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Affording excellence: What does excellence funding do for researchers?

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ABSTRACT

The ambitions to fund excellent researchers and path-breaking research unite a whole family of funding instruments ranging from Centres of Excellence to individual grants. While instruments aimed at funding excellence share a number of commonalities, there are important subsidiary features which determine their overall efficacy. The paper uses a case study of the Swedish Distinguished Professor Grant (DPG) to investigate the role of subsidiary features in enabling conditions associated with path-breaking research. Interviews were conducted with DPG recipients, to develop an “affordance analysis” identifying how features of the instrument enabled certain researcher actions and opportunities. Results suggest that while long duration and large funds are central to research excellence, the way in which subsidiary features such as reporting, planning and content requirements are structured affect the level of risk-taking. In terms of policy, the paper offers specific and general suggestions for the design of excellence funding instruments.

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1. Introduction

This paper addresses the question of how an excellence funding instrument promotes excellent research, in terms of how the combination of specific features of the instrument stimulates favourable conditions for path-breaking research. It also aims to demonstrate a methodology for capturing such insights, namely affordance analysis. The designation “excellence” has come to indicate a particular form of research funding – one that targets top performers in science and offers them substantial resources, for longer time period than is usual. The most well-known form of excellence funding is that of Centers of Excellence (CoE), where a group of several researchers are expected to coordinate efforts over a period of time, usually ten years, typically “under one roof”. The assumption is that this arrangement builds capacity and captures synergies, thereby increasing the chances of new discoveries (Heinze 2008; Hellström 2018). Typical examples of

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CoE funding include the Swedish Linnaeus Centers, the Swiss NCCR programme and the Norwegian SFF scheme. The collectivist slant of the CoE, the idea that a network of scholars applies for money and form a group from day one, can be contrasted with a more individually oriented mode of funding, where an individual researcher is granted a similar level of funding for equal or a longer time period. This individual is then expected to use the funding to build an environment and advance her own research programme. Examples include the European Research Council's (ERC) Advanced Grant, the Norwegian Research Council's Renewal Grant and the not-so-typical Swedish Distinguished Professor Grant (DPG), which is the subject of this study.

The study of research funding instruments is part of an emerging sub-field of science policy studies that takes as a point of departure the idea that the organization of science funding, e.g. priority-setting and programming, funding instruments, peer-review arrangements and evaluation systems, have an impact on the type and content of the research produced (de Rijcke et al. 2016; Whitley and Gläser 2007, and a special issue in *Minerva* devoted to the topic in 2018). The influence on science exerted by these arrangements can be more or less formal, more or less technical/direct or discursive/indirect, and amounts to a form of "epistemic governance", the conditions of which need to be more clearly understood (Jacob and Hellström 2018; Pearce and Raman 2014). The focus on the interplay of epistemic aspects of science and its institutional context, e.g. funding, may be traced to Rip's (1981, 1997) socio-cognitive approach to science policy, which makes the useful observation that scientific and policy norms interrelate, and policy instruments themselves integrate ideas of science with various effects on the latter. Rip (1981) pointed out that the sphere of science and that of policy have cognitive/epistemic aims (such as understanding, simplicity, legibility etc) as well as procedural/social norms (such as efficiency/efficacy, validity, relevance etc.) that form relationships with each other when confronted in certain institutionalized settings, such as priority setting, funding and evaluation. In the context of science funding, a number of researchers have begun to consider how this influence ought to be studied and theorized. For example, Laudel and Gläser (2014) investigated how "funding opportunities" offered by the ERC connected to certain "epistemic properties" of the conducted research, and elaborated on how this relationship can be studied through qualitative content analysis (see also Gläser and Laudel 2019). In the present paper we build on this approach, and frame it within the tradition of affordance analysis, where pace Rip (1981, 1997) the relation between the cognitive and the social is a central concern (see also Gibson 1979; Norman 1998). Affordance analysis typically looks at how features of an object, in this case, a funding instrument, facilitate or *afford* certain actions given the involved actor's circumstances and abilities. This is a form of technology or instrument-oriented analysis of the epistemic effects of funding, in which the funding instrument is analysed in terms of those features likely to affect the conditions, and in extension the work of the researcher. In affordance analysis, this may be expressed, for example, in terms of how such features are structured, e.g. sequenced or bundled, and how they operate, e.g. socially, cognitively or normatively, on the grant recipient (for a more detailed review of this approach, see Hellström and Jacob 2017).

