PERCEPTIONS OF THE AUSTRALIAN RESEARCH COUNCIL LARGE GRANTS SCHEME: DIFFERENCES BETWEEN SUCCESSFUL AND UNSUCCESSFUL APPLICANTS

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Introduction

The Australian Research Council (ARC) is the major source of funding for basic research in Australia in disciplines other than clinical medicine and dentistry, where the responsible authority is instead the National Health and Medical Research Council (see McCloskey 1994). While awards under the ARC Small Grants Scheme have remained under the control of universities, the ARC Large Grants Scheme is administered centrally through a system involving disciplinary panels and use of peer review (see Brennan 1994). Only 19% of applications for initial Large Grant funding in 1992, and 21% in 1993, were successful This circumstance led a committee which had been appointed by the ARC to review grant outcomes in molecular biology to note: 'In a situation where less than 20% of applicants are successful, it is essential to ensure that the procedures are rigorous and the outcomes generally accepted as fair and equitable by the applicants' (Australian Research Council 1994, p. 14).

Wood, Meek, and Harman (1992), in surveying academics who had applied unsuccessfully in 1990 for a Large Grant, found substantial dissatisfaction with ARC processes, and particularly with the competence of assessors selected by ARC panels. Concern was expressed about not only the standard of assessor reports (there were complaints about lack of understanding of the topic, superficiality, failure to substantiate critical comment), but also the limited consistency between assessors evaluating the same project. Since each application was rated by only a limited number of assessors, many applicants felt that outcomes of the Large Grant Scheme to some extent reflect chance or 'luck of the draw'. The possibility of bias, including cronyism, in the manner in which ARC panels arrived at funding decisions also was raised.

Two United States surveys, one concerned with the National Cancer Institute and the other the National Science Foundation, compared successful and unsuccessful applicants (see Chubin & Hackett, 1990; McCullough, 1989). Although successful applicants overall provided more positive evaluations of grant funding processes, the association between outcome and appraisal was partial rather than complete. Applicants who had been funded often were critical of the content and standard of reports provided through peer review, and they acknowledged the possibility of bias by panels and assessors. Further, many respondents, whether successful or unsuccessful applicants, felt that assessors generally favour orthodoxy and are unwilling to support innovative or high-risk research. As noted by Chubin and Hackett (1990 p. 66), '... while success predisposes one to approve of peer review practices, a large fraction of successful scientists were disapproving'. Studying successful applicants (who have a less direct motive for providing negative appraisal) in addition to unsuccessful applicants may thus yield information about limitations in decision making within a specific research grant scheme.

Following Wood *et al.* (1992), the present study examines perceptions of the ARC Large Grants Scheme. Whereas Wood *et al.* surveyed only unsuccessful applicants, the contrast here is between successful and unsuccessful applicants. The two groups are compared in terms of perceptions of how the application they themselves lodged had been handled by the ARC, but also the extent to which they believed specific aspects of the ARC funding process are valid and appropriate. One issue of interest is whether there are aspects of the ARC Large Grants Scheme about which applicants, irrespective of funding outcome, express dissatisfaction. Identifying such aspects provides a basis for recommending changes in the way the Large Grant Scheme operates.

Consideration is also given to consequences of failing to obtain an ARC Large Grant. Although some of the unsuccessful applicants surveyed by Wood *et al.* (1992) claimed that applying again for ARC support was not worth the time and effort, more than two-thirds of respondents expressed an intention to re-apply. However, Wood *et al.* did not employ follow-up measures to determine whether a further application was made. Nor did they identify the extent to which unsuccessful applicants for an ARC Large Grant sought alternative means of support. These questions are addressed in the present study.

The survey to be reported covers academics who applied in 1993 for an ARC Large Grant to commence in 1994. Under the scheme as it then operated (Australian Research Council, 1992), applications closed at the end of February; in April the nine disciplinary panels culled 15% of all applications without any external assessment and sent the remaining 85% of applications for peer review; in June a further 35 % of applications were culled following peer review; in

August some applicants were interviewed; and in September the panels ranked all applications that remained active. Lists from the different panels were then integrated before being forwarded to the Minister for Higher Education and Employment. Only 21% of all applications were funded, and usually at a level well below the amount requested. As well as being advised in November as to whether they were being funded, applicants received copies of reports from assessors (but with anonymity maintained). Changes to the Large Grant Scheme since 1993 are noted later.

