

Patterns of Patronage: Why Grants Won Over Prizes in Science

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Abstract

Prizes were a common way to patronize basic research in the eighteenth century. Science historians say grants then won over prizes because grants are a superior institution. If different patron types tend to use different patronage forms, however, perhaps the patron types who tend to use grants just became more common.

To test this hypothesis, I estimate the use of prize-like vs. grant-like funding among eighteenth century scientific societies. Societies with non-autocratic, non-local government patrons were especially likely to use grant-like funding. As these are today's dominant patrons of basic research, eighteenth century data successfully predicts current patronage forms.

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Introduction

Historians of science tell us that the research grant, now a staple of basic research funding, had relatively few analogues in the eighteenth century. Prizes, in contrast, were then a more common way to patronage basic research. Was this transition from prizes to grants an example, as grant advocates have claimed, of a superior institution displacing an inferior one? Or have there have always been analogues to prize-like and grant-like patronage, with the choice between them being largely determined by other aspects of the patronage relationship? That is, has there been a fundamental innovation, or can this variation be understand as an example of relatively timeless patterns of patronage?

In two appendices of his 1985 book *Science Reorganized - Scientific Societies in the Eighteenth Century* [19], James McClellan systematically surveys 135 scientific societies of the eighteenth century¹. For each society, McClellan lists: name, city, starting and ending years, number of members, publications produced, which authorities recognized the society, the fraction of the society devoted to science (as opposed to other intellectual, social, and artist endeavours), the kinds of sources from which each society gained financial support, and the kinds of activities this support paid for.

If there are relatively timeless patterns of patronage in science, then McClellan's data on eighteenth century societies should provide a reasonable basis for forecasting patronage relations at other dates in history. In particular, whatever changes later caused the transition from prizes to grants in basic research should be foreshadowed in eighteenth century relations between forms of patronage, such as prizes or grants, and other aspects of such societies. If, however, there are not relatively timeless patronage patterns, then all else equal we have

¹When a society changed its name and reorganized, I have treated these two McClellan entries as the same organization if one of these organizations either lasted for less than ten years, or if no other information is given about it other than name, city, and dates.

little reason to expect eighteenth century patterns to predict later patronage relations.

We can therefore test whether patronage relations are timeless, by examining how well statistical models built to predict eighteenth century forms of patronage from eighteenth century data can account for current forms of patronage. This paper presents such a statistical model of the patterns of patronage of basic research in the eighteenth century, constructed from McClellan’s survey². It predicts the combinations of prize-like and grant-like patronage among eighteenth century scientific societies from two kinds of factors which historians have suggested as central to the transition from prizes to grants: a society’s level of scientific professionalization, and the types of patrons who supported that society.

In the following sections, I describe and motivate my choices of data proxies for these variables, and then describe the resulting statistical model, discussing in particular its implications for our understanding of the historical transition from prizes to grants.

Forms of Patronage

McClellan describes fourteen different kinds of activities which societies spent resources on: anatomical theaters (5 known societies), cabinets (17), courses (12), expeditions (6), gardens (14), laboratories (6), libraries (39), medals (3), museums (6), observatories (14), pensions (13), prizes³ (45), publications (78), and salaried researchers (5).

The economic literature on institution design [20], and in particular on principal-agent relations [23], offers a natural way to generalize the distinction between prizes and grants, and hence to organize these patronage choices: a research patron can be considered a *principal* to the research scientist *agent* he patronizes [8].

A principal typically hires an agent to perform a task where he has difficulty observing the

²The data in McClellan’s appendices has been supplemented by information from the body of his book.

³McClellan does not distinguish prize competitions from general retrospective awards.

agent's relevant abilities and efforts. For example, a person may hire a lawyer to represent her, or an employer may hire an employee to help produce or sell some product. To select the best agent, and to encourage this agent to make his best effort, a principal generally has two major approaches available to her, which she can combine in many ways.

One major approach is for a principal to pay for *results*, via an incentive contract wherein an agent is paid more for outcomes the principal prefers. Agents then have an incentive to make efforts, and competition in hiring can select the most able agents. For example, a lawyer can be paid only when a case is won, and a salesperson may be paid a sales commission.

The other major approach is to pay for *effort*. The principal can expend resources to monitor an agent's effort level, and to evaluate his ability level. Pay can then depend on these observations. For example, an employee can be fired or not promoted if she doesn't seem to be trying very hard.