Affordance analysis enables us to illustrate in which ways specific combinations of features in funding instruments produce possibilities for the funded researchers. In line with a socio-cognitive approach discussed above it thereby enables an analysis of the links between "social technologies" (such as those found in organizational funding requirements typical of

CoE and some large project grants) and the cognitive possibilities they enable (such as new collaboration and discoveries). The present case is especially useful for such an analysis. The Distinguished Professors Grant (DPG) funds high-performing researchers who aim to produce break-through research. The DPG may therefore be said to belong to the family of instruments that combine high volume and long duration funding. Notable others are CoEs and ERC grants. The DPG is distinguished from the others in so far as it combines the basic features (volume and duration) with a number of subsidiary implementation features (modalities) not typically found in other excellence funding instruments. In this paper, we will show how the autonomy/discretionary opportunities afforded by the DPG combine with a set of main funding instrument features (high volume, long duration) and additional subsidiary features in stimulating central conditions for excellence. The DPG case offers important lessons for funders to improve instrument design and bundle modalities to tailor instruments to promote excellence in specific ways. Further, this case enhances our understanding of how project funding may be used to promote ends that are normally associated with institutional funding. Project funding and institutional funding are normally seen as operating in different parts of the spectrum. Institutional funding is generally seen as more suitable for long-term support of open-ended/green field research (Whitley 2014) while project funding is regarded as more suitable for targeted or strategic objectives (Franssen et al. 2018). Excellence funding breaks with this distinction between project and institutional funding and is therefore worthy of attention, not least because of its implications for managing higher education institutions. The DPG case that is the object of this paper is a further development of excellence funding which gives us the possibility to both complement and extend our understanding of such funding.

In what follows we will review some extant research on research excellence and excellence funding. Our review is divided into two parts, the first of which summarizes some aspects of individual excellence typically relevant to the funding decision, and a second that focuses on excellence on the group level. This review of literature is followed by an outline of the methodology of the study and the results. The paper concludes with a discussion of how conditions for excellence correspond to features of the funding instrument, as well as implications for excellence funding.

2. Research excellence and excellence funding

Research has shown that although several of the qualities that signify research excellence are field independent, the most important markers of excellence tend to be field specific (Abbott 2014; Korom 2020; Lamont 2010). However, while researchers treat research excellence as a variegated concept, a perusal of research funding practices reveals that excellence funding tends to rely on a unitary definition. For example, Research Excellence Initiatives (REIs) have typically stabilized or institutionalized certain indicators of excellence by making them basic eligibility requirements for acquiring funding (see European Union 2019; Swedish Research Council 2019). Once a researcher is able to meet those requirements, then field-specific judgements of excellence may be applied.

In this way, attaching excellence to a researcher seems to be a relatively simple matter. Funder eligibility requirements typically establish individual excellence as a more or less recent track record depending on the instrument (ERC goes back 10 years; Swedish Research Council, 8 years, etc.). Bornmann and Williams (2017) contest this focus on

recent productivity and state that researcher capacity to be excellent can be predicted from the types of journals that s/he publishes in already as a junior researcher. This finding is confirmed by Lindahl (2018), who states that in mathematics, excellence can be predicted already from performance in the first four years of a researcher's career. Sandström and van den Besselaar (2016) take a position closer to the one reflected in funding calls by arguing that both quantity and quality matter as predictors of excellence.

The researcher's most recent performance is further reduced to specific types of achievements. All funding instruments for excellence require demonstrated productivity in terms of publications, other types of funding attracted, and reproduction in terms of supervision of doctoral students and postdocs. Far from being invisible, as argued by Lorenz-Meyer (2012), care for doctoral students and postdocs is valued by funders and researchers as indicative of research excellence. The focus on care for early career fellows as an evaluative measure is related to the conviction that "excellence breeds excellence" (Whitley 1982). Giacomo, Tagliaventi, and Cutolo (2019) and Korom (2020) provide recent confirmation of this assumption. Giacomo et al.'s study of Italian academics showed that even moderate-performing academics were positively influenced by being placed in groups with high performers. So, REIs treat individual track record as the most important indicator/predictor of a researcher's capacity to do path-breaking work. As we will see, the focus on track record in the selection of grantees has implications for how REI features ought to be conceived.

The specific excellence criteria are usually expressed in terms of epistemic qualities of the proposal or qualitative assessments of the type of contributions made previously. These qualities should also be regarded as *ex-post* epistemic quality criteria, i.e. as representing outcomes of interests from an excellence funding instrument. Typically, excellence in these dimensions focuses on methodological rigour and novelty/originality in the problem/hypothesis. The most typical type of contribution seems to be that of promising a conceptual/theoretical advance in the field. Philipps and Weißenborn (2019) in a study of the Volkswagen "Experiment!" programme identified four modes of such contribution, viz. solving practical problems; exploring specific phenomena by indicating unknowns and identifying new patterns; expanding confirmed knowledge by indicating shortcomings in theory; and offering alternative theory. Dirk (1999) was able to identify a number of cases of "methodological novelty" viz. methodological advance on existing problems, extension of standard methods and proof of "methodological concept". These contributions are typically more time and resource consuming than conceptual/problem novelty, since methodological commitments are typically more stable over time than theoretical ones (Laudan 1979; Nola and Sankey 2013). Guetzkow, Lamont, and Mallard (2004) and Guetzkow and Lamont (2016) identify "original approach" as central, which may involve original topic, original data, and original method, i.e. a mix of the above.

