

This article was downloaded by: [Delborne, Jason A.]

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Access details: Access Details: [subscription number 934628169]

Publisher Routledge

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## Science as Culture

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713444970>

### Imagining Ordinary Citizens? Conceptualized and Actual Participants for Deliberations on Emerging Technologies

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First published on: 19 August 2010

**To cite this Article** Powell, Maria , Colin, Mathilde , Lee Kleinman, Daniel , Delborne, Jason and Anderson, Ashley(2011) 'Imagining Ordinary Citizens? Conceptualized and Actual Participants for Deliberations on Emerging Technologies', *Science as Culture*, 20: 1, 37 – 70, First published on: 19 August 2010 (iFirst)

**To link to this Article:** DOI: 10.1080/09505430903567741

**URL:** <http://dx.doi.org/10.1080/09505430903567741>

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# Imagining Ordinary Citizens? Conceptualized and Actual Participants for Deliberations on Emerging Technologies

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**ABSTRACT** *In this paper, we explore conceptualizations of ‘ordinary’ citizens common in public engagement forums on emerging technologies and assumptions from deliberative theory that ordinary people are more likely to be appropriately ‘changed’ through deliberative processes facilitated by experts. Looking at a large US public forum event [the National Citizens Technology Forum (NCTF)], we asked: What were the goals for this exercise and how did they shape conceptualizations of ordinariness and representativeness? Whose goals and conceptualizations were they? Were the engaged citizens ordinary and representative—and were they changed by the exercise? Our exploration revealed that exercise organizers conceived of ordinary citizens as people lacking science and technology backgrounds, without advocacy or business connections to the technologies at hand, and demographically reflecting the US population. Exercise materials also implied that ideal ordinary participants would lack strong opinions and emotions about these technologies. Actual NCTF participants, however, tended to be more educated, have higher incomes, and to be more liberal than the US public, and participants from all backgrounds had a range of relevant knowledge, experiences and opinions about science and technology. They were changed by the exercise in complex and conflicting ways—based as much on their own knowledge and reflections on relational dynamics as on exercise processes, interactions with experts, and information provided in the exercise. We argue that inadequately*

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*explored ideas about ordinary citizens are highly problematic. Further, invisible assumptions about what is 'normal' among experts and status quo institutions serve to reify the lay-expert divide that engagement exercises are intended to counteract.*

KEY WORDS: Citizen engagement, ordinary citizens, deliberation, consensus conference, nanotechnology, human enhancement

There is no such thing as a typical individual, because it is an empty concept, resting on a fundamentally mistaken idea of representativeness in statistics: it is to claim that the middle point (whether mean, median, or mode) of a distribution curve is 'representative' of all the points on the curve, no matter how far away from the middle those points are, the skew of the curve, or how wide the variance in the data (Parkinson, 2006, p. 70).

## Introduction

The United States 21st Century Nanotechnology Research and Development Act mandates that nanotechnology research and development integrate 'public input and outreach ... by the convening of regular and ongoing public discussions, through mechanisms such as citizens' panels, consensus conferences, and educational events ...' (US 21st Century Nanotechnology Research and Development Act, 2003, p. 1480). In recent years, perhaps responding to this mandate and similar calls worldwide, many policy reports and scholarly papers on nanotechnologies have highlighted the need for lay citizen engagement in dialogues about these technologies. Drawing on a variety of mechanisms as conceptual and practical models, numerous academics, NGOs, governments and consultants all over the world have organized engagement exercises focused on nanotechnology or other emerging technologies (Einsiedel *et al.*, 2001; Gavelin *et al.*, 2007; Powell and Kleinman, 2008).

In this paper, we explore and problematize conceptualizations of 'ordinary' and 'representative' citizens common in these engagement forums. Who has developed these conceptualizations? Are the citizens engaged in these events ordinary and representative, and are they changed by the exercises? We propose that these questions cannot be addressed without also exploring the goals for the exercises. In exercises intended to engage citizens in science and technology, which are typically organized from the top-down (as opposed to emerging from the interests and/or concerns of citizens or communities), engagement organizers' goals for the exercises—and their conceptualizations of ideal participants to meet those goals—shape the kinds of participants recruited and selected.

We use a combination of qualitative and quantitative approaches to explore these issues, analyzing a large US engagement forum on emerging technologies

as a case study. Our analyses suggest that ideas about ordinariness among engagement scholars are based on deliberative theories, which propose that ordinary people are more likely to be changed by deliberation than non-ordinary people—and the appropriate changes in people’s opinions will occur via expert-facilitated and structured engagement processes (e.g. Chambers, 2003; Hamlett & Cobb, 2006). These conceptualizations, we propose, also reflect experts’ unspoken ideas about their own qualities and capacities as experts, as well as invisible assumptions about what is ‘normal’ (or not) among the status quo societal institutions that sponsor many engagement exercises.

### Scholarly Conceptualizations of Ideal Citizens for Engagement Exercises

Many engagement organizers explicitly aim to recruit ‘ordinary’ or ‘average’ citizens, while others seem to aim for ‘non-opinionated’ or ‘disinterested’ citizens (Carson & Martin, 2002; Seifert, 2006; Evans & Plows, 2007). As some critics note (e.g. Maranta *et al.*, 2003; Irwin, 2004; Lezaun & Soneryd, 2007), few organizers who attempt to recruit such citizens clearly articulate what they mean by ordinary or average, what kinds of interests or opinions should disqualify people from participating in these exercises, and/or why they should disqualify them. At times, these terms are used interchangeably. Evans and Plows (2007), for example, implicitly connect the term ‘disinterested’ with ‘lay’ by generally defining disinterested citizens as those lacking the experience and detailed knowledge of technical and other experts. In other cases, Lezaun and Soneryd (2007) observe, disinterestedness seems to imply ‘lack of opinions’ on the issue at hand. Sometimes people who appear to have previous experience, opinions, or stakes (be it related to their business, financial connections or investments, ideology, political affiliations, environmental concerns, etc.) on the technology being considered are excluded from participation even if they don’t have scientific or technological backgrounds or expertise; the fear seems to be that people with partisan leanings will set the agenda and/or dominate the discussion (Williams, 2000).

Vaguely defined and seemingly interchangeable conceptualizations of the ideal citizens that should participate raise questions about whether it is really lay-ness (e.g. lack of technical expertise) that is desirable, or whether the aim is to recruit only people without opinions about the issue at hand—e.g. citizens who are conceived of as ‘a priori empty-handed so far as opinions and interests are concerned: individuals who either have little interest in expressing their opinions, or may even have no opinion to express’ (Lezaun & Soneryd, 2007, p. 280). ‘Lack of opinions’ often seems to imply ‘lack of bias’, although few explain why ‘bias’ should disqualify participants—and perhaps more importantly, *which* kinds of bias should disqualify them and why. ‘Representativeness’ of citizen participants is also a stated goal of engagement exercises, but like ordinariness, its meaning is seldom clearly articulated (Martin, 2008).

## Deliberation for Better Citizens

A central premise of this paper is that conceptualizations of the ideal ordinary citizens for engagement exercises are inseparable from organizers' goals for the exercises. Many engagement processes are designed to facilitate deliberation, and draw on scholarly theories about deliberative processes in which participants are supposed to deliberate in unrestricted, respectful, and inclusive ways, and to put public interest above private interests (e.g. see Habermas, 1984; Gutmann & Thompson, 1996; Chambers, 2003; Sunstein, 2005; Hamlett & Cobb, 2006). A key tenet of deliberative theory is that deliberation can 'foster the egalitarian, reciprocal, reasonable and open-minded exchange of language' and ideally will help citizens understand common goals and issues and move away from just their own personal goals and agendas (Williams, 2000; Mendelberg, 2002, cited in Hamlett & Cobb, 2006, p. 631). Chambers (2003) notes that deliberation is expected to produce 'reasonable, well-informed opinions' and 'can change minds and transform opinions' (p. 318). Ultimately, many deliberative theorists argue, deliberation results in better decisions as well as better citizens (Gutmann & Thompson, 1996; Putnam, 2000; Hamlett & Cobb, 2006) (see Figure 1).

### *Are Ordinary Citizens more 'Changeable'?*

Traditional deliberative theories assume that extreme views will be moderated by deliberation towards a common or middle position—and this is considered an inherent part of creating better outcomes and decisions (Hamlett & Cobb,



**Figure 1.** Becoming better citizens? People deliberate during the 2005 Madison Consensus Conference. *Credit:* Maria Powell.

