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Using Q Method to Reveal Social Perspectives in Environmental Research

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PREFACE

We wrote this document to help familiarize graduate students and new researchers to Q methodology. While there are other excellent primers that introduce the method, what seemed to be missing was a document that would help novices to the field work through a Q study in a step-by-step manner from inception to completion. A large part of this document is essentially a highly practical tutorial on how to carry through a Q study. We address basic elements such as how to print and prepare Q cards, how to physically carry out a Q sort with a participant, and how to use the PCMethod computer program to enter and analyze data. Interpreting the outcome of the computer analysis involves judgment and experience. We suggest some techniques that novices can use to gain this experience. Throughout the document, we highlight controversial themes about the method and present and defend our stances on those issues. Our experience with using the method comes exclusively from applications in environmental policymaking. It is because of this that the examples we use in the text are taken from environmental studies. We were originally introduced to Q method by Rob Krueger and Will Focht about fifteen years ago. Since that time we have had the opportunity to learn from many colleagues and to introduce many new students and researchers to the method. It is our hope that this document will continue to promote learning and exchange among scholars as well as illustrate how Q method can be a valuable research tool.

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SUMMARY AND KEY CONCEPTS IN Q METHOD

Overview and History of Q Method

One of the prominent ways in which Q method can be used in environmental studies is to reveal different [social perspectives](#) that exist on an issue or topic. A Q study begins by identifying a [concourse](#), or a body of literature about the topic. A concourse usually consists of text, often created from interviews with well-informed people. From the concourse a sample of [Q statements](#) is strategically selected. Each Q statement is an expression of an individual opinion. [Q participants](#) are people with [clearly different opinions](#) who are asked to express opinions about the Q statements by sorting them, i.e. “doing a Q sort.” Typically a few dozen Q sorts are collected. These are analyzed using [statistical techniques](#) of correlation and factor analysis to reveal patterns in the way people associate opinions. The results of the analysis are interpreted and expressed in the form of different social perspectives. A Q study also reveals how the individuals who did the Q sort agree or disagree with the perspectives.

Q method is not the only research technique that can reveal social perspectives. One way to think about Q is as fitting under the broad umbrella of “[discourse analysis techniques](#).” Discourse analysis is a large category of methods to analyze texts in order to find underlying patterns or meanings. Like other methods to explore subjectivity, Q method is self-referential. That is, people doing the Q sort are expected to respond to statements using internal yardsticks. An advantage that Q method has over other forms of discourse analysis is that the participants’ responses can be directly compared in a consistent manner, since everyone is reacting to the same set of Q statements. This is not usually the case in other kinds of qualitative discourse analysis.

The method was developed by [William Stephenson](#) at the University of Oxford in the 1930s. He was a psychologist (and also a physicist) interested in finding new ways to study individuals’ beliefs and attitudes.

The most prominent Q method expert alive today is [Steven Brown](#) of Kent State University. He wrote a definitive book on the science of Q method in 1980 and continues to be actively involved in all aspects of Q scholarship. Brown’s Q Primer from 1993 gives excellent methodological depth and widely cites original work of William Stephenson. As the box to the right illustrates, Brown believes that Q is capable of revealing the structure of people’s beliefs and opinions.

“Only subjective opinions are at issue in *Q*, and although they are typically unprovable, they can nevertheless be shown to have structure and form, and it is the task of *Q technique* to make this form manifest for purposes of observation and study.” – Steven Brown.

Source: Brown (1986: 58).

[Peter Schmolck](#) of the University of the Federal Armed Forces Munich wrote a software program to make the analysis of a Q study easy and straightforward. This program is available for free download on the [qmethod.org](#) web site or directly from his own site, <http://www.lrz-muenchen.de/~schmolck/qmethod/>. There is a version for the PC (PQMethod) and another version for Mac OS9 (MQMethod). There is, at present, no Mac OSX version available. Another version of Q analysis software for the PC is available from <http://pcqsoft.com/>. There are also several software programs to allow the Q sorting to be done online. These are listed at this resource page on the qmethod.org site: <http://qmethod.org/links.php#online>.