Just as REIs prescribe that a specific set of performance criteria characterizes an excellent researcher, so too do they assume that excellent research environments can be expected to exhibit a well-defined set of properties. Hellström, Jabrane, and Brattström (2018b) and others maintain that these organizational properties include capacity for high scientific quality; high productivity; demonstrated ability to attract resources; well-defined research focus; high visibility and good capacity to attract international talent (see also Bloch, Schneider, and Thomas Sinkjær 2016; Brorstad Borlaug 2015). As can be seen, these qualities may be regarded as the productive elements of an excellent

research environment, as well as of excellent individuals. Also reflected in call requirements and evaluations is a reproductive dimension, in that many REIs incentivize the promotion of early career researchers. This reproductive dimension of excellence relates to what Hellström (2018) refers to as the capacity-building objective of excellence funding, which also include factors such as network stimulation, skills development and transfer of expertise from one area of research to another (see also Heinze, Rogers, and Senker 2009; Hellström 2012; Tjissen 2003).

There is reason to believe that REIs that target excellent research environments such as Centers of Excellence or even Networks of Excellence differ in at least one respect from those that target individuals. The typical CoE is expected to gather a number of senior researchers, who work on related topics in the hope that the resultant increased interaction would lead to new discovery. There is an assumption that REIs are able to promote epistemic effects such as interdisciplinarity and cross-specialism interaction (Hellström, Brattström, and Jabrane 2018a; Langfeldt et al. 2015). A general aim for all REIs though is the desire to promote the formation of a particular type of research organization characterized by resource availability, long-term focus and “critical mass” (Bloch, Schneider, and Thomas Sinkjær 2016). The basic assumption is that the favourable resource situation will stimulate a particular type of research culture (Cremonini, Horlings, and Hessels 2017). Resource agglomeration is one of the typical characteristics of instruments that target excellent research environments or individuals, and resource agglomeration is used both as an *ex-ante* and *ex-post* quality criteria (Hornbostel 2001). Reasoning from the design of extant REIs, funders seem to converge on the idea that duration and amount of funds are two indispensable resources for excellence to flourish (Bonaccorsi and Daraio 2005; Cremonini, Horlings, and Hessels 2017; Hellström, Jabrane, and Brattström 2018b). Bourke and Butler (1999) found that researchers with long-term funding had a higher impact in terms of quality, than those with short-term funding, and others have also shown that duration is positively correlated with excellence (Hellström 2012; Hellström, Brattström, and Jabrane 2018a; Laudel and Gläser 2014). For example, Franzoni and Stephan (2023) suggest that the risk involved, *ex ante*, in project funding involves questions such as whether the project will “involve exploration with the potential to lead to unexpected findings”, or that “the research involve solving conceptual or methodological problems that may result in secondary outcomes” (7). Such potentialities are clearly favoured by research grants that cover longer time spans and allow for financial slack. This is also supported by Hellström, Brattström, and Jabrane (2018a) who found that longer time-frames and slack tended to support exploration of new lines of inquiry and testing of risky projects.

Size is operationalized in REIs in two ways, group size (critical mass, capacity building) and grant size. REIs cover both these dimensions in that these instruments are usually large (€2.5 m – €5 m over 5–10 years) in the case of the individual grants, and (€5 m for 5 years) for the group grants (Hellström 2018; Langfeldt et al. 2015). However, results are not unambiguous. Bloch, Schneider, and Thomas Sinkjær (2016) show that larger centres of excellence are subject to a reduced level of performance or perhaps a levelling off after a certain period. Ziman (1989) argued the concentration of resources had positive effects depending on specific conditions, and recent research suggests that resource agglomeration may be more efficacious for STEM subjects than the humanities (Brorstad Borlaug and Langfeldt 2019). In addition, Fortin and Currie

(2013) argue that diversity rather than grant size promotes impact measured in terms of publication per unit of money invested. The increasing diffusion of REIs suggests that funders are, for a variety of reasons, betting that resource concentration and duration of funding are necessary determinants of individual and group excellence.

3. Method

3.1. Case background

The empirical base for this paper is one case study of a funding instrument with interesting features for understanding excellence and volume funding. It offers distinctive possibilities for drawing inferences in terms of how instrument modalities and features are causally efficacious in terms of supporting research excellence (via the mechanisms operating in the funding situation and concomitant funding expectations) as well as a contrast case with regard to similar instruments. Following Miles and Huberman (1994) we use a critical and theory-based case. Such a selection logic assumes certain principles for generalizability or translatability into other contexts. One of these is that the case illustrates some important key principles that similar cases depend on, and that the framing of these principles (e.g. within the context of how an instrument combines features to accomplish an aim) allows theoretically significant conclusions to be drawn about a domain of action (such as research funding). This is the ambition of the present study.

