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7 Conclusions and general discussion

The past decades can be characterized by a growing awareness of the importance of human capital. Across all industries, the quest for talent has generally invaded society. Academia is no exception to this. Universities have openly made it one of their main goals to attract scientific talent. Human resource management is more and more turning into talent management, with several talent programs being implemented to attract, develop and retain excellent academics. Is talent within academia so scarce that we need this focus and these programs? Although there are differences between disciplines in supply and demand, in general it seems there is no real shortage of talent. The term 'War for Talent' (Michaels, Handfield-Jones and Axelrod, 2001) was introduced in times of increasing demand and decreasing supply, referring to talent as being a highly sought-after commodity. However, currently with regard to science, there rather seems to be a 'war between talents', with an oversupply of talents and an undersupply of academic career opportunities.

In this study we have aimed to unravel the frequently used term 'talent'. What exactly is academic talent? Here a distinction needs to be made between definitions and practices of recognition. Asking members of the academic community to describe the characteristics of talent is, in a way, a bottom-up approach to formulate a definition. We have also used a top-down approach, starting from the outcomes of talent selection processes to determine what is considered to be talent. Because of the growing importance of personal grants in the funding of academics, we chose the Innovational Research Incentives Scheme (*Vernieuwingsimpuls*) of the Dutch Research Council as specific context in considering talent selection. We studied how academic talent is assessed and selected, both by individuals and panels, taking into account the social and competitive nature of these processes. Furthermore, we looked at the role of gender in talent selection and studied performance differences between male and female academics. Finally, we analyzed the careers of academics who once were labeled as talents to identify factors supporting or impeding academic careers. This chapter will summarize the main results, instigating reflection on the current mechanisms of talent selection and its potential consequences for individual academics and academia in broader sense. While doing that, we will refer back to the validity of some of the claims and critique described in the introductory chapter. It concludes with several implications for practice and further research.

7.1 Summary of most important results

Chapter 2 analyzed the notion of talent based on 29 interviews with established researchers involved in the allocation of personal career grants. We compared the general notion of talent that academics value in their daily work to the concrete notion of talent within grant allocation processes. Everyone seems to have ideas about what talent is, but making these ideas explicit is quite a challenge. Generally it is found easier to point out talents amongst people we know directly or indirectly. This relates to the tacit dimension of talent, reflected in popular statements like 'you know it when you see it' and 'everyone will recognize real talent'. When predefining talents as those who stand out and can be considered of great value for a research group, university or science in general, experienced scholars largely agree upon which characteristics to ascribe to talent. First of all, they do not excel on one single dimension, but they possess both

social, professional and predominantly individual capital: most importantly, they are social people, have acquired prestigious grants, are able to work very hard, are ambitious and have published extensively. Seemingly, having outstanding research skills and an extensive publication record do not suffice to be considered an academic talent. Rather these academic skills and expertise are a basic requirement, and it is personal and social characteristics which distinguish real talents from their peers. As academic work is increasingly becoming team work, social skills like communication skills, ability to motivate others and to fit in a group, gain more importance. In the context of grant allocation, the definition of talent can be narrowed down to mainly professional capital: talents have published a lot, including as single author and preferably also without their current promoter and on new topics, they have written a well reasoned proposal in a generally comprehensible way, and they have international working experience.

Moreover, the obtainment of grants (especially personal grants) is considered a particularly important indicator for talent, also outside the concrete context of grant allocation. Personal research grants like ERC's starting grants and NWO's Veni and Vidi grants, provide grantees not only with financial resources, but also with considerable academic prestige due to their high symbolic value. Established scholars indicated the necessity of grants for further career development and generally perceived them as one of the few options for early career researchers to stay within science. The high symbolic value not only has to do with being able to acquire funding (a skill of increasing importance also for early career researchers), but with previous recognition of a person's quality, seeing that assessment criteria not necessarily include actual obtainment of grants, but also receiving positive reviews of grant proposals. The general claim of 'you know it when you see it' might therefore be rephrased to 'you know it because they saw it'.

Which components of talent are valued the strongest depend on the context in which evaluation takes place. With regard to talent selection within the Dutch funding program, the Innovational Research Incentives Scheme, the goal is set in advance in the call: to select talented, creative researchers who engage in innovative research. The procedure determines the input, the information available to reviewers. A written résumé and research proposal expose different characteristics compared to a face- to-face interview with the applicant. The interview phase was found to be very important (as also shown in *chapter 4*), enabling panellists to assess especially the candidates' individual and social capital and to test the tenability of their previous reviews based on the written applications.