Method

The questionnaire

Information was obtained from ARC applicants by postal survey. One section of the questionnaire sought demographic information (such as academic rank, age, sex, disciplinary field), while another section asked about the person's recent history as an ARC applicant and the extent to which the person had been called upon by the ARC to assess applications. The bulk of the questionnaire assessed perceptions of the ARC Large Grants Scheme. What are later referred to as self-referent evaluations were obtained by asking respondents to rate their level of satisfaction with the manner in which their own application in 1993 had been processed by the ARC, their evaluation of the expertise of the assessors used by the ARC panel, and the extent there was consistency between assessors in the ratings and comments they provided.

In addition to self-referent assessments, general evaluations were obtained by asking respondents to identify their level of agreement with 27 statements (noted later) concerned with different aspects of the Large Grants Scheme. In content terms these statements covered aspects of the Large Grant Scheme which were noted as contentious in the survey conducted by Wood *et al.* (1992), in commentaries by Over (1994, 1995), and in funding outcome reviews in different disciplines commissioned by the ARC (eg. Australian Research Council, 1994). Drafts of the questionnaire were circulated for comment among academics and senior administrators with knowledge of how the ARC Large Grants Scheme operates, and the content and wording of questions was modified as a consequence of feedback that was received. The issues covered in the 27 general statements included the criteria that should be employed by the ARC in deciding what projects to fund, whether the ARC should fund few applicants substantially or many applicants less generously, and whether universities rather than the ARC should be responsible for allocating research funds. Several statements probed the extent respondent felt the ARC processes are subject to chance influences or open to bias. The structure of ARC panels (whether they should be discipline-

specific rather than spanning several disciplines), the reliance panels should place on reports by assessors, and grounds for appeal when an application is not funded also were covered.

Each respondent was asked to rate each of the 27 general statements ratings on a 5-point scale ranging from 'strongly disagree' to 'strongly agree'. The self-referent evaluations (such as the person's level of satisfaction with the ARC processes overall) were also made on 5-point scales, with the descriptors used as anchors determined by context. In completing other sections of the questionnaire the person responded to multiple-choice questions (eg. current academic rank) or provided information directly (eg. number of assessors' reports received from the ARC). A further section of the questionnaire was to be answered only by persons who had applied unsuccessfully for an ARC Large Grant to commence in 1994. These respondents were asked whether they would continue with the research project that had failed to receive ARC funding and, if so, where they had sought or would seek support. In the final section, respondents were asked to provide supplementary commentary or offer comment on aspects of the ARC Large Grant that had not so far been covered.

Distribution of questionnaire

The questionnaire was distributed in March/April 1994 to all academics at La Trobe University, Monash University, and the University of Melbourne who had applied in 1993 as chief investigator for an ARC Large Grant to commence in 1994. Although there were 621 such applications across the three universities, only a single copy of the questionnaire was sent to the 79 academics who had applied as chief investigator for two grants (the maximum number of applications permitted in any year). Following Wood *et al.* (1992), questionnaires were distributed in a way that ensured anonymity in response and protected the confidentiality of the grant application process. Packages were addressed by staff within the Research Office at each university, and then distributed by the Research Office. The completed questionnaire was returned to the author in a pre-addressed envelope. Eighteen packages were returned undelivered and six persons wrote or telephoned stating they did not wish to participate in the survey. Although 288 questionnaires (effective response rate of 56%) were returned, ten could not be used in data analysis.

The possibility of volunteer bias needs to be kept in mind in interpreting results, particularly when reasons for non-participation are unknown. For example, applicants who were unsuccessful and thereby motivated to evaluate the ARC in negative terms might be more likely to participate in a survey concerned with ARC processes. However, the grant success rate (applications funded by applications lodged) among persons who responded to the questionnaire was 33%, in contrast to 23% overall for La Trobe University, Monash University, and

the University of Melbourne. It was similarly found in the National Cancer Institute and the National Science Foundation surveys (see Chubin & Hackett 1990, p. 220) that successful applicants are more likely than unsuccessful applicants to return questionnaires concerned with grant processes.

Characteristics of sample

The comparisons that follow are between 74 respondents who were successful on either the sole application or both applications they lodged ('successful applicants') and 182 respondents who were unsuccessful on either the sole application or both applications they lodged ('unsuccessful applicants'). A further group of 22 respondents had lodged two applications, one successful and the other unsuccessful. These respondents were similar in most respects to the 'successful applicants'.