The Distinguished Professors Grant instrument was first launched by the Swedish Research Council in 2013 and a new call has been opened every other year thereafter. This brings the total number of calls to four at the time that this research was initiated, and each call funds 10 scholars. Researchers from any discipline were allowed to apply and the aim of the funding is “to create conditions for the most distinguished researchers to conduct long-term, innovative research with great potential to achieve scientific breakthroughs. The grant will also promote the establishment and development of a research environment of highest quality” (www.vr.se).

Each recipient of the Grant receives a total budget of €5 m distributed over a period of 10 years. In order to be eligible to apply, the researcher must be in possession of a doctoral degree at least twelve years before date of application. Scholars are required to submit a five-page description of their project idea. Unlike the ERC individual grants, the DPG requires no specification of how the budget will be spent, or annual reporting. Grantees have the freedom to move resources in different directions to accommodate changes in the implementation of their projects. Similarly, the project plan required in the application demands only indicative details about implementation rather than detailed Gantt charts outlining how the project is expected to unfold as it progresses. In 2015, the funding agency introduced two additional demands to the call. The first of which was that applicants were required to outline how they would use the funding to build a research environment. The second was that recipients of the Grant would have to submit five-year reports. This implies that at the time at which this research was conducted, the first cohort (2015) who were required to submit five-year reports had not yet done so. Recipients were evaluated by interdisciplinary panels of international researchers. The panels were medicine and health, natural sciences and engineering, education sciences and humanities and social sciences.

3.2. Data collection

At the time we conducted our interviews, the total population of recipients was 29. We contacted all recipients but only 18 agreed to be interviewed. These recipients come from four generations of the Grant since 2013 and cover all of the disciplinary categories that are eligible to apply. We interviewed one programme officer to verify the background information regarding the grant, such as aims and motives, implementation and financial information. We also collected supplementary background material covering these aspects from the funder homepages. The research council's funding activity is organized around four disciplinary groupings, each of which has a budgetary allocation for all of its funding activity. The four groupings are medicine and health, natural sciences and engineering, social science and the humanities (including educational sciences). These groupings correspond roughly to the evaluation panels to which applicants' proposals are sent.

Only one of the total ten possible grants to be awarded is intended to be awarded for research in the humanities and social sciences (HS). A total of five grants were awarded to HS (sociology, economics, psychology, archaeology and interdisciplinary social science). Since 2019, there has been no DPG call open to the humanities and social sciences. Six of the grantees in our sample came from medicine and health (MH) and six from natural sciences and engineering (NE). One grantee had a project that included elements from both natural sciences and engineering as well as medical and health sciences. All of the projects with the possible exception of one HS project were interdisciplinary even in the cases where the researcher listed a particular discipline, the keywords provided indicated interdisciplinarity.

The interviews were conducted in English with the grantees and focused on the relationship between the funding instrument, the research carried out during the funded period, and the research environment. All interviewees were provided with information about our research project and what we proposed to do with the interview material. Specifically, the interviewees were asked to address questions about how the grant had actually affected the circumstances for their research. Interviews were conducted face-to-face and digitally, and typically lasted for 45 minutes to one hour. The interviews were informal in character, following a semi-structured format where the researchers posed follow-up questions and asked for examples where deemed necessary. All interviews were recorded and transcribed verbatim, and respondents were invited to verify interview transcripts to ensure correct rendition and to indicate the presence of sensitive information. Since the interviews aimed to facilitate interpretations of cause and effect, or pathways of influence, the interviewers worked with various "probes" such as exemplification, "laddering up" and "laddering down" (alternate between asking for explanations and examples) (Cresswell and Cresswell 2018).

3.3. Analysis

The interview material was pre-structured according to template analysis (King 2012), in order to facilitate attributional coding and an affordance analysis. The template used was derived from previous research on instrument affordances (Gibson 1979; Hellström and Jacob 2017), where the main analytical categories are *the instrument* (which possesses

certain features), *the target/researcher* (who has certain dispositions and interests) and *the environment* (where existing structures, processes and resources are required for absorbing the effects of the instruments, and which are in turn affected by the instrument). The authors utilized a type of affordance analysis that emphasizes the action-supporting aspects of the studied instrument, or what the actor is “better able to do” as a result of having received funding (Chemero 2003). The present analysis does not attempt to attribute causes for behaviour. Instead, it tries to capture the conditions facilitated by the instrument that makes certain actions easier, and that enables types of activities already in place to be maintained (the distinction between causality in terms of “producing” and “maintaining” mechanisms is outlined by Craver and Darden 2013).