2006). Perhaps reflecting this assumption, many seem to conceive of ideal citizens for deliberative processes as those who are most ‘changeable’. People perceived as lacking strong interests and potential biases, Lezaun and Soneryd (2007) speculate, are more likely to be desirable to organizers who would like participants to ‘neutrally’ and ‘rationally’ engage in deliberations, without contention and strong debate—and ultimately to be changed or moved by the process. Partisans, in contrast, are often excluded because they are expected to ‘enter the forum to convince, not be convinced’ and therefore may be ‘in a conflict between their representative and deliberative roles’ (Hendriks *et al.*, 2007, p. 369). Others argue, similarly, that people who pursue or defend special interests (group representatives and/or activists), may lack the autonomy to shift their opinions towards collective interests, contrary to people without obligation to any constituency who are seen as more likely to consider arguments from all parties (Dienel, 1997; Young, 2001). In part, these conceptualizations about ideal citizens and deliberative processes seem based in Habermasian notions of ‘discourse ethics’ and ‘coercion-free discourse’ (Habermas, 1984).

*Are Ordinary Citizens Subject to ‘Incorrect’ Decisions?*

Some scholars, however, disagree with the expectation of traditional deliberative theorists that extreme views will be moderated by deliberation towards a middle position (Sunstein, 2000, 2002, 2005; Mendelberg, 2002). Instead, they argue, ‘ordinary people are subject to emotional, social, and intellectual errors in their thinking’ that are likely to be accelerated in group interactions and result in ‘incorrect’ decisions. In particular, critics propose, ‘polarization cascades’ are likely to occur ‘when individuals holding the minority opinion in a group adopt the majority opinion for normatively undesirable reasons after deliberating’ [p. 631; Hamlett and Cobb (2006), drawing from Kuran and Sunstein (1999) and Sunstein (2002, 2005)]. Moreover, these scholars connect polarization cascades directly to people with ‘extreme’ tendencies, arguing that ‘groups consisting of individuals with extreme tendencies are more likely to shift, and likely to shift more’ in the direction of the majority (Sunstein, 2003, p. 15, cited in Hamlett & Cobb, 2006, p. 632).

Further, polarization scholars suggest, ‘some kinds of people should be more susceptible to nonrational opinion change than others, and citizens who have weakly held beliefs (i.e. “neutral”) would seem to be more susceptible to deliberative errors’ (Hamlett & Cobb, 2006, p. 639). These arguments seem to imply that ordinary people (people without strong opinions, or neutral) are likely to be incorrectly swayed in their decision-making by arguments of extreme individuals. The assumption, again, is that the opinions of these extreme individuals will not be moderated towards the center (they are not changeable) but will instead influence other people who don’t have strong opinions to adopt the extreme position due to social pressure and consequently the whole deliberating group will move towards an extreme position.

Hamlett and Cobb (2006) argue, though, that while polarization and other pathological patterns in group deliberative processes normally happen, they can be ‘held at bay by manipulating key facets of the deliberative environment’, particularly the diversity of perspectives presented to the deliberators, the social composition of the group, and the operational structure of the deliberations (p. 632). Paralleling traditional deliberative approaches, they highlight the importance of a ‘wide and diverse argument pool’ that will expose group members to perspectives different from their own. In sum, these narratives propose that extreme individuals are likely to influence ordinary participants’ opinions in pathological ways in unstructured, unfacilitated group deliberations—but structured, facilitated engagement with citizens from diverse backgrounds (but lacking extreme or strongly held views) will shape opinion changes in the ‘correct’ ways.

### Who Defines ‘Ordinary’ People and ‘Correct’ Deliberation?

Reading beneath the surface, debates about ideal participants seem to be as much about *who* decides what is ordinary and *who* should shape participants’ opinion changes as about what counts as ordinariness and why it is important. Changeability of participants is clearly considered desirable in both approaches described above—but *who* should change them and how? Who has the power to distinguish between ordinary and extreme individuals, determine when deliberative processes are pathological, and decide which deliberative decisions are ‘correct’ or ‘incorrect’?

#### *Experts’ Conceptualizations of Ordinariness Reflect Assumptions about Expertise*

In the case of academic engagement initiatives, organizers—typically social science experts within mainstream institutions—clearly have the most power to make these judgments about who is included in (or excluded from) the exercises. Engagement organizers conceptualize and recruit participants based on existing engagement models, theories that underpin these models, as well as their own ideas about lay citizens (Maranta *et al.*, 2003; Lezaun & Soneryd, 2007; Martin, 2008). These conceptualizations frame the ways organizers think and write about interacting with citizens, as well as how they actually interact with them (Maranta *et al.*, 2003).<sup>1</sup>

Exploring this issue further, scholarly discourses about ordinary citizens reflect as much about how these scholars conceive of experts and expertise as they do about their understanding of ordinary citizens. If we accept that a boundary between experts and lay citizens must be constructed, the ways in which experts define lay citizens implicitly constructs their own self-ascribed identity. For example, discussions about ordinary citizens’ capacities to deliberate effectively (such as those in the polarization cascade literature reviewed above)

suggest—by implicit contrast and/or omission—that experts do not have the qualities of ordinary laypeople. Descriptions of citizens as subject to the influence of ‘extreme’ individuals and ‘emotional, social, and intellectual errors in their thinking’ that are likely to result in ‘incorrect’ decisions without structured facilitation by experts (e.g. Sunstein, 2002, 2005) imply not only that ordinary people are deficient, but that experts are *not* subject to these emotional and social deliberative errors. In other words, these texts suggest that, unlike ordinary laypeople, experts are rational, calm individuals not swayed by group dynamics, peer pressure, or extreme individuals.

*Experts are Assumed to be Neutral and to Know What’s Normal*

While the expert/lay divide implies some difference in capacities, the descriptions above suggest that fairly narrow scholarly expertise (specific to experts’ specialty areas) bleeds into multiple dimensions of competence. Further, these texts seem to assume that experts not only inherently know what the correct deliberative outcomes are—or in other words, they know how ordinary people should be changed—they also know how to most appropriately facilitate this change. There is little discussion of obtaining input from the citizens who will be engaged on whether and how they would like to be changed and to what end. There is also little discussion of experts being altered by the deliberation in any way—implying that they do not need to be changed, and further, that they already know all there is to know about deliberative processes and about the issues at hand.

Indeed, even though engagement processes are expected to be carefully choreographed by expert organizers—and in fact this is assumed to be a necessary component for good deliberation—their presence in the deliberative process is rarely discussed, giving the impression that they are so ‘neutral’ as to not shape or be shaped by the deliberation in any way (Harvey, 2009). Moreover, deliberative literatures rarely indicate that the organizers and/or content experts involved in the deliberation should be representative or diverse in the same ways groups of citizen participants are expected to be—e.g. coming from a representative range of demographic backgrounds, institutions or organizations, political perspectives, etc. This suggests that all experts are conceived of as having universal, unbiased knowledge (see Haraway, 1988), so it is not necessary to try to achieve the kinds of diversity among the experts that is considered ideal for the lay citizens.

Perhaps most problematically, the framing in these texts suggests that experts, no matter what their demographic backgrounds, affiliations, or areas of expertise, are qualified to make what are essentially normative judgments, shaped by politics, values, cultures, and contexts of the issues at hand. Yet what is an extreme citizen or incorrect deliberative outcome can only be judged in relationship to what is considered ordinary or normal, and these terms are inseparable from what is seen as the status quo in the societal context in which the deliberation takes place (Wynne, 2008) (see Figure 2).





**Figure 2.** Which of these citizens are ordinary? Which are normal?  
*Credit:* Reproduced with permission from David O’Connell.

### Engaging Ordinary Citizens—For What?

The issues explored above point to the need to place deliberative forums into larger institutional, sociopolitical, and cultural contexts. What institutions sponsor these exercises, and what are they intended to accomplish? The designers and facilitators of deliberative exercises—experts in their own rights—are often employed and funded by mainstream academic institutions, and their judgments about what is normal (or not), as well as their goals for the exercises, are likely to reflect the cultures and values of these institutions.

Although relatively few engagement exercise organizers clearly articulate broader political or societal goals, some engagement models commonly adopted by scholars (e.g. Danish consensus conferences) are meant, at least in theory, to involve lay citizens in dialogues about science and technology in order to have

impacts on policy (Grundahl, 1995; Einsiedel *et al.*, 2001; Rowe & Frewer, 2005). Unfortunately, engagement forums are rarely connected to actual policy discussions or public input processes in meaningful ways. Regardless, efforts to select only purportedly neutral or unopinionated individuals to participate seem paradoxical when exercises are intended to have actual political impacts, since citizens lacking opinions are the least likely to care about the issues or to participate politically. Lezaun and Soneryd (2007) point out the contradictions in this approach:

The prioritization of the ‘silent majority’ of unengaged citizens over active ‘stakeholders’ gives rise to a curious form of politics; one in which the individuals seem to abstain from participation in political life, what the ancient Greeks would have known as ‘idiots’ (idio-te-s, private individuals who are exclusively dedicated to the privacy of one’s own, or idion), become the most highly valued constituency in what is allegedly an attempt to broaden political participation (p. 280).