The successful and unsuccessful applicants were similar in terms of age distribution and sex ratio. Mean ages were 50.1 years (SD 9.1) for successful applicants and 49.6 years (SD 8.5) for unsuccessful applicants, t (254) = 0.48, $p>.05$. Women constituted 16% of successful applicants and 15% of unsuccessful applicants, $X^2 = 0.16$, $p>.05$. There was a significant association between academic rank and likelihood of being funded, $X^2 = 7.75$, $p<.05$, but the relationship was not simply monotonic. The success rate was only 17% for senior lecturers, in contrast to 29% for lecturers, and 35% for readers, associate professors, and professors. The success rate for readers, associate professors, and professors is not unexpected, since promotion to these ranks typically is governed by research achievement (see Over, 1993). Although the higher success rate for lecturers than senior lecturers is consistent with a 'new blood' policy, the funding criteria outlined by the ARC (1994) do not identify either age or career status as a moderating factor in award of grants.

All three universities (La Trobe, Melbourne, Monash) had changed in composition since 1987 by amalgamations through which institutes that once were within the college of advanced education sector became part of the university. Durable consequences of the binary divide were evident. The ARC Large Grant success rate in 1993 among respondents who had been within the university sector under the binary system was 33%, compared to only 8% for the respondents who had previously been within the college of advanced education sector, $X^2 = 6.67$, $p<.01$.

The successful applicants (85%) were significantly more likely than the unsuccessful applicants (53%) to have been requested by the ARC within the past three years to review one or more Large Grant applications, $X^2 = 23.35$, $p<.001$. Further, among the respondents who had served as an assessor in this period, the successful applicants (mean 8.1, SD 6.8) had reviewed more applications than the

unsuccessful applicants (mean 5.7, SD 6.8), t (156) = 2.59, p<.01. Since proportionately more successful applicants (65%) than unsuccessful applicants (49%) had held an ARC Large Grant in the past, $X^2 = 5.55$, p<.05, it probably was the research record of the successful applicants, rather than insider status per se, that led them to be called upon more often as assessors.

Results

Self-referent ratings

The successful and unsuccessful applicants differed significantly in the ratings they provided with reference to the application they themselves lodged in 1993, mult. F (5, 219) = 27.30, p<.001. Means and standard deviations on each measure are reported in Table 1. Successful applicants were more likely to express satisfaction with the manner in which their application had been processed by the ARC, conclude that the ARC panel had chosen expert assessors, claim a high level of consistency between assessors in ratings and comments, and consider that the assessors had provided adequate justification for criticisms. Consistent with these results, unsuccessful applicants (63%) were more likely than successful applicants (17%) to claim that one or more assessors had demonstrated unfair bias, $X^2 = 43.47$, p<.001, or to contend (94% vs 56%) that the ARC outcome was not fully consistent with evaluations provided by the assessors, $X^2 = 32.79$, p<.001.

Table 1. Mean ratings on global aspects of the ARC funding process by successful applicants (N = 74) and unsuccessful applicants (N = 182)

	Successful Applicants		Unsuccessful Apllicants		
	M	SD	M	SD	F
Expertise of assessors	4.2	0.7	3.2	0.9	63.70
Consistency in ratingsbetween assessors	4.0	1.0	2.8	1.1	82.24
Consistency in comments between assessors	3.8	0.9	2.5	1.1	76.00
Adequate justification provided by assessors	3.7	1.1	2.4	1.1	72.57
Satisfaction with ARCprocesses	4.2	0.9	2.3	1.2	140.82

Notes: M signifies mean, SD standard deviation. In each case the F values are significant at p<.001.

These differences indicate that unsuccessful applicants have much less confidence than successful applicants in the processes involved in award of ARC Large Grants. The issue now addressed is whether unsuccessful applicants appraise more negatively than successful applicants all aspects of the Large Grants Scheme, or instead there are features of the Scheme that applicants, whether successful or unsuccessful, believe should be changed. Respondents rated the extent they agreed with statements concerned with 27 general issues. To facilitate commentary, the 27 statements are grouped into four sets (criteria that should govern award of an ARC Large Grant, processes involved in evaluation of applications, the extent decisions are subject to chance and bias, funding outcomes). Differences between successful and unsuccessful applicants need to be considered not in isolation, but in the context of absolute levels of endorsement.

Evaluative criteria

Successful and unsuccessful applicants expressed similar views concerning the evaluative criteria the ARC panels should employ in deciding which applications to fund under the Large Grants Scheme (see Table 2). Both groups strongly agreed that the primary determinant of funding should be the merit of the project. Although respondents generally favoured funding decisions being consistent with peer review, they did not express a positive or negative opinion overall as to whether an applicant's track record should be the primary basis for funding, or whether applicants with strong track records should be guaranteed ARC funding. Respondents overall were opposed to the ARC relying more on quantitative indicators, such as publication rate and citation rate, than on peer review in deciding which projects to fund.