Standard principal-agent theory suggests that paying for results is attractive when the principal can more easily specify the results she prefers, when the principal is more risk-averse, and when agents can take more risks and have more access to capital. Paying for effort, on the other hand, is attractive a when the principal can more cheaply monitor effort, when she knows better whom to hire, and when the principal can take more risks.

An accomplishment prize competition, where some award is offered to the first team to accomplish a certain task, is the form of science patronage most like paying for results. For example, a prize was offered to the first team to figure out how to determine a ship's longitude at sea to a given accuracy [25]. At the other extreme, directly hiring a researcher for the long-term is the form of science patronage most like paying for effort. This is the main approach used to fund basic research at the US National Labs, such as NASA, and was the main approach used in the USSR.

Between these extremes lie a variety of other patronage forms. Grants, which pay someone

to work on a short-term research project, are a less extreme form of paying for effort. And competitive grants, which fund much of today's best basic research, can be viewed as a small prize for thinking up a promising topic, coupled with a larger but still moderate grant for working on that topic.

Moving in from the other extreme, typical prize competitions sought the best contribution on a specific topic by a certain date, rather than requiring the winner to have solved a certain problem. And general retrospective prizes typically rewarded the best recent work in some broader area. The breadth of subject area and the time-horizon covered by such prizes could both vary, and a patron could, instead of offering a single large award on the problem that interests him, offer many smaller awards for progress on easier related problems.

Some forms of science patronage can also be thought of as paying for *overhead*, instead of for results or effort. A patron underwriting a research library, for example, might easily verify that the library is being used for research and not for parties, and may feel confident that only competent researchers would bother to use his library. Today's research tax credits can also be thought of as a form of paying for overhead.

If we take the distinction between paying for results vs. effort as a natural generalization of prize-like vs. grant-like funding, we can collapse some distinctions in McClellan's data. We can say that any society with prizes or medals paid for results, and that any society with salaried researchers, pensions, or expeditions paid for effort. If publications and courses are set aside as difficult to classify, the remainder of society activities can be thought of as paying for overhead. Thus, of our 135 eighteenth century societies, 47 paid for results, 20 paid for effort, and 47 paid for overhead.

Since our primary interest here is to understand what influences prize-like vs. grant-like funding, the dependent variable in the statistical analysis below will be PAYCOMBO, whose four possible values are: *results*, *effort*, *both*, or *neither*. This says whether McClellan

mentioned that the society paid for any results but no effort, any effort but no results, both effort and results, or neither effort nor results. This variable form allows us to treat the two forms of patronage symmetrically, and allows for some non-linearity in the choice between them.

Given that our limited data will only support inferences about a limited number of distinctions, I have chosen not to include tendencies to pay for overhead in the following analysis.

Grant Superiority and Professional Scientists

Since the eighteenth century, science historians tell us, basic research has seen a change in emphasis from prize-like to grant-like funding. General retrospective prizes replaced prize-competitions, subject areas became broader, and large prizes were replaced by more numerous smaller prizes. Grants paying for promised future work replaced prizes for acknowledged past work, it became acceptable to reward the same person repeatedly, and society insiders became eligible to win grants. Long-term employment of researchers eventually became more common.

As a result of these changes, the patronage of basic research came to rely more heavily on the judgment and trustworthiness of those administering the funding process. In particular, changes replaced evaluations of past contributions on topics of clear interest with judgments about the future potential of researchers and topics. Today, it seems, patrons of basic research pay more for effort and less for results than they once did.

Though by reputation reluctant to generalize, especially on normative questions, today's historians of science have mostly lauded this transition, favorably quoting contemporary scientists who advocated these changes.

Roy MacLeod said that the Royal Society’s experience with privately-funded medals revealed their failure and that “the fundamental task of government” was to fund grants [16]. Elisabeth Crawford praised the French Academy of Sciences move from prize competitions to general retrospective awards [2] as a move toward “a more effective instrument”, and she notes how grants help interdisciplinary work [2].