In order to do this, a qualitative content analysis/general inductive approach was used to analyse the transcripts (Thomas 2006). This implied going through the transcripts in detail and identifying “meaning units” (Giorgi 1997), segments of text, where some kind of attribution of influence is made by the researcher with regard to the instrument. A special effort was made to select statements that were rich in their causal account, in the sense that they were supported by exemplification, by other statements in the transcript, or by other known facts about the instrument. Here, a version of “content analysis of verbatim explanations” (LACS) used in organizational research (Silvester 2004) was used to assist in identifying the instrument’s influence on researcher and environment, as enunciated by the researchers themselves.

4. An affordance analysis of the distinguished professor grant (DPG)

The analysis of the interviews focused on the impact of the instrument on the research process, i.e. how its features create or afford certain conditions for actions. As has been argued above, these affordances may arise from features in the instrument itself (*instrument affordances*); be enabled by actions or traits connected to the actor/recipient of the funding (*researcher affordances*); or be actualised by the environment (*environment affordances*) in which the research is conducted. We structured the results according to these distinctions, and exemplified using extracts from the interviews. Each quote has been identified with the general field of the interviewee (according to the funder’s classification), to establish some context.

4.1. Instrument

The most salient characteristics of the DPG are the same as for most REIs, namely its *long-term duration* (10 years) and the *large funds* (500,000 euros) granted per recipient. It is clear from the interviews (illustrated below), that these two features significantly enable the recipients to pursue certain directions in their research. In addition to these two main instrument affordances however, the Grant call is implemented in a way that differs from many other REIs, in that the expected character of the applications signals a higher-than-usual level of acceptable risk. For one, the call stipulates a project text of only five pages excluding budget. Similarly, the planning requirements for the proposal are low, which allows applicants to be less concrete about outcomes, and to employ a more open work horizon, with small long-term content commitments. Applicants typically expressed this in the following way:

you're allowed to be a little bit vaguer and not as detailed [...] when it comes to project description or budget. [...] You can get a bit more abstract the longer the duration of the grant. (Medical and health sciences)

And:

they recognize that you actually can't really plan something for 10 years. It's impossible. You can't predict where you'll be and they're very understanding of that. It provides a lot of opportunity. (Social science and humanities)

The low content requirement is anchored in the principle that the Grant supports the person and the environment, and thereby provides general support for a research programme rather than support for specified project components. This creates space for new impulses:

It was not specific. It was really to support the environment around the research I have initiated, which is very nice, [...]. I do what I want with it. Whereas the funding from ERC, I do one thing. (Natural and engineering sciences)

The absence of plans and milestones allows flexibility and freedom to develop the project in new directions:

The beauty with this distinguished professor grant is that it requires very minimal reporting, and that you're not expected to follow the proposal [literally]. With European funding, there are milestones and deliverables stipulated in the proposal that you have to meet. (Natural and engineering sciences)

At the same time, this implies high novelty expectations on the proposed research, which not only stimulates creativity but also necessitates "reasonable" novelty-feasibility trade-offs:

So, you could propose anything, even if it's not clearly possible at that time. What you have to do is to convince someone that you have an approach that could solve it, even though you don't have enough proof to unequivocally state that you could. (Medical and health sciences)

The long-term duration and substantial resources characteristic of excellence funding are complemented by a few subsidiary, or "implementation features", viz. low requirements on planning, reporting and outcomes. These together place a higher premium on novelty, and the applicant's track record.

4.2. Researcher

This section deals with researcher account of how the instrument affects their research processes. The typical ways in which this happened were cognitive, in that the knowledge production process was the immediate target, viz. through more intense conceptual exploration, deepening inquiry, and increasing the difficulty level of the problems. An additional actor affordance was that of reinforcing the identity and self-esteem of the researcher, including transferring a sense of responsibility and trust.

4.3. Conceptual exploration

This involves a general freedom to inquire broadly in the field and to pursue topics and problems in a way that would not normally be possible given time and resource constraints. It may involve a stronger orientation towards *open-ended inquiry*, e.g.:

when you get [this grant] that's fantastic because – that's a good foundation [...]. It says, Look, you can actually continue working on this line of doing things which you don't know exactly if they are going to be used or not, but you can think like this for the next ten years. (Natural and engineering sciences)

It also promotes a higher degree of *risk-taking*:

The main difference is that I can take higher risks and I can do long-term projects. I feel safe to do a project, even if I know this will take five years before I have a result, I can do it. (Natural and engineering sciences)

Conceptual exploration is also about *exploring new and complementary angles and ideas*, and the timeframe and volume of the DPG funding makes this possible:

Some of the other projects [...] are much more focused [and] depending how these develop; I could use the grant to fill in and expand things that look particularly exciting. [...] you could take advantage of emerging opportunities. (Medical and health sciences)

4.4. Deepening inquiry

Rather than simply broadening your research focus in new directions, this has to do with continuing on the same track but digging deeper in specific areas, for example expanding research questions by *taking already existing ideas further*.