With regard to the process of grant allocation, panellists indicated they faced two main problems: the broadness of the set of applications they needed to review and the small quality differences within the main share of applicants. As with the panel deliberation, no clear differentiation could be made using the objective and most common criteria (e.g. scholarly performance, international experience, innovativeness of proposal); more tacit and subjective criteria (e.g. personality, fit in the group, perseverance) come into play. Talent cannot fully be captured by objective criteria or expressed in scores even to two decimals places. Our study illustrates this by panellists describing how they reach their final decisions. At the end of the panel meeting when all proposals and applicants were elaborately discussed and scored, a ranking is calculated based on these scores. Several panellists described how they checked this ranking for correctness. Not whether the ranking was calculated correctly, but whether candidate A rightfully stood above

candidate B, disregarding the better score of A. Besides these more subjective criteria, selection outcomes are affected by factors inherent to the social nature of the group decision-making process (e.g. panel composition, speaking order and atmosphere within panel). Many panellists indicated to be aware of these various 'uncontrollable' influences. Despite the thorough selection procedure and time investments, they acknowledged their final decisions regarding the large set of applicants of equal average quality to partly be the product of arbitrary and subjective influences.

More insight on the social nature of grant allocation was detailed in *chapter 3*, which covers an extensive literature review on panel review processes. Many of the review and selection processes within science involve panel reviewing, a group activity. As this entails social interaction, group dynamics influence the review process. For this reason we combined studies from the sociology of science and science policy studies with literature from social psychology. Where the first mainly focus on how peer review affects review outcomes, the latter focuses on actual review processes. Research within social psychology predominantly deals with central mechanisms involved in decision-making processes and the context in which these are carried out. We designed a conceptual model of grant allocation processes, including factors related to the applicants, their application and their network, to the social process of reviewing and to the context in which it is performed. Characteristics of the applicant which were found to affect review outcomes are, for example, past performance, status of previous employers, research trail and research field, more specifically cognitive similarity between applicant and reviewer. With regard to panel deliberation, for example, the composition of the panel affects the represented expertise and sharing of information, the social identities of and status differences between panellists, and the communication within the panel. The decision-making process furthermore is open to influences from factors like group norms, motivational differences and strategic behavior. Finally, the available time and budget, procedural guidelines and the condition of accountability were found as influential context factors. The complexity of these types of processes reduce the predictability of its outcomes. Due to the (social) nature of this process, these influences can never be completely excluded (Lamont, 2009). According to Opthof and Wilde (2009), politics and personal bias affect review outcomes due to the difficulty of their task: while they succeed in filtering out work that should not be granted, it is generally impossible for reviewers to distinguish between good or excellent applications. This chapter explained how grant allocation is the product of human interaction, and therefore liable to a certain extent of subjectivity and arbitrariness.

Chapter 4 described a quantitative study on grant allocation and the evidence of talent. Statistical analyses of the review scores of about 900 grant applications were conducted. These involved personal career grants from the Innovational Research Incentives Scheme for researchers in different career phases. First of all, we found no clear 'boundaries of excellence', as there were very small differences in scores between those who were successful and those who were just unsuccessful. We did not find any evidence for the general claim (as also often heard in the interview study of *chapter 2*) that 'top talent is easily recognized by everyone'. Furthermore, the moderate correlations between the evaluation criteria suggests that talent is multidimensional and people can excel on different dimensions. Consensus on quality was found to be lower for researchers who were further in their career, as also within the Social Sciences and Humanities compared to Technical and Life Sciences.

The considerable changes in the assessment scores through the various phases of the selection process, indicate that talent evaluation is dependent on how it is organized, confirming that talent is context dependent as shown in *chapter 2*. The interview phase was found to be very influential proven by the considerable changes in the ranking of applicants after the interview, indicating the importance of the new information added to the selection process. At the same time we saw that the weight of reports of external referees, peers who are asked to review an application based on their specific expertise, is modest. Panellists, who cannot be considered real peers to all applications they have to review, can overrule these external reviews, e.g. when they disagree or when the reviews lack a clear motivation (see *chapter 2*). Furthermore, the panel has additional autonomy in decision-making. Finally, no evidence was found for a structural gender bias due to the panel composition. However, our findings do show that when women are better represented amongst the applicants and the panellists, biases in either direction seem to diminish.