The reason for the name “Q method” is unusual. In the analysis of survey data, statistics are used to find patterns in responses across respondents. It is common to compute a correlation coefficient comparing responses. The most popular statistical test used produces an “r” statistic (Pearson product moment coefficient). This “little r” was capitalized to “R” and marshaled to serve as a representative of that

generalized approach to the study of traits. The letter “Q” was selected to emphasize that Q method was different from R method techniques.

Some say that “Q” was selected because it precedes R in the alphabet and this symbolizes the fact that it is necessary to define perspectives before conducting a survey to measure the frequency of occurrence of perspectives in a population (Asah 2008).

The letter Q is also reputed to be representative of what Stephenson called *quansal* units (QUANtification of SALiency). Stephenson applied ideas from quantum physics to the study of subjectivity and the *quansal* unit has parallels in measuring the potential of electrons. When Q participants sort statements into categories, *quansal* units demarcate the categories. Statements that are sorted near the middle of the distribution have low saliency, while those located at the extremes are comparably more salient (Brown 2008).

Q and R approaches have many differences.¹ Stephenson argued that there was no matrix of data for which *both* Q and R approaches could be applied. However, when it comes to how factor analysis is done, the R and Q approaches can be distinguished quite simply. In R research, respondents are subjects and questions are variables. R researchers look for patterns in responses across the variables for each person. They look to see if the valuation of one variable is related to the valuation of a second variable in the same individual. As an example, an R researcher might ask: Do people who say they strongly support environmental values (variable 1) also say that they use public transportation a great deal (variable 2)?

Factor analysis [...] is concerned with a selected population of n individuals each of whom has been measured in m tests. The $(m)(m - 1)/2$ intercorrelations for these m variables are subjected to ... factor analysis. The technique, however, can also be inverted. We begin with a population of n different tests (or essays, pictures, traits or other measurable material), each of which is ... scaled by m individuals. The $(m)(m - 1)/2$ intercorrelations are then factorised in the usual way.”

Source: Stephenson (1935: 297)

	R Method	Q Method
Variable	Survey question	Q sort done by a Q participant
Subject	Respondent	Q statement
Population	All possible respondents	Concourse (all possible Q statements)
Goal	Find patterns in how respondents answered different questions	Find patterns in where Q statements appear in different Q sorts
Example	Do people who value environment more also drive less?	Are beliefs about dolphins' emotional intelligence linked to beliefs about cognitive ability?
Factor Analysis	Normal	Inverted

¹ For a concise summary on the differences between R and Q methods see Addams, 2000:36-37.

In Q research, subjects and variables are inverted. Thus, the “subjects” of a Q study are the Q statements and the “variables” are the people – more specifically, their Q sorts. Q researchers look for patterns across the variables (e.g. people’s Q sorts) for each subject (e.g. Q statement). They look to see if the saliency of one variable (a Q sort by person 1) is related to the saliency of another (a Q sort by person 2) for the same Q statement. Participants sort statements according to how those statements fit into their beliefs and understandings. Q researchers then look for patterns that show up across the participants’ Q sorts. When patterns are found, it suggests that there are inter-subjective orderings of beliefs that are shared among people. This leads to the notion of social perspectives.

Q method has been used to investigate patterns of opinion among groups of people on dozens of issues. Its use in the area of environmental studies is rapidly expanding. In the fields associated with environmental studies, there have been Q studies published on many topics, including: global environmental change (Dayton 2000, Niemeyer et al. 2005), environmental policy (Addams and Proops 2000), animal rights (Kalof 2000), animal intelligence (Sickler et al. 2006), ecological economics (McGinnis and Herms 1999), cultures of risk communication within agencies (Johnson and Chess 2006), human geography (Robbins and Krueger 2000), forest management (Steelman and Maguire 1999), and environmental policy and decision-making (Focht and Lawler 2000, Webler et al. 2001). The [qmethod.org](http://www.qmethod.org) web site includes a number of publications. The *Journal of Operant Subjectivity* is the home journal of the professional association for Q researchers. The web site for the journal is: <http://www.operantsubjectivity.org/os/index.html>

Availability of other Primers

There are three excellent sources that give concise introductions to Q method. One of the first places students should go is to the following journals: *Operant Subjectivity*, *Journal of Human Subjectivity*, and *Q-Methodology and Theory*. The latter is a Korean journal. In addition, the Q Method listserver is an excellent source for peer feedback on all matters associated with the method (you can sign up at www.qmethod.org).