It is really nice [...] to be able to push it a little bit further, and to take more risks and develop something that takes time, but once it is there, it really brings a lot of value. (Medical and health sciences)

And:

With most research questions [...] you can make them bigger or smaller according to your opportunities, and this is a big opportunity. (Social sciences and the humanities)

It seems that in many cases the nature of the DPG “demands” a *different angle on problems*, i.e. it prompts longer-run, deeper and higher risk projects, e.g.:

The team really has to deliver. We have to really focus on trying to solve problems in a more comprehensive way and that we shouldn't do anything that's really superficial. We should really strive to try to get down deep into the details because there aren't too many limitations. (Medical and health sciences)

4.5. Increasing difficulty

The time frame and funding make it easier to take on more complex, difficult projects and to *explore risky ideas*:

That may be the most important, that you can dare to explore the most challenging and [...] high-risk projects because you have a long time and you have good funding. [...] (Medical and health sciences)

Just as you can take on more difficult problems and pursue more challenging ideas, the time frame also allows *testing different solutions* to such problems, e.g.:

If you know you're working on something that's really technically difficult, you feel more free to try different approaches if you have a longer time span. Because even if one approach doesn't work, maybe another one will be able to work before you get to the end of your time frame and need grants. (Medical and health sciences)

4.6. Identity

Apart from effects on the ways in which the recipient pursues research problems, there also seems to exist a type of impact that has to do with professional identity and confidence, which in turn produces certain social "halo effects". In terms of *confidence* effects, the following is a typical example:

If you get support [from the grant] you are willing to take more risks because you believe that this is something that you have the capacity of doing. (Natural and engineering sciences)

Receiving the DPG itself becomes a validation of what type of problems the researcher may be capable of solving. Recipients experience the DPG as an expression of *trust and responsibility*, greater than for the traditional three to four-year grant:

It's certainly risky but you're not going to go take a half a million kronor or euro a year and just throw it out the window. You have to be responsible with what you're doing. (Medical and health sciences)

4.7. Environment

The interviews revealed three salient ways in which the DPG afforded capacity in the research environment, namely in terms of organizational autonomy, flexibility in resource allocation, and human resource flexibility.

4.8. Organizational autonomy

Unlike CoEs, the DPG offers the recipient *an independent platform* that can be adapted to her specific research:

With that much funding per year and long-term, it's well suited for building an environment, [...] focused on the same kind of issues that I as an individual researcher [...] burn for. (Social sciences and the humanities)

One important consequence of this is that *expected environment and network-building activities* associated with other REIs are de-emphasized, in favour of a focus on epistemic/discovery issues:

We can do our research and we can engage collaborators when it fits the project rather than network grants where we need to find a fit for the money to be in a collaboration. (Medical and health sciences)

The DPG also allows multiple streams of research which in turn leads to lowering the risks involved in *sharing with the outside community*. This could be considered an instance of the Matthew effect, where self-sufficiency enabled by financial resources in turn affords a broadening and deepening of one's research networks.

4.9. Flexible resource allocation

Funds and freedom to use them at a high level of discretion affords several possibilities, e.g. responding more freely to new research opportunities, for example through *portfolio-type combinations* of projects:

Pursuing both long term projects and short-term initiatives/pilots in parallel allows me [...] to do certain things [...] just to see if they work. Trying new and maybe crazy ideas, in generating pilot data for a grant, for other grants ... (Medical and health sciences)

Longer time frame and funding also makes *basic investments in people and technology* possible:

Longer funding, a longer perspective really helps to make some investments both in people and in technology development. Otherwise, you have to focus very much on papers that you have to produce. We were able to do something that we knew was going to take longer but once done, it will great. [...] (Medical and health sciences)

The next two types of resource flexibilities are more specific instantiations of the above.

4.10. Human resource flexibility

A central part of realizing the potential of the Grant is to be able to attract research staff through presenting *low-risk employment opportunities*. The long-term funding enables some possibilities in this regard:

The funding does allow me to bring in the talent. I can then tell these people, “Look, I have funding for you for this amount of time.” They can feel they can work without a lot of anxiety. (Medical and health sciences)

The researchers receiving such grants are usually already well-known in their fields, but the signal value of having this type of grant, in combination with the long-term funding commitment represents a *halo effect* that *stimulates researcher attraction*:

In other words, we don’t go out and invite applicants. We wait for applicants to apply to us [they are] usually self-motivated and know about our work and actively want to work with us, because it’s hard to get people to agree to work on something for three or four years with no certain outcome. (Medical and health sciences)

Hiring junior staff is always associated with a certain amount of risk. The DPG offered time and funding to do “personnel testing” to an extent that would typically not be the case in a three-year project where only one post-doc period can be accommodated:

