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Allocation by lot: a conceptual and empirical analysis

In 1989 the Soccer Club of Peize, represented by six youths and a trainer, won a national TV quiz. The prize consisted of 50 tickets for the Holland-West Germany soccer match, which were scarce and highly valued because of an atavistic rivalry between the two countries in this respect. The Club Committee decided to have lots drawn for the tickets and to ask the winners to contribute DFL30 to the club funds for the purpose of buying a TV set for the club canteen. The six boys who had won the quiz, and who had already received personal presents, were not given priority in the distribution of the tickets; this decision was later reversed under heavy pressure amounting to, among other things, anonymous telephone threats to the club chairman.

Many more illustrations could be given for the strong feelings of aversion that are often evoked by using lottery as an allocative mechanism. On the other hand, rational arguments in favour of lottery have been put forward. Elster (1989a) discusses three types of indeterminacy that might justify random choice between options. One is strict equioptimality, as in choosing between cans of Campbell's tomato soup. A second is equioptimality within the limit of what it pays to find out, that is, the case in which the cost of gathering more information would exceed the marginal utility of the superior option. The third is the incommensurability of options; one might say that, in this case, any investments into the choice procedure are fruitless a priori.

The present analysis takes the contrast between aversion and argument as its point of departure. Its scope is allocative problems and particularly those situations in which some public *authority* distributes scarce indivisible goods among *people*, rather than problems of choice between *goods* from a private point of view, whether individual or institutional. In the context of allocation, the question about the feasibility of lottery may be analysed as follows: from a rational point of view, the *efficiency* of distributive mechanisms is at stake, as it is in other problems of rational choice. However, the interplay between the allocative authority, the target subject, and the general public or common interest introduces two further aspects of feasibility. One is *justness*, that is, the extent to which the mechanism is compatible with written and

unwritten rights. The other is *acceptability* in an empirical rather than a normative sense, and especially acceptability to the subjects of allocation. Undoubtedly there are all sorts of interactions - conceptual, historical, empirical - between these three criteria. However, the reduction of these economic, juridical and social points of view to each other appears to be unsatisfactory.

Efficiency

A first question is whether allocation by lottery can be rational from an economic point of view. In reply to Elster's statement summarized above, I argue that it cannot. My approach takes two steps, the first of which consists of making his three variants collapse, and the second of showing that lottery is generally not rational.

The first variant, strict equioptimality, is a limiting case with a zero probability of occurrence. Few experienced shoppers, for example, would agree to the appropriateness of even the extreme example of choosing between cans of Campbell's tomato soup. In practice, one would take the closest one and inspect its ultimate consumption date, rather than carry out a mental lottery. Advanced players of bridge can point to a case where a defender plays his best when trying to execute such a mental lottery, namely, when that defender has the queen and jack doubleton; similar situations may arise in other games where it pays to be unpredictable. For practical purposes, however, strict equioptimality is non-existent.

Incommensurability is to be disregarded for a quite different reason. Once the possibility of incommensurable options is entertained, the idea becomes infinitely contagious. No two applicants for a job or school, requests for a research grant, or cans of soup can evermore be argued to be commensurable. The admission of possible uniqueness of options instantly kills rational choice altogether. Conversely, the perspective of rational choice presupposes commensurability - see, for example, the classical statement by Coombs (1964: 284-91, on "Comparing Incomparables"). In that perspective, even multi-attribute utility degenerates into comparability. Indeed, options may have different scores on a number of attributes; the very idea of rational choice, however, brings about the possibility of aggregating these scores into a composite score.

What remains is the general case of indeterminacy. Barring trivial cases, any two options will differ in many respects, and it is usually difficult to aggregate their merits and demerits in a cogent and systematic manner. The argument, then, is that the cost of a systematic procedure of comparison may outweigh the marginal utility of the superior option.