Table 2. Mean ratings and standard deviations for successful and unsuccessful applicants on items concerned with criteria governing award of ARC funds

	Successful applicants		Unsuccessful applicants		
	M	SD	M	SD	F
ARC should rely on quantitative indicators (e.g., publication rate) peer review in deciding which projects to fund	2.5	1.1	2.8	1.0	2.97
ARC should fund primarily on the basis of the applicant's research record	3.0	1.2	3.2	1.2	2.46
People with good track recordsin research should be guaranteed continuous funding by ARC	3.2	1.2	3.0	1.3	1.82

Notes: M signifies mean, SD standard deviation. In each case the F values are nonsignificant (p>.01).

Funding allocation processes

In contrast to consensus as to the criteria that should govern award of an ARC Large Grant, there were significant differences between successful and unsuccessful applicants in mean ratings on six of the 10 items concerned with funding allocation processes (see Table 3). Unsuccessful applicants expressed more strongly than successful applicants the beliefs that research funds should be allocated within universities rather than by the ARC, the ARC should fund a higher proportion of applicants by reducing funds per successful applicant, members of ARC panels should not themselves be eligible to apply for an ARC grant, interviews as conducted by ARC panels have served no useful purpose, applicants should be entitled to respond in writing to assessors' comments, and the ARC appeal process should permit the expertise of assessors to be questioned. The two groups did not differ significantly in ratings as to whether ARC panel members are the most eminent researchers in their discipline, persons who have been unsuccessful ARC applicants should be used as assessors, there should be discipline-specific panels rather than panels spanning several disciplines, and decision-making processes within ARC be regularly subject to extent review.

Table 3. Mean ratings and standard deviations for successful and unsuccessful applicants on items concerned with grant allocation processes

Grant allocation processes	All respondents		Successful applicants		Unsuccessful applicants		
	M	SD	M	SD	F		
Universities should be responsible for allocation of all ARC research funds	2.4	1.3	1.7	1.0	2.7	1.3	30.42***
Interviews as conducted by ARC panels have served no useful purpose	2.9	1.2	2.4	1.1	3.1	1.2	22.88***
Applicants should beentitled to respond in writing to assessors' comments	4.3	1.0	3.9	1.1	4.4	0.9	11.32**
ARC shouldand a higher proportion of applicants by reducing funds per successful applicant	2.8	1.3	2.5	1.3	3.0	1.2	10.27**
The ARC appeal process should permit the expertise of assessors to be questioned	4.1	1.0	3.8	1.1	4.2	0.9	9.64**
Members of ARC panels should not themselves be eligible to apply for an ARC Large Grant	2.9	1.5	2.5	1.6	3.1	1.5	7.46**
Persons appointed to ARC researchers in their disciplines	2.9	1.1	3.0	1.1	2.8	1.1	2.63

Grant allocation processes	All respondents		Successful applicants		Unsuccessful applicants		
	M	SD	M	SD	F		
The decision making processes ARC employs should be regularly subjected to external review	4.3	0.8	4.2	0.9	4.3	0.8	2.29
There should be discipline-specific panels rather than panels spanning several disciplines	4.0	1.1	4.0	1.1	4.0	1.1	0.22
Persons unsuccessful in gaining ARC funds should not be used as assessors	2.8	1.2	2.8	1.2	2.8	1.2	0.00

Notes: M signifies mean, SD standard deviation. ** $p<.01$, *** $p<.001$

Note needs to be taken of absolute levels of response. On some items where the two groups differed, there was nevertheless substantial endorsement of a particular process within the group as a whole. For example, as indicated by the mean rating of 2.4, respondents overall did not favour universities rather than the ARC being responsible for allocation of Large Grant funds. Respondents generally gave strong endorsement to applicants being entitled to respond in writing to assessors' comments, a procedure that was in fact introduced by the ARC in 1994. There was also substantial overall agreement that, in lodging an appeal an applicant should be able to question the competence of the assessors appointed by the ARC panel (the ARC appeal guidelines specifically prohibit the competence of assessors or panels being called into question). Successful as well as unsuccessful applicants strongly endorsed the proposition that there should be discipline-specific ARC panels instead of panels that span several disciplines. Within the group as a whole, there was strong consensus that the decision-making processes followed by the ARC should be open to regular external review.

Chance and bias

As shown in Table 4, the unsuccessful applicants were significantly more likely than the successful applicants to claim there is a strong element of luck or chance in being awarded a Large Grant, the outcome of applications depends too much on whom the ARC panel selects as assessors, panels favour applicants from some universities, there is an element of cronyism in the ARC evaluation processes, knowing panel members is a significant advantage in being funded under the Large Grants Scheme, and panel members are themselves advantaged when applying for a Large Grant.

