

# **Mapping Deliberation: calculation, articulation and intervention in the politics of organ transplantation**

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## **Biographical note**

Gail Davies is Lecturer in Human Geography at University College London. Her research interests are in the spatial, institutional and embodied aspects of knowledge practices, particularly the relationship between scientific understandings and vernacular knowledges. Much of this work has focused on animals, as a way of linking diverse empirical contexts, from natural history filmmaking to public debate about transgenic animals, to broader questions about the changing relations between ideas of nature, ethics and expertise.

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## **Abstract**

This paper reflects on the aims and outcomes of an innovative methodology of participatory technology appraisal, called Deliberative Mapping, which seeks to contribute to theoretical debates and practical experimentation around what it might mean to bring the technosciences into democracy. Deliberative Mapping is a hybrid methodology, involving both calculative and deliberative processes, which seeks to map the entanglements of biotechnological imbroglios, and translate these connections into the contexts of decision-making. Through application to the case study of organ transplantation, these procedures of calculation and articulation are critically examined, exploring their aim to reduce asymmetries between scientific, political, economic and other framings of the issue and their operation in contexts already complexly structured through existing power relations, which indicate the challenge of co-fabricating these experimental forms of intervention into political facts.

## **Keywords**

Deliberative Mapping, organ transplantation, public participation, calculation, articulation, intervention.

## Introduction

I want to start this paper with some numbers about kidney transplantation. In 1991, in the United Kingdom and Ireland, 2,597 kidney transplants were carried out, whilst 4,815 people remained on waiting lists. By 2000, the number of transplants had declined to 2,515, whilst the number of patients on transplant waiting lists had increased to 6,823 (UKTSSA 2001). In Western Europe, approximately 40,000 patients now await kidney transplants. Similar trends exist elsewhere. In the US, transplant recipients increased from 12,786 in 1988 to 20,672 in 1997, but, at the same time, waiting times increased, with deaths on waiting lists doubling from 1,502 to 3,916 (OECD 1999). With ageing populations and declining donation rates, there is a growing gap between the availability of organs and the needs of individuals awaiting transplants: a global shortage of organs for transplantation. For some biotechnology companies, xenotransplantation is proposed as an optimal solution to this problem, using pigs, genetically engineered to make their immune systems more compatible with human bodies, to provide unlimited numbers of organs. Market research has estimated that by 2010, given clinical trials and regulatory approval, 450, 000 people could have had solid organ xenotransplants, a global market worth \$6 billion (Rifkin 1998: 21).

Such numbers describe one aspect of this problem, and introduce one potential solution, but they do not exhaust it. The reasons for the growing disparity are complex, including reductions in deaths that lead to availability for organ donation, ageing demographic profiles of developed countries and advances in medical technology allowing patients to survive acute episodes of organ failure. The possible solutions are similarly multifaceted. The organisation of international biotechnology markets, the provision of national health services, the protection and promotion of public health, and plural ethical considerations cannot be dissociated from the co-ordination of new forms of organ transplantation. The implications of xenotransplantation thus overflow the economic and medical frames that suggest it as a singular solution to the global scarcity of organs, and involve a proliferation of new entities embedded in unexpected relations and entanglements

(Brown 1998; see also Latour 1999). There are consequently difficult questions about how best to understand and manage the overflows from this, and other biotechnological inventions, which are troubling traditionally reductive approaches to science policy-making and blurring the boundaries between economics, politics and science (Callon et al 2002).

Such questions have led to diverse theoretical debate about what it might mean to bring the trajectories of technoscience further towards democratic accountability, ranging from calls for a new constitution to revise and reconnect our concepts of nature, science and politics (Latour 2004), to more modest interventions into existing political, economic and scientific procedures for technology assessment and decision-making (see for example, Joss and Durant 1995; Lebessis and Paterson 1999). Much is agreed about the potential benefits of increasing the legitimacy and efficacy of decision-making through extending participation in the governance of science and technology (Ravetz and Funtowicz 1999), yet critical questions remain about evaluating the effectiveness of these new and often experimental democratic procedures according to different criteria and interests. Making judgements about whether such participatory approaches have the potential to make institutions more responsive to wider concerns about science and technology (Stirling in press), or whether they represent the next round of business as usual for policy (Strathern 2002), requires both overview of the theoretical commitments and the situated operation of specific forms of democratic intervention in context.

This paper reflects on the aims and outcomes of one hybrid methodology, called Deliberative Mapping (DM), using theoretical vocabularies from science and political studies to explore its epistemic commitment to reframing knowledges for technology appraisal, whilst examining its application in the on-going politics of organ transplantation. Developed by colleagues at SPRU, UCL and PSI, DM is a participatory process, based around a form of multi-criteria appraisal, which assesses how well different courses of action perform when judged against the economic, social, ethical and scientific criteria defined by specialist and citizen participants. Assessments are both quantitative – measuring the performance of options against criteria, and qualitative –

exploring the forms of reasoning participants use to justify their judgements. The methodology was developed and tested through a full-scale public engagement exercise in the UK, which assessed xenotransplantation alongside a set of alternative policy options for reducing or closing this ‘kidney gap’, including stem-cell research, reorganising donor schemes – through opt-out schemes and encouraging living donation, alongside improving existing transplant services and preventative approaches<sup>1</sup> (Davies et al 2003). This is thus a specific form of political intervention, directed to a particular moment in the politics of biotechnology and the technologies of health administration, where political judgements are made about health promotion, priorities, protection and purchasing. It seeks to create new spaces for engagement between the economic, scientific, political and other actors that make up the socio-technical networks of, in this case, organ transplantation, whilst translating these entanglements into the technical procedures of politics in institutional settings

In this paper I argue that Deliberative Mapping can be considered an experimental intervention into the linked processes of framing and connection. The DM process integrates prior work on multi-criteria decision-making techniques (Stirling 1997; Stirling and Mayer 2000; 2001) and deliberative group approaches to public engagement (Burgess et al. 1998; Collins and Burgess 2000; Burgess 2000). The resulting methodology seeks to elicit different framing rationalities, whilst working to enhance connections between actors through two different modes of articulation. The use of a multi-criteria analytic produces numerics that ‘map’ the range of citizen and specialist reasoning, producing ranked pictures of option performance that are commensurate and mobile, seeking to provide a transparent connection between processes of framing and patterns of option appraisal for decision-makers. Staging deliberative encounters between citizens and specialists complements this calculative procedure through social action, allowing all participants to locate and challenge the epistemological, ethical and ontological claims of others.

The search for hybrid methodologies, which combine inter-personal deliberation and quantitative methodologies, is not unique in the pursuit of processes producing both

depth and breadth in public participation (see for example, Fishkin 2003; Luskin 2002). Yet the issues raised here are novel, in that a quantitative heuristic underpins the appraisal process for all participants, rather than extending the deliberative sample. Discussion of this research so far has focused on the forms of dialogue and argumentation that emerge in the face-to-face encounters between citizens and with specialists through this process (Davies and Burgess 2004; Davies 2006). This detailed exploration of speech acts is more familiar to academic advocates of deliberative democracy than the graphical representations through which they can be summarised. Indeed, prior presentations of this part of the research suggest an initial hostility to numerical depictions of the outputs of public deliberation. Yet here I want to focus primarily on the processes of calculation that generate these graphs, suggesting it is by combining two modes of articulation that the methodology may operate, however modestly, to reform relations of power within decision-making contexts and thus reduce asymmetries between scientific, political, economic and other framings of the issue. Taken together, these calculative and deliberative processes and their outputs stage the potential for connection, resituating specialist knowledge claims through attention to their framing conditions and boundaries of uncertainty, whilst co-producing new forms citizen expertise, thus opening up technology appraisal to other forms of framing and reasoning.