Granting the validity of this conclusion, the second step of my argument consists in pointing to a third procedure that is, under the circumstances, generally superior to both lottery and laborious decision-making. This is the alternative of sloppy choice. It may take the form of intuitive decision-making, or turning a screening device - which is used to ensure that applicants, grant requests, parents claiming child custody, and the like, meet minimal standards - into a fully fledged selection procedure providing a complete ranking, or other sloppy procedures. Their marginal cost is essentially zero. Their validity tends to be low but positive. From an efficiency point of view, even the laziest stereotyping is usually superior to random choice.

There are limits to this argument. One follows from the fact that the efficiency perspective is limited as such - unless one would wish to stretch it to an extent that would make it tautological. Other limitations may be encountered within the rational perspective. Selection of students for closed studies is an example. Considering the isolated problem of selecting applicants for medical studies, there can be no doubt about the efficiency of using grade point averages in high school. However, from the national or institutional point of view that is relevant here the appropriate model is not selection but placement, by which individuals are distributed over studies, closed and open, in such a way that the overall utility is maximized. The complications that arise under the placement perspective, are exemplified by the fact that in The Netherlands the academic discipline with the highest number of applicants per slot is veterinarian studies (cf. Hofstee, 1983). The admission system is highly selective in terms of grade point average. It is hard to maintain that the national interest is better served by the superior treatment of pets that is the probable main result of this policy, than by a system that would relegate some of these bright youngsters to other intellectual endeavours. Thus the efficiency principle may encounter its own limits and become perverted.

Incentive effects constitute another complication. Elster (1989a) discusses self-mutilation by young men in systems where disability leads to automatic exemption from military service. The asymmetry between exemption and admission is considered in the last section of this article. In admission to closed studies, selection on the basis of grade point average may demotivate the large majority of mediocre students (if they correctly perceive achievement to be mainly a function of talent) and therefore lower the average achievement. Admission by lottery would avoid creating the disincentive. However, an important question is whether incentive effects are administratively legitimate in the sense that authorities can account for their decisions in terms of such effects: the paradoxical and disrespectful nature of the account may well undermine authority in the long run.

Finally, incentive effects may pertain to the authority itself. By using lottery for admission to closed studies, for example, the authority may create more dissatisfaction with the scarcity of slots than by using selection (as the rejection of candidates has a person-blaming rather than a system-blaming implication), and thereby keep itself committed to solving the scarcity problem. However, such creative detours also hardly satisfy the criterion of public accountability.

These complications, subtleties, or even perversions are not to obscure the primary argument about the inefficiency of lottery. The general conclusion from this section is that random assignment is not justifiable on rational grounds. If there is an argument for lottery, it is to be sought beyond rationality.

Justness

The second question to be discussed is whether lottery is just, as distinct from efficient. In order to illustrate the distinction, I emphasize the contrast between admission and selection problems, for example, admission to higher education versus personnel selection. The contrast is meant to be ideal-typic; some of the blurrings that are favoured in real life are discussed later.

Selection entails comparative judgement of individuals, whereas admission is absolute. Selection typically consists of filling one or more slots with the best applicant(s) in terms of expected net productivity, whereas admission is typically not so restricted, and hinges upon qualifications that are assessed without reference to other candidates. (Philosophically, there may be no such thing as an absolute judgement; what is meant here is that in the executive phase, comparisons among individuals are not in order, only comparisons between a person and a preset standard). In terms of scaling, selection presupposes an ordinal scale, without a natural threshold point; for admission purposes, the full emphasis is upon the threshold, and individual differences above or below the threshold are irrelevant. In terms of decision-making, selection errors are measured in loss of utility, whereas for admission errors the appropriate unit of measurement is regret.

In everyday reality, there are all sorts of blurrings of the distinction between admission and selection. For a particular high-level job, all available applicants may be found wanting, which implies that absolute thresholds have emerged. An applicant may complain about not getting a particular job for which he or she was qualified, thereby implicitly treating the situation as an admission problem. The complaint may even receive wider acknowledgement where social considerations are part of the hiring policy, as in the case of affirmative action, which can be viewed as a partial transformation of selection into admission. On

the other hand, private schools may favour highly selective "admission" policies; in *numerus clausus* situations even in public education, many local decision-makers automatically favour an approach of personnel selection in choosing future students. All this is not to say that the distinction between selection and admission is useless or even vague; on the contrary, it may help to clarify misunderstandings that frequently arise between interested parties.