Despite the rise of female academics, men are still overrepresented at the higher positions within academia. Can this be related to gender differences in academic performance? *Chapter 5* investigated whether the generally claimed performance differences between men and women still persisted in the younger generation of researchers. Based on publication and citation records of about 845 social scientists, recent scholarly performance was compared between established and early career researchers, in all social science fields together, and separately for psychology and economics. In the established generation, men were indeed found to outperform women. However, in the younger generation these differences had disappeared. Furthermore, in the younger generation the share of women in the top increased considerably compared to the established generation. An important factor that may contribute to the changing differences is the considerable increase of the share of women. Compared to the established generation, the share of women in the younger generation has doubled (from 23% to 45%) and in psychology, women are even overrepresented (55%). If these differences do not emerge in later career phases after all, the disappearing performance differences may be a stimulus for changing gender relations in science, as numbers of publications and citations increasingly influence academic careers, especially in the early career phase.

Chapter 6 explored which factors influence academic talents to stay in academia or to leave. This qualitative study was based on 42 interviews, labour market data and performance data. We compared the careers of pairs of similar researchers (in terms of generation and research field) that were considered as very talented in their early careers. One had a continued academic career, the other left academia. First of all, we found considerable differences between academic career structures, implying it is not necessary to take short career steps to achieve a successful academic career. Next, whereas cultural capital (educational background of parents and school performance) does not seem to influence career paths, social capital does. Mentor support and network building opportunities were found to be especially important. With regard to family situation, support of a partner is necessary, and as amongst the stayers, far fewer women than men had children, our findings suggest that having children does matter for successful female scholars. Furthermore, an important problem related to the career system that was generally mentioned was the lack of flexibility and clear career perspectives. With regard to intellectual capital (scholarly performance), no systematic differences were found between stayers and leavers. This study does not confirm that the university system always preserves the highly

productive researchers, as leavers were even found to outperform the stayers in the final career phase. Finally, we did not find one single factor determining which talents are preserved for the university, but rather an accumulation of (dis)advantages, including coincidences.

Next, we will reflect on potential consequences of the current selection practices for the supply and development of talent. Taking the results of this study as a starting point, we will outline a few potential scenarios that will refine some of the claims described in the introductory chapter. These scenarios are no direct results of this study, but are meant to stimulate further debate on talent selection and academic career development.

7.2 Further reflection upon the current selection system and its accompanying criticism

Science is growing more and more competitive, especially with regard to resources and positions. The general principle of competition is that it should improve quality and transparency. At the higher levels of science and universities this might largely be valid, but at the individual level only a small group benefits from it. Those who 'win' receive considerable recognition and a positive boost to their career (Bloch, Graversen and Pedersen, 2014). But many of those who 'lose' (even when they are considered to be 'just as good') leave academia or stay in temporary positions without any clear career prospects. After years of insecurity and job-hopping, a switch to a career outside academia could be complicated by a high degree of specialization and a higher age (Broersen, 2003). But there seems to be a growing awareness that at higher levels, competition does not only yield positive results. Most extreme are people caught out after unethical behavior and fraud, claiming they felt forced towards this because of severe competition. Starting from our findings and taking them a step further for reflection, what potential consequences do the current selection mechanisms have for the supply and development of academic talent?

7.2.1 The significance of publication records and competition

The strongest criticism concerning current scientific practices is directed at the overpowering role of publishing in 'surviving' and building a career within science. Quality nowadays seems to a large extent to be defined as productivity. Universities seem to have internalized the performance culture and rhetoric to such an extent that academics even define and regulate themselves in terms of dominant performance indicators like numbers of publications, citations, or the H-index. Academics are evaluated on their contribution to the performance of the organization instead of their contribution to the professional and intellectual community (Morley, 2005). Consequently, publishing scientific articles seems to have become the goal of academic labour. The enormous pressure to publish is criticized to a growing extent, as it is considered to have detrimental effects, e.g. encouragement of fraud and salami science. In fact in my opinion it leads to an inflation of the scientific article: who still has the time and interest to read the multitude of publications? What is the added value of each publication, more often describing smaller parts of research, to knowledge production or to its societal use? Due to the perception of publishing as a goal of academic work instead of a means to distribute knowledge, less attention is paid to what is really done with newly accumulated scientific knowledge.