One of the most widely cited sources is the Sage monograph by McKeown and Thomas (1988). It runs through several examples and is written for an advanced audience. Helen Addams’s introductory chapter in an edited book on applications of Q method is concise and clear (Addams 2000). Thomas & Watson’s (2002) primer gives clear guidance for doing a Q study. Steven Brown’s 1993 Primer was published in *Operant Subjectivity* and is freely available on the web. It too runs through a concise example and carefully discusses details associated with the factor analysis aspect. A more recent Primer document is by Job van Exel and Gjalt de Graaf (2005). It gives an excellent overview of the method and demonstrates the method with three examples. This too is readily available on the web. A new chapter on the method is another excellent source for interested students (Brown, Durning, & Selden 2007).

Epistemological orientations

In social science research there are three general research paradigms: post-positivism, constructivist-interpretism, and critical-post modernism. Under which umbrella does Q method fall? One could make the case of all three. Post-positivist hypothesis testing is certainly possible. Since Q attempts to understand how people construct understandings of the world, it could also fall under constructivist-interpretism. By revealing alternative perspectives, Q could be used to help intervene in empowering the disadvantaged.

Source: Gephart (1999).

We chose to write this Primer in order to emphasize environmental applications of the method. We also sought to document the method in close detail and to highlight specific points where Q method researchers need to make important choices. To make the text more meaningful, we have also cited other environmental applications that reiterate or elaborate on specific points.

MORE DETAIL ON KEY STEPS IN Q METHOD

The results of a Q study are determined by three main decisions:

- What set of Q statements are used;
- Who completes the Q sorts; and
- How the data analysis is done.

Here we elaborate on each of these, providing deeper background knowledge, before turning to step-wise instructions for how to implement a Q study.

Selecting Q statements

A Q study begins with identifying a topic of study and a group of people, a segment of society, whose perspectives we are interested in learning about. As a recent example, a project done at the Bronx Zoo and New York City Aquarium investigated what visitors to the aquarium thought about dolphin intelligence.

For the topic of study, one identifies a concourse of text that contains expressions of all the perspectives on that topic. The concourse can comprise existing print media (newspapers, web sites, public records, etc.) and the Q statements can be selected from these existing sources. Alternatively, a concourse can be re-created via interviews with informed individuals. Interviewing is often an efficient and practical way

Application: Visitors' Perspectives on Dolphin Intelligence

Studying aquarium visitors, researchers developed two sets of Q statements, one for children aged 8-12 and another for adults. The concourse included stories about dolphins from newspapers, magazines, television, children's books, web sites, and interviews with adults and children. Six categories for selecting Q statements were generated by the research team after reading the concourse:

- communication
- capacity for learning
- self-awareness
- capacity for emotion
- intentionality
- spiritual/mystical/healing abilities

Over 150 potential Q statements were sorted into these categories. 32 Q statements were selected for the adult Q sort, 28 for the children.

Source: Sickler et al. (2006)

of re-creating the concourse, because one can ensure that all relevant aspects of the topic are explicitly discussed and nothing is systematically eliminated. One of the benefits of constructing a concourse from interviews is that the Q statements end up coming directly from the people being studied. Consequently, the researcher's influence in designing the stimuli is minimized to the act of selecting statements.

What makes an ideal Q statement? First of all, it is important to note that good Q statements are different from good "R" or survey statements. Good survey questions have three qualities. First, each statement avoids double objects. It asks about one and only thing at a time. Second, a good survey question should be explicitly clear so that every respondent interprets the statement in exactly the same way. Third, survey questions are intended to be read and reacted to independent of all the other

survey questions. This is why survey researchers investigate "ordering effects" – the difference in responses they get from asking the same questions in different orders.

Good Q statements, on the other hand, do not have any of these qualities. The only quality they share with survey statements is that they should be short, "stand-alone" sentences that are easy to read and

understand. This is all good Q statements have in common with good R statements. One important quality of Q statements is that they should contain “excess meaning.” In other words, a Q statement can be interpreted in different ways by different sorters (Brown 1970). At the same time, too much excess meaning will make it difficult to compare the resulting perspectives. The important quality of Q statements is that they accurately represent what is said in the concourse. For example, there is nothing wrong with a Q statement asking about economy and war on terror if this was what was originally said in the concourse. A second important quality of Q statements is that they are meant to be interpreted in the context of all the other questions. This means that Q researchers do not need to worry about ordering effects. Instead, Q participants should be encouraged to interpret the statements in the context of each other.