The distinction between admission and selection paves the way for an allocative principle that differs from efficiency - namely, rights. Rights (or qualifications, or entitlement), rather than expected future productivity, are associated with admission as distinct from selection. With respect to allocative issues in areas like education, health and welfare, entitlements are documented in the Declaration of Human Rights, the Strasbourg Treaty, etc.

From an economistic point of view, one may be tempted to reduce rights to efficiency. The fact that admission to universities, for example, is conditional upon prior qualifications, may be interpreted in terms of the predictive validity of such qualifications for future success. There are at least two objections against this interpretation. One is practical: economic and juridical principles may conflict with each other in concrete cases. A public school, for example, cannot admit a highly intelligent student without a proper diploma at the expense of a mediocre student possessing the diploma. So irrespective of their origin, rights lead their own life and may become counterproductive. The other, more fundamental objection is that rights may not be based on prospective efficiency considerations at all. In many cases they refer to a retrospective principle like merit or credit, in other words, a personal or generic balance sheet. Rights are acquired individually, through past effort, or bestowed upon a group of persons generically on the basis of sex, race, nobility, etc. In the latter case, they inherit assumed credit left by their ancestors. Positive discrimination, for example, compensates a present generation for lack of recognition of the merits of earlier ones. (I concur with the ethical individualism position taken by Elster [1986] according to which vicarious credit is unacceptable. However, the principle does appear to play a role in defending positive discrimination, so it is retained here for analytic purposes.) There is no logical connection between a person's credit and his or her expected future productivity, so the two should be kept apart in analysing the feasibility of allocative mechanisms.

Having argued that lottery is generally not efficient, I propose that it is just under certain conditions. Whereas the probability of two persons being equally fit is zero from the rational point of view, equality is the very point of departure in the context of human rights. If rights are conditional, as in admission and in many other allocation situations, the presumption is that at the very least those who are qualified are to be

treated as equals; in other words, the condition is to be interpreted a *contrario* in the sense that the posing of additional requirements is not justifiable. Thus if scarcity arises, lottery is the only just procedure (barring the options that are mentioned by Elster [1989b] under the heading of "Absolute Equality", namely, the dividing of goods or their denial to everyone, neither of which is appropriate in the present context); all other procedures, including queues or waiting lists which require additional differential effort, introduce improper demands on the applicant.

Against this reasoning, some would argue that equal distribution of indivisible goods cannot exist at all. Equality in lotteries means that everyone has an equal chance of receiving the good, for example, admission. The objection is that individual probabilities are devoid of meaning, and that all that is registered by the individual is the fact that some are admitted and some are not, thereby violating equality. The argument is a sophism (see Hofstee, 1979a) because it implies that people cannot distinguish between, for example, two treatments that would offer them a chance of survival of 10 per cent and 90 per cent (as each offering would be devoid of meaning, so that their comparison would *a fortiori* make no sense), and that is an absurd implication.

A far more serious objection pertains to the rules of justness that lead to the conclusion that lottery may be suitable in a sense. Rights, especially written law and rules, are best conceived as fallible operationalizations of very abstract underlying principles, in this case, credit, equality, and perhaps fitness or need; moreover, these principles do not at all coincide. Basing one's actions on such fallible rules, even if justifiable, may not meet the criterion of wisdom, to be circumscribed as keeping an eye on the future of humankind. In the practice of civil law, for example, wisdom consists of taking the needs and interests of the parties into account, in addition to their legal positions (ten Kate and van Koppen, 1984). Conversely, personnel selection as a rational enterprise faces boundary conditions of a social and individual nature. Because of this higher-level uncertainty, the mixed system of weighted lottery in admitting Dutch youngsters to *numerus clausus* studies (see e.g. Hofstee, 1983), apart from being a political compromise, may be taken as testimony to the wisdom of the Dutch authorities.