Even though these propositions were more strongly endorsed by the unsuccessful applicants, the mean ratings of above 3.5 for the successful applicants show that a number of respondents who had been funded also believed

that there is a strong element of luck or chance in being awarded a Large Grant and that the outcome of applications depends too much on whom the ARC panel selects as assessors.

Table 4. Mean ratings and standard deviations for successful and unsuccessful applicants on items concerned with perceptions of chance and bias

Chance/bias item	All respondents		Successful applicants		Unsuccessful applicants		
	M	SD	M	SD	M	SD	F
There is an element ofcronyism in ARC evaluation rocesses	3.6	1.0	3.1	1.1	3.8	1.0	23.69***
There is a strong element of luck and chance in gaining ARC funding	4.1	1.0	3.6	1.1	4.3	1.0	22.60***
ARC panels favour applicants from some universities	3.2	1.2	2.6	1.3	3.4	1.1	19.03***
Knowing panel members is a significant advantage in gaining funds from the ARC	3.5	1.3	3.0	1.3	3.7	1.2	13.37***
The outcome of an ARC application depends too much on whom ARC selects as assessors	4.3	1.9	3.7	0.9	4.6	2.3	9.49**
ARC panel members areadvantaged in applying for an ARC Large Grant	3.4	1.1	3.1	1.4	3.5	1.0	7.29**

Notes: M signifies mean, SD standard deviation. ** $p<.01$, *** $p<.001$

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Funding outcomes

The successful and unsuccessful applicants differed significantly in terms of the mean ratings they provided for five of the seven statements concerned with

funding outcomes (see Table 5). The unsuccessful applicants were more likely to claim that the ARC is unwilling to fund innovative research, too few of the publications funded under the Large Grants Scheme result in major publication, many projects which fail to gain support under the Large Grants Scheme are of better quality than those which were funded, and the ARC system is not as good as it could be, given the resources that are available.

Table 5. Mean ratings and standard deviations for successful and unsuccessful applicants on items concerned with funding outcomes

Funding outcome	All respondents		Successful Applicants		Unsuccessful applicants		
	M	SD	M	SD	M	SD	F
Many projects rejected by ARC are of better quality than those funded	3.1	1.0	2.5	1.0	3.4	0.9	44.00***
The ARC system is as good as it could be given the resources that are available	3.0	1.1	3.5	1.1	2.7	1.1	29.69***
It is difficult to get fundingfor innovative research through ARC	3.6	1.2	3.2	1.2	3.8	1.1	19.75***
Too few of the research projects funded by ARC result in major publication	2.8	0.9	2.6	0.9	2.9	0.8	5.72*
ARC should monitor more closely how the funds it awards are spent	3.0	1.1	2.8	1.1	3.1	1.1	4.38*
Universities are placing too much pressure on academics to apply for ARC funding	3.7	1.2	3.6	1.3	3.8	1.2	1.44

Notes: M signifies mean, SD standard deviation. * $p<.05$, *** $p<.001$

As indicated by mean ratings greater than 3.5, successful as well as unsuccessful applicants believed that universities are placing too much pressure on academics to apply for ARC funding.

Comments from respondents

The questionnaire invited respondents to provide comment on any aspect of the ARC Large Grant Scheme. Supplementing the above analysis of ratings by these comments offers a broader perspective to the questions under consideration.

Although the appropriateness of panel members themselves being applicants was raised, few respondents questioned the integrity of panels. The difficult responsibility of deciding which among many positively evaluated projects should be funded was instead recognised ('The major problem seems to be an absolute shortage of funds, so that many good projects must miss out, and not a problem of selection, which is generally done responsibly'). In contrast, administration of the Large Grants Scheme by the Department of Employment, Education and Training was criticised (eg. 'a shambles - proposals sent late for review, sent by sea mail overseas, proposal numbers mixed up'). The delay (February to November) between application and outcome was also a matter for comment, and there were several proposals (e-mail lodgement and transfer of documents, specialist panels, fewer assessors each evaluating a larger number of applications) for streamlining the system. Reliance on panels covering a range of disciplines was a primary concern ('The fields covered by panels are so broad that panellists can understand only a fraction of the submissions which they read', 'In most years none of the Panel has had direct expertise in my discipline').