Using the pilot case study of organ transplantation, each of these moments is critically examined: firstly, to introduce the calculative processes of the multi-criteria procedure used, and secondly, to explore the performance of the actors, identities and articulations associated with its operation. Finally, through attention to their operation in contexts already complexly structured through existing power relations, I reflect on the challenge of co-fabricating these new forms of collective action into political facts. If the main point of such methodological experimentation is to ‘open up’ a particular point in the politics of decision-making, to act as a Trojan horse, bringing other framing logics into the political spaces of health, in conclusion, I ask if it is possible to emerge from this methodological construction and contribute something substantive to the on-going contestations around new biotechnologies like xenotransplantation.

## **The politics and performance of technology appraisal**

The starting points for this exploration into the politics and performance of participatory democracy are critiques of established procedures of expert-driven risk appraisal and the development of new forms of governance in the face of socio-technical complexity and hybridity. Traditionally, procedures of technological risk assessment or economic analysis have attempted to describe the dimensions of an object, or technological option, in terms of a single numeric. In narrowly technical appraisal processes, such as cost-benefit analysis, there is only one criterion, which is financial, and those elements of an issue without obvious monetary value will be converted into what is intended to be a commensurable monetary unit. Multi-criteria approaches, especially in the last decade, have burgeoned in response to damning criticisms of these economic approaches (for discussions see Stirling 2000, 2005, in press). However, even much multi-criteria analysis, albeit admitting that multiple qualities are relevant to appraising the performance of an object, ultimately aggregates and abbreviates these dimensions, so that a single preferred option or a short list of ranked actions may be swiftly calculated. Conventional critiques of calculation are pertinent here; used in this way, numbers reduce ambivalence to equivalence (Doel 2001: 556).

Yet the institutional appeal of such techniques is important. As Rose suggests, ‘numbers have achieved an unmistakable political power within technologies of government’ (1999: 197). Numbers make modern modes of government possible. The hybrid objects that overspill scientific, economic and political frames appear through such metrics as well-defined entities, with clearly described properties, summed up in a number, which can be easily incorporated into the administrative procedures of doing politics. They are ways of making complex arrays of data and information manageable in decision-making contexts, of taking numerous issues and agencies into account. They are judged, at least by their proponents, to be the most efficient, reliable and transparent ways of dealing with complexity (DTLR 2001). Yet their dangers too are evident. Notwithstanding endless arguments about the mathematics and internal logics of different forms of multi-criteria appraisal, they make this integration too easy. Too much is lost of the uncertainties,

complexities and essential open-endedness of the relations in which the objects thus described are inevitably embedded. Such procedures turn what Latour would characterise as the risky attachments and tangled objects that embody a ‘matter of concern’ into a smooth object, a ‘matter of fact’, just as the objects that science policy is having to consider present new and more complex entanglements (Latour 2004).

One response to these limitations has been the rise of governance strategies based on ideas of ‘communicative partnership’ between the different agencies who have a stake in the issue, with explicit commitment to redress the ethical, environmental or social issues excluded from expert forms of appraisal (Dobson 1999; Dryzek 1990). Such techniques are attracting increasing policy attention and growing critical scrutiny. The development of a new strategy for the governance of public policy at the European level is enshrined in the EU’s White Paper on Governance (European Commission 2001), whilst the Aarhus Convention (1998) establishes a principle of open communication between government and citizens, and greater participation at all stages of the policy process. The body of shared practice within and between different countries is thus growing, much supported by the EU in programmes such as Europta (Joss and Bellucci 2002) and ULYSSES (Kasemir et al 2003). However, there are issues with these emerging forms of decision-making. Some questions are procedural: the meanings of representativeness and inclusiveness (Smith and Wales 2000); the provision of information to citizens (Abelson et al 2003); the engagement of marginalised communities (Webler et al 1995). Others are institutional: the weaknesses in evaluative frameworks to assess participatory processes; stakeholder ‘fatigue’ from public and private sector institutions; and increasing fragmentation of expertise and experience as one-off exercises are not capitalised upon.

Yet other issues are more substantively critical, emerging from the way such processes have adopted and translated a particular notion of the performance of rationality in deliberative spaces. The work of Habermas has provided a valuable normative lens through which to address the asymmetrical operation of instrumental and lifeworld rationality in the discussion of new technological developments (Habermas 1984, 1987). It proposes the ideal of ethical dialogue unfolding in an inclusive public sphere,



confronting the overweening power of instrumental rationality through deliberative processes that are transparent to all participants and insulated from conflicts of power. Yet, in practice, if not in principle, much of this is dependent on a particular form of symmetry. Habermas has argued that if instrumental reason is not to enjoy an unacceptably dominant status, one must explain how reasoning about norms and values is similar to reasoning about facts, to give a symmetrical epistemic standing to these two dimensions (Habermas 1984). Critics of this ideal have drawn attention to its assumption of unified reason in argumentative strategies (Bohman 2000), the limited conceptualisation of the ethical subject in discourse ethics (Gardiner 2004; Whatmore 1997), the valorisation of consensus above antagonism (Mouffe 2000) and the power external to communication (Flyvberg 1998; Pellizzoni 2001). These critiques are accompanied by growing concerns about practice. Thus Healy concludes that, whilst ‘public participation is increasingly regarded as a legitimate way, even necessary way of tackling the challenges and risks of complex contemporary problems, the practice of participation is severely hampered by the hegemony of traditional conceptions of knowledge and rationality’ (Healy 2003: 97).

In the same way that expert-driven forms of appraisal truncate the entanglements of the objects they seek to describe, so too deliberative processes risk becoming a new ‘black box’ into which concerns about science and technology are bracketed off. Agreement by facilitated consensus emerges from small groups of participants at the end of a relatively short process, which institutions can then choose to endorse, or not, according to pre-existing concerns. As Stirling suggests, ‘powerful instrumental pressures towards institutional legitimation and decision justification, serve to privilege consensus in participatory deliberation just as they demand aggregation in risk assessment’ (Stirling, in press). Both forms of appraisal can thus become part of politics as usual. Indeed, the rapid proliferation of these processes points to their success for decision-makers in containing overflows of social or ethical concern, separate from technical procedures, which continue unchanged (Strathern 2002). Thus, whilst acting to manage controversy over science and technology in the short term, the institutionalisation of procedures in this way may leave epistemic commitments and forms of governance untouched.