It should be emphasized that the notion of wisdom was used here without reference to political categories such as acceptability and consent; thus far, the analysis is meant to be axiological, not empirical.

Principles and mechanisms

Rationality and justness are principles that underly allocative mechanisms; they may be invoked to account for the use of such mechanisms. Acceptability is another matter; it is an empirical criterion not a normative principle. Before turning to empirical issues, an attempt is made here to answer two remaining conceptual questions, namely, whether other principles have to be considered, and what the relation is between principles: and allocative mechanisms.

Principles of allocation

Taking the question about the feasibility of lottery as the pivotal issue, two major principles of allocation have been discussed: efficiency and justness. The justness principle branches into the principles of credit and equality: some people deserve to be allocated certain goods; in the absence of such considerations, equality prevails. The credit principle may be viewed as a special case of equality, that is, as conditional equality; for systematic purposes, however, I reverse the emphasis and take equality as a special case of credit, namely, as the absence of legitimate considerations of differential credit. Finally, it has been noted that credit can be individual or generic, as in the case of affirmative action or other cases of privilege.

In addition to this list, the principle of need is often mentioned. In the context of allocation of scarce indivisible goods by an authority, there is not much room for the need principle, as it is difficult to formulate any rules about differential need, even though the concept may have a general appeal. In many cases, therefore, need is no more than a redundant label for considerations of equality or credit. Probably the most fruitful conception of need in this context is discretionary. It covers cases where the authority feels exceptionally sorry for some particular person, but does not wish to turn the exception into a rule. Need is thus a non-principle, or a limiting case of a principle. This is again not to deny that the idea of need may underlie allocation in general, only to state that its differential application is a marginal affair.

Assuming that no other basic principles can be found, the following structure may be formulated: we have three principles, namely, efficiency, credit and the discretionary principle of need. Subjects of an allocation procedure may or may not differ among themselves in their standing with respect to these principles; if they do, differences may be either strictly individual or vicarious, as in the case of generic credit. Table 1 contains the structure. Not all combinations will appear to make sense at first, without the following explanation.

TABLE 1
Structure of allocative principles

	<i>Rational:</i> "fitness"	<i>Justice:</i> "credit"	<i>Discretionary:</i> "need"
Individual	selection	honouring	exception
Generic		priority	
No difference		equality	

The application of the rationality principle to individual differences in fitness is usually called selection, for example, personnel selection. An interesting case arises when efficiency is combined with generic differences based on, for example, race, sex, nationality, etc. Such cases of discrimination represent a frontal clash between rationality and justness. On the one hand, there is no doubt that discrimination pays off: empirically; the predictive value of these characteristics is generally positive. On the other hand, discrimination is always inadmissible because the set of so-called *bona fide* requirements is empty; there is no prior reason, for example, why a soprano should be female and a bass male. In this clash, justness is the clear winner. The instructive implication is that efficiency as such is a second-rate principle in allocative contexts. Personnel selection, where that principle is generally accepted, hardly counts as an allocative problem because the involvement of public authorities is at best marginal.

The cell representing absence of differential fitness is empty because of the argument presented earlier: under the viewpoint of efficiency, equioptimality is a zero-probability case.

In the central column of Table 1, the top line represents the honouring of individual efforts to qualify. Positive discrimination, here labelled priority, is another example where justness beats efficiency. An interesting disparity should be noted at the empirical level between the wide acceptance of affirmative action, which is counterproductive, and the lack of acceptance of equality as operationalized in the lottery mechanism, which is merely nonproductive.

Finally, if the conception of need as a discretionary principle is accepted, only individual exceptions come under that heading, and generic need is a contradiction in terms. Absence of differential need, like differential fitness, also makes no sense. Once the possibility of interindividual utility comparison is granted, the probability of finding two persons with equal need becomes zero.