Some critics, moreover, suggest that exercises intended to engage people upstream in scientific and technological issues, particularly those organized by large institutions and other powerful sponsors, may not really be intended to stimulate meaningful dialogues or to genuinely include laypeople in decision-making, but instead are essentially public relations mechanisms to help assure public *acceptance* for the technologies (Beder, 1999; Irwin, 2006; Petersen *et al.*, 2007; Lyons & Whelan, forthcoming). To ensure acceptance, some organizers exclude stakeholders and activists because they are likely to create a ‘hostile social climate’ (Irwin, 2006, p. 311). Irwin (2006) notes, for example, that in a large UK engagement event on genetically-modified food (GM Nation), organizers took special measures to involve people who were not ‘actively involved in discussing GM issues’ because they felt that ‘by circumnavigating the usual stakeholders, they would tap into a less prejudiced (and more representative) public opinion’ (p. 315). Further, he suggests, ‘the implicit premise here is that organized groups represent a problem for this form of public debate and, conversely, that true public opinion must be held by those without fixed views’ (p. 312).

### *Citizens’ Capacities to Engage With—and Question—Status Quo Power*

In the ‘real’ world, decisions about scientific and technological developments are typically made by scientists, government, and corporations who have a great deal more societal power than lay citizens, who in turn need considerable resources, skills, and capacities to engage effectively (Powell & Colin, 2008, 2009; Kleinman *et al.*, forthcoming). Given these power imbalances, it seems odd to exclude those who might have capacities to engage on a more equal footing

with experts and decision-makers from exercises intended to actually have some impacts.

This is particularly critical if citizen participants are *questioning* the status quo—for example, if they raise concerns about ethical issues, social disparities, or environmental and health risks related to technologies, which lay citizens often do (e.g. Radstake *et al.*, 2009). The common practice of excluding environmental activists from deliberative processes often results in a situation in which volunteer participants have far less power than the well-compensated professionals representing industries (Kenney, 2000) because these volunteers do not have the experience and capacities to effectively engage with or counter the claims of these paid and often highly sophisticated professionals. Excluding people who may have more knowledge and capacities related to the issues at hand not only deprives the public deliberation from additional information and new perspectives, but it is likely to also widen existing societal power inequities (Mansbridge, 1992).

Moreover, the attempt to engage people who are conceived of as having no opinions or stakes from exercises in emerging technologies stands in sharp contrast to participatory approaches in other fields. In forums to negotiate complex real-world issues, often involving environmental, public health or medical matters, people who are or have been closely affected in one way or another (e.g. AIDS activists, people who have become ill from environmental toxins, people addressing disposal of nuclear waste, management of water) are the expected and even the desired participants (Fischer, 2000; Kleinman, 2000; Callon *et al.*, 2001). Their knowledge, perspectives, experiences, and emotions related to the issue are viewed by participatory researchers as essential *assets* to the engagement process and understanding of the issues at hand, rather than disqualifiers. Often the intent of facilitating engagement in these contexts is, at least in part, to improve the situation at hand—which requires actual socio-political actions and outcomes. Clearly, engaging only un-opinionated people in these situations would not make any sense.

### **Case Study: The United States National Citizens Technology Forum**

In this article, we explore several of the questions and issues raised above. We do not attempt to define ordinariness, expertise, or representativeness, nor do we propose what the goals of engagement exercises on emerging technologies should be. Rather, we consider what these terms seem to mean in an actual ‘citizen technology forum’ and how they relate to the goals for the event. How is expertise conceived, and who are the experts involved? What kinds of citizens end up participating in the exercise—e.g. are they ordinary and representative in the ways imagined by organizers? Do they change (or not) during the exercise, and how so?

Our case is a very large national-scale engagement exercise, the US National Citizens Technology Forum (NCTF). The NCTF took place in March 2008, and focused on human enhancement in the context of converging technologies such as nanotechnology, biotechnology, information technology, and cognitive science (NBIC). Funded by the National Science Foundation, the project was led by the Center for Nanotechnology in Society at Arizona State University (CNS-ASU), and involved 86 citizens (74 at the end of the exercise due to attrition) in six geographically distinct sites across the country: Atlanta, GA; Berkeley, CA; Durham, NH; Golden, CO; Madison, WI; and Tempe, AZ. Two professors at North Carolina State University (referred to subsequently as ‘national organizers’) designed and coordinated the event, compiled the background materials, and selected the moderators and experts that would participate in online sessions. Research teams of several graduate students (and a few professors) from universities in each of the six sites facilitated face-to-face meetings.

A combination of two deliberative frameworks, the Danish Consensus Conference (CC) model and the Citizens’ Technology Forum (CTF) process, the initiative included several in-person deliberative sessions at the local sites as well as online deliberations with experts and citizen participants from all of the sites. On the first weekend of March, participants met with the local organizers for the first face-to-face (F-2-F) session. They were introduced to the NCTF project and asked to share their comments, reactions, and questions about the process, the issue at hand, and the background information that was sent to them beforehand. During the nine following keyboard-to-keyboard (K-2-K) sessions,<sup>2</sup> participants from the different sites discussed which issues they wanted to question the experts on, and then chatted with the latter about these issues and others [for an analysis of this aspect of the NCTF, see Delborne *et al.* (forthcoming)]. During the final F-2-F weekend at the end of March, each local group discussed and formulated its own recommendations on NBIC human enhancement technologies.<sup>3</sup>

### *Mixed-Methods Research Approach*

We draw on both qualitative and quantitative data from various aspects of the NCTF. Applicants and selected participants for the NCTF were extensively surveyed (via written questionnaires) three times by national organizers: when they applied, after they were selected but before the event, and then after the event. We had access to these data, and analyzed a few variables from the whole applicant group ( $N = 352$ ) and participant group ( $N = 86$  before the exercise), and also separated out the Madison group ( $N = 15$ ) from the rest of the participants to make comparisons related to our focal questions. Qualitative data are drawn from several NCTF documents, particularly the Handbook (Hamlett, 2007) and Final Report (Hamlett *et al.*, 2008),<sup>4</sup> semi-structured in-depth interviews with Madison NCTF participants before and after the process, and participant

observation of the in-person and online sessions. Qualitative interviews asked a series of open-ended questions about Madison panelists' interests in participating, their past engagement experiences and perceptions about the NCTF engagement process, their knowledge and uncertainties about NBIC, and their perceptions about whether or not the exercise would have any impacts.

The first two authors of this paper were observers at the Madison site (not actively involved in the facilitation or formally affiliated with/funded by the project) and the remaining authors were formally involved in the project and helped with recruiting participants, facilitating in-person Madison meetings, and/or interviewing participants before and after the exercise.

## **Results: Exploring Our Research Questions**

### *What Were the Goals for the NCTF?*

The NCTF processes goals appeared to be based, according to the Handbook and other written materials, on a combination of several interrelated but also somewhat contrasting factors and goals, including (1) the Citizens Technology Forum (CTF) and Danish Consensus Conference frameworks, and the deliberative theories and goals that underpin them; (2) organizers' research goals to study opinion formulation and changes; (3) the goals of the National Science Foundation (which funded the exercise) to obtain deliberative opinion polling and also develop a mechanism for national scale engagement; and (4) the intent to have some policy impacts (in line with the Danish Consensus Conference model).

Firstly, the exercise was a Citizens Technology Forum process, which the NCTF national organizers developed based on key elements of the Danish Consensus Conference model (see Hamlett & Cobb, 2006; Hamlett, 2007, pp. 4–7). Both the Citizens' Technology Forum and the Danish Consensus Conference are rooted in the ideals cited by traditional deliberative theorists, such as encouraging public-spiritedness, promoting mutually respectful decisions, and enhancing the legitimacy of collective decisions. Moreover, both aim to facilitate deliberative processes that incorporate characteristics considered essential to achieve these goals, such as early involvement in the decision-making process, representativeness of the deliberating group, incorporating accurate knowledge, considering a broad range of perspectives, and potential for impact (Habermas, 1984; Gutmann & Thompson, 1996; Burkhalter *et al.*, 2002; Rowe & Frewer, 2005).