High numbers of publications and citations indeed seem to be particularly important to aim for when you want to succeed in academia as an early career researcher. Having an extensive

publication record adds to career opportunities within science, although this study showed that it is a condition but not a guarantee for success. Moreover, our results question the overpowering significance assigned to these performance measures in the debate, as they were not found to be entirely decisive. If they would have been, we would have seen clear cut decisions, but we did not. Where previous studies already showed that allocation outcomes are not just based on publication records (see also Bornmann, Wallon and Ledin, 2008; Melin and Danell, 2006; Van den Besselaar and Leydesdorff 2007, 2009; Hornbostel et al., 2009), this study described what other types of information are used in selection processes. Various personal and social characteristics are included, particularly in face-to-face assessment during the interview, which was found to be highly decisive. This can be considered a positive finding, as academics are involved in more activities than only publishing excellent papers, e.g. teaching, providing supervision, managing research groups, collaboration or distributing knowledge to society. Referring to the last activity, attention is being paid to the contribution of academic research to wider society to an increasing degree.

Nevertheless, publication counts are dominant in the rhetoric of current debates on performance measures and talent selection. This rhetoric seems to be very powerful, although its exact power needs further research. It would indeed become dangerous if the various players within academia will start to believe and adjust to it, as we already see happening. Should this rhetoric affect academic career opportunities, it might induce a constriction of academic talent. Henceforth talent might mainly stand for proven academic achievements instead of potential quality and performance, predominantly supporting career opportunities for academics who manage to publish a lot and obtain lots of external funding. This scenario could potentially lead to a more uniform model of 'the talented academic', as the variety in types of talented academics and their skills would be diminished.

A more uniform model of talent may also be a consequence of growing competition. As science is getting more competitive, especially with regard to research funding, talent selection is also strongly characterized by competition where excellence is required. Generally candidates are compared to each other and the number of candidates who can be identified and selected as talent is limited. The challenge of having to compare candidates is that it forces reviewers to make their criteria explicit. On the one hand this contributes to the fairness of the procedure, as it avoids candidates being assessed on different (implicit) criteria. On the other hand, it causes the 'objective' performance criteria to predominate over criteria related to personal or social skills. Numbers of publications, citations and grants, or years of international experience, are easier to compare than, for example, motivation, perseverance or communication skills (see also Musselin, 2002). While academic talent ideally is perceived as someone excelling on a broad range of characteristics, academic, personal and social, talent selected within these competitive programs might to a large extent be narrowed down to more easily and objectively measurable characteristics, like academic performance. However, when 'measuring' academic performance by counting numbers of publications and citations, one should realize that more need not always be better, as high performing scholars may be less influential than low performing scholars (Waltman, Van Eck and Wouters, 2013).

7.2.2 The high symbolic value of grants

Besides publications, research grants are strongly related to prestige. Academics who managed to obtain significant grants are seen as very talented, considerably increasing their chances of receiving subsequent resources compared to those who have not obtained grants (yet), in line with the well-known *Matthew effect*. Universities currently tend to strongly focus on supporting and improving the grant success of their academic staff. There have even been opportunities in the recent past to apply for grants which enabled academics for some period to prepare a grant application for the Dutch national or the European research council. Grant acquirement is often explicitly included in universities' selection criteria in recruitment or promotion procedures.¹

However, this study showed there is quite some uncertainty regarding grant allocation decisions. Although the few at the top and at the bottom are rightfully granted and rejected respectively, within a large pool of applicants quality differences seem minimal. Moreover, due to the social character of the panel review process, decisions are liable to subjectivity and arbitrariness. Then there is the time and information available to reviewers to found their decision with regard to talent selection. There was a general awareness amongst panel members that the grants they distributed were vitally important financial resources for early career researchers in order to develop an academic career. As these grants therefore are considered *career* grants instead of just *research* grants, the assessment of the applicant is an important part of the selection procedure. The information available on which to base the assessment, is composed of written résumés, a half-hour presentation by a selection of the applicants and perhaps some anecdotal information. Compared to the richness of information that can be gathered by people working close to the applicant, for example, this input can be considered fairly restricted, when we take into account that the resumes of early career researchers are generally not clearly distinctive. Despite acknowledgement of the various uncertainties characterizing the allocation process, these grants are still ascribed major symbolic value. Minor differences in quality are enlarged to major differences in recognition and thus in career opportunities.