Allocation mechanisms

Selection, honouring, priority, equality and exception take an intermediate position between abstract principles and concrete allocation mechanisms. A list of such mechanisms is provided by Elster (1989b). Table 2 summarizes the associations between mechanisms and principles. Roughly, a mechanism may be positively or negatively associated with a principle, or be neutral towards it. Mechanisms can be applied in a positive or a negative manner. Ability is applied negatively in exemption from military service; new applicants may be preferred to those of last year in school admission, amounting to a negative waiting list; sex, race, age and seniority may be applied negatively as well as positively. In compensatory education, there is a risk of rewarding lack of achievement and incurring the consequent incentive effects. Lottery is the only mechanism that cannot be reversed. In the following, only positive applications are considered.

TABLE 2
Associations between allocative mechanisms and principles

	<i>Fitness</i>	<i>Credit</i>		
		<i>Individual</i>	<i>Priority</i>	<i>Equality</i>
Lottery	0	0	0	+
Ability testing	+	0	0	0
Queues	±	+	0	+
Sex, race	±	0	+	0
Achievement	+	+	0	0
Age	+	0	+	+
Seniority	±	+	0	0

With the exceptions of lottery and ability testing, mechanisms embody more than one principle. Queues and waiting lists are applied irrespective of personal characteristics, and they cater to equality in that respect. An element of honouring individual credit, however, enters especially into queues. It is argued, moreover, that perseverance testifies to motivation and, therefore, to fitness, although that argument is sometimes reversed to the extent that waiting lists are said to constitute a negative selection criterion. The primary principle in positive discrimination on the basis of race, sex etc. is priority because of generic credit. Although counterproductive in the short run, affirmative action tends to be argued also in economic terms, and the argument may be valid in the long run. Achievement as an allocation mechanism primarily honours individual effort, but is also predictive of productivity. Age, as a

criterion for receiving privileges such as the right to vote and to drive, represents generic credit and fitness, but it also represents equality because the coming of age befalls every individual. Seniority primarily honours individual credit, but also relates to productivity, albeit in an ambivalent manner; the experience or human capital argument is counteracted by considerations of high salaries and loss of flexibility.

The list is not complete; nationality and geography, for example, are missing. However, it may serve to illustrate the idea of over-saturation of mechanisms by principles. Preference for impurity is further illustrated by the frequent use of strategies consisting of serial (conjunctive) connections of mechanisms, as in the case of weighted lottery, or parallel (compensatory) connections, as in point systems.

Acceptability

Turning to the empirical issue of the acceptability of mechanisms, two recent studies are briefly reported. The first of these relates to the theme of mixed principles that has come up repeatedly in the earlier analysis. The second study is an experimental investigation of the relation between allocative problems and principles. It focuses specifically on the hypothesis formulated by Ester (1989a), among others, that lottery is more suitable for exemption than for admission problems.

Study 1: Admission to advanced medical training

Until recently, the procedure for admission to advanced education for general medical practitioners in The Netherlands was as follows. Among the many applicants (about 1600 for 260 vacancies in 1989) a lottery was conducted; the lucky applicants were entered into local selection procedures consisting of an interview by a panel of three doctors. A difficulty arose when one of the local panels decided that the interview provided insufficient grounds for selection and subsequently installed a second lottery; the rejected candidates sued the school and won, to the effect that they had to be admitted. This incident, and general dissatisfaction with the procedure, led to a phase of reconsideration. The present study was carried out in that context. In the present reporting, however, the focus is upon the theoretical question of whether subjects of allocation procedures prefer mixtures of principles over pure solutions.

Methods and results. A questionnaire was sent to 540 people registered as candidates for the schools for general medical practitioners. The response rate was 55 per cent. Respondents were asked to give their

answers in terms of general desirability rather than personal interest. The questions, together with the response percentages, are given in Table 3.