10-year funding gives you a certain kind of self-confidence that you can hire a postdoc, try for a couple of years, and then if it works out well, [...], then that person would be associate professor or so. (Natural and engineering sciences)

Several respondents reported that the long-term funding also helped promote collaboration with other seniors. These are senior colleagues who, under less financially secure circumstances, would normally not be able to engage in high-risk collaboration:

this may affect who I bring into the project and collaborate with. The part-time faculty involved in the project, they are senior researchers that I would not be working with in

this manner, if we weren't taking this long-term risk. This risk we would not be willing to take in a short-term project. (Natural and engineering sciences)

In the following, we will identify the most salient aspects of these results in terms of how they relate to previous research, but more importantly, we will synthesize their relationships to capture how features of the funding instrument combine to afford certain valued outcomes.

5. Discussion and conclusions

As suggested above, affordance analysis can be used to unpack how an instrument affects the research conditions of the target by the way features of the instrument are bundled. The DPG bundles some of the typical characteristics of excellence funding, viz. long duration and a substantial amount of funds, with a number of subsidiary, enabling features, that affect the way in which the main features can be utilized by the researcher. These subsidiary features may be referred to as “flexibility (bestowing) affordances” of the instrument which, as we have seen, are dependent for their efficacy on the autonomy offered by the individual-oriented feature of the Grant (as illustrated in Table 1). The researcher affordances accounted for by the respondents were mainly cognitive, in the sense of affecting the type of knowledge production that they were able to pursue. Previous work on novelty contributions in the sciences matches present results, e.g. Philipps and Weißenborn (2019) showed that unknown entities and new patterns which contributed to theory, were identified as central in discovery-oriented research funding. Also, Dirk's (1999) identification of methodological novelty contributions is reflected in the material, in that the resources available in the Grant allowed for testing different approaches or solutions to research. As suggested above, such contributions are typically more time and resource demanding than conceptual problems. However, the material above suggests that time investments seem to afford conditions for novelty production, whether empirical, methodological or conceptual. The recurrent theme here is that the long-time horizon and low specification requirements on budget and project implementation afford an open-ended form of inquiry that stimulates risk-taking. This differs significantly not only from ordinary project funding but also from other types of excellence funding which is *prima facie* similar, e.g. ERC funding.

These researcher-oriented affordances are clearly connected to environmental affordances offered by the DPG. As has previously been discussed by Hellström, Jabrane,

Table 1. Combinations of instrument features enable excellence conditions.

Main instrument features →	Instrument implementation features →	Researcher and environment conditions
Duration +Funds	<i>Low planning requirements</i>	Flexible resource allocation (portfolio type combinations; distribution of research effort more flexibly over time) Increasing difficulty (explore risky ideas) Conceptual exploration (risk-taking; new, complementary angles and ideas)
	<i>Low content commitments</i>	Increasing difficulty (explore risky ideas) Deepening inquiry (taking already existing ideas further) Increasing difficulty (testing different solutions to problems)
Long-term duration	<i>Low reporting requirements</i>	Human resource flexibility (low-risk employment opportunities; “personnel testing”; high-risk senior collaboration)
Large funds	<i>Low planning requirements</i>	Identity (trust and responsibility; confidence)

and Brattström (2018b), Brorstad Borlaug (2015), Bloch, Schneider, and Thomas Sinkjær (2016), environmental dimensions supporting excellence include capacity for high scientific quality, e.g. in terms of talent, high productivity; resource attraction; and research focus. These qualities are all found in the empirical material regarding the environment stimulated by the DPG, but with a number of important additions. Firstly, the DPG provides autonomy, in the form of an independent platform. The recipient does not have to engage in prearranged interactions and networking, and can save such “diversions” for those occasions when they are clearly beneficial to the research pursued. In addition, while research focus is stimulated by “personal ownership” (or independence) of the DPG (as opposed to the CoE situation), the flexibility of the resource allocation allows for a balanced form of risk taking, such as a mix of high and low-risk projects (portfolios). It also allows for (riskier) investments in people and equipment than ERC funding.

Heinze, Rogers, and Senker (2009) pointed to high visibility and good capacity to attract international talent as central to excellence, and Cremonini, Horlings, and Hessels (2017) and Hornbostel (2001) showed how a favourable resource situation stimulates a particular type of research culture. In the above results, we observe how, similar to previous results, halo effects as well as resource stability from the DPG works to attract external talent and senior collaborators, where these would normally be difficult to attract and, importantly, that this can be done at the recipient’s discretion. These mechanisms are key to understanding the notion that “excellence breeds excellence” discussed above, or the Matthew Effects that ensue from focusing resources in one place (Habicht et al. 2021; Langfeldt et al. 2015; Whitley 1982). These results also offer us a more detailed understanding of how individuals, utilizing the autonomy-affording features of the DPG, are able to realize these values.