Although continued use of assessors was supported ('The peer review system must be protected; alternatives such as directives from bureaucrats are too disconcerting to countenance'), aspects of peer review as currently employed by the ARC were seen as problematic. There was frequent reference to the competence of assessors ('It is very frustrating having one's project condemned by assessors' reports that are inaccurate and misleading'). Whether assessors were from within Australia or from overseas was felt to influence outcome. While one respondent claimed that 'Australian assessors are much harsher in their assessment of projects than their overseas counterparts', another noted that assessors from overseas were generally unaware how high the average rating had to be for a project to be funded. The potential for conflict of interest in using Australian assessors was noted ('The Australian pool is so small that nepotism and personality conflicts are too inevitable', 'With the shortage of funds, it now appears there are assessors who choose to crucify the opposition to increase their chances of success').

There was a general feeling that 'You can forget it if your project isn't rated almost perfect by everyone', 'A project can be rejected on the basis of one bad review', and 'Such is the pressure on the ARC that it takes only one negative comment to damn an application'. Respondents suggested that this belief has led to inflated ratings from assessors who know how the system operates and wish to support the applicant ('Assessors know that if they do not blow it out of proportion, it will get nowhere'). Conversely, applicants are disadvantaged when assessors do not realise that a project needs exceptionally high ratings to be funded. Consequently, 'as an assessor you are in a moral bind-do you play the

game and give ratings of 'top 20%' to any project you would like to see undertaken, which is the route most assessors take, or do you give an honest assessment and thereby doom the project?' Grade inflation, together with concern over whether panels choose sufficiently competent assessors, led to claims that there is a chance element in ARC funding decisions. Specific comments included 'Lack of adequate funding for excellent projects has resulted in inflation of the cut off scores and this is increasing the lottery aspect of awards', 'There is a great deal of chance in getting a large ARC grant-that is why the results are usually announced on the same day as the Melbourne Cup', and 'The current system would be fairer (and cheaper) if awards were made by ballot'.

Categories of applicants seen at present to be disadvantaged included younger researchers ('An extra pool of funds should be available for younger investigators ... God knows how the next generation will establish a track record in the absence of such a resource'), women (particularly if they had experienced career interruption), researchers who had entered the university system after a period in industry, and academics who had been in the college of advanced education sector rather than the university sector under the pre-1988 binary system. The question of whether applications in all disciplines should be evaluated by identical procedures was raised in conjunction with concerns about the level of funding for research in humanities and the social sciences. Bias against interdisciplinary research was noted ('invariably there is disagreement among experts from the various disciplines about the criteria for evaluation', 'panels give priority to projects strictly within their field').

Successful applicants expressed concern about level of funding ('ARC sets the size of grants arbitrarily', 'budgets are slashed to the point where projects can barely be carried out'). The mean grant requested by successful applicants was only 69% (SD 12%) of the amount requested. It was also suggested, however, that many applicants seek support at a level well above what they really require in anticipation of a reduction in budget. In contrast to the satisfaction with the Large Grants Scheme generally expressed by successful applicants, some unsuccessful applicants conveyed a sense of frustration and pessimism, as indicated by comments such as 'No questionnaire can really elicit the degree of frustration engendered by institutions such as the ARC', 'I have no idea how I might improve my chances of getting a grant', 'It is very poor money for the effort', 'Research is easily discouraged by a failure to get grants', and 'I am sick of the wasted time and effort, given the near zero probability of success'. Another respondent claimed, 'I will apply every year because it is now virtually a condition of employment (not to get funding—just to apply').

Consequences of not being funded

Although some unsuccessful applicants were obviously demoralised and discouraged, the majority demonstrated determination and persistence in the face of the negative outcome they had experienced (see Table 6). Relatively few respondents intended to abandon the research project that had not been funded. The most immediate response of unsuccessful applicants was to apply within their own university for an ARC Small Grant to undertake the research that had not been funded under the Large Grants Scheme. The success rate in obtaining a Small Grant was 88% among respondents who were successful on one Large Grant application but not another, and 66% for applicants who had not received any Large Grant funding. The majority of unsuccessful applicants intended to apply again for a Large Grant to support either the project that the ARC had not funded in 1993 or a different project (see Table 6). In fact, 69% of applicants who had been unsuccessful in 1993 applied in 1994 for a Large Grant to commence in 1995. As a further index of level of commitment, more than half of the respondents indicated that they would pursue the project that the ARC had failed to fund, even in the absence of grant support from any source.