The NCTF process, following the CTF framework developed by the organizers (Hamlett & Cobb, 2006), borrowed some key elements of the consensus conference model, but was distinct in several ways. Like consensus conferences, the NCTF process was designed to engage lay citizens in 'consensual, facilitated, advisory, and heterogeneous deliberations' (Hamlett, 2007, pp. 4–6). The CTF process was also designed particularly to avoid group 'polarization cascades' and other deliberative 'pathologies' by facilitating the participation of a much

larger number of participants from many regions, to broaden the range of perspectives included and thereby theoretically lessen the likelihood of polarization cascades (Hamlett, 2007, p. 6).

Secondly, unlike traditional Danish consensus conferences, the NCTF exercise had a central research component focused primarily on studying opinion formulation or change resulting from deliberation. Questionnaires given to participants before and after the exercise assessed knowledge, opinions, feelings, and attitudes on a variety of issues related to NBIC, such as worry about risks and hopes about benefits, judgments on risk/benefit tradeoffs, trust in scientists and government.

Thirdly, sponsors of the exercise, the National Science Foundation, ‘want to see if this particular approach can succeed in generating informed, deliberative citizen opinion on a national scale concerning the management of nanotechnology’ (Hamlett, 2007, p. 11, Handbook). In other words, the effort was a national public opinion poll as well as a test of a new mechanism to scale up deliberation to the national level. Extensive surveys of participants and the online components of the NCTF-facilitated national opinion polling in ways that smaller-scale, in-person processes can’t.

Finally, the exercise aimed to have at least some impacts on political and societal decision making. The Handbook notes that ‘We hope to provide decision makers—in the government, in business, and in society generally—with the informed, deliberative opinions of ordinary people who have taken the time and effort to study the issues carefully’ (Hamlett, 2007, p. 2).

### *Experts and Expertise in the NCTF*

The only individuals explicitly called experts in the NCTF materials were the ‘content experts’ selected by national organizers to interact with citizens in online sessions. The Handbook discusses the role of these experts as follows:

The definition of ‘expert’ is important . . . since the panelists may wish, in addition to listening to scientists and engineers, to hear from individuals who are neither. They may want to hear from ethicists, lawyers, philosophers, even theologians. The panelists should not be severely restrained in whom they wish to question, but should be exposed to a diversity of perspectives and opinions (Hamlett, 2007, p. 8).

The Handbook also notes that ‘The content experts should reflect the general distribution of opinion within the expert community, rather than representing just one, or the dominant perspective’ (Hamlett, 2007, p. 8).

*NCTF experts from the academic arena.* Institutional affiliations, academic degrees, and area of research interest seemed to play major roles in signifying expertise in the case of the content experts (and we can also assume that the

personal/professional networks of NCTF lead organizers were important in choosing experts). The group of experts selected suggests that the extent of the ‘expert community’ from which organizers aimed to recruit a ‘general distribution of opinions’ was limited to the mainstream academic arena.<sup>5</sup>

The five content experts selected to participate in online sessions were all PhD-level academic researchers and professors at US universities (all white, two female and four male). Each was paid \$1,000 for his/her participation. Their areas of expertise were described in the Final Report as follows: (Expert 1) ‘a specialist on the legal, ethical, and policy implications of life sciences research and biotechnologies’; (Expert 2) ‘a specialist on cortical neuroprosthetics’; (Expert 3) ‘a specialist in the federal regulation of medical technology’; (Expert 4) ‘Executive Director of the Center for Biological and Environmental Nanotechnology’; and (Expert 5) ‘a philosopher of science and bioethicist’ (Hamlett *et al.*, 2008, p. 6).

The NCTF written materials did not explicitly refer to any other individuals involved in the process as experts, although several kinds of people involved at different levels and stages of the exercise clearly played expert roles throughout the process. Firstly, the three lead national organizers at Arizona State University and North Carolina State University (white male professors and social science researchers with research backgrounds and publications on deliberation) were clearly high-level experts and very influential in the NCTF process; they conceived of and designed the exercise, coordinated the writing of the background materials, designed the quantitative survey, took primary responsibility for analyzing the survey results, and were responsible for selecting most of the other experts in the NCTF process. Secondly, the Oversight Committee members played expert roles as well; they were selected by the organizers to ‘manage the panel selection process’ and make sure that written materials provided to the panelists were ‘accurate, balanced, and accessible’ (Hamlett *et al.*, 2008, p. 5). The Oversight Committee consisted of two people: a project manager for the Danish Board of Technology in Copenhagen, and the director of the Project on Emerging Nanotechnologies of the Woodrow Wilson International Center for Scholars in Washington, DC.

The roles of local site facilitators as experts in the process were more ambiguous. Local facilitators were primarily social science graduate students or postdocs (a mix of male and female, mostly white) selected by professors at universities at local sites. Site facilitators played insignificant roles in designing the structure of the NCTF process as a whole and they had no role in selecting other experts. At the same time, they had considerable discretion in organizing and facilitating the in-person deliberations, suggesting an assumption of some level of expertise in group facilitation. While site facilitators received no formal training, NCTF organizers did provide some resources (e.g. a copy of Mansbridge, 1992), and site facilitators shared ideas with one another. We noted a wide variety in facilitation experience among the site facilitators, suggesting that expertise was unevenly distributed among persons in this role.

*Conceptualizations of Ideal Ordinary Citizens to Meet NCTF Goals*

The models, scholarly theories, organizers' and funders' goals, and other factors described above directly or indirectly shaped conceptualizations about what kinds of people would be ideal for the exercise. Statements throughout the Handbook allude to conceptualizations of ideal participants for the NCTF, and some of the underpinnings of these conceptualizations. For example, the introductory section states:

If ordinary citizens, without advanced degrees or experience in science and engineering, are simply unable to master enough of the relevant scientific, technical, and social implications of specific technologies, or if they cannot master the give-and-take of deliberative exchanges, then the demands of democratic activists and theorists that average citizens should be given access to the important decision making arenas that shape the kinds of technologies that, in turn, shape the lives of those citizens must fail on the grounds of public incompetence (Hamlett, 2007, p. 2).

Ordinary citizens are viewed as non-experts in science and technology; more specifically, they are people who do not have advanced degrees or experience in science and engineering. Also, the Handbook implies that the NCTF process itself assures that the participants will be broadly representative—noting that 'The CTF practice integrates a *diverse and broadly representative* participant pool, an *extensive argument pool* reflecting the broadest range of opinions ...' (Hamlett, 2007, p. 6, emphasis added). The Handbook suggests that both demographic diversity (e.g. by age, race, gender, education, etc.) and diversity of opinions/perspectives are important to good deliberation.

In line with polarization cascade literatures, the NCTF written materials hint that people with strong opinions and/or emotions would not be ideal participants for the exercise because they might cause distorted or pathological deliberation. The Handbook states that small groups of deliberating citizens 'often fall prey to a number of cognitive and affective pathologies that may distort their decision making in important ways' (Hamlett, 2007, p. 6). Descriptions of the engagement processes facilitated throughout the NCTF, moreover, imply that organizers expect certain types of participants to be more likely to engage in ideal deliberative processes than others. For example, deliberations are described as 'small group cognitive processes' that 'involve talking, but not every kind of talking counts' (Hamlett, 2007, p. 2):

In this context, deliberation is understood as informed, respectful reasoning among participants who have equal standing—social, political, and informational—to speak. Public discussions that lack these sorts of features, e.g. much of contemporary talk radio, activist-led public protests or



disruptions, etc.—whatever benefits they may provide—would not measure up as deliberative experiences (Hamlett, 2007, p. 4).

In other words, these texts suggest, healthy deliberations are calm, cognitively-based processes in which there are no knowledge or power inequities among participants, reflecting Habermasian deliberative ideals (Habermas, 1984). Strongly opinionated participants conceivably could create power inequities, which could eventually lead to the kinds of polarization cascades the organizers wanted to avoid. However, again, NCTF organizers aimed to avoid what they perceived as pathological deliberation by facilitating structured processes and by providing the participants with information vetted by experts.