TABLE 3
Questions about admission to advanced medical training, and answer percentages

1.	Given a limited number of slots, the procedure should be:	
	(a) Waiting list	16
	(b) Lottery	1
	(c) Selection	27
	(d) A mixture (see below)	57
2.	Assuming that a mixture would be chosen, what should it be?	
	(a) Lottery and waiting list	6
	(b) Waiting list and selection	79
	(c) Selection and lottery	8
	(d) All three	7
3.	Assuming a selection procedure, what should it consist of?	
	(a) Interview	17
	(b) Internship	1
	(c) Achievement tests	1
	(d) GPA basic medical education	1
	(e) Psychological tests	0
	(f) Other ...	2
	(g) A combination of (a) to (f)	79
4.	What kind of procedure, in your judgement, is preferable?	
	(a) Procedures with definitive rejection of candidates	15
	(b) Procedures by which rejection is not definitive	85

Discussion. The respondents were opposed to one-track mechanisms (item 1) and instruments (item 3). Among the single instruments, the interview, which is a mixture in itself, is the only one that gathers more than a handful of votes; most respondents, however, prefer a buffering. Lottery, the only single-principled mechanism in this context (because selection may refer to achievement and/or ability testing) appears to be the least acceptable (items 1 and 2). Preference for fuzziness and indeterminacy is also illustrated in item 4. Together, the results provide consistent support for the proposition that solutions to allocative problems are less acceptable the purer they are.

Study 2: Allocative problems and principles

The second study to be reported here was designed to investigate the differential acceptability of allocative solutions depending on the kind of problem. Particularly, the solution profiles for selection and admission problems were expected to differ. Furthermore, a hypothesis formulated

by Elster (1989a) was tested, namely, that lottery is more acceptable in problems of exemption than in positive allocation.

Between exemption and allocation there is a formal correspondence: exemption is allocating exempt status to a person. The substantive difference, however, may be expressed as follows. In exemption problems, a choice has to be made between individuals such that some will remain in their present state (e.g. in a lifeboat) whereas others will incur something undesirable (e.g. being thrown overboard); in positive allocation, the alternative to the present state is desirable (e.g. receiving an organ for transplantation).

Method. The problems presented were taken from Elster's (1989b) list (E1 to E4 concern exemption; A1 to A4 positive allocation).

- E1 *Life Boat:* The boat is overloaded and a storm is impending.
- A1 *Transplantation:* The number of donor organs is insufficient.
- E2 *Tax Audit:* The comptroller can audit only a fraction of the tax forms.
- A2 *Restitution:* Not all requests for restitution of tax payments can receive timely treatment.
- E3 *Lay-offs:* Because of shrinkage of the labour organization, forced lay-offs are inevitable.
- A3 *Promotion:* Only some of those who are eligible can be promoted.
- E 4 *Conscription:* Only some of those who are fit need to be called upon.
- A4 *Quota:* More people apply for immigration than the number a country wishes to admit.

The digits refer to pairings; in all four cases, an attempt was made to have an exemption problem mirrored by a positive allocation problem. Two questionnaires were constructed, one containing the problems E1 to E4, and the other A1 to A4. To both questionnaires, a fifth problem was added, namely, *Closed Studies*. In the E-questionnaire, the phrasing was: "some of the applications for a particular study cannot be honoured". In the A-questionnaire, the phrasing was: "For a particular study, admission is restricted". In the present definition, *Closed Studies* is an A-problem. The context and the corresponding phrasing, however, might make a difference.

The following solutions were presented to the respondents:

- I. *Lottery*, decision by chance.
- II. *Priority*, based on sex, race, age, etc.
- III. *Honouring*, of personal merit from the past.
- IV. *Selection*, on the basis of the expected future value of the person.

The solutions are meant to represent equality, generic credit, personal credit and fitness, respectively.

One hundred second-year students of psychology at the University of Groningen received the questionnaires by mail. The E and A versions were distributed randomly. The number of responses was 66, divided evenly between E and A versions.