To ensure that the Q statements used in the study represent the entire concourse, strategic sampling is sometimes used. This simply means that the concourse is divided into categories and the potential Q statements are sorted into these categories. These categories can be theoretically inspired or they can emerge inductively from a formal or informal analysis. The final set of Q statements (i.e. the Q sample) is selected by choosing a small number of statements from each category. There is a direct parallel here with the approach of stratified random sampling that is used in survey research. If, for instance, there are eight categories for the concourse, then one might select four or five of the best statements from each category, which would yield a set of 32-40 Q statements.

Q participants and the Q sort

The people who do the Q sorts are called **Q participants**. In R studies, the people who fill out surveys are called respondents. In a survey study, a sample of respondents is constructed in such a way that it mimics the way the population would respond. In other words, the frequencies of the variables (e.g. the percentage of people saying that they take public transportation daily) should be identical in the sample and in the population. In this sense we speak of the respondent sample being representative of the population.

Application: Planning Responses for Oil Spills

In a Q study into how coastal communities should plan and respond to oil spills, Q participants were selected from the group of people who participated in a workshop on oil spills. The workshop was run by the National Oceanic and Atmospheric Administration (NOAA) and included all key coastal stakeholders. A few phone calls with the organizer of that workshop led to a short list of individuals with different, but well-formed opinions.

Source: Tuler et al. (2007)

Q participants are also selected to be representative of a population, but in a different manner. Q participants are selected to represent the breadth of opinion in a target population, not the distribution of beliefs across the population. For example, in a study on forest policy making, we made sure to include in our Q participants stakeholders from all the main interest groups: timber industry, environmentalists, small farmers, state regulators, and so on. Q participants are also chosen because they have different and well-formed opinions. People who have well-formed opinions will find it easier to do the Q sort and are likely to produce a more robust sort.

What is the parallel to selecting Q participants in an “R” type study? Participants in a Q study are equivalent to the survey questions in an R study. Survey questions are not selected at random. They are intentionally selected because the researcher feels that they will yield interesting insights. Comparatively, Q researchers select Q participants because they think those individuals have something interesting to say.

Determining the right number of Q participants means finding the right balance between two competing rules of thumb. On the one hand, it is good to have a certain amount of redundancy among the Q participants. Normally a Q study will result in 2-5 social perspectives. For each perspective, it is sufficient to have four to six individuals who “define” a perspective, although plenty of studies involve many more people. According to this criterion, the number of Q participants should be between eight (2

factors x 4 people defining each factor) and 30 (5 factors x 6 people defining each factor). However, it is impossible to know who will determine which factor, therefore, in practice, it is necessary to include more people than this.

On the other hand, it is important to have fewer Q participants than Q statements. Normally a ratio of 3:1 is used. For a study with 45 Q statements, the ideal number of Q participants would be 15. The highest ratio that should be used is 2:1. Many Q studies involve between 12 and 20 Q participants.

Q analysis

Q method is a type of research that integrates qualitative and quantitative techniques to reveal social perspectives. Social perspectives are identified by looking for patterns in individuals' Q sorts. The number crunching that does this is known as factor analysis. What factor analysis does is to mathematically invent a few new variables that explain variation in many variables. It is the task of the Q researcher to figure out the qualitative meaning of these new variables, or "factors." In a Q study the variables are the Q sorts. If we have 20 Q sorts, then there are 20 variables. A factor analysis attempts to boil this complexity down to a simpler picture, usually between 2 and 5 factors. Once the factor is described in the language of the Q statements it becomes a social perspective and the product of the Q study. The individuals' Q sorts are *individual* perspectives, the factor analysis solutions reflect deeper organizing principles, hence they are called *social* narratives (Stephenson 1965).

Factor analysis is a kind of mathematics that can involve a great deal of judgment. Judgment enters in two main ways. First, there is any number of possible solutions to the factor analysis, and determining which is "best" is a matter of interpretation. Each solution presents a number of "factors" (aka "viewpoint" or "perspective") that explain variation in the data. Each factor is described as a particular arrangement of the Q statements. We can direct the statistical program to find one factor, two factors, three, or more -- up to the number of Q sorts that were done. If we had 20 Q sorts and we did the analysis to find 20 factors, we would basically re-create our original dataset by computing one factor per person. This would, of course, be absurd. Ideally, we want to discover a small handful of factors.