The Handbook includes a small section on the selection of participants, beginning with advertisements in newspapers soliciting people who would receive \$500 at the end of the exercise. The criteria for exclusion are explained as follows:

Each volunteer is sent a short questionnaire which solicits various socio-economic data from them, e.g. age, gender, education, ethnicity, and so on. In addition, they are asked to specify if they are currently employed by any of the businesses involved with the technology, or if a member of their immediate family is employed by such a business. They are asked if they have any significant investments in any business involved with the technology, and whether they are active members of any advocacy group that has taken a public position concerning the technology. If the answer to any of these questions is ‘yes’, the volunteer is excluded from participation on any panel. From the pool of acceptable volunteers, a stratified sample of individuals is assembled that is broadly representative of the community from which they are drawn . . . (Hamlett, 2007, p. 7).<sup>6</sup>

### *Actual Citizen Participants in the NCTF*

Our goal in this section is to explore who ended up in the sample in light of discussions above about ordinariness and representativeness, rather than to critique the selection, exclusion, or representativeness of participants *per se*.<sup>7</sup> For the whole sample, some demographic variables (gender, age, and race) roughly parallel national statistics. There were slightly higher proportions of African American participants in the NCTF than in the national population, half as many Hispanics, and the number of Asian Americans was about parallel to national statistics. On income, it is difficult to make direct comparisons, because only categorical data were gathered. However, data show that median incomes for both applicants and participants fell into the \$50,000–70,000 range, which is above the overall US median income of \$46,000, and household median incomes are much lower for African Americans (\$33,916) and Hispanics (\$38,679). Minorities who applied tended to be in higher

income brackets. Applicants and panelists included a higher proportion of people with graduate school education than the American population<sup>8</sup> and a higher proportion of liberals and Democrats.

Despite the aim of disqualifying those with business or advocacy connections to NBIC, a number of participants answered yes on one of the exclusionary variables mentioned in the Handbook: 14 people chosen to participate said they were employed by a business involved with NBIC, and one participant was an active member of an advocacy group that has taken a public position concerning NBIC. A participant at one site considered herself a ‘transhumanist’, and another had nanotechnology-based implants. Not surprisingly, given their higher education levels, awareness and knowledge levels about NBIC were also higher in the national group than most people in the US, at least in rough comparisons with existing public surveys (see Tables 1 and 2). This likely reflects both the type of issue at hand (a sophisticated technological and futuristic topic) and the fact that participants were recruited from urban areas with universities doing nanotechnology research.

We scrutinized the data on Madison participants in particular, to put it into the context of what we know about the community and compare with interview data, which were only available for Madison. Survey data showed that Madison participants tended to be even more educated and knowledgeable about NBIC than

**Table 1.** Heard of nanotechnology and nanotechnology products?

Heard of nanotechnology? <sup>a</sup>	US public <sup>c</sup>	All applicants	Madison applicants	All participants	Madison participants
Nothing	80%	23%	3%	18%	0%
Just a little		42%	29%	44%	40%
Some	20%	30%	58%	34%	47%
A lot		5%	11%	4%	13%
Heard of nanoproducts? <sup>b</sup>	US public	All applicants	Madison applicants	All participants	Madison participants
Nothing	No US public	52%	29%	56%	33%
Just a little	data for this	31%	40%	31%	27%
Some	category	14%	26%	11%	33%
A lot		3%	5%	1%	7%

<sup>a</sup> ‘How much have you heard about nanotechnology before today?’

<sup>b</sup> ‘How much have you heard about nanotechnology being used in commercial products, like cosmetics, tennis balls and suntan lotions, before today?’

<sup>c</sup> Approximate numbers based on Cobb and Macoubrie (2004), Scheufele and Lewenstein (2005) and Scheufele *et al.* (2009).

For all tables:

All applicants = 352, Madison applicants = 38.

Madison participants: pre = 15, post = 14.

All participants (without Madison): pre = 71, post = 54.

‘Applicants’ are those who applied to participate in the NCTF.

‘Participants’ are only those who were selected to participate in the NCTF.

**Table 2.** NBIC definitional knowledge

	All participants (w/o Madison)		Madison participants only	
	Pre (% correct)	Post (% correct)	Pre (% correct)	Post (% correct)
Nanotech refers to:	72%	91%	87%	100%
Nanoscience is:	57%	76%	67%	93%
Transhumanist is:	56%	85%	60%	86%
NBIC is:	61%	93%	67%	100%

the whole participant group. Almost half had some graduate training or a graduate degree. There were only Democrats and Independents in the group. The race breakdown roughly reflected the community (Madison is 80% white and so was the Madison group), but as with the national group, the minority participants fell into higher income and education brackets, not reflecting the demographics of most Madison minorities outside of the university. Three of the Madison participants worked in NBIC-related fields, and one retired participant had spent 30 years teaching in electronics-related areas at a technical college. Contrary to the image of Madison as an activist community, none of the original applicants at the national level who said they were involved with advocacy related to NBIC was from Madison.

In part, the higher education and knowledge levels among Madison participants may reflect the community, which tends to be more educated, liberal, and privileged than other US cities overall, and also has a significant high technology business sector. The higher levels of knowledge about NBIC may also reflect the specific aspects of the Madison community context. The University of Wisconsin includes two large, highly-funded nanotechnology research centers, both of which have sponsored outreach, education, and engagement projects related to nanotechnologies. Several stories about nanotechnology have appeared in the mass media and on radio in Madison in the last five years. None of the Madison participants had been involved in the citizen engagement projects organized by the university, but one participant, a local journalist, wrote a substantial story on nanotechnology risk issues in a weekly paper the summer before the exercise, and in doing so had interviewed several top experts in the nanotechnology risk field as well as members of the Citizens' Coalition on Nanotechnology, a group of volunteers that formed after a consensus conference in 2005 on nanotechnology. Another Madison participant specifically mentioned reading this news story when asked why he was interested in participating.

### *Changes in Participants' Opinions and Feelings during the NCTF*

Participants came into the exercise with a mix of knowledge, interests, and motivations for participating. Among all of the factors listed by participants as reasons to be involved in this exercise, the one rated most highly (on average) for the

**Table 3.** Reasons for participating in the NCTF

	All participants (w/o Madison)	Madison participants only
Personal interest in NBIC	8.38	8.93
Taking part in research	8.46	7.67
Financial compensation	7.52	6.13
Desire to be engaged	6.93	7.20
Desire to socialize	5.51	5.20

Participants were asked: ‘For each of the following reasons that might have influenced your decision to participate, please rank each one in terms of their importance to you on a scale of 0 to 10. Use the number ‘0’ to represent a very unimportant reason for your decision, and the number ‘10’ to represent a very important reason for you to participate.’

Madison group, and second highest for the national group, was an interest in learning about nanotechnology and human enhancement (see Table 3). Madison interviews also reveal strong interests in science and technology more generally—likely paralleling the statistics above about participants’ education levels, awareness and knowledge about NBIC, and/or previous connections to NBIC through their work. For example, when asked why he was interested in participating in the NCTF, one participant answered, ‘I have a fairly strong interest in science in general . . . I read science fiction, I’ve read a little bit on nanotechnology, William Gibson among others. So it’s a field I am interested in . . .’. In the interviews following the NCTF, several respondents reflected on their perceptions that other participants seemed to be very interested in and aware of science and technology developments.

Did participants have (or lack) strong opinions and feelings about NBIC, and did they change during the exercise? NCTF organizers concluded: ‘The main effect of deliberation was that it produced (informed) opinions (i.e., greater % holding an opinion)’ but that ‘deliberation sometimes failed to alter attitudes’ (Hamlett *et al.*, 2008a, slide 17). Participation in the NCTF also resulted in ‘reduced certainty about the benefits of human enhancement technologies’ and ‘conflicting emotions—continued, extensive hope and increased worry—about NBIC developments’ (Hamlett *et al.*, 2008b, p. 2). Our analyses of the national and Madison data confirm that the majority of NCTF developed opinions by the end of the exercise (see Tables 4–6). The proportion of people reporting ‘no opinion’ decreased for the variables we analyzed (worry, hope, risks/benefit tradeoff).

Overall patterns in the national and Madison data reflect the conflicting emotions highlighted in the final report, and a closer examination of shifts among individual Madison participants revealed interesting inconsistencies. There were only a few cases of strong shifts in one way or another—and most were among people with no opinion (and often lower knowledge/awareness levels) to begin with. For example, all but one of the five Madison participants who reported having ‘no feelings’ of worry coming into the exercise were women who also reported knowing less (or nothing) about nanotechnology.

**Table 4.** Opinions about risk/benefit ratio

Risk/benefit trade-off?	All participants (w/o Madison)		Madison participants only	
	Pre	Post	Pre	Post
No opinion	59%	4%	33% (5)	0% (0)
Risk > benefit	3%	33%	20% (3)	7% (1)
Risk = benefit	16%	20%	20% (3)	36% (5)
Benefit > risk	23%	43%	27% (4)	57% (8)

Actual question: 'What do you think about the risks and benefits of using nanotechnology for human enhancement, such as creating superior performance and longer, healthier lives?'