Maurice Crosland defended subterfuge by the French Academy in making these changes against the wishes of donors as “necessary” because Academy leaders knew science better than donors [5]. Maurice Crosland and Antonio Galvez [7] complain that “the cost of apparatus and equipment constituted a barrier” with prizes, and that prizes were “necessarily elitist” in contrast to the new “more open system.” Finally, Harry Paul writes that “The grant was a much better way of getting more research for the same amount of money.” [22]

Grant advocates, both scientists of the time and recent historians who quote them, offer a variety of arguments in favor of grant-like funding. Some of these arguments are stronger than others. On the weak side, there is the economically-dubious argument that prizes waste money because prize-winners need not spent their winnings on further research⁴. Of a similar nature are Crosland and Galvez’s simultaneous complaints that there were “too many prizes with too many terms of reference,” and that donors refused to break down large prizes into many smaller awards [7].

Stronger arguments focus on the general shortcomings of paying for results rather than for effort: agents suffer increased risk, and it can be difficult to define in advance what results are desired. Grant advocates emphasized that grant awardees had more flexibility in choosing their topics of research, and that interdisciplinary work became easier. They also argued that with science becoming increasingly professional (i.e., less amateur) and

⁴By this argument, paying for a car is economically wasteful if the car-seller won’t use the money to build another car. Prizes create their desired incentives at the time they are announced, not when the money is distributed.

lab equipment getting more expensive, capital constraints facing researchers had become a serious problem. Scientists wanted their money up front.

If grants replaced prizes because they are uniformly better for all basic research, then in the absence of some theory about who should see the light first, we would have no reason to expect the patterns of patronage among eighteenth century scientific societies to explain much about historical trends. If, however, grants are especially appropriate for professional rather than amateur researchers, then we might expect the more professional scientific societies of the eighteenth century to be among the first to introduce grant-like funding.

For 91 of the 135 scientific societies he lists, McClellan offers a numerical estimate, which I call FRACSCI , of the fraction of that society's activities devoted to science as opposed to other intellectual, social, or artistic endeavours. I take this fraction to be a proxy for professional vs. amateur research, since societies fully devoted to science seem less likely to be primarily associated with amateur research.

Types of Patrons

Consider now the possibility of explaining variations in forms of patronage, across either time or space, in terms of variations in types of patrons. Different patron types may have different preferences regarding research progress vs. other benefits of patronizing research, such as policy validation or prestige by association. Different types of patrons may also have different risk-aversions, abilities to monitor, or negotiating powers.

Historically, the distribution of patronage forms and patron types have been changing together since the eighteenth century. Nineteenth century advocates of grants were also advocates of more state funding, and new programs of state research funding appeared mostly in the form of grants. British grants managed by the Royal Society began in 1849.

Prussian grants managed by the Berlin Academy appeared in the late nineteenth century. And the crushing defeat of France by Prussia in 1871 sparked a fear of being out-classed by state-funded German research, driving substantial increases in English and French state funding in the 1870s.

But why would scientists have pushed grants if grants were not a superior institution? Well not all of them did – for example, on both occasions of increased British state grants, in 1850 and 1876, the then-Presidents of the Royal Society privately expressed strong reservations, such as a fear of personal jobbery and bureaucratic formalism [17].

More important, big grant advocates were typically associated with leaders of the scientific societies, and grant-like patronage gave these leaders more discretion regarding the money that passed through their hands. Research patrons delegated much of their monitoring and evaluation tasks of their research agents to a second set of agents, the leaders of the scientific societies. These leaders often chose the prize questions for prize competitions, and usually judged the entries. Initially, to ease this second agency problem, entries were anonymous, judges were ineligible to win, and any violation of these standards would have provoked public outrage.

General retrospective awards, however, gave judges more discretion in choosing winners, and grants gave them even more discretion. Society insiders became eligible, personal contacts became more important as there was no formal application process, awards could now be repeated, and there was little formal accounting regarding how the money was spent.

For example, in 1831 the founder of the dues-funded British Association for the Advancement of Science announced his plan for prize competitions. Association leaders instead instituted the first British grant system, and most money ended up going repeatedly to the same ten Association insiders. The ruling committee allocated “money to themselves or their proteges. Grants proved more attractive to leading savants than prizes: they were

more flexible, less shackled by rules, and repeatable year after year.” [21]

Or consider the best documented transition from prizes to grants, at the Paris Academy of Sciences, which managed more prize funding than any other society⁵. In 1820 the will of Baron Montyon endowed two very large annual Academy prizes for “making some industrial process less unhealthy”, and for “improving medical science or surgery” [5]. The unprecedented size of Montyon’s bequest emboldened the Academy to obtain royal permission to violate Montyon’s will.