7.2.3 Gendered impediments

With regard to gender, the rhetorical emphasis on publishing and acquiring funding can be considered to be detrimental to female academics. It reinforces the 'masculinity of excellence', as it forces people to work long days, fulltime and overtime, with inflexible work schemes, to always be available and because it attributes more value to research than to teaching achievements. As women generally are entrusted with more caring tasks, therefore being less flexible and as they are more involved in teaching, women are disadvantaged (Bleijenbergh, Benschop and Vennix, 2013; Mason, Wolfinger and Goulden, 2013). This may result in fewer women making a career in science, encouraging them to seek an alternative career path and consequently resulting in a potential loss of talent for academia.

Next, implications for practice will be given to prevent a loss of academic talent and support academic careers of early career researchers.

1 See for example <http://www.ugent.be/nl/actueel/vacatures/zap/erc-consolidator-grants>

7.3 Implications for practice to uphold and stimulate talent

7.3.1 Create more clarity on career perspectives

A complicated issue with regard to talent selection is the question of what is the right moment for selection. While research career opportunities are scarce, it may be more efficient to select at an early stage of people's careers. Resources can be invested more effectively in a smaller group of high potentials, enabling them to fully focus on developing themselves as excellent researchers. Those who do not make it through the selection can concentrate on other career paths, saving many of them years of drudging work, submitting numerous grant applications and cherishing hopes without yielding any career certainty. However, the disadvantage of early selection is that talent has not yet had the opportunity to fully develop, leading to more differentiation between academics. Selecting too early in the development process, when diversity is limited, creates the risk of missing out on talent and potential excellence in the long run.

7.3.2 Pay attention to a broad scope of skills

Because of the high level of uncertainty and the lack of clear career perspectives particularly for most of the early career researchers, high potentials should be well supported and supervised. Currently the focus in HRM policy seems to be on organizational interests, increasing the distance from the needs of individual employees (Thunnissen and Fruytier, 2014). Instead HRM programs could stimulate academics to broaden their view and to reflect upon their capabilities, not only in terms of performance, but in terms of skills and experience. Currently, the résumés of researchers predominantly convey their publications, grants, international experience, awards and teaching experience. When this is perceived to be most relevant, other experiences and skills (e.g. related to organizational expertise, entrepreneurship activities or software use) are often overlooked and not described on résumés. Consequently, these other features cannot be reviewed and will not play an important role in selection processes. In order to enable reviewers to broaden their review criteria and to facilitate comparison of these broader criteria, academics should develop portfolios in which these are included.² This may enhance their self-awareness of their usefulness and employability inside and outside academia.

Moreover, the state of academic talent may benefit from a softening performance culture. Because of the emphasis on publications and grants, other valuable skills are often far less appreciated. Although criticism on the dominance of productivity measures and requirements is augmenting, no real alternatives are currently implemented. For example, to reduce the publication pressure, academics may no longer be assessed on their total number of publications, but on a limited number of their best achievements (not necessarily scientific publications). To an important extent it is up to academics themselves to initiate change, since they are mainly responsible for the assessment, selection and recruitment within science. It is the academic elite sitting in review panels for the evaluation agencies or research councils who set the norms, criteria and priorities according to which academic activities, and thus academic reward and

2 Part of the ACUMEN project (funded by the European Committee in the 7th Framework Programme) is development of portfolio's reflecting researchers' careers and experiences. These portfolio's enable researchers to provide adequate evidence regarding their various activities and development (<http://research-acumen.eu/>).

careers, are evaluated (Musselin, 2013; Thunnissen and Fruytier, 2014). Reviewers tend to search for candidates who look like themselves, have similar characteristics, work in similar ways and can be imagined as their colleague; also described as a bias towards homothetic recruitments (Musselin, 2002). This is in line with the rationale of composing grant panels in the Dutch *Vernieuwingsimpuls*: they generally consist out of former laureates. Academics previously identified as talent are equipped with the task of identifying new talent. This automatically sets a kind of blueprint for the candidates they are looking for. Due to the growing importance of review practices and its use by university managers as management tool, the academic elite is reinforced (Musselin, 2013) and therefore the main target group when it comes to changing performance culture or selection criteria.

7.3.3 Dare to commit

As shown in this study (*chapter 6*), linking early career academics to a mentor is an important instrument for career support. Furthermore, to prevent loss of talent, high potentials should be offered clear career prospects. Nowadays career opportunities are still strongly dependent on (unpredictable) vacancies and obtainment of grants. Universities should create more possibilities for departments to retain early career academics who are considered to be highly talented. Their talent policy does not need to depend to a great extent on decisions taken by grant panels. If they are convinced of someone's talent, they should have the courage of their convictions and organize their resources to commit themselves to this person and to invest in him or her. In order to rightfully appreciate talent, especially with regard to early career researchers, researchers should not only be assessed within competition, but to a larger extent on their own (unique) merits, offering more room to a broad variety of talent dimensions, including the often distinctive tacit dimension.