Numbers in parentheses are actual numbers of people who reported this in the Madison group.

**Table 5.** Worry

	All participants (w/o Madison)		Madison group	
	Pre	Post	Pre	Post
No feelings	35%	2%	33% (5)	0% (0)
Not at all worried	24%	19%	13% (2)	21% (3)
A little worried	39%	65%	47% (7)	71% (10)
Very worried	1%	15%	7% (1)	7% (1)

Actual question: 'Are you worried about nanotechnology used for human enhancement?'

Numbers in parentheses are actual numbers of people who reported this in the Madison group.

After participating, one said she wasn't worried and the rest said they were a little worried. Of those who reported some feelings of worry beforehand, most (six) reported the same feelings after the exercise, while a couple reported being slightly more worried, and a couple slightly less worried. Changes in opinions about the risks and benefit ratio were equally multidirectional—in some cases paralleling changes that might be expected in related variables (e.g. participant shifted towards thinking risks would outweigh benefits and also towards increased worry), but in other cases not (e.g. participant shifted towards thinking risks would outweigh benefits and also towards *decreased* worry). Of course, with such a small sample, we cannot calculate meaningful statistical relationships among these variables or generalize from these patterns to larger populations.

*Conflicting and tentative changes: deliberation generates uncertainties.* What can these mixed quantitative patterns in individual-level data tell us about participants' 'changeability'? On the surface, these results might suggest that people who came into the exercise with less knowledge and no opinions about NBIC tended to be more changed by the experience than those with opinions and knowledge—suggesting that the latter were less amenable to change.

**Table 6.** Hope

	Whole group (w/o Madison)		Madison group	
	Pre	Post	Pre	Post
No feelings	34%	4%	13% (2)	0% (0)
Not at all hopeful	1%	2%	7% (1)	0% (0)
A little hopeful	37%	48%	40% (6)	21% (3)
Very hopeful	28%	46%	40% (6)	79% (11)

Actual question: ‘Are you hopeful about nanotechnology used for human enhancement?’  
 Numbers in parentheses are actual numbers of people who reported this in the Madison group.

However, it is hardly surprising that those with little knowledge of NBIC would report ‘no opinion’ or ‘no feeling’ beforehand but have opinions and feelings after learning a bit about it. Also, if people already reported an opinion on a variable, there was little room for change on these variables (since the range of options was limited).

Interviews with Madison participants, moreover, provide depth and nuance to survey answers, and suggest that some broad trends in the quantitative data could be misleading. For example, participants who answered definitional knowledge questions correctly on the pre-survey also, not surprisingly, knew a lot more about NBIC than just these definitions; some had relatively detailed and sophisticated knowledge about NBIC-related technology developments. Interviews showed that even these more knowledgeable people, many of whom reported the same numbers on the pre and post surveys, still learned and/or shifted their understandings of some issues in ways not assessed by specific variables on the surveys.

*Worry, hope and uncertainty can coexist—and change.* Participants’ comments show that opinion and emotion changes resulting from deliberation were not consistently in one direction, and in many cases seemed highly tentative, raising questions about simple or one-way changes in opinions influenced by other participants (as hypothesized among polarization cascade theorists). Several of the participants who started the exercise with lower levels of knowledge and no feelings of worry about NBIC, for example, reported feeling ‘a little worried’ after the exercise—often about environmental risks they learned about at some point in the exercise. One said, when asked what kinds of things she learned about in the exercise,

Um, that it’s really far more complex than I would [have] ever guessed if you just picked me off the street and asked me. That there are, I mean the environmental stuff, the wastes and that kind of stuff that had never occurred to me before—it’s probably gonna be a huge concern especially cuz we won’t be able to see these little buggers as we inhale them or whatever.

Interestingly, reflecting the mixed emotions highlighted in the NCTF Final Report (Hamlett *et al.*, 2008), all three of the participants who went from ‘no feeling’ to ‘slightly worried’ about NBIC also reported high levels of hope after the exercise. Comments reveal a range of emotions (sometimes at odds with each other) and uncertainties, as well as often insightful reflections on the various factors that shape their own and scientists’ perceptions of potential risks and benefits. One participant, a university student who started the process with a perfect score on the knowledge questions, and thinking the risks would outweigh benefits, after the exercise reported lower worry and a feeling that the benefits would outweigh risks. Her comments, however, suggest that in spite of the numbers she reported on the surveys, she was just as conflicted and unsure as others both before and after the exercise. When asked before the exercise how certain she was about the risks related to NBIC, she answered: ‘Fairly uncertain, just because it’s completely uncharted territory at this point’. Her answers after the exercise illustrated continued uncertainty as well as understandings of the broader socio-political factors that shape the potential risks and uncertainties. Asked how uncertain she is about the risks related to nanotechnology, she answered:

I would say fairly uncertain, because like I said I feel that I could go in two very different directions. So not knowing who is going to prevail as the larger research group, is it gonna be the public or is it gonna be the private? . . . private is going to be ‘how can we make more money’ and public will hopefully benefit the greater good.

### *Relational Dynamics Shape Participants’ Experiences and Opinions*

In sum, interviews reveal that all Madison participants were changed in some way—whether or not the numbers on the quantitative survey changed—but not necessarily from the exercise processes or information *per se*. Interview comments highlight the importance of *relational* dynamics in shaping participants’ experiences and opinions in ways the survey did not (and could not easily) assess. Participants were interested in and reflective about their interactions with other participants and organizers, and they learned from them as well as from a variety of formal and informal information involved with—and external to—the exercise process.

For example, most participants reflected on various aspects of the engagement processes during the NCTF, including the keyboard-to-keyboard and face-to-face experiences, the background information they were provided, other participants’ perspectives, trust in the experts and authorities (government), the quality of the facilitation, and the organizers’ research and practical goals. (We intend to elaborate further on participants’ perceptions of relational dynamics in a subsequent paper.) Many participants, for instance, mentioned their awareness that the exercise was part of a research study.<sup>9</sup> One noted in the follow-up interview,

for example, 'I think I got a sense that we were more of an experiment than anything else'. In part because of this, some expressed serious doubts about the event having much impact:

*Do you think the report will have an impact?* No. I don't. I think it might have an impact to further study consensus groups. In the field of nanotechnology I don't think it will really matter to anyone.

*Did your experience affect how you feel about your own efficacy as a citizen regarding technological and scientific issues?* It was good for the research of consensus conferences in general. I don't feel like it was productive to create policy for nanotechnology development.

### *Were NCTF Participants Ordinary and Representative?*

Our analyses show that while the NCTF exercise included people from a range of backgrounds, it under-represented certain demographic groups (as compared to the US population), such as lower income and less educated people, some minority groups, and politically conservative people. Further, participants tended to be much more knowledgeable about NBIC than the US public, which is not entirely unexpected given their higher education levels and the fact that they were recruited primarily from university towns. Indeed, the exercise seems to have selected for participants with strong interests in science and technology (and NBIC in particular), which is also not surprising given that the advertisement for the exercise framed it as a research project focused on this sophisticated futuristic topic. It is hard to imagine why people would commit so much time to the NCTF (more than 40 hours in one month) if they were not at least somewhat interested and knowledgeable about NBIC and/or science and technology more generally; people who are highly interested and knowledgeable about science and technological developments, in turn, will likely have opinions and emotions about them, as many NCTF participants did.

Did the higher percentage of more liberal, educated, and higher income people and people with strong interests in science and technology make a difference in the quality of the NCTF deliberations and/or the content of the recommendations? Conceivably, more educated people with strong interests in or connections to science and technology are likely to view technology developments as positive, and perhaps inevitable, and are therefore less likely to question scientific/technological or expert frameworks in substantial ways. Previous public opinion studies related to science and technology hint that this may be the case, showing relationships between higher education and more support for technology developments (e.g. see Lee *et al.*, 2005).

In the survey data from the entire NCTF group, personal interest in nanotechnology and human enhancement is positively correlated with a desire to take



part in research, trust in business industry scientists, trust in business people, trust in professors, trust in doctors, and belief that people should be able to rely on government. Together, these connected interests and perspectives may reflect certain kinds of ‘cultural capital’ that were disproportionately represented among NCTF participants relative to the general public, and that are likely to be associated with more positive views about technological frameworks and developments and more comfort with structured, facilitated processes and repeated surveying in the NCTF (Learmonth *et al.*, 2009). The Madison group, for example—which was even more educated and knowledgeable about NBIC than the national group overall—seemed very comfortable with the structured engagement processes throughout the exercise, and tended to be more positive, less worried, and more hopeful about NBIC than groups from other sites by the end of the exercise (e.g. see Tables 4–6).