The respondents judged each problem for each solution, using a three-point scale running from "acceptable" to "not acceptable". They were invited to comment.

Results and discussion. The mean acceptability ratings of the solutions for the problem are given in Table 4. Clearly, problems have their own profiles; in particular, the selection problem A3 differs from the admission problem A5 in the expected direction. The fact that lottery has the highest overall acceptability, in sharp contrast to Study 1, can be explained by a difference of subjects (psychology students versus medical doctors) or procedure (fictitious versus real-life problems), or both. Priority is judged to be marginally acceptable for A1, *Transplantation*, and E3, *Lay-offs*; these exceptions to its overall lack of acceptability are probably artefactual: a number of subjects commented that sex and race were out of the question, and that only age might provide an acceptable basis for decisionmaking. Age, however, in this context represents efficiency (as in the *Transplantation* problem) or personal credit (as in *Lay-offs*) rather than generic credit. Therefore, the acceptability of privileges may be concluded to be quite low with the present respondents.

TABLE 4
Means of acceptability ratings or exemption (E) and positive allocation (A) problems, on a scale ranging from +100 (acceptable) to -100 (not acceptable)

		Lottery	Priority	Honouring	Selection
E1:	Lifeboat	64	-36	-82	-52
A1:	Transplantation	36	06	-88	-36
E2:	Tax audit	94	-67	-55	-76
A2:	Restitution	70	-63	-88	-94
E3:	Lay-offs	-03	00	42	55
A3:	Promotions	-15	-45	73	76
E4:	Conscription	79	-42	-64	-06
A4:	Quota	48	-39	-27	-39
E5:	Closed studies	76	-79	-48	15
A5:	Closed studies	76	-85	-24	06

The specific hypothesis that, in addition to general descriptive purposes, motivated the present study was that lottery is more acceptable in problems of exemption than in problems of positive allocation. The design of the study contained two approaches to test this hypothesis. First, a matching was attempted between the problems E1 and A1, E2 and A2, and so on; secondly, one and the same problem, *Closed Studies*, was presented as the last problem in both lists, therefore in different framings. The latter operation was unsuccessful. The acceptability ratings of lottery for both framings were identical (Table 1, bottom row). In fact, all four solutions received quite comparable ratings for the two framings of the *Closed Studies* problem (with the possible exception of *Honouring*, which is difficult to interpret, however, as this solution is not consistently less popular in exemption problems), thus testifying to the comparability of the two respondent samples. The most likely interpretation of this failure to achieve a framing effect is that the problem is well-known to Dutch students and therefore resists framing.

The matching operation in itself was quite successful. The rank order correlations between the solution profiles of paired problems, omitting the *Closed Studies* pair, averaged .75, whereas the average correlation between all other pairs was -.19. In terms of their pairings, the exemption problems all show greater acceptability of lottery than do their positive allocation counterparts. This result is all the more striking as no other solution shows such a systematic pattern. In sum, the indications are that lottery is associated with exemption rather than with positive allocation problems. This finding supports the otherwise subtle distinction between the two classes of situations.

Acceptability of mechanisms: general discussion

Several aspects of the empirical findings in the two studies invite further reflection. To begin with, preference for compromise solutions has appeared in an earlier study (Hofstee, 1983) where Dutch youngsters opted for weighted lottery in admission to *numerus clausus* studies rather than straight lottery or selection. That study differed from the present Study 1 in many respects: the data were gathered in the late 1970s, the respondents were high-school students, and the problem was different. These differences are expressed in the findings; in particular, straight lottery was not massively rejected as it was in the present study. The preference for compromise, therefore, seems to be all the more robust.

An appealing parallelism may be noted between these inclinations on the part of the subjects and the political process. Allocation principles are to some extent associated with political mainstreams. Efficiency appeals primarily to liberal -democrats, equality and priority to social-democrats, and personal credit and need to the christian-democratic

tradition. A plausible prediction is that parties will attempt to implement these values when an allocative problem is placed on the political agenda. Only the necessity for bargaining in multi-party democracies can explain the resulting compromises. So if there is wisdom in impurity, as I have argued, the wisdom is in the democratic system rather than in the politicians or parties.