Reasoning from the above, we can now synthesize the features of the instrument in a more systematic way. Table 1 illustrates the most salient empirical insights from the study in terms of how features of the instrument are bundled and sequenced, and how they thereby afford conditions for its main desired outcomes (excellent, path-breaking research, novelty, etc). The focus of the analysis is on the way the instrument’s main features, resources and duration, are combined with a number of subsidiary or implementation features, thereby affecting various researcher and environmental outcomes.

Our initial results show that long-term duration and high-volume funding coupled with low planning requirements allow for flexible resource allocation. Recipients were inspired and enabled to develop and implement portfolios of complementary research, and to allocate effort over time according to emerging needs. In other words, the individual researcher begins to engage in a level of strategic planning and capacity building that one normally expects of an organization. The two basic features, duration and funds, when connected to low planning requirements, are also viewed by the respondents as being essential to stimulating increasing difficulty in problem selection, that is to encourage the selection of riskier ideas, as well as to explore more conceptual/theoretical problems by pursuing new complementary angles.

The two main features, when coupled with low content commitments (in the application), are quoted as having similar epistemic effects, namely allowing an increase in difficulty and deepening inquiry, e.g. by testing several solutions to a problem, rather than being tied to a given set of predefined studies. One may view this coupling as a basic affordance of the instrument. Rather than simply allowing a researcher to

“execute a big project”, time and resources generate risk-taking and novelty when coupled with flexible resource allocation and open-ended planning horizons, as well as organizational autonomy.

Long-term duration on its own, coupled with low reporting requirements, offers human resource flexibility in terms of low-risk employment opportunities, testing new personnel, and collaboration among seniors. Although respondents quoted this affordance as tied to long-term funding, it is not likely to be “activated” as such without substantial funds to hire staff as well as, of course, being in a position to make the hiring decision with a measure of autonomy. In this way a basic excellence funding feature ought to be understood as dependent on other features for achieving certain outcomes in a particular way – in other words how it is bundled. A key flexibility affordance such as low reporting requirements may be efficacious for stimulating novelty production by use of a resource strategy, but only in so far as the resources can be allocated according to the discretion of an autonomous PI. In the same way, a flexibility affordance such as low planning requirements may stimulate the same outcome by contributing to increased researcher confidence and willingness to take responsibility. However, it seems unlikely that the epistemic effects of such affordances can be realized if either funds or duration is missing from the equation. The DPG shares many characteristics with other funding instruments for promoting excellence. However, the DPG more than any of the other instruments fulfils the type of expectations that one has of institutional funding. The low reporting requirements, low specificity in project description, taken together with the usual features of excellence funding such as volume and duration, created a number of spin-off effects such as increased responsibility taking, strategic planning and collaboration with other seniors. These three spin-off effects reported by recipients push the DPG along the continuum towards the direction of institutional funding. This suggests that the instrument has the potential to be developed further and may even be used as a catalysis for enabling universities to better identify their research strengths. Further research is required to assess which design features are most relevant if one would wish to develop this particular affordance.

Our analysis shows how the cognitive and the social dimensions of the DPG interact to generate the observed outcomes. It also demonstrates that the efficacy or fitness for purpose of a given instrument may be reduced or increased by bundling modalities in particular ways. This was particularly evident when recipients reflected on their experiences with the ERC and CoE grants and compared it to what they were able to do with their DPG funding. All these instruments strive to promote high-risk research but recipients experience the DPG as being more suited to the task because of variations of specific modalities such as time, project specification and reporting. In other words, the DPG simply *affords more*. It does so by allowing the researcher the freedom to take comparatively higher levels of risk-taking and explorative work. If the aim had been to stimulate networks or build capacity within a field, then perhaps the CoE model would have been better. In other words, this does not imply that all other excellence instruments may be replaced with DPG-type funding. Instead, our analysis opens up the possibility to conceptualize excellence funding as a task that could be approached via a portfolio of different instruments, which bundle modalities in specific ways in order to promote excellent research. An extension of this way of thinking about funding instruments is to perceive them as bundles of features, that may be combined to pursue a

specific task. Features such as individual recipient, long duration, large funds and low reporting requirements combine to generate some effect, under some circumstances. If group replaces individual recipient, and low reporting is replaced with frequent reporting, the instrument changes its effect.

Seen from this perspective, the instrument fades to the background and the focus shifts to features and combination of features. This way of conceptualizing instruments and instrument design – as an assemblage of features – is enabled by the affordance analysis offered above and summarized in [Table 1](#). It effectively does away with the need for a typology of instruments and instead focuses on instrument features, where instruments are simply viewed as temporary decomposable systems of such features, that are assembled to afford certain outcomes given characteristics in circumstances and target. Understanding the single and combinatorial effects of such features would enable a more flexible and target-sensitive design of funding instruments.

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