Instead of the usual prize competitions, however, the Academy funded the academy journal, some general retrospective awards, and some grants (still called “prizes” to avoid legal challenges), which from the 1850s on were often awarded for non-medical topics. These awards were also often made secretly to avoid criticism, even though the Academy claimed it published all such decisions [7]. The Montyon legacy and increased state funding also emboldened the Academy to increase pressure on other patrons by refusing bequests which were “too restrictive” [3]. By the late nineteenth century, most bequests to the Academy were for general retrospective awards or grants, and had weaker restrictions.

Similar stories can be found elsewhere. In 1796, Count Rumford established a specific prize at the American Academy of Arts and Sciences; but no action was taken until 1832, when the funds were instead awarded as grants. And in 1900, the Royal Society of London declared they would accept “no further bequests to be awarded as prizes for past achievements” [3].

This historical detail can suggest features of patrons to consider when trying to explain variations in grant-like vs. prize-like funding among eighteenth century science societies. For example, given the historical correlation between grants and state-funding, we should

⁵These prizes were mostly privately patronized, while the French crown supported resident Academy researchers.

compare government vs. private patrons. This effect also seems plausible in light of the fact that most prizes today are privately funded,⁶ and that governments today seem to prefer to pay more for effort rather than results, at least relative to recurring proposals to “privatize” procurement.

We might also consider the possibilities of inefficient political “pork” in the patronage relationship. That is, some types of patrons may be more likely to favor the concentrated interests of society leaders over the diffuse interests of other researchers and general scientific progress. If so, we should consider factors suspected of moderating government tendencies toward pork. Two natural candidate factors are how local a government is, and whether it is autocratic, with a single central ruler. One might expect less pork from a local government, which may be better monitored by local constituents, and from an autocrat, who can probably better resist distributive political pressures. Of course, these factors may also affect patronage forms in other ways, such as via negotiating power, monitoring ability, or risk-aversion.

McClellan’s survey gives a list of patrons for each society, which I have classified as follows. Societies were patronized via product monopolies granted to them by states (9 societies), or directly by a crown⁷ (40), a central legislature⁸ (1), a provincial estate (7) (mostly in France), some other provincial government (2), a city (7), a city senate⁹ (1), a town (9), a named private patron (7), an unnamed private source (12), or by dues¹⁰ (15).

Having one more patron of any type seems likely to increase the total funding available to a society, and therefore to increase the chances that the society will spend money in

⁶For example, I won the 1995 Linz Prix Ars Electronica Golden Nica (WWW category) a prize which was offered and managed by a state-funded media agency, but whose prize amount had to be privately funded.

⁷This includes patrons McClellan just called “crown”, and named persons known to be sovereigns in overlapping periods.

⁸This is the Venetian Senate, taken to be a central government of the region ruled from Venice.

⁹The Bologna Senate, taken to be a local government within the Papal States.

¹⁰This dues figure seems a substantial underestimate, as most Anglo-Saxon societies had dues [13].

any given way. Thus our statistical analysis will first make use of an NPATRONS variable, which gives the number of patrons of any type that McClellan lists for each society. Our other patron variables will describe the number of patrons of particular types. Statistical coefficients of these variables will therefore describe the *additional* effect of such a patron type, over and above that of a “generic” patron.

Since data is limited here, the three distinctions of private vs. government, local vs. non-local government, and autocratic vs. non-autocratic government, have been expressed in just two variables. The variable BIGGOV describes, for a society, the number of its non-local governments, i.e., its monopoly, crown, central legislature, provincial estate, or other provincial government sources. And the variable UNRULER describes, for a society, the number of its non-autocratic government sources, i.e., its provincial estate, central legislature, or city legislature sources. Note that some sources are both BIGGOV and UNRULER patrons; for such cases the coefficient on UNRULER can be thought of as the effect of such a patron over and above it being a BIGGOV patron and a generic patron.

Data Analysis

To review, we want to examine how well the use of grant-like vs. prize-like funding among eighteenth century scientific societies can be explained in terms of the scientific professionalization of each society, and in terms of the types of patrons of each society. We do this both to compare the explanatory power of these factors, and to consider how well a model derived from eighteenth century data might explain subsequent historical changes.