Yet, I want to argue that to jettison such the potential of such experiments to precipitate more reflexive governance is prematurely pessimistic, and suggest there is scope for including experiments with both calculation and deliberation in the search for innovative collaborations and new configurations that might democratise the technological economy. Literatures developing out of science and technology studies, which move science studies outwards towards theoretical overviews of a new constitution (Latour 2004), into close empirical studies of the technologies of politics (Barry 2001), or the performance of economics and market transactions (Callon 1998) all offer places from which to re-examine critically the performative and political dimensions of such processes. Two concepts are valuable here: understanding the dynamic link between framing and overflowing (Callon 1998), and the performative nature of social scientific attempts to model and understand these processes of framing and overflow (Barry 2001; Callon 1998; Law and Urry 2004).

Framing, firstly, refers to the work that has to be done in order to make relations visible and calculable (Callon 1998). To the extent that xenotransplantation only emerges as a solution to the organ gap in certain medical and economic frames, so too, both expert-driven and participatory forms of technology appraisal emerge from particular political frames. As such, both are contestable, for 'framing is always, in principle, contestable' (Barry and Slater 2002: 185). Furthermore, both are subject to overflow, as 'total framing is never possible, by reframing to include some externalities further overflow follows' (Callon 1998: 17). Such overflows have become the rule, hence one reason for the increase in different processes seeking to reframe and contain these hot entanglements. A mature approach to the politics of participation has to recognise the inevitable role framing plays in the production of different statements of public meaning. No one way of framing an appraisal process can be entirely neutral. Yet given the inevitability of overflows, it is possible to suggest that an ability to incorporate diverse framing assumptions and the opportunity for participants to examine and challenge the legitimacy of other framings become critical to developing robust processes for progressing the democratic accountability of science.

Secondly, critical methodological attention to the part played by economics in performing markets (Callon 1998), or the techniques used to constitute the political (Rose 1999; Barry 2001), is bringing further recognition of the multiple roles that such processes, practices, diagrams and instruments play in the performance of politics. A distinction between *politics* as ‘a set of technical practices, forms of knowledge and institutions and the *political* as an index of the space of disagreement’ (Barry 2002: 270, emphasis added) enables the contradictions of different forms of technology appraisal to be held in tension. Whilst the institutionalisation of appraisal methodologies may indeed become part of politics as usual, acting to close down the space for political dissent, such processes can also at certain times be political, opening up the possibility of disagreement. This includes the use of calculative processes, which are generally regarded as reducing the space for the political. Through what Barry identifies as the ‘fragility of metrological regimes’ or the ‘inventiveness of measurement’, he suggests that the implications of such techniques are often underdetermined and that calculation and measurement can in fact disrupt the frames of politics and reopen political spaces (Barry 2002). All forms of technology appraisal operate through constituting the identities of the actors, entities and political arenas in which they are enacted. All involve certain exclusions and separations that establish more purified objects and modes of calculation – they are all interventions framed in a certain way. Yet such frames can act to condense political conflict and negotiation, and there will always be overflows beyond these framings, which may encourage greater reflection and reflexivity (Stirling, in press). Whether the specific operation of the processes of calculation and deliberation affect a political or anti-political intervention, opening up conduits for cross-examination of economic, political and technological entanglements, or closing down debate around narrow institutional frames, itself becomes an open question.

## **Calculation and demonstration of symmetry**

The conventional view of calculation is that it represents a levelling out of difference, a radical reduction of complexity in the pursuit of closure. A principle of simplification and aggregation underpins the basic steps for many multi-criteria appraisal processes, where choices between different courses of action have to be made. In such processes, participants identify and clarify the nature of the problem; they define the range of options available to resolve the problem; determine the criteria needed to ensure proper appraisal; appraise each option against each criterion; and finally, review the outputs of the appraisal to produce recommendations. In this process, criteria are devices to make things commensurable, for comparing different means of achieving a particular end. Implicit in achieving this commensurability is a particular form of scaling, for thinking about how people express preferences and for thinking about how to reconcile these preferences collectively. There are different kinds of multi-criteria methodologies (Jaeger et al 2001), but most Anglophone forms have roots in rational choice theory, that is a way of looking at choices between courses of action based in how economics understands preferences. This talks about trading off. For example, it is premised on thinking about ‘how much cost’, versus ‘how much health’, may make an option perform well. This economic framing ‘allows one to provide a clear list of the entities, states of the world, possible actions and expected outcomes of these actions’ (Callon 1998: 19). Frames are constructed to allow connection between different viewpoints, yet these often translate ethical themes into the limited calculus of risk (Strathern 2002). Through such manoeuvres ‘calculation is thought to reduce the space of the political and to limit the possibility of disagreement’ (Barry 2002: 272).

However, closer attention to the relation between the production and performance of calculative procedures may point to different assessments. As Barry and Slater propose, ‘calculations effect a certain rationalization of social and economic relations but the extent of this rationalization should not be overestimated’ (Barry and Slater 2002: 181). Slater, in particular, identifies a double abstraction in considering academic accounts of economic calculation. He suggests there is ‘the false abstraction of economic formalism, but there is also the real abstraction of economic process. Critique the former and one might miss the latter; formulate the latter wrongly and one is likely to make a return to

economic formalism' (Slater 2002: 234-235). I would suggest the academic critique of different decision-making processes offers parallel dangers of entrapment. To critique only the metrological formalism of calculative methodologies is potentially to miss the real abstractions that take place within decision-making processes, yet to formulate these wrongly is to usher in a return to a different form, yet equally closed form of appraisal. There are two potential counters to these dangers: firstly, to engage with the abstractions of political decision-making whilst exploring how it might be possible to use numbers differently (Derrida 1981: 24); and secondly, to pay close attention to the performances of identity and agency that maybe be articulated around these procedures; to politicise the frames, and to chart the overflows. Through these strategies, it is possible to trace how, in certain contexts, equivalence might lead to ambivalence about powerful framings of the issues.

In the DM process, both specialists and citizen follow the heuristics of a multi-criteria appraisal, supported in different ways through a series of joint and individual meetings. Seventeen specialists<sup>2</sup>, representing a range of medical, economic, patient and ethical expertise, were interviewed on three separate occasions: to scope options, to complete the appraisal, to review the process and outcomes. At the end, specialists met together to explore the outcomes as a group. Four panels of eight citizens, divided by gender and socio-economic class<sup>3</sup>, worked in small groups on tasks organised through the heuristic of the multi-criteria technique. Over six group meetings they worked through the component parts of the decision-making process, meeting with the specialists for a one-day workshop. They negotiated shared understandings of the options, defined criteria important in judging between them, recorded their opinions of how options performed against criteria, weighted criteria, and reviewed the outputs and the process. The graphical outputs from this appraisal are illustrated and explained below.

[Figures 1, 2 and 3 about here]

In many ways, these graphs present the outcomes of a straightforward multi-criteria assessment, with relative option performance judged against participants' criteria. The

‘deliberative maps’ are, on the one hand, radical reductions of the relations between the various different actors and the issue. Yet I would also argue that they are demonstrations of complexity. The term demonstration is taken from Barry (2001). Compared to representation, which suggests the use of numbers to refer to an absolute metric, demonstration has a more deliberate and polysemic meaning, referring here to the rhetoric of numerics as a political device, an act of making things visible to a particular audience. Several parameters of multiplicity, variability and uncertainty are incorporated into these deliberative maps, which thus hold open the possibility of an ontological politics.