*Was a diverse range of perspectives represented?* Would a broader, more diverse range of knowledges, opinions, emotions, and perspectives have been represented in the recommendations and the deliberative experience if higher proportions of minorities, lower-income, and less educated people were included? We speculate, based on previous research and experience, that these groups would likely have less cultural capital specific to technological development and less experience with academic deliberative and research processes—and therefore might be less comfortable engaging in these kinds of exercises. Engaging people from a wider range of race, class, and cultural backgrounds in exercises like the NCTF, we propose, would require more culturally-diverse, participatory, and reflexive research and deliberative processes (Powell *et al.*, in review). Also, of course, to include racial/ethnic groups that are not comfortable with or do not speak English, engagement exercises and surveys would require translation.

As for opinions and perspectives that may be lacking in the NCTF results because of the lack of representation among less privileged participants, it’s hard to say. While some argue that minority groups and poor people will benefit from emerging technologies (Salamanca-Buentello *et al.*, 2005), historical evidence suggests that compared to privileged people, poor people are often more likely to suffer *negative* consequences from technological developments, and have less capacity and resources to engage in decisions about these developments (Bullard, 1990; ETC Group, 2003; Invernizzi & Foladori, 2005). Perhaps in some ways reflecting these disparities, many studies show that the poor, minorities, and women tend to be more concerned and more angry about environmental and health risks than privileged white men (sometimes referred to as the ‘white male’ effect) (Bord & O’Connor, 1997; Gustafson, 1998; Finucane, 2002; Powell *et al.*, 2007). Involving more participants from these groups, then, might generate more complex and contentious debates about race, class, and gender disparities related to who is likely to benefit or suffer from technological developments.

Regardless of whether they would be more or less positive about technological developments, less privileged people and minorities are likely to have *different* and unique knowledges and perspectives on these developments than more privileged, white people—and these would be invaluable in deliberations and decisions resulting from them (Harding, 1998; Fischer, 2000; Powell *et al.*, in review). Unfortunately, since engagement exercises and public opinion studies on science and technology tend to select for more privileged (and usually white) people, we don't know how the inclusion of more minorities and/or less privileged people would affect their quality and outcomes (Kyle & Dodds, 2009).

### *Ordinary or Not—Were Participants Changed by the Exercise?*

In sum, our analyses show that the NCTF participants, whether ordinary or not, opinionated or not, were changeable and were, indeed, changed—but not necessarily by the controlled, structured process based on deliberative theories and not always in ways assessed on the surveys. Again, quantitative data show that participants who knew less about NBIC were more likely to report no opinion or no feeling on certain variables before the exercise and to report an opinion afterwards. Does this support the claim that strong opinions make people less amenable to changes of opinion, and lack of opinions more so (as deliberative theories assume)?

Qualitative data illustrate that participants had a range of knowledge coming into the exercise, and their opinion and emotion changes were complex, sophisticated, tentative and often conflicted—rather than simply opinion changes in one direction or another. This was the case even among those who reported high knowledge levels and the same opinions both before and after the exercise. Engagement generated many uncertainties. Further, opinions, emotions, knowledge, and uncertainties about NBIC were shaped by a variety of information external to the exercise's structured processes and vetted information.

Moreover, perspectives were shaped as much by relational factors, such as interactions with experts, organizers, and other participants, as they were by information from experts or others *per se*. Participants' critiques of, and sometimes distrust in, the information provided by experts in the exercise, their perceptions about the ways experts answered their questions (or not), and their awareness of organizers' research goals and reflexivity (or lack thereof) in the process played important roles in shaping their opinions and emotions about the process, the technology, the political/regulatory context of the technology's development, and the potential that the NCTF report would have any impacts on broader policy and societal decisions (Irwin & Wynne, 1996).

## **Conclusions**

In this paper, we explored conceptualizations of ordinary and representative people common in engagement exercises on science and technology. Using a

large US engagement forum as a case study, we set out to answer several questions: What were the goals for the exercise and how did they shape conceptualizations of ordinariness and representativeness? Whose conceptualizations were they, and what do they reflect about experts' ideas about the nature of expertise? Were the engaged citizens ordinary and representative, and were they changed by the exercise?

### *NCTF Goals, Conceptualizations of Ordinariness and Representativeness*

*Calm and changeable ordinary citizens wanted—to avoid pathological deliberation.* The NCTF was designed to study ideal engagement processes as outlined by deliberative theories and engagement models and at the same time to test a mechanism to scale up engagement to the national level and to generate national public opinion data. In line with some of these theories, organizers aimed to recruit ordinary and demographically representative people to avoid pathological deliberation (Hamlett & Cobb, 2006). Materials and exclusion criteria implied that the ideal ordinary participants would come from a diverse range of backgrounds, but would lack science and technology backgrounds and/or business or advocacy connections to the focal issue (NBIC, or the convergence of nanotechnology, biotechnology, information and communication technologies). Texts in NCTF materials, moreover, implied that the ideal ordinary participants would lack strong opinions or emotions about NBIC and therefore would be more likely to rationally and calmly engage and be changed by the exercise.

### *Whose Conceptualizations Were These—and What Do They Reflect About Experts?*

*Academics imagine ordinary citizens and neutral experts.* Conceptualizations of ordinariness and representativeness in the NCTF were clearly those of the lead organizers and other experts who designed the event (e.g. members of the Oversight Committee). Every expert involved (other than the two members of the Oversight Committee) was a researcher affiliated with a mainstream academic institution, and nearly all were white males. Apparently, the mainstream academic arena was considered a sufficient 'expert community' from which to provide a broad range of perspectives. Unfortunately, members of this group are not likely to reflect the diverse range of cultures, perspectives, and/or values in our society. Their perspectives are likely to reflect the cultures, values, and norms of academic institutions—not intentionally or explicitly, but rather, implicitly and invisibly (Wynne, 2008).

Unfortunately, conceptualizing ordinary citizens as those without knowledge or expertise relevant to the technology at hand, while not recognizing experts' ordinariness outside their areas of expertise, parallels deficit model approaches to public understanding of science that many engagement models are purportedly

intended to counteract (Irwin & Wynne, 1996; Owens, 2000; Masuda *et al.*, 2008). Deficit-model descriptions of citizens in NCTF surveys and written materials were noticed by at least one participant, who noted that ‘some of the language in the materials was a little condescending to the participants . . . talking to us nonscientists as really average and ordinary’. She went on to provide an example: ‘A lot of questions were phrased like . . . “how do you feel about scientists doing this as opposed to average people, or ordinary people?” almost like scientists are extraordinary people. Whatever’.

Delineations between ordinary participants and experts, further, assume that the experts are completely neutral arbiters of engagement processes. Yet science and technology experts, academic organizers, and the institutions that fund them have obvious stakes in science and technology developments, since most are heavily invested in them in one way or another. It seems inconsistent to exclude certain biases among engagement participants and at the same time not recognize any potential biases among the experts who work with citizens, when as Carson and Martin (2002) note, ‘so many experts and politicians are themselves notoriously biased and susceptible to influence’ (p. 106).

Finally, of course, selection and exclusion of participants for exercises organized from the top-down by mainstream institutions are likely to reflect status quo assumptions about what is (or is not) ordinary. In the NCTF, for example, the inclusion of several people who worked in NBIC-related fields doesn’t seem to have raised any red flags about potential pro-technology biases of these participants that could have made them more emotional, more opinionated, or more likely to influence other participants with their strong views. If participants who identified themselves with groups that might involve more critical stances toward NBIC (environmentalists, activists, etc.)—in other words, people questioning or trying to change the status quo—had inadvertently ended up in the participant group, would they have been considered as ordinary as people who work in NBIC-related fields were? We suspect not.

### *Were Actual NCTF Participants Ordinary and Representative?*

*Participants tended to be educated, interested in technology—and none were ordinary!* Were the citizens engaged in the NCTF ordinary and representative in the ways conceived by organizers? Throughout NCTF materials, national organizers note that the exercise successfully engaged ordinary participants, while also admitting that ‘both applicants and participants were more liberal and educated than the population as a whole’ (p. 5, Final Report). Our analyses supported this, and also revealed that the NCTF participants tended to be higher class, and some minority groups were significantly under-represented. The exercise also clearly selected for people with strong interests in and knowledge related to science and technology, including some who worked professionally in these areas.