The intriguing suggestion that comes out of the empirical studies on acceptability is that the consent of the subjects is with compromise as such; in other words, preference for compromise is an individual rather than just an aggregate phenomenon. To say that the subject prefers compromise is not an instance of holistic bad taste.

To the extent that this finding is generalizable, it frontally opposes ideas ventilated by many commentators who deplore the fuzziness of politics and depict it as a threat to democracy. In a direct test of the hypothesis that citizens opt for compromise, one should confront voters with a thought experiment in which they are made individually responsible for the composition of their parliament. I expect that only supporters of small parties would go so far as to take all the seats, or even an absolute majority; that uncompromising attitude would be precisely the reason why these parties are so small.

A possible objection to the present reasoning is that the observed tendency to compromise is an artifact of the prior conceptual separation of underlying principles. However, the behaviour as well as the arguments of local decision-makers (as opposed to subjects) are probably well captured by the conceptual distinctions proposed here. For example, an inventory of the admission procedures to professional colleges in The Netherlands (Hofstee, 1979b) revealed many instances of straight lottery and other one-track strategies designed by autonomous local authorities. (If the argument is accepted that wisdom resides in fuzziness, then the logical consequence is to remove allocative decisions from local control, with the possible exception of hardship cases.)

Compromise does not mean that an even mixing of principles is indicated for each allocative problem. First, the principles entertain their own pecking order. In authoritative allocation (as distinct from private selection), justness seems to dominate efficiency; within the domain of justness, generic privileges have a tenuous status. Secondly, the finding that problems have differential solution profiles is probably generalizable. Among these differences, the association between lottery and exemption versus admission especially merits further discussion.

At least part of the explanation for the disparity may be that lottery functions as a default option because of the inapplicability of other mechanisms to problems of exemption. Ability tests, for example, are used to reject military enlistees but can hardly be used purposely for exemption. To exempt the highest scorers would be illogical from the

institutional point of view (certain stereotypes about the institution notwithstanding), and conversely, exempting low scorers would amount to using a test for unintelligence, which is a contradiction in terms. Another example of an inapplicable mechanism is the waiting list, which is the closest competitor to lottery because it is also impersonal. In admission problems, the waiting time tends to become stationary in due course because the number of people who drop out approaches the number of new applicants. With respect to exemption problems, however, the number of those who volunteer to be drafted (corresponding to the applicants for admission who waive their rights) might never approach the number of new "candidates", with the result that the age of new recruits would quickly mount to eighty and over. Other principles and mechanisms like priority (in particular, sex and vicarious credit for one's brother's service) and personal credit, which are applicable without paradox, do play a role in exemption situations as they do in admission. The remaining gap, as it were, is filled by lottery.

The reason why the pure-principled solution of lottery is politically acceptable for exemption from military service may be sought in the fact that the problem is low on the political agenda. Whereas admission restrictions infringe upon human rights to be vindicated by authorities, few people would care about a scarcity of military slots.

Conclusion

The present conceptual and empirical analysis of principles and mechanisms in allocation took off from a contrast between aversive reactions to lottery and arguments in its favour. I have attempted to show that the aversions are not irrational, because lottery itself cannot be arrived at from a rational point of departure. Under certain circumstances, lottery can be justified by the principle of unconditional or conditional equality. In this perspective, aversions against lottery need not be interpreted as contempt for justice, but may be viewed as objections to single-principled solutions in general. Preference for compromise was demonstrated empirically at the individual subject level. Speaking normatively, I presented the case for such buffered solutions in terms of wisdom.

By its character, this laborious attempt to unravel things, only to fuse them into fuzziness, is comparable to the case of a neurotic person who engages in a seven-year psychoanalysis and comes out as neurotic as before, but more at ease with the neurosis. Allocative problems, like humans, may defy more definitive solutions.

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