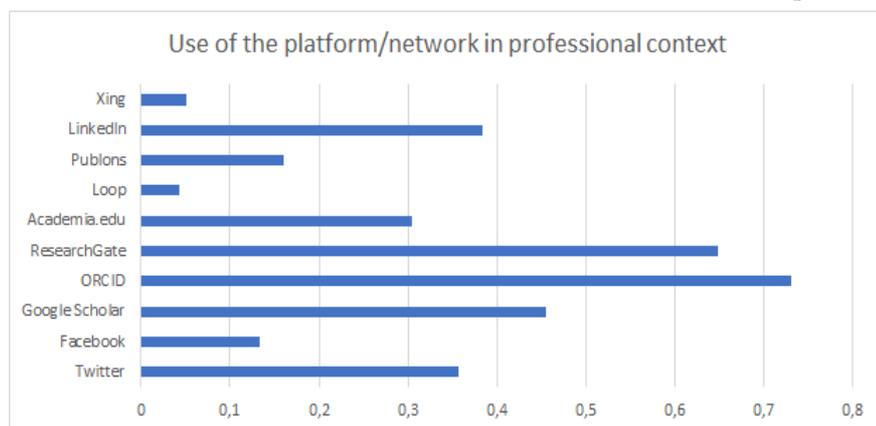## 5.1 The use and importance of ASNP



*Figure 5: Use of ASNP in professional context*

Our sample displayed an uneven distribution in the use of ASNPs, but was quite high for RG. 65% of respondents reported using RG in a professional context, while GS was used by 46% and Twitter by 36%. The usage rates were higher than in similar previous studies (Muscanell and Utz, 2017), which provides some evidence for the increasing importance of ASNPs over the last few years. However, we also found significant differences concerning ASNP use between disciplines. While the RG use was particularly high in the natural sciences (74%) and also among social scientists (71%) and economists (69%), it was much lower in the humanities (38%). Furthermore, more men than women in our sample used RG (67% and 63%, respectively) and more younger (<35 years) than older (>50 years) researchers (67% and 64%, respectively). We found very similar disciplinary differences and

much more pronounced gender differences (53% male and 36% female) for GS, while its user age distribution was even. By contrast, Twitter users were much younger (48% <35 years and 13% >50 years) and more female than male (38% and 31%). Disciplinary differences were again similar.

While RG use was especially widespread among our sample of Austrian academics, a lack of time resources (RG: 47%; GS: 38%; Twitter: 50%)was seen as the most important restriction for an even higher rate of engagement on ASNPs. In this context, it is also telling that 50% (RG) and 40% (GS) agreed or strongly agreed with the statement that their engagement on the respective ASNPs meant that 'unevaluated aspects of my scientific work, such as teaching, academic self-administration, peer reviews, lose importance'.

In a next step, we asked respondents about their experiences with the relevance of research metrics in their professional careers. More specifically, we asked: 'Where do you think metrics like impact factors, Hirsch index, RG score, citations have played a role in your scientific career?' Overall, we found that metrics especially played a role in job applications (58%) and for research proposals (49%). Moreover, 36% also reported that research metrics impacted 'internal university evaluations' and 31% 'for external evaluations of my position/job.' Again, metrics seemed to be more important for natural scientists (61%), followed by social scientists (49%) and economists (41%) and less important for scholars in the humanities (22%, each for the case of job applications). While younger scholars reported a comparably lower relevance of metrics in job applications (24%) compared to older scholars (40%), this might be due to their career status, but there was also a significant gender difference. 50% of the male, but only 42% of the female respondents reported that metrics had been relevant for past job applications.

In a last step, we also looked at the overall relevance of metrics in different disciplines and asked respondents to evaluate the importance of research metrics for both their and other disciplines. The results were quite striking: 95% (strongly or fairly) agreed that metrics were important in the natural sciences, followed by economics (80%), social sciences (62%) and the humanities (16%). First, these results provide further evidence for disciplinary differences concerning the

extent to which research metrics and quantitative stratification logics have been successfully scientifically