The idea of multiplicity draws attention to the fact there are numerous ways of responding to the proposition to take further into account the personal and bodily distress of people dependent on dialysis technologies. All of these scenarios or options promise to address this problem in diverse ways. They reflect different interests, and embody within them different ideas about the organisation of agencies, entities and qualities of relating that might support the exchange of organs to those in need. By assessing all options, all actors are asked what is at stake in confronting these propositions, and review the alternative routes for addressing them.

The maps also give shape to the uncertainties and ambiguities that emerge in considerations of the fit between these multiple future scenarios and different framings of the problem. Participants assign two performance scores to each option under each criterion. For specialists, this is their most optimistic and pessimistic assessments of the performance of any option under each criteria. For citizens, the two points demonstrate the group variability, the most optimistic and pessimistic scores given within the group. These ranges thus express uncertainty in assigning scores; differences of opinion; and variability in performance from context to context, for instance, the differences between good and bad implementation, or between appropriate and inappropriate applications. These uncertainties emerge from the problem of defining the actions of actors that currently make up the complex networks of the kidney gap, as well as uncertainties about the behaviour of the new entities suggested. The bars of the graphs map the range of

concerns about the actions of all actors on one scale, including judgements about: whether nonhuman entities will perform as their advocates say they will; whether specialists themselves will perform in the way they talk about their work; whether different publics are able to inhabit the different roles imagined for them; or whether institutional actors are able to adapt to the new demands placed upon them.

Thus, the traditional uncertainties described through scientific risk assessment, for example, evaluating the efficacy of stem cells in organ repair or the chances of porcine endogenous retroviruses crossing species barriers, are held alongside the wider sets of ethical, social or institutional uncertainties. These include such diverse aspects as, whether people are able to assemble healthy lifestyles, the implications for trust in the medical profession in shifting to systems of presumed consent, or whether medical interventions are proceeding too far in remodelling ideas about bodies, nature and society. All actors are faced with making decisions in these contexts of uncertainty, which brings recognition of their entanglements into these debates on the future of organ transplantation. As Callon reflects, 'how can agents calculate when no stable information or shared prediction on the future exists? The only solution is that provided by the network; not only a network connecting entities which are already there, but a network which configures ontologies' (Callon 1998: 6).

DM, then, is not a form of calculus that attempts to purify reasoning to particular technical or economic forms. Rather it attempts to use numbers, not as an absolute metric, but to demonstrate the existing entanglements and uncertainties of different actors, which may be a precursor to action. Despite their heterogeneity, the maps show a picture of surprising convergence. This is not a paralysing plurality. There are clear areas of agreement about the poor or positive performance of certain options emerging from this mapping of multiplicity, plurality and uncertainty. These convergences can be seen as robust. Yet they do not emerge from some alignment of axiological principles, for example, around ethics or epistemology. This picture of unification does not assume a unified rationality, for the way participants reach their judgements are open to different

framing rationalities and understandings of the constitution of the collective (Davies and Burgess, 2004; Davies 2006).

Thus, the heuristic of a multi-criteria form of appraisal can thus be carefully retained. The benefits are severalfold. These graphs have a political dimension, for they demonstrate multiple legitimate standpoints from which to speak about the objects under consideration, leaving their webs of entanglements traceable. By using the same form of structured appraisal, citizen and specialist views are translated into a similar and transparent repertoire that can be rendered immutable and mobile. This extends the universe of criteria likely to be taken into account by decision-makers. Yet by holding onto the range of performances for each option, political debate is not foreclosed. The framings, identities and agencies of objects and actors are not preordained, and the fact that actors rarely perform in the way that economists expect them to becomes part of the set of variables that trouble the coherence of the worlds that are being proposed. Like any map, the DM maps cannot fully capture the terrain, but they can serve as resources to structure different kinds of collective action. They are not only maps of different views, but of potentially productive forms of relating, a picture of current diversity on which to base political debates about future ontologies.

## **Articulation and the production of heterogeneity**

The previous section introduced the numerical and rhetorical performance of the DM maps; in this, I follow the focus on performance to the deliberative mapping process, looking at the relations between the identity, expertise and agency of the different spokespersons constituted by and performed through this process. Staging face-to-face encounters between participants complements the calculative procedures of the multi-criteria appraisal methodology through social action, allowing all spokespersons to locate and challenge the epistemological, ontological and ethical claims of others and to explore different forms of collaboration and relationality. As Bohman suggests deliberation is a 'joint social activity, embedded in the social action of dialogue – the give and take of



reasons. But more than that, it is a joint co-operative form of social action' (2000: 32). Such collaborative processes are thus charged with responsibility for rebuilding relations between differently located stakeholders and spokespersons. Yet, as much as in the reductive metrics of multi-criteria appraisal techniques, deliberative methods also entail exclusions and contingencies of construction, which require the same reflexivity. Here I want to look at just three related questions about the nature of this collective in action: exploring the performance of a lay-expert divide, the production of citizen plurality and the way these are inflected through the encounter with the DM methodology.

Latour's analysis of the problem of democratising science (2004), suggests the current separation between science and political power underpins a further separation between lay people and specialists, ordinary people and professional representatives. This configuration produces a series of problems, notably the constructed passivity of 'ordinary citizens', who are expected to delegate the production of knowledge to professional experts and their will to elected representatives (Strathern 2002). Filling this gap has relied largely on creating active individual citizens able to engage with expertise to incorporate public views in the assessment of developments in science and technology. The model of society embedded in deliberative democracy is thus often one composed of individual citizens able to challenge the instrumental rationalities of specialists within a public sphere. Callon and Rabeharisoa identify in this construction a triple demand: 'a demand for explicit inclusion; a demand for justification and articulation of individual choices; and a demand for making some facts and debates perceptible to a certain audience' (Callon and Rabeharisoa 2004: 23). From this construction of the active agent within a public arena, overflows of both absence and abundance emerge.

Firstly, there is the problem of 'disarticulation' for those reluctant to meet these demands. 'Seen from the point of view of the person who is summoned to speak on his or her own behalf, the position in the public arena produces the by-product of a split between opinions that can be expressed and intimate convictions' (Callon and Rabeharisoa 2004: 21). Secondly, there is also the problem of articulating multiple opinions that are expressed in this form. As Strathern (2002) points out the more you seek to articulate a

view about what society thinks, the more you encounter the problem of the individual, who's opinions need to be reconciled with others. In her analysis of the Canadian consultation on new reproductive technologies, she explores how the resulting pluralism can only be framed and resolved through the normative framework of those holding the enquiry, the vast quantities of data used to support the commissioners' final authority. In such instances, 'difference can be turned into an amenable and governable fact not by reducing the significance of pluralism but by *exaggerating* it' (Strathern 2002: 260, original emphasis). For most deliberative processes, these issues are addressed by seeking to promote group consensus. However, the specific basis around which consensus is achieved, or not, in different deliberative processes is rarely explicit: a lack of transparency is common<sup>4</sup>. Thus, whilst the expectation of collaboration and openness to others that deliberation encourages are important (Barnett 2004), here too, there are empirical questions about the way that deliberative methodologies enact particular understandings of identity, agency and expertise.