Specifically, we seek to explain variation in PAYCOMBO, which describes whether a society paid for effort, results, both, or neither. And we seek to explain PAYCOMBO by reference to FRACSCI, McClellan’s estimate of the fraction of the society devoted to science,

PAYCOMBO	effort	both	results	neither	<i>All</i>
<i>Ave. FRACSCI</i>	.700	.751	.601	.758	.709

Table 1: Average Science Fraction vs. Forms of Patronage

<i># Societies</i>	effort	both	results	neither	<i>Total</i>
biggov	4	9	5	15	33
both	1	6	10	2	19
other	0	0	10	11	21
none	0	0	7	55	62
<i>Total</i>	5	15	32	83	135

Table 2: Types of Patrons (rows) vs. Forms of Patronage (columns)

BIGGOV, the number of non-local government patrons McClellan mentioned, UNRULER, the number of non-autocratic government patrons mentioned, and NPATRONS, the number of patrons of any type mentioned.

An initial survey of the relations between PAYCOMBO, FRACSCI, and BIGGOV can be found in Tables 1 and 2. Table 1 gives the average value of FRACSCI, broken down by the four different values of PAYCOMBO. While societies which pay only for effort are more focused on science than societies which pay only for results, both these groups are less focused on science than societies which pay for both or neither. The implications of these observations are far from clear.

Table 2 shows the number of societies in the data corresponding to each of the 16 possible combinations of the four values of PAYCOMBO and the four combinations of whether a society had any BIGGOV support ($BIGGOV \geq 1$) or any other non-BIGGOV support ($NPATRONS - BIGGOV \geq 1$). The nine cells in the upper-left hand corner of the table, comprising only 45 cases, are the main cases of interest. (FRACSCI estimates are available for only 41 of these cases.)

Note that all 5 of the societies which paid only for effort had BIGGOV support, and 4 of these 5 had no other support. (The one exception was in Bologna, supported by both the Papacy and the Bologna Senate.) In contrast, of the 32 societies which paid only for results, only 5 had only BIGGOV support. It is also worth noting that two of the 5 cases of paying for effort and not results are also two of the 9 UNRULER cases, specifically the Senates of Venice and Bologna. (Of the other 7 UNRULER cases, 5 pay only for results, one pays for both, and one pays for neither.)

To support a more formal statistical analysis, I have also constructed from this data a standard maximum likelihood¹¹ unordered logit model which predicts the dependent variable PAYCOMBO for each society from linear combinations of independent variables FRACSCI, BIGGOV, UNRULER, NSOURCES, and a CONSTANT (of 1)¹². Table 3 show the maximum likelihood coefficients b_{kj} found¹³ for the logit model equation:

$$\log\left(\frac{\text{Prob}(\text{PAYCOMBO}_i = j)}{\text{Prob}(\text{PAYCOMBO}_i = \textit{neither})}\right) = \sum_k b_{kj}x_{ki}.$$

In this equation, x_{ki} are the variable values for each society, b_{kj} are the estimated model coefficients, i ranges over the 91 cases with FRACSCI data, j ranges over the three other values (besides *neither*) of the dependent variable PAYCOMBO, and k ranges over the five independent variables. (The regression significance tests are one-tailed because we have theoretical expectations, described above, regarding the coefficient signs.)

Note that this sort of model captures the idea that the type of a society's patrons may influence the ways in which that society spends its money, as one might expect from a

¹¹The maximum likelihood model within some model class is that model which assigns the highest likelihood (or probability) to the data.

¹²Similar coefficients, but wider standard errors, result if one adds in the population of the town where the society resides, and if one distinguishes private vs. public local patrons.

¹³These estimates were obtained using the statistical package SST.

Independent Variable	PAYCOMBO		
	effort	both	results
FRACSCI	-1.13 (2.07)	-0.57 (1.50)	-4.00** (1.37)
BIGGOV	3.18* (1.76)	2.18** (1.04)	-1.20 (0.79)
UNRULER	2.05 (1.69)	-1.50 (1.66)	0.38 (1.35)
NPATRONS	-0.48 (1.50)	1.60** (0.69)	2.36** (0.62)
CONSTANT	-3.50* (1.82)	-4.10** (1.49)	0.40 (0.86)

Table 3: Logit Regression Coefficients (* = significant at the 5% level, ** = at the 2% level (both one-tailed), asymptotic standard errors are in parentheses, 59 of the 91 cases are predicted correctly.)

principal-agent framework. It does not, however, capture the idea that the ways in which a society spends its money may influence the types of patrons that it attracts. The fact that scientific societies rarely had local competition should reduce, but not eliminate, this effect. While a simultaneous model in which both sides could affect the other would be preferred, I have not yet found identifying restrictions or instrumental variables to allow this with my limited data.