metrics was lower than their self-evaluation (77% perceived them as very or fairly important).
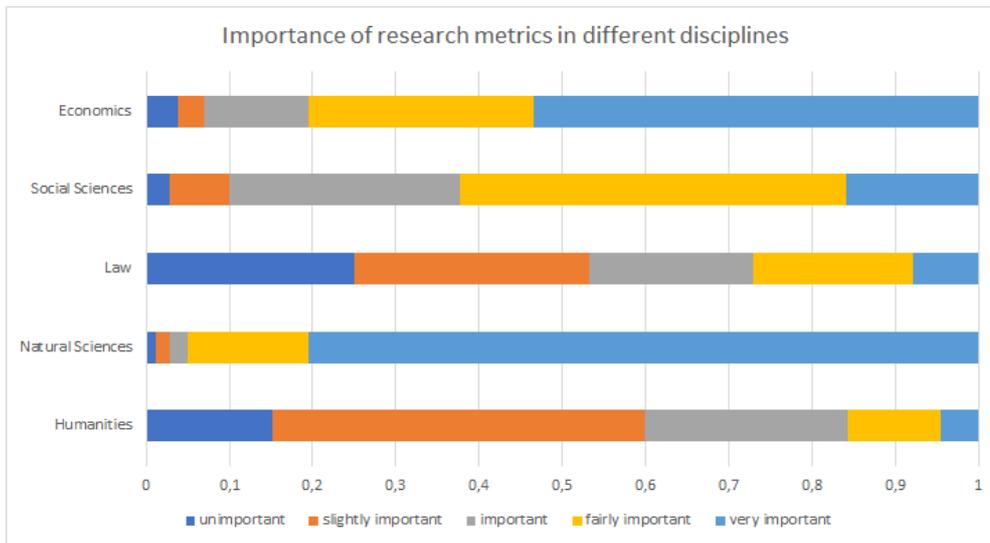


*Figure 6: Importance of research metrics in different disciplines*

adopted. Yet, looking at researchers' self-evaluation of their own disciplines provides slightly diverging results.

For the natural sciences and the humanities, the self-evaluation and the evaluation of other scholars about the importance of research metrics in the field was very similar. In fact, 96% of natural scientists reported that research metrics were either very (77%) or fairly important (19%). Among scholars in the humanities research, only by 16% considered such metrics as important or fairly important, while 55% perceived them as unimportant or slightly important. Quite to the contrary, economists evaluated the importance of rankings in their discipline even higher than their colleagues (55% very high and 34% fairly high). The same was true for the social sciences, where the overall evaluation of the importance of research

## 5.2 Competitive subjectivation on ASNP

Based on this overall evaluation of ASNP use and the role of research metrics for researchers from different disciplines and of different ages and genders, we aimed to evaluate enacted competitive subjectivation. Therefore, we used the following set of questions indicating an increase of competitive behavior associated with the use and active engagement on ASNPs.

We generally found that direct impact of ASNP use on competitive subjectivity was reported by a considerable

*Table 2: Evaluations of subjectivation on ASNP. * The values represent the share of respondents who agree or strongly agree.*

| Because of my use of GS/Twitter/RG… | GS [%]* | Twitter [%] | RG [%] |
|---|---|---|---|
| … I increase my own visibility. | 64,03 | 74,34 | 66,83 |
| … I find it easier to assess the quality of individual researchers/research results. | 52,11 | 26,13 | 21,63 |
| …. it seems more important for me to get cited | 56,34 | 18,52 | 38,50 |
| … I compare myself more often with other researchers. | 44,37 | 47,79 | 41,40 |
| … I see my work more in a competitive context. | 38,46 | 35,40 | 44,92 |
| … I perceive other researchers as competitors. | 19,91 | 25,89 | 24,64 |

share, but hardly the majority of our respondents. However, the results from our questionnaire concerning main causes of ASNP use and the fact that, for instance, about two thirds of respondents had a RG account (see section 5.1) indicate that many researchers chose or felt obliged to confront themselves with the competitive logic of ASNPs to a certain extent. Table 2 provides an overview of approval rates to questions that evaluate the enacted competitive subjectivation of ASNPs.

First, the responses again show that increasing one's visibility is not only one of the main motivations behind ASNP use, but that ASNPs also seem quite capable of fulfilling this task. In fact, 64% (GS), while 67% (RG) and 74% (Twitter) agreed or strongly agreed with this statement. Concerning age and gender, we found that men perceived the impact of ASNPs on visibility much higher than women for all platforms. Older researchers (>50 years) conceived the impact of RG higher than their younger colleagues (<35 years) (72% to 59% respectively, strong agreement) and GS (72% to 54% respectively, strong agreement). However, older scholars were less likely to agree that Twitter was important as their younger colleagues (75% to 72% respectively, strong agreement). Overall, active ASNP participation was seen as an important way to gain visibility, which in turn increases the competitive position of researchers in contemporary academia. This effect was especially pronounced for older men.