More importantly, our interviews and participation in the NCTF illustrated that all the participants—whether they had a formal background in science and technology or not, whether highly educated or not—had relevant knowledge, experiences, and opinions in a variety of areas related to science and technology developments, including biotechnology, nanotechnology, group facilitation, communication, law, journalism, and a variety of other areas relevant to discussions about NBIC.

We highlight these findings not to critique the participant selection process, but to problematize common conceptualizations of ordinary citizens as people who lack relevant knowledge, opinions, or expertise about the science and technology at hand. In this sense, we contend, there is no such thing as ‘ordinary’ people. Our results also point to the complex and problematic relationships between the conceptualizations of ordinariness and representativeness and the goal of including diverse and broad argument pools for deliberation. As Learmonth *et al.* (2009) note, ‘a commonsense understanding of ordinariness might be difficult to reconcile with increasing the racial and social diversity of involvees’ (p. 108). If certain kinds of people (minorities, poor, etc.) do not end up in participant groups for whatever reason, or people are explicitly excluded from participation because they are not considered ordinary and/or because their opinions are considered too strong, are the resulting participant groups actually representative of the population? Is the broadest argument pool really available to participants? We propose that the answer to both of these questions is no.

### *Were Participants Changed by the Exercise?*

*All participants were changed—but not necessarily from the top-down.* Clearly, participants formulated opinions as the organizers hoped they would—or in other words, they were changed. The national organizers’ summary of NCTF survey data highlights the ‘firming of opinions’ and the ‘significant increases in the percentage of participants who hold opinions’. Statements indicate that these outcomes were met through properly facilitated deliberation and that the opinions formed during the exercise were informed by the balanced and expert-vetted information provided in the exercise. The report concludes: ‘With the appropriate information and access to experts, citizens are capable of generating thoughtful, informed, and deliberative analyses that deserve the attention of decision makers’ (Hamlett *et al.*, 2008, p. 2). Materials also note that through appropriate participant selection and facilitation, deliberative pathologies were successfully avoided; they conclude that panelists ‘were thoughtful, committed, and well-informed panelists, not misinformed, hysterical, individuals being manipulated by outside groups’ (Hamlett *et al.*, 2008, p. 11).

While our interviews and observations show that participants were changed in some ways by the exercise, they suggest that their opinion changes were based as much (or more) on relational dynamics and interactions as they were on

‘appropriate information’ and ‘access to experts’. Perhaps most importantly, our analyses suggest that participants played much more active roles in their opinion changes than the existing literature suggests and than the lead organizers anticipated—drawing on their experiences and knowledges about a wide range of issues related to science and technology, as well as their understandings of broader socio-political processes and reflections on the NCTF’s potential role within these processes. Ironically, in other words, their own ‘bottom-up’ reflections on and critiques of the same deliberative processes and information intended to inform them from the ‘top-down’ played significant roles in their opinion changes (Wynne, 2008).

### *Engaging Actual Rather than ‘Imagined’ Citizens*

Experts’ abstract and unexplored imaginations of ideal ordinary citizens for engagement exercises implicitly parallel deficit approaches by treating citizens as lacking relevant knowledge, opinions, and expertise—to be informed by the appropriate knowledge from the proper experts and with controlled expert facilitation (Masuda *et al.*, 2008; Wynne, 2008).

Reliance largely on quantitative survey evaluation of the exercises, while providing some useful data (and fulfilling public opinion polling goals), also parallels deficit models because surveys cannot adequately capture the complex mix of knowledge, opinions, emotions, and other perspectives of participants, and thereby tend to over-simplify their perspectives.

While our analyses of quantitative data from this case study revealed some interesting patterns, qualitative analyses provided much more grounded, nuanced understandings of NCTF participants’ experiences in the exercise and how they shaped shifts in opinions and feelings—and in this case, created more uncertainties. Our findings highlight ‘the complex social, cultural, moral and political resources that publics draw upon to make sense of nanotechnologies’ (Kyle & Dodds, 2009, p. 87), and reveal ‘the dangers of reifying public opinions into overly simplistic representations of support and opposition’ (Kotchetkova *et al.*, 2008, p. 81).

Inadequately examined assumptions about ordinary or representative citizens are also likely to limit what organizers and institutions expect from laypeople in engagement exercises. Conceptualizations of ordinary citizens as those who lack opinions and who are politically inactive—while strongly opinionated, impassioned citizens are seen as not ordinary or representative—are not supported by the history of civic involvement and social change in the United States, and worse, may be self-fulfilling. These conceptualizations may unintentionally reify the assumption that most citizens are inherently passive and the potential for them to become active, involved citizens is small. Further, if ordinary people are conceived of as passive and opinion-less (but still able to calmly deliberate), while more active, opinionated people are seen as irrational and unreasonable (e.g. not able to deliberate effectively because of strong emotions), why

facilitate engagement processes or nurture active citizen engagement that will undoubtedly further strengthen opinions and maybe emotions?

*Everyone has stakes in scientific and technological developments.* Aiming to exclude perceived stakeholders and/or people perceived to have strong opinions from engagement forums about scientific and technological developments is a problematic approach on a number of levels. Given the ubiquitous and often substantial effects of technological developments on people's lives, *everyone* conceivably has stakes in them, because they will—or more likely already do—affect their health, environment, comfort, privacy, business, social lives, etc. in both positive and negative ways. People from all backgrounds bring relevant and critical knowledge and experiences, as well as opinions and emotions often closely tied to them, into discussions and decisions about science and technology.

At the same time, powerful institutions such as academia, government, and media play systemic and critical roles in facilitating (or not) meaningful and ongoing citizen engagement in societal issues, including emerging technologies. Even if citizens are active and engaged, currently there are few if any ongoing institutional mechanisms in which they can have a meaningful say in decisions about scientific and technological developments. Societal institutions such as academia and government should work to support and facilitate ongoing opportunities for citizens from diverse backgrounds to engage in discussions and decisions about emerging technologies—on the citizens' terms and towards goals they value.

## Notes

<sup>1</sup>We recognize that, like other scholars and organizers, our conceptualizations of citizens and citizen engagement processes are shaped by our backgrounds, cultures, experiences, education, and institutional affiliations.

<sup>2</sup>Transcripts are available at: [http://www4.ncsu.edu/~pwhmds/online\\_session\\_notes.html](http://www4.ncsu.edu/~pwhmds/online_session_notes.html).

<sup>3</sup>The final reports from all six sites are available at: [http://www4.ncsu.edu/~pwhmds/final\\_reports.html](http://www4.ncsu.edu/~pwhmds/final_reports.html).

<sup>4</sup>The *National Citizens' Technology Forum Handbook* (Hamlett, 2007) was written by the lead national organizer and describes the Citizens Technology Forum (CTF) process. It was given to the local facilitators to help them understand the NCTF's intellectual premises and goals, and to facilitate the process; the Final Report (Hamlett *et al.*, 2008), also written by national organizers, analyses and summarizes the questionnaire data, final reports from the six sites, and the overall NCTF process and outcomes. It is available at: <http://cns.asu.edu/files/NCTFSummaryReportFinalFormat08.pdf>.

<sup>5</sup>Although several years ago, there were few organizations outside of academia or government working on issues related to nanotechnologies, by 2008 there were numerous non-governmental organizations and non-academic entities (in the US and worldwide) engaged in addressing nanotechnology issues from a wide range of perspectives (social, ethical, environmental, economic).

<sup>6</sup>According to our communications with national organizers, site facilitators were expected to exclude participants with connections to NBIC-related businesses or advocacy and to select

participant groups that matched their community's demographics as much as possible. However, it appears that there was some confusion about whether exclusion of inappropriate participants was to be done at the national or site level. Also, very little time was allotted for recruitment and selection, so although facilitators did their best to match community demographics, the types/numbers of people who applied and facilitators' judgments about appropriate participants also influenced who ended up in the final groups. Some sites had large numbers of applicants (e.g. 70+), whereas other sites had very few applicants and therefore included everyone who applied.

<sup>7</sup>Obtaining perfect national demographic representation in this exercise would have been extremely difficult, if not impossible, given that only six US communities were involved and also because of time and resource constraints.

<sup>8</sup>Some 33% of applicants and 31% of participants had attended graduate school or completed a graduate degree, compared to 9% nationally.

<sup>9</sup>The heading of the advertisement sent out to recruit participants said 'Paid participants needed for university research project' (NCTF advertisement). It is noteworthy that not only did the participants know about it, but for many of them it was also what attracted them in the first place: 'a desire to take part in current research' rated as the highest motivation among the national group and second among Madison participants; and at one site, at least 50% of the participants were recruited through an existing university list of people who would like to participate in research for pay.

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