The perspectives that emerge are generalizations of attitudes held by persons. As such, they permit direct comparisons of attitudes irrespective of the number of people who subscribe to them.

Source: McKeown and Thomas (1988).

Judgment also enters into the ways factors are produced in the analysis through what is called "rotation." Factor analysis allows the researcher to "rotate" factors while creating the factor solution. Rotating the factor changes its meaning, but it also can make the factor more relevant or meaningful. One way to avoid judgment entering into this phase of the analysis is to use a computer-automated rotation called "varimax." Varimax produces the factor solution that maximizes the amount of variance explained on as few factors as possible. There is no reason why a varimax solution is any "better" than any other factor solution, but because it makes the analysis straightforward and transparent, it is widely used.

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Q researchers must wrestle with the question: What determines whether the solution reached is good, ideal, poor, or acceptable? Unfortunately, there is no ideal mathematical answer, although there is statistical guidance. Factors with Eigenvalues <1.0 are frequently ignored as too minor. In the end, however, factors have to be justified on whether or not they make sense. The Q researcher needs to rely on his or her familiarity with the subject to make this judgment, and his or her skill and putting together a convincing explanation of the results.

Social perspectives are coherent patterns of opinion about a topic. They rarely match any individual's view completely. But some individuals' views will be closer to the social perspective than others'. People whose individual views most closely match a social perspective are said to "define the

perspective.” This means that, in the numerical analysis, their Q sorts were closer to the social perspective than other people’s. The degree of this similarity can be computed into what are called **factor loadings**. People with a high factor loading for a given perspective, are said to “define” that perspective. To avoid the social perspective being driven too strongly by one person, it is desirable to have several people with high factor loadings on each perspective. In general, it is important to avoid having a factor defined by only one person, since it is mathematically impossible to distinguish the social narrative (communality) from the individual perspective (specificity) (Brown 2008). Once the social perspectives are described, they are often fed back to the individuals who most strongly defined those perspectives for further validation or confirmation.

Generalization and bias

A Q study reveals social perspectives on an issue, but cannot comment on how widely held these perspectives are in a population. To measure the beliefs of a population, survey techniques would need to be used. After perspectives are identified in a Q study, a survey instrument can be developed that asks a representative sample of a population the degree to which they agree with each of the perspectives (Further details on how to combine Q and survey research can be found in Danielson 2009.)

Q method researchers reduce bias by selecting Q statements verbatim from the concourse. By directly using people’s natural statements, Q method reduces researcher bias, but it cannot eliminate it (Robbins and Krueger 2000). The selection of statements is still a methodological value judgment. Bias can also enter into a Q study during the data analysis phase as the selection of a particular factor solution is also a methodological value judgment.

Can researchers develop a standardized set of Q statements for investigation of subjectivity on specific themes? This is a point of controversy among scholars in the field today. Jack Block has proposed a standardized set of Q statements to investigate character (Block 2008). Steven Brown, on the other hand, has argued that Stephenson advised against standardized Q sets (Brown 2008). Brown points out that reusing the same Q statements over and over again is akin to using the same survey respondents over and over again, something R researchers generally avoid, preferring to draw a fresh sample for each study. Still, in longitudinal studies, the same respondents *are* used over and over again, thus it appears that it might be reasonable to conclude that standardized Q statements do have a place in the repertoire of research methods.

Application: Wildfire management in the suburbs of Sydney, Australia

This study revealed 4 social perspectives on how wildfires should be managed. A follow-up survey to a statistically random sample of 400 people living in the region revealed that the most popular perspective among the Q participants was the least popular among the general public (43% vs. 19%), and vice-versa for the least popular (7% vs. 36%). This illustrates the need to be cautious about generalizing the results of a Q study and the usefulness of mixed-method research.