In the DM process, a plurality of specialist and citizen views were sought. Specialist perspectives introduce issues and entities from the spheres of virology, immunology, surgery, industry, ethical debate, transplant co-ordination, and patient experience to the complex issue of co-ordinating relations around organ transplantation. Also pertinent are the roles assumed for the actions of a range of publics and potential patients, incorporated into or potentially contesting the successful performances of different options. A wide range of spokespersons is relevant to the issue; all have different understandings of the qualities and competences of the entities under evaluation. Such views matter. But, more than that, a range of specialist and public identities need to be made to matter to create these new networks, and would need to be re-articulated in the implementation of any option. However, this focus on articulating heterogeneity does not presume aligning different expressions of identity, rather it points to the complex sets of agencies involved in and transformed through this issue. Technical expertise is critical in 'imagining the possibilities, while offering to public life heterogeneous innovations and compromises' (Latour 2004: 139), but articulation of public life alongside these technological imaginations would be essential for implementation. Thus technical propositions do not

close down the necessity for collective examination, and as Barry indicates ‘in politics the collective is not a given but an entity in process’ (Barry 2002: 271). In this processes, identities, agency and expertise become rearticulated and redistributed.

All specialist participants were approached in relation to their institutional affiliations; the assessments elicited were personal and not taken to reflect their organisational affiliation. This caution is because the DM appraisal process requires specialists to make judgements outside of the options normally considered by their organisation. Thus, for many specialists the DM process is challenging. It draws immediate attention to the boundedness of different kinds of expertise and raises new uncertainties. The appraisal process allows all participants to scrutinize how problems and solutions are framed in different specialist knowledge communities; furthermore, by being asked to evaluate a large range of options, many specialists find themselves in a lay position, as the following extract suggests.

The ones I didn’t know about I had to have a lay perspective, and I think, to me, if you’re looking for an expert’s opinion across the board, you wouldn’t have gotten that (Ethnic health development manager, NHS Regional Executive).

Citizens were also recruited to speak on an individual basis; recruitment stressing the importance of the ordinary ways in which people responded to these propositions. Citizen were provided with preliminary information on the issues and options, and each group constructed their own understanding of these through further research, discussions in their group, interaction with specialists at the one-day workshop, and conversations with friends and family. Through this, they gained a sense of the relevance of their existing expertise to the issue (see Davies and Burgess 2004), and the way this might complement or challenge specialist expertise in application outside of professional contexts. Throughout the process, they reflect on how their own experience articulate with and at times supplement expert views.

Bianca (salon manager, 40s, Black Caribbean): The thing is when you're an expert in any field, you think so single-mindedly you forget what the real person, thinks about things ...

Kate (IT consultant 30s, white): We're thinking more emotionally ... We're more objective aren't we? (BC1 women's panel)

Yet, citizen identities also shift through the process, with individuals at the end reflecting on what they learnt about their relations with others in the group, their growing empathy with decision-makers, and their changing authority as public representatives. As the process concluded they felt themselves to be becoming more expert.

If we're supposed to be a cross section of the general public of a London borough, we aren't anymore; we're more educated in the subject, so anything that we decide isn't going to be a normal cross section (Susan retired, 65, white, C2D women's panel)

Thus both citizens and experts articulate these new perspectives around an encounter with the DM methodology. And as outlined above, the DM process is a particular form of calculation, which some appear to have found easier to perform than others. This difference did not fall simply along the expert/lay divide. Whilst some experts struggled to fit their existing expertise into these procedures, many citizens found the ordered process empowering for understanding the issues and expressing their opinions of the options, providing them with a sense of ownership of the issues and process, as the following extracts suggest.

I just couldn't get my head round it at the beginning, 'I just don't understand what this means' [...] I couldn't understand the English of it, and I actually found it very, very difficult. But once I kind of got into it, it did seem to start to make sense but like you I was kind of thinking, 'I'm learning as I'm going along here' (Manager, Xenotransplantation Company).

Aimee (self employed, 30s, white): It's nice, I think, the way people have used the techniques that you've built. If we'd have started at week six, week one, I'd have been very intimidated with the actual technique you were using. Whereas by week five or six, it seemed 'we can manage this, the things you're asking us to do are not too hard'. It was staggered and I think that was very effective.

Anne (library manager, 30s, white): Multi-criteria analysis, I can do that in my sleep! (BC1 panel)

The way the different elements of the process were used also differed. Some individuals within each citizen group employed the multi-criteria appraisal methodology to express opinions they felt unable to articulate within the group discussions. The transcripts do demonstrate people reasoning with each other, tending towards a consensus, finding common ground, and working through specific discursive tropes, such as corporeality or social responsibility, to do so (Davies 2006). Clear differences between relatively consensual panels emerge from this qualitative analysis. However, quantitative analysis reveals further differences within each panel, as people register opinions about options that differ from the groups' views; expressing support for contentious options like rewarded giving or scepticism of popular options like prevention. The quantitative outputs thus record individual difference within each group, whilst showing a broadly similar range of views across the four groups and many similarities to the specialists' appraisal. Were final analysis to focus either on a quantitative account of individual scores or upon qualitative investigation of divergent discursive styles, then the picture generated would have been dominated by contrasts and tensions. Thus, the overlying concordance in the pictures of the overall option performance arises from a variety of different sources – for different reasons expressed by different actors in different contexts – which can be articulated through this methodology.

There is therefore some evidence that the methodology supports the redistribution of agency between specialists and citizens, without imposing the performance of traditional concepts of communicative rationality on all participants. However, other dualist categories do re-emerge in this encounter between different actors and the techniques of

the DM process. It is clear in both citizen and specialist strands that certain individuals empathise with the framework employed in Deliberative Mapping more readily than others. In particular, whilst there were lengthy and charged discussions in all panels about how to make judgements about whether people could live with these new organ transplantation technologies, encapsulating these in a specific set of criteria appeared a more difficult process for the two women's panel. Overall, these groups appeared less willing to make the calculative step required by the idea of criteria of holding things separate. It is thus difficult to conclude that DM is not a gendered process; but this is complex. The methodology was used effectively, if differently, by both men and women's panels and specialists of different genders (see Davies and Burgess, 2004). Additionally, whilst the calculative procedures may guide participants towards performing certain kinds of gender, so too does the use of single-gendered panels in this case. Thus, both constraint and fluidity may be enabled by this mix of processes. The process is not gender neutral, but nor can it be said to be simply masculinist; as in other forms of articulation, it interferes in and performs gender in ways that are complex and specific (Moser and Law 2003). The combination of deliberation and calculation performed through DM offers one further way to co-produce knowledges that allow for the redistribution of competencies and identities between actors; yet, as in other processes it bring into existence these identities that it represents, and there emerge further differences and further exclusions. The difference perhaps is in the flexibility and transparency of the processes it entails, which make explicit this 'principle of uncertainty about what the collective is made of, or will be made of' (Callon 2002: 288).