Table 6. Actions unsuccessful applicants reported they had taken or would take

	One of two applications funded	Sole or both applications successful
Abandon research	10%	21%
Sought an ARC Small Grant in 1993	55%	54%
Small Grant success rate in 1993	88%	66%
Seek alternative sources	47%	54%
Apply for an ARC large grant for the same project	78%	51%
Apply for an ARC large grant for a different project	53%	44%
Proceed without funding	71%	48%

Discussion

In interpreting the results, it needs to be recognised that the sample comprised academics from three Australian universities and that only 12% of the respondents overall had worked within the college of advanced education sector under the binary system. Further, since 44% of the potential sample did not return

the questionnaire, there is the possibility of selectivity through volunteer bias. Another factor to note is that the survey assessed appraisals of the Large Grants Scheme. How the Large Grants Scheme operates may be different in many respects from how applicants perceive it as operating. Thus, instead of being accepted at face value, claims by respondents that there was bias in processing and evaluation of applications need to be checked through independent study of ARC operations.

There was substantial agreement among respondents as to the criteria ARC panels should employ. The consensus was that Large Grants should be awarded on the basis of the merit of projects as established through peer review rather than through reliance on global performance indicators, such as an applicant's history of funding or the person's productivity and impact as indexed by counting publications or citations. Successful and unsuccessful applicants differ not with respect to the evaluative criteria they believe ARC should employ, but in terms of their perceptions as to whether these criteria are applied fairly and effectively. Although the majority of successful applicants expressed satisfaction with the manner in which their application had been processed, many unsuccessful applicants questioned the expertise of the assessors chosen by the ARC panel and pointed to inconsistency in ratings and evaluative comments among assessors. Consistent with these differences, unsuccessful applicants were more likely than successful applicants to contend that there is an element of cronyism in the ARC evaluation processes, ARC panels favour applicants from some universities, and knowing panel members is a significant advantage in gaining a Large Grant.

Some of the negative appraisals of the Large Grants Scheme provided by the unsuccessful applicants were generally shared by the successful applicants. As indicated by mean ratings of greater than 3.5, both groups agreed that there is a strong element of luck and chance in gaining a Large Grant and in particular that the outcome of an ARC application depends too much on whom the panel selects as assessors. Over (1995) outlined several changes to ARC procedures that would overcome these problems. Although the objective should be to ensure that expert and sufficient assessors are used, natural justice requires there be scope for applicants to question the expertise of assessors. The ARC introduced in 1994 a procedure by which applicants who reach the final round can provide a one-page response to criticisms offered by assessors. Applicants who do not reach the final round lack this opportunity for rebuttal, but can appeal. However, appeals can be lodged only on the grounds that required procedures were not followed. The expertise of assessors or panels cannot be challenged. As noted by Over (1994), it is difficult to sustain an effective appeal even on procedural grounds since the information in the public domain as to how panels must process applications is so limited.. In the present survey, successful as well as unsuccessful applicants

expressed quite strongly the view that the ARC appeal process should permit the expertise of assessors to be questioned.

Several respondents provided comments highlighting the extent to which 'grade inflation' by assessors complicates the grant award process. Statistics for the 1993 funding round reported in the Research Grants and Fellowship Programs: Members' Handbook (see DEET, 1994) can be cited to illustrate the problem panels face with grade inflation. Assessors were asked to rate each project on a 7-point scale, where 7 indicated that a project fell within the top 2% in terms of quality and 6 within the top 5%. The instructions to assessors stated, 'Please only use the highest ratings when you think the project truly deserves them. Rating of a project within the top 2%, for instance, should be reserved only for a project which you genuinely consider is of outstanding quality and the results of which constitute an important and lasting contribution'. Nevertheless 52% of all applications in the physical sciences and 50% of all applications in the humanities received a mean rating (values averaged across assessors) greater than 6 (DEET, 1994). In a year in which only 21% of applications could be funded, a much higher proportion of applications were being rated as outstanding by assessors. One consequence of the heavily skewed distribution of ratings was that panels had to select from among many strongly recommended applications. A further consequence of attenuation is that whether a project is funded cannot correlate highly with peer review (average of assessor ratings). Problems such as grade inflation and a substantially higher number of applications than can be funded are by no means unique to the ARC Large Grants Scheme (see Chubin & Hackett, 1990; Klahr, 1985; Marshall, 1994).

The survey also identified dissatisfaction with the present system by which each of the four ARC panels covers a range of disciplines, with a discipline often represented (if at all) by only a single panel member. Respondents in the survey overwhelmingly endorsed discipline-specific panels. However, apart from the administrative costs associated with operating a large number of panels, it is questionable whether Australia has a sufficiently large pool of appropriately qualified persons in all of the disciplines in which the ARC funds research. Further, there would be greater potential for conflict of interest if many more persons than at present who themselves are applicants serve on ARC panels. A compromise position would be to maintain generalist panels, but ensure that a wider range of persons from specific disciplines are involved at stages such as nomination of assessors and culling (see Over 1995).