Source: Danielson (2009)

CARRYING OUT A Q STUDY: A DETAILED EXAMPLE

Procedure for doing Q method to evaluate public participation processes

To illustrate the application of Q method, we report here on a recent research project. The purpose was to investigate methods for empowering local communities to become more effectively engaged in cleanup decision-making at Superfund sites. Illustrations are drawn primarily from the two case studies we conducted:

- Cleanup of the Ciba-Geigy Superfund site in Toms River, New Jersey, USA
- Cleanup of the Waukegan Harbor Area of Concern in Waukegan, Illinois, USA

The basic steps involved in the use of Q method in this study were:

1. Determine objectives: Establish the relevant topic and sub-segment of population
2. Conduct background interviews to re-create a concourse
3. Identify, select, and edit Q statements
4. Identify and recruit Q participants
5. Conduct Q sorts
6. Analyze the Q sort data using factor analysis techniques to arrive at social perspectives
7. Report findings and make program improvements

Step 1: Determine objectives: Establish the relevant topic and sub-segment of population

In all research, it is essential that the core questions of the project be clear. Toward that end, it is worthwhile to answer the following three questions:

1. In the context of _____.
2. I want to understand the different social perspectives on _____.
3. In order to _____.

These questions specify whose perspectives you care about knowing, the specific topic about which you want to reveal social perspectives, and what you plan to do with this knowledge. (These questions come from an excellent text on research by Booth, Colomb, and Williams 2008).

Application: Empowering Local Communities in Superfund Clean-up

In the context of *public participation in the clean-up of contaminated sediments in Waukegan Harbor*,

We wanted to understand the social perspectives on *the adequacy of the existing public participation process*,

In order to *give process organizers feedback that would help them revise the process so that it would empower the local community to participate more effectively*.

Source: Social and Environmental Research Institute (2008)

Be clear about whose perspectives you are interested in learning about and whose may be of lesser importance. Consider the barriers that need to be overcome to reach those individuals. Language and

culture are sometimes difficult barriers. Q studies often seek to involve leaders of organizations and groups. Getting a meeting with these individuals can take persistence.

Decide what social perspectives you are interested in understanding and have a clear notion of what you intend to do with this knowledge. People want to know that their time is well spent and are more likely to participate if they know the results will be used to accomplish something that they care about.

Q is useful as an evaluation tool because it can clarify conflict among parties. Understanding a situation more fully means that surveys or experiments to further research the topic can be better designed.

It is also possible to have people do two Q sorts in the same meeting. For instance, it might be useful to know social perspectives on process and outcomes. For example: What do participants think of the community involvement process? And: What do participants think of the cleanup decisions that have been made at the site?

Application:

Ecotourism in the Nanda Diva Biosphere Reserve, India

To involve local villagers in his Q study of local community involvement in ecotourism it was necessary for Dave Meek to have Q statements available in Hindi as well as English. Even then, several of the participants were illiterate and needed to have the Q statements read to them. Other participants were farmers and could only do the Q sorts very early in the morning, before going out to the fields.

Because he was interested in “local communities,” he had to draw a physical line on a map defining which villages were “local” to the Biosphere Reserve and which were not. He did not elicit perspectives from non-local villages.

Source: Meek (2007)

The costs of using Q method are variable. If it is possible to take advantage of pre-existing Q statements, then the only costs lie in collecting and analyzing data, which are quite low. Generating the Q statements is a much more time-intensive process. The next step addresses the origination of Q statements.

Step 2: Conduct background interviews to re-create the concourse

Background interviews are time-intensive and costly, but they are also highly rewarding. There are two reasons to conduct background interviews, both of which may not be necessary in some instances. The two objectives are:

- To learn the history and context of the study.
- To re-create the concourse so that the Q sample can be created.

Objective	Reasons for skipping this step
To learn about the history and context of the study site	Pre-existing familiarity with the topic or site of the study
To re-create the concourse	Will use a pre-existing set of Q statements from another study.

In some cases it is possible to use a pre-existing set of Q statements. However, one of the advantages of Q method is that the statements can be tailored to reflect the specific issues that have been important at a particular site. What's more, the language in which the issues are described will be familiar to

participants if Q statements are drawn verbatim from people in the target population. Site-specific Q statements are typically drawn from interviews with key stakeholders. When there are time or resource constraints, statements may also be drawn from other sources, such as transcripts of public hearings.

Conservation Planning

Brown and colleagues worked with a steering committee for the Yellowstone-to-Yukon conservation initiative. In a workshop with the 21 stakeholders they generated Q statements, selected the Q sample, and did the Q sorts all in the matter of a day or two. This is a very efficient way of re-creating the concourse.