Another way to retain talent, particularly female talent, is to enhance the flexibility of the HRM system. Inflexibility is an important factor impeding academic careers, as shown in this study. Career development could for example be supported by more flexibility in working schemes, working on and off site, opportunities to work part time and to better balance professional and family life (Dijkers, Van Engen and Vinkenburg, 2010). This could subsequently stimulate gender equality within academia by contributing to a change in the organizational culture at universities, making it less masculine.

7.3.4 Aim for differentiation

To conclude, the current focus on research excellence contributes to the image that academia is only looking for top researchers. Obviously, Dutch universities are not exclusively involved in research, as their main task still remains education. There is more to academic work than conducting research, and not all starting academics aspire to become a professor or a top researcher, (which is just as well as there are insufficient posts for these aspirants). Due to the increased size of the higher education system, universities therefore need to aim for differentiation in academic functions and careers. Besides researchers and teachers, universities need people with expertise in management, organization, fundraising and valorization for example. Excellence can also be applied to these other tasks, and enhancement of academic prestige should also be possible through achievements related to these tasks. Universities should provide room for top teachers or top 'valorizers', who are hardly or not involved in research activities. Various types of career paths

should be stimulated and supported, in which the variety of academic tasks are more equally valued, instead of predominantly valuing research activities.

With regard to evaluation and selection of academics, differentiation of assessment procedures could result in a broader variety of talent being recognized in practice. For example, including interviews in evaluation procedures enables reviewers to assess communication and personal skills, which cannot properly be assessed from written applications or résumés. Variation in procedures prevents a bias towards preferences for a restricted set of skills. Finally, attention should also be paid to diversity within evaluation panels in terms of gender, expertise and status, as panel composition affects the evaluation outcomes.

7.4 Implications for future research

In the interviews with panellists gender was not put forward as an important or sensitive issue. While talking about the review process and describing talent, gender was hardly ever mentioned, neither by male nor female respondents. Only to the concluding question, if they had any questions or final additions, several of them responded with 'I expected you to ask me about gender too', followed by 'it did not play any role within our panel'. From other studies we know gender biases can be unconsciously influencing people's behavior, for example, as it is often implicitly embedded in organizational cultures. Asking people about their behavior implies asking them to reconstruct their behavior. This is expected to yield different results from actually observing their behavior. Systematic observations of review or recruitment panels would be very valuable in order to identify the more subtle impact of gender on review processes. They will also enable researchers to better understand the implicit mechanisms which enter into panel review processes and to understand how group dynamics affect the panel decisions. We looked at grant allocation from a social psychological perspective and identified various factors and mechanisms inherent to the social nature of panel reviewing that influence these selection processes. Selection outcomes were found not to be fully determined by track records, leaving them partly unpredictable and intangible. We consider our study a valuable contribution to the existing body of knowledge on peer review and grant allocation, but it requires further investigation on how these factors and implicit mechanisms more precisely affect the actual selection outcomes. Observational studies would be an important and essential method to answer these questions.

This study showed how grants are given strong symbolic value and are perceived to be almost a requirement for academics to develop their academic careers. At the same time we pointed out the power of rhetoric and its potential influence on people's behavior and on policy. Further research is needed on the effects of rhetoric and to find out what the real value and impact of these grants are on individuals' careers. To what extent are they requirements or guarantees for successful academic careers? Is it possible to have a successful career without these grants and does being awarded a prestigious grant always mean you will have a successful career? As career opportunities differ per discipline, comparisons between disciplines would be relevant to get more insight into the impact of grants.

Furthermore, gender differences in scientific performance were found to be disappearing. While in the established generation of researchers men were outperforming women, in the younger generation women performed at least equally to men. This study covered the social sciences.

Although fields like psychology, economics and education are covered rather well in publication databases of Web of Science, fields like law and political science are included to a smaller extent, therefore limiting our results. To determine how solid and generally valid our findings are, replication of this study in other disciplines (with high Web of Science coverage) is recommended. Finally, longitudinal research is needed to study if these performance difference have really disappeared in the long run or if they have shifted towards later career phases.

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