We found that GS seemed to provide an especially useful tool for assessing the quality of other researchers and research results. Although we deliberately asked the question directly and directly linking this statement to the 'personal quality' of the researcher, more respondents agreed than disagreed with this statement about GS. The same was true for that it 'seems more important for me to get cited.' While the agreement to these statements was lower for RG and especially Twitter, the share of positive responses was still quite substantial. In terms of age and gender, we found a similar pattern in the responses about the importance of being cited and being able to assess the quality of other researchers regarding GS and RG. For both ANSPs, more younger and male researchers than older

both older and male researchers agreed more strongly than female and younger researchers. In summary, while male researchers generally seemed to show a greater degree of competitive subjectivation on ASNPs, age effects were mixed.

To further investigate the level and extent of competitive subjectivation on ASNPs, we asked three more direct questions, namely about comparing oneself with others, seeing one's work in a competitive context and perceiving other researchers as competitors. Again, we deliberately decided to frame the questions rather provocatively and thus assumed that there was a substantial social desirability bias favoring disagreement to these statements. Nevertheless, although respondents majorly disagreed with all three statements, a substantial share agreed with these very explicit aspects of the enacted competitive subjectivation of ASNPs. The approvals were higher for comparing and seeing one's work in a competitive context than perceiving other researchers as competitors (see table 2). For RG, 41% of respondents (strongly) agreed that they compared themselves with others more often and 44% saw their work in a more competitive context. Moreover, one quarter reported that they perceived others as competitors. Interestingly, disciplinary background impacted the three questions on enacted competitive subjectivation on ASNPs quite differently. Social scientists reported comparing most strongly (GS: 51% agreement; RG 46% agreement), followed by economists (GS: 49% agreement; RG: 34% agreement), naturals scientists (GS: 41% agreement; RG: 45% agreement) and humanities scholars (GS: 31%; agreement RG: 29% agreement). The pattern was quite similar for seeing one's work more in a competitive

**Table 3: Disciplinary differences between competitive subjectivation on ASNP**

|  | Economics [%] | | | Natural Sciences [%] | | | Social Sciences [%] | | | Humanities [%] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | RG | Twitter | GS | RG | Twitter | GS | RG | Twitter | GS | RG | Twitter | GS |
| I compare myself more often with other researchers | 34,15 | 57,14 | 48,57 | 45,45 | 55,81 | 41,18 | 45,61 | 32,26 | 51,28 | 29,17 | 40,00 | 31,25 |
| I see my work more in a competitive context | 41,46 | 33,33 | 34,29 | 43,84 | 42,86 | 33,33 | 47,37 | 35,48 | 46,15 | 37,50 | 30,00 | 41,18 |
| I perceive other researchers as competitors | 26,19 | 28,57 | 22,86 | 28,00 | 23,26 | 15,69 | 25,45 | 26,67 | 25,64 | 16,67 | 25,00 | 12,50 |

and female researchers reported that citations were gaining importance due to their engagement on ASNPs. However, for the quality assessment role of ASNPs,

context and perceiving others as competitors (see Table 3).

Concerning age and gender, our results mirror the results about ASNP importance in section 5.1. Again, we found stronger agreement about all three items for enacted competitive subjectivation among male and, in most cases, younger researchers. The gender difference was quite striking: For GS and RG, male researchers (strongly) agreed significantly more about comparison than women (GS: male 52%, female: 37%, RG: 46%/38%), seeing one's work in a competitive context (GS: 44%/34%, RG: 48%/41%) and perceiving other researchers as competitors (GS: 20%/17%, RG: 29%/24%). Hence, although a majority of respondents did not report many aspects of competitive subjectivation, a substantial share demonstrated the critical competitive pressures in modern academia—particularly young researchers. In this respect, typical open responses read like the following: 'I also think it is hypocritical to pretend that one is not encouraged to see oneself in a competitive environment in all academic matters (project acquisition, job advertisements etc. etc.). Competition is promoted by all those responsible and often contradicts or prevents cooperative behavior.'

# 6   Discussion and conclusion

Our analysis of different aspects of enacted competitive subjectivation on ASNPs shows some revealing results. First, the high share of researchers using RG and GS indicates that ASNPs play an important role in contemporary academia, with the humanities being an exception (usage rates of 38% for RG and 24% for GS); this is in line with previous similar studies (e.g. Muscanell and Utz, 2017; Ortega, 2015). It is therefore telling that younger researchers tend to engage more on ASNPs and that 'gaining visibility'—or as one respondent shyly stated, 'gaining at least a bit of visibility'—is reported as one of the major reasons for ASNP use. By contrast, many users are well aware that their ASNP engagement depreciates other 'unevaluated' aspects of their academic work such as teaching, academic self-administration and science communication. Thus, our study shows that the need for self-presentation on ASNPs to attract attention and visibility and the deliberative exposure to competition on ASNPs has a formative impact on the everyday academic practices of many researchers.