## **Intervention and the politics of responsibility**

So what kinds of intervention does the DM methodology suggest? There are a growing number of ways of evaluating such methodologies. Some evaluative criteria are derived from first principles (Renn et al 1995; Webler et al 1995); others emerge from conversations between practitioners based on first-hand experience (Clark et al 2001). The criteria defined include inclusivity, transparency, learning, legitimacy, efficiency and

so forth, referring to different stages of an analytic-deliberative process: on how the problem is framed, on how the process is run and on the use made of the outcomes. Yet embedded in these criteria is a key tension: between evaluative criteria relevant to those who seek effective means to close down uncertainties within the practice of politics and to others who seek to hold open spaces for the negotiation of the political. For the organisations that promote and sponsor deliberative processes the major challenge now faced is to demonstrate their efficacy. How have the outputs of intensive, expensive and demanding processes been taken into decision-making? What difference, if any have they made? At present, there is little openness or transparency about this element of the process. More than this, a failure to act – or to be seen to act – in response to the outputs of engagement processes is increasingly seen as a threat to this new governance (Clark et al 2001; Marris and Joly 1999). The criterion of efficacy is thus the most difficult to demonstrate, and the most charged, for it exposes a political confrontation as processes that are ‘good’ on all other criteria fail to make a difference, and as institutions that demand the further refinement of processes, neglect to take their outcomes into account.

DM, in particular, is not well suited to offering unequivocal justification for policy decisions. The focus on rendering the determinants of policy decisions more explicit and accountable, rather than on providing a means to invoke legitimation or divert blame, is both its strength in relation to most criteria and its weakness in relation to institutional understandings of efficacy. Conversely, in contrast to the tenets of radical democracy (Laclau and Mouffe 1985), such a combination of calculative and deliberative processes risks overriding sensitivity to differences, closing down contestation, of being too open to capture, too anti-political. That both are potential responses to this experiment brings focus onto the relationship between the ‘two compelling forms of responsibility’ which Barnett identifies for democratic plurality, in ‘the urgent responsibility to act in the world, and the patient responsibility to acknowledge otherness’ (Barnett 2004: 503). This final section thus returns to the realm of politics, and the way that the demonstrations of symmetry emerging from DM may both be open to and open up spaces of uncertainty and ambiguity in the spaces of politics. I turn to this tension, and suggest it can be viewed productively, drawing on the work of Barry, who reminds us that politics is both

‘about the possibility of governing *and* about questioning and disrupting the conditions for government’ (2002: 270).

Taking the first, there are clear recommendations here for the possibility of governing the development of new forms of organ transplantation, for the urgency to act now to reduce the distress of patients on dialysis. In spite of the complexities tracked, the ‘bottom line’ is a remarkable degree of consistency between the four citizens’ panels and the specialists. The two ‘technology-based’ options, xenotransplantation and embryonic stem cells, perform worse than others overall. Neither specialists nor citizens are yet convinced of the relevance of stem cell research to the problem, nor are they assured of the stability of porcine retroviruses or the creation of new identities in the developments of xenotransplantation. Two further options are generally ranked well, but with some qualification. There is cautionary guidance on the conditions under which presumed consent or living donation might be made liveable with for as many as possible. Two options, improved transplant services and better preventative health care, perform best. The achievements, in other national contexts, of institutional improvements in access to transplants are convincing alternatives to the proposition to reduce the kidney gap, and the importance of educating and supporting people to be healthy is underlined, as a means, but more than that, as an end in itself.

Yet there are other outcomes, which question the conditions of government and the current imperatives and institutional boundaries constructed around the issues of organ transplantation. The institutional audiences for such an account of the political relations of organ transplantation are multiple and dislocated, including such diverse bodies as UK Transplant, NICE (the National Institute of Clinical Excellence), UKXIRA (the UK Xenotransplantation Interim Regulatory Authority) and the animal procedures committee of the home office. As Brown and Michael observe, such ‘novel biotechnologies present acute difficulties to regulation for the very reason that they traverse the boundaries between existing regulatory authorities, their terms of reference, their disciplinary capabilities, and so on’ (2004: 207). All organisations involved in the governance of transplant technologies have some commitment to public engagement, yet their terms of



operation construct a narrow framing of dialogue that means there is no place to communicate the risky attachments and tangled objects that constitute the complex choreographies of organ transplantation. The heterogeneous logics that underpin the development of this form of appraisal thus fit uneasily alongside the existing institutional alignments.

This then comes back, ultimately, to the institutional framing of appraisal questions, and the institutional commitments of technoscience. There are manifold dangers in forms of consultation that presuppose the answer to the question under appraisal; but what about presupposing what the question itself is about? In this case the thing that was being asked was open to different interpretations, yet many of these were implicit. The case study of organ transplantation was initially prompted by the formidable alliance drawn in corporate framings of the problem of patients suffering from organ failure and the promise of genetically engineering animal organs to meet this need (Brown 2000). This alliance seeks to orchestrate a specific relationship between one framing of the problem and with one possible solution. Yet to frame a consultation question around a single option is to insert only a stop/start role for the democratisation of science, influencing only the rate of scientific developments, through temporary moratoria or further control measures, allowing time for procedures and public attitudes to catch up with an already constructed scientific reality. There are, therefore, many more ways of asking questions about organ transplantation. There are questions about the relative value of the alternative routes towards reducing and meeting transplantation needs outlined above (see also Center for Technology Assessment 2001; Einsiedel. 2002; Dutch Consumer and Biotechnology Foundation 2001). These questions open up how patterns of scientific understanding are linked to the type of questions that are asked, the assumptions adopted in addressing questions, and the interpretations placed on the answers.

This then leads to a further set of questions, embedded in all of the options, which are more difficult to articulate. These are about the forms of relating on which the current medical success of organ transplantation is premised. Perspectives on this differ according to participants. For medical practitioners, transplantation is a series of

technologies dependent upon the fundamental dichotomies of Western biomedicine: between mind and body, life and death, self and other (Lock 2002). For transplant coordinators, the more anthropomorphic notion of the gift of life charges organs with essential properties to encourage the personal generosity of donors and families (Joralemon 1995). For transplant recipients, organ transplantation is a profoundly transformative experience requiring reworking understandings of bodily identity and care for the self (Sharp 1995). Thus, evaluations of each option throw up, for different actors, questions about what the current system of organ transplantation is premised upon, and which future interventions may threaten the stability of these associations.

There were initial concerns about this range of issues from participants. As one specialist suggests, ‘there’s an issue about how you interpret the question, because I’m sure we all interpreted the questions slightly differently’ (Medical ethicist, British Medical Association). Perhaps this concern is appropriate if the logic of the multi-criteria analysis is paramount, and the end point of the process is to provide a singular answer to a tightly defined question. Yet, in this case, the process is as much about generating more, and different kinds of questioning about what is being proposed in contemporary developments in biotechnology than about providing the ‘right’ answer. Efficacy perhaps means something very different in this context. Through the deliberative mapping process, there is information to contribute to the urgency to act to reduce current suffering for kidney patients, yet there are other challenges that open up accepted trajectories of technological development to question. The realities mapped by these processes are open, dynamic and contestable, and show the potential of ontology to be shaped through collective and participatory processes. The challenge for governance here becomes one of responsibility in guiding – not just the pace, in terms of slowing down or speeding up different developments – but also the very nature of scientific enquiry, technological change and institutional regulation (Stirling 2005). What is then done with these political maps is then the subject of a further round of politics, which requires additional analysis and further experimental intervention.