Successful as well as unsuccessful applicants strongly endorsed the proposition that the ARC be regularly subjected to external review. The review of the National Board of Employment, Education and Training (NBEET) by Wiltshire (1994) was concerned mainly with administrative structure. In

recommending that the ARC remain a constituent Council of NBEET and continue to be serviced by DEET, Wiltshire (1994, p. 48) noted, "The administration of the grants ... has been performed for the ARC by DEET in a manner which, even the Department has conceded, has left a lot to be desired' . A recent review (National Board of Employment, Education and Training, 1996) of the processes for appointment of ARC panel members highlighted the need for greater transparency in process. The ARC has itself funded reviews in order to evaluate the impact that ARC funding has had on research and scholarship in specific disciplines. The outcome studies so far published contain many comments similar to opinions expressed by respondents in the present study. For example, the committee reporting on funding in materials and chemical engineering (Australian Research Council 1993a) described the ARC assessment processes as 'arbitrary and capricious' (p. 9), and conclude that '... it is not possible for the Committee to be certain that those funded were the best persons in their respective fields' (p. 22). Other reviews have questioned the structure of ARC panels, culling of applications without peer review, the manner in which assessors are chosen by panels, and the basis on which funding decisions are made. These concerns point to need for the Large Grants Scheme to be evaluated independently along, for example, the lines of the review of the National Science Foundation undertaken by Cole and Cole (1981).

Whereas a number of respondents called for a substantial increase in the level of ARC funding, the Chair of the ARC has contended that 'the current level of government supported activity in basic research in Australia is about average for the middle sized OECD countries' (Brennan 1992, p. 1). He instead argued that the demand for Large Grants needs to be dampened ('one must ask whether steps are needed to avoid further increases in demand for ARC funds'). The number of Large Grant applications increased sharply, following creation of the unified national system as a consequence of 'clawback' of research funds from universities for central distribution through the ARC, greater reliance on external funding levels as a performance indicator and as a measure of institutional quality, the extent to which career advancement within universities relies on research achievement (see Over 1993), and the degree to which senior administrators have placed pressure on academics to apply for external funding.
Respondents did not favour universities having responsibility for funds at present distributed by the ARC (although unsuccessful applicants were more supportive of this proposition than the successful applicants were). It is unlikely that the primary responsibility for research funding will be returned from the ARC to universities. Doing so would be contrary to government policy directions, and reverse processes such as 'clawback' that have operated since creation of the unified national system. The indications are that centralised control over research

resources will increase rather than decrease. In fact, concerns about how universities currently administer the Small Grants Scheme have led to recommendations (e. g., Australian Research Council 1993b) that the Small Grant Scheme as well as the Large Grant Scheme be administered centrally by the ARC.

Conclusion

The survey points to the resilience of researchers in a climate of deteriorating support. Few unsuccessful applicants indicated they would abandon their intended research. However, it may be only in some disciplines that research not funded by the ARC despite being assessed as of good quality can be pursued through support from other sources. Longitudinal analysis is needed to identify the extent unsuccessful applicants modify the nature of their research plans in order to meet requirements, implicit or explicit, of grant funding bodies. Consideration needs to be given to not only the manner in which applicants change their strategies in applying again for a Large Grant, but the extent to which failure to gain funding for basic research produces a shift to mission-oriented research. Policy directives in the government White Paper (Dawkins 1988) have resulted in increased support for mission-oriented research. For example, funding under the Collaborative Research Grants Program, which is funded jointly by government and industry, increased from $2.7 millions in 1992 to $16 millions in 1994. Increasing support for mission-oriented research, while holding funding for basic research steady, may in time reduce substantially the number of applications for ARC Large Grants.

The primary concern of the analysis reported in this article is with whether applicants perceive the assessment and decision-making processes employed by ARC panels as ensuring that funds for research are allocated on an equitable, valid, and reliable basis. In terms of the perceptions of applicants, there is substantial disquiet about a number of aspects of the ARC's operations. Some of these matters of concern were also expressed in the grant outcome reviews that the ARC has commissioned. Problems identified in grant outcome reviews, by surveying applicants, and through analysis of the ARC (see Over 1994, 1995) should be addressed through external and independent review of the Large Grant Scheme. Matters of concern include the processes by which panels select assessors, lack of consensus in evaluations provided by assessors, and the extent to which funding decisions reflect independent input from panel members rather than assessors' ratings. Although the ARC seemingly does not have any legal obligation of accountability toward applicants and the research community, there is a moral obligation for accountability which has not in the past been fully met.

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