For predicting the case of paying only for effort, the coefficients on BIGGOV and UNRULER from Table 3 are both large and have the expected sign. While the coefficient on BIGGOV is significant at the 5% level, the coefficient on UNRULER is only significant at the 12% level. While this is not surprising given only 9 UNRULER cases, it means that though the evidence lends support to an UNRULER effect, and although we have reasons for expecting autocrats to better resist political pork, we can't yet reject the hypothesis of no effect at standard significance levels.

For predicting the opposite case of paying only for results, these coefficients are small

<i>One Patron, Of This Type</i>	FRAC SCI	<i>PAYCOMBO Probabilities</i>			
		effort	both	results	neither
UnRuler Big Gov	1	.470	.040	.055	.435
	.5	.480	.031	.236	.253
Big Gov	1	.085	.252	.053	.610
	.5	.101	.226	.263	.410
UnRuler Gov	1	.032	.007	.285	.676
	.5	.020	.003	.739	.238
Private	1	.012	.034	.214	.740
	.5	.009	.019	.662	.310

Table 4: Model Predictions

and not significant. Instead, it is the coefficient on FRACSCI that is large, significant, and has the expected sign. Thus we may tentatively conclude that while an increasing separation of science from other intellectual endeavors reduces the chance that an eighteenth century scientific society pays only for results, it is an increase in big government and perhaps also non-ruler support that increases the chance of paying only for effort.

Another way to see these tendencies is found in Table 4, which lists, for various cases of interest, this model’s predicted probabilities for the various PAYCOMBO values. If missing data effects are important, then the “neither” column becomes especially suspect, so we will focus attention on the relative values of the first three columns.

Specifically, consider the first row of Table 4, which describes a hypothetical setting constructed to best mimic the current prototypical situation of basic research funding, a society which is 100% focused on science and which has one non-autocratic non-local government patron. For this hypothetical society our model predicts that, conditional on paying for any effort or results, there is an 83% chance of paying only for effort. If we change this hypothetical society to be only half science, this prediction changes to a 64% chance. If we instead change to a single non-government patron, however, this chance drops to 4.5%.

Thus this model, based only on patterns of patronage among eighteenth century scientific societies, seems to successfully predict today's dominant form of basic research patronage from today's dominant patron type and level of professionalization. And it does this even though only 5 out of our 135 eighteenth century societies used today's dominant patronage combination of paying for effort and not results.

Therefore this model can be seen as successfully predicting the historical transition from prizes to grants. While this may not be as strong a test as one might prefer, it is nonetheless a test that the theory of relatively timeless patterns of patronage has passed.

Furthermore, this model suggests that while the professionalization of science may be an important factor in explaining the decline of prize-like funding, the changing mix of patron types may be a more important factor for explaining the rise of grants over prizes in science.

Conclusion

Under the assumption that forms of science patronage are largely caused by, rather than causes of, certain other relevant factors, a statistical model has been constructed to predict the combinations of grant-like and prize-like patronage among eighteenth century scientific societies. This model successfully predicts today's dominant form of basic research patronage, mostly grant-like and not prize-like, and such predictions rely more on patron types than on a proxy for scientific professionalization.

If further research confirms these results on patterns of patronage, including direction-of-causation assumptions, then research into the historical transition from grants to prizes might do well to examine the role of patron types in more detail. Grants may have won not, as their advocates claimed, because they were a superior institution, but instead because non-local and non-autocratic governments tended to prefer them.

I have suggested that such governments might prefer grant-like funding to prize-like funding because they were susceptible to distributive pressures from leaders of scientific societies, who preferred the “pork” of increased discretion over the money that passed through their hands. There are, however, many other possibilities. One might suppose, for example, that non-local non-autocratic governments care less about the added prestige from being associated with widely announced prizes. One might even suppose that grants are actually a better institution, and that such governments have the public interest more at heart.

The existence of relatively timeless patterns of patronage does not by itself offer any normative argument in favor of prizes. It might, however, weaken the “we tried that already” argument against prizes, and suggest that we give fresh consideration to recurring proposals, such as [29, 27, 26, 12], to return to more prize-like mechanisms of patronage. Conservative prize-like proposals, such as paying researchers per paper published [24], or per citation [28], seem reasonably feasible, especially if universities and research labs routinely pay researchers up front for rights to their later prize-winnings.

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