## Conclusions

This paper opened with a discussion of the challenge offered by the proposition of xenotransplantation, in the context of experiments to devise new ways to address the frames and overflows from contemporary biotechnology. The paper has explored one way of staging such an experiment. The Deliberative Mapping process offers a way for participants and policy-makers to recognise what is cut-off – in terms of knowledges, identities and materialities – in order to accomplish different framings. Through the procedures of a calculative and deliberative process, the entanglements of these matters of concern are mapped, and these connections translated into the contexts of decision-making, their fuzziness and instability intact. The deliberative maps of these entanglements suggest different solutions, bring forth new subjects for discussion, and have the potential to generate new understandings and collaborations. The interventions that might follow from these demonstrations are multiple, they explicitly recognise the plural nature and potentialities of the future relations of organ transplantation, and they are explicit about their construction, contingencies and overflows.

In simplistic ways perhaps, these procedures echo the stages suggested for the new constitution by Latour: for processes of *taking into account* – determining how many we are - and *arranging in order* – for figuring out whether and how we can live together (Latour, 2004). Thus, through reflections on the operation of this experiment in one context, the case study has something wider to contribute to the diverse efforts to bring the sciences into democracy. In particular, it explores the issues that emerge in taking appreciation of an experimental and non-dualistic politics of nature into currently constituted institutional contexts. Many questions emerge in such an endeavour. How can the social sciences offer something both careful and useful to these contexts? Which actors do you co-operate with and with whom do you not work? What is the right balance between complexity and abbreviation in different contexts, and how might this be judged? And specifically, in what ways might existing points for public engagement be used productively to usher in different logics and different kinds of questions about biotechnological futures?

Clearly, there is more than one route for these kinds of social scientific interventions, though Callon, for one, cautions against working with policy makers, he suggests, ‘I would be reluctant to use this programme to co-operate with governments for the purposes of public administration’ (Callon 2002: 306). Instead, the possibilities of working with social movements and those loosely networked to co-produce new knowledges between actors and social scientists are promoted. For social scientists, this is also often the route of least resistance. Despite this dismantling of epistemic or power hierarchies, it is still often easier to ‘study down’ than to ‘study up’, to demonstrate the productivity of these new configurations, rather than follow their interface with established institutional frames. To trace through the way that such knowledge practices might articulate with hegemonic knowledge practices is to risk political capture, contributing to what Barry (2001) identifies as the emergence of a new socio-technical *agencement* in which, to benefit, citizens are required to participate and intervene in particular ways in the production of the technological economy.

The dangers of such ‘legitimatory appropriation’ of the different forms of technological evaluation are well rehearsed in charting the move of sustainability discourses into more mainstream economics (Wynne 2002). Yet even here, the relationships are complex and often conflicting, with parallel demonstrations of the appropriation and dilution of radical ideas alongside use of economic discourse to legitimate more radical agendas (Stirling, in press). In this arena, perhaps, ‘the very existence of ‘legitimation discourses’ as a subset of wider discourses of sustainability is a positive indication of some transcendent substance to the concept of sustainability’ (Stirling, in press). In biotechnology, as in environmental issues, making our institutions and policies more responsive and responsible requires us to explore vocabularies for both co-producing new citizen knowledges and for their articulation with existing expertise, as well as tracing the anti-political or political effects of such experiments in different contexts. In this paper I have suggest a re-examination of the processes of calculation and articulation in the Deliberative Mapping process as a start to exploring this interface. This then is a call for one further strategy, for experimentation in translating the complex entanglements of

biotechnology into the technical procedures of politics, engaging in a critical way with the political possibilities offered by public participation, alongside other forms of political and social scientific collaboration.

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<sup>1</sup> The pilot process centred on evaluation of six core options defined through a process of stakeholder consultation for addressing the shortfall of organs for transplantation. Four ‘prompted options’ could also be appraised if participants wished: improved kidney machines, adult stem cells, rewarded giving and accepting death or palliative care. Specialist participants were invited to define unlimited further options.

<sup>2</sup> The specialists represented a wide variety of expertise and professional competencies and included the following: a manager for a medical equipment supplier; a professor of biomedical science from Sheffield University; a transplantation business manager for a pharmaceutical company; an ethnic health development manager from the NHS Regional Executive; a senior medical officer from the Department of Health; the director of an institute of complementary medicine; a medical ethicist from the British Medical Association; a professor of clinical sciences from Guy’s Medical School; a health economist from NICE; a professor of applied philosophy from Lancaster University; the National Secretary of the Guild of Catholic Doctors; a manager of a xenotransplantation company; a professor of nephrology from University College Medical School; a kidney transplant patient from Middlesex Hospital; the Director of UK Transplant; a research director from Compassion in World Farming and a director of public health from an NHS primary care trust. The twelve men and five women were recruited through a process of stakeholder review and snowballing, overseen by the Project Advisory Committee.

<sup>3</sup> The citizen strand of the DM process involved four citizen panels of 8-10 members, held in the London Borough of Camden between April and July 2002. Thirty-four citizens were recruited by stratified sampling using a questionnaire administered by a specialist recruitment agency. The key principle in constituting the panels was to create a supportive environment for members to undertake the challenging assessment tasks, so the four panels were differentiated by gender and socio-economic class. Previous experience of working with in-depth groups indicated the difficulty of incorporating diverse educational experiences in discussions of science and technology issues (Burgess, Harrison, and Filius 1998; Harrison, Burgess, and Filius 1996), so socio-economic status was used as a proxy to divide the groups on this basis. Existing literatures also suggest that single gendered panels may be preferable when dealing with sensitive medical issues (Wellcome Trust 1998). Furthermore, although still a poorly researched issue, there is evidence to suggest that gender plays an important role in accounting for differences in risk perception and assessment (Kerr, Cunningham-Burley, and Amos 1998). In recruiting for each

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panel, further criteria were drawn up to reflect the ethnic diversity within the Borough of Camden, where the proportion of people from non-white ethnic groups is currently 20%, with additional weight given to recruiting a mix of age groups and participants with and without children.

<sup>4</sup> For example, increasingly critical questions are being asked of the citizen jury process. Smith and Wales (Smith and Wales 2000), explore the claims for representativeness and inclusiveness in the recruitment of jurors, and in the conduct of the jury's business. They highlight the danger of a 'false essentialism' in the sense that selecting individuals on the basis of their socio-economic position can lead to an assumption that this one individual can somehow speak for all with a similar social position. There are also doubts about the quality of the private deliberations between the jurors as they work with the moderator towards their decision. Some ex-jurors report that the moderators 'push for consensus among the jurors at the expense of allowing participants to understand and work through their differences' (Smith and Wales 2000: 59).