Second, while our results suggest that ASNPs seem to contribute to an overall trend of competitization in academia, there seems to be a discrepancy between being aware of competitive pressures in general and reflecting and acting according to competitive principles on a very personal level. We found that the agreement with more explicit aspects of competitive subjectivation on ASNPs was much lower and not usually held by a majority. Nevertheless, a substantial share of respondents (strongly) agreed that they compared themselves more regularly, saw their work more in a competitive context and even perceived other researchers as competitors. Hence, the group of researchers that consciously perceives, reflects upon and thus enacts competitive subjectivation might be in the minority. However, as some of our open responses suggest, competitive pressures are often simply interpreted as 'rules of the game' in contemporary academia and that adhering to these rules is not interpreted as a competitive act by many researchers.

Third, we found some illuminating patterns in competitive subjectivation concerning gender, age and disciplinary background. Without exception, male respondents deliberately expose themselves more to competition, interpret academia more competitively, act more competitively on ASNPs and also see and perceive their work more strongly in a competitive context than female researchers, which is again in line with recent findings about gender biases in competitive behavior (e.g. Carpenter et al., 2018; Saccardo et al., 2018). These findings have nontrivial implications given the rise of competitive formats in academia (e.g., new excellence programs, Harroche, 2022) and are thus particularly alarming for science policies aiming at gender balances in academia. Similarly, our results about age are also quite clear: Younger researchers tend to engage more on ASNPs, perceive a stronger competitive pressure and also show higher levels of competitive subjectivation than their older colleagues. On the one hand, this could indicate tendencies of competitization in academia and thus suggest that the 'competitive self' could gain further ground among researchers. On the other hand, our results also reflect recent reforms in Austria's organization of the university system that was accompanied by a sharp increase in rates of short- and fixed-term-contracts (see section 2.1.1) and indicate the existence of clear hierarchies in academia. Given the various implicit and explicit negative implications of a high degree of competitive behavior in an academic environment, which is strongly organized according to quantitative research evaluation tools (e.g. Woolston, 2020 on the severe psychological pressure for postdocs), our results

also raise concerns about the future development of the Austrian academic system.

Fourth, concerning the disciplinary background of researchers, our results show that ASNPs hold much less importance in the humanities than in the natural sciences, economics and the social sciences. However, while natural scientists stress the high relevance of metrics in their discipline and also largely report experiences with metrics in their academic careers, competitive pressure and competitive subjectivation due to ASNP use was interestingly reported the most strongly by social scientists. Again, social scientists and economists also evaluated the importance of metrics in their field higher than their peers from other disciplines. Hence, our results suggest that the 'metric tide' (Wilsdon et al., 2015) seems to be of particular importance in the social sciences and economics and that ASNPs play a crucial role in this process. Perhaps it is because the 'competitive self', while barely established in the humanities, is becoming increasingly prevalent in these disciplines.

Our findings show that contemporary scholars are confronted with metrics and platforms that co-encourage competition-oriented subjects. Moreover, metrics co-produce the notion that they represent actual achievements and that scientists can be hierarchized according to them—that science is meritocratic (Gallas, 2018; Peter, 2017). Thus, ASNPs are not merely neutral technologies that simply measure and visualize scientific work for better or worse, and whose flaws could be fixed with better measurement tools in the sense of a critique *in concurrentia* (Ergen and Kohl, 2022). Rather, our survey results show that ASNPs shape social relations between scholars towards competition (which may also have the effect of isolating and making scientists less self-organized, see (Ullrich, 2019)). Hence, our results also raise *ad concurrentia* concerns about the far-reaching implicit and explicit consequences of the competitization of science in general. This intensification of the quantitative assessment of one's own work and its immediate visibility and universal comparability represents a broader societal trend, as evidenced by the increasingly important role of metrics in other social fields and professions such as docfinder, Lernsieg or Uber. However, in order to understand the relevance of ASNPs, it is important to also think about the context in which the platforms and metrics are used: Competition does not only take place in terms of scientific output, as found on ASNPs, but is linked in Austria to an increasingly tense academic job competition. Given the unstable professional situation of many scientists, metrics and platforms take on a special weight.

# 7   References

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