Source: Brown et al. 2004.

Doing the interviews

Interviews should be conducted with a range of individuals with an in-depth knowledge about the site. These should include a cross-section of the major stakeholder groups and opinions (insofar as this can be ascertained beforehand) – for example: EPA officials, local government, industry, economic development, public health activists, environmental groups, social or religious clubs or organizations, and other involved citizens.

Interviews are best done in a semi-structured format. Prepare an [Interview Guide](#) to ensure that all of the topics of interest defined in Step 1 are covered. An example of an Interview Guide is in Appendix A. Allow the conversation to flow freely so that the interviewee can raise the points most important to him or her and frame the issues in the way that he or she ordinarily thinks. The goal is to generate a database of natural-language statements about the topic.

Generating theoretical categories for sampling Q statements inductively from interviews

One way to ensure that the final Q sample represents the concourse accurately is to use a sampling approach based on theoretical categories. These categories can be taken from existing theory or they can be created inductively from the concourse. Once the categories are defined, a large number of potential Q statements are sorted into the categories. Q statements are then selected from each category, ensuring that all important aspects of the concourse are included in the Q sample.

Application: Empowering Local Communities in Superfund Clean up

To understand the history of the case and the roles and relationships among the key participants, we interviewed stakeholders at each site. Nine interviews were done at Toms River, NJ and 13 interviews in Waukegan, IL. The number of interviews needed depends on the size and complexity of the site, the number of stakeholders, and the degree of controversy it has generated. The following groups were tapped:

- EPA staff (e.g., Community Involvement Coordinator, Remedial Project Manager)
- Local elected officials
- Local planners
- Local residents
- Community advisory groups
- Activist groups
- Staff from the responsible party
- Members of the local business community
- State environmental agency staff
- County health department and planning agency staff

Source: Social and Environmental Research Institute (2008)

The categories for the theoretical sampling can be generated from the interviews using inductive analysis. This kind of social research was first identified by Barney Glaser and Anselm Strauss as “grounded theory” (Glaser and Strauss 1967). Inductive analysis works from the raw data to generate conceptual categories that have explanatory potential. One begins by collecting data, often through interviews. With the permission of the interviewees, the interviews are tape-recorded. These tapes are then be transcribed

and coded. **Coding** is a process of qualitative data analysis which involving identifying themes and sub-themes in the interview.

In an inductive approach a researcher reads the transcripts and recognizes recurring themes in the interviews. These themes may be simple and concrete (e.g. opinions toward a specific trash incinerator) or they may be more abstract and generalizable (e.g. reasons why it is important to build trust in government). Codes are labels assigned to pieces of text in the interviews. After going through all the interviews, several dozen first-level codes result. The researcher takes these codes and looks for deeper patterns and meanings within them, essentially doing a second level of coding. For the sake of clarification, we call these second level codes “categories.” Second-level coding should lead to only a handful of categories.

Application: Empowering Local Communities in Superfund Clean up

Drawing on previous research into public participation in environmental decision-making, we used the following set of conceptual categories for the concourse on public participation process. These are:

- Relational qualities among participants
- Features of good participants
- Atmosphere and format of interaction
- Substance of deliberation
- Access to information
- Leadership
- Administrative support
- Timing and duration
- Quality of analysis
- Representation, outreach, and fairness
- Decision-making
- Responsiveness of sponsoring organization
- In-group / out-group communication

Source: Social and Environmental Research Institute (2008)

Once the categories are identified, the researcher takes the whole set of potential Q statements (which have been mined from the concourse). These are then placed into the appropriate category. If one category is thinly represented in the concourse, the researcher can seek more candidates by mining the concourse again. The final Q sample is constructed by “sampling” from each category.

An accelerated way to create the categories is to start by reading or listening to the concourse and selecting a large set of potential Q statements, usually in the range of 100-300. Use these statements to induce conceptual categories for the concourse. Here is one technique for doing this. Print each potential Q statement out on a slip of paper. Lay all the slips out on a large surface like a floor or conference table. Read each statement and begin by grouping the obviously similar ones.

Keep related ideas in neighboring areas, in order to more easily see when a reorganization of the piles would be helpful. Gradually condense