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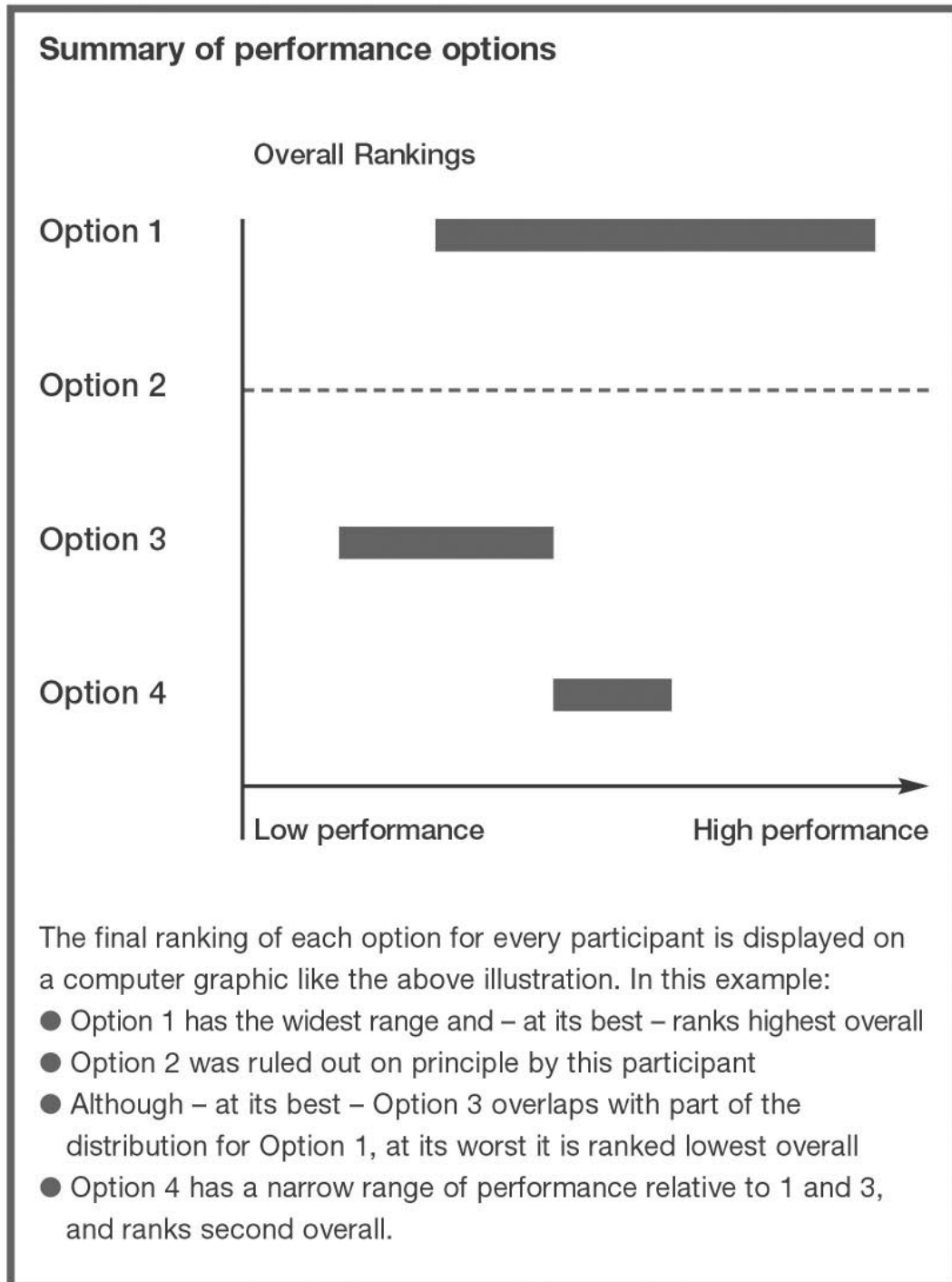
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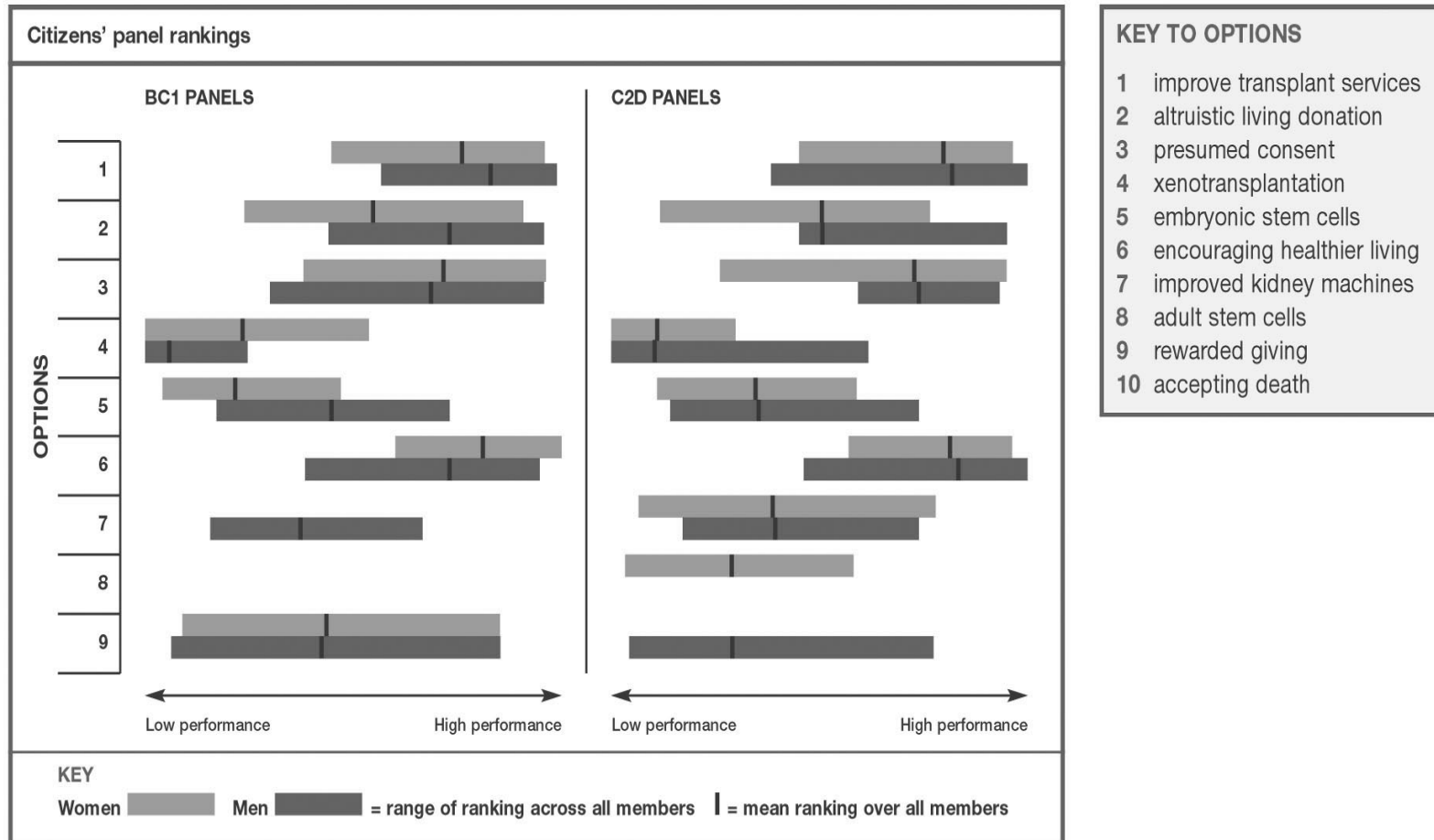
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**Figure 1**





**Figure 2**



**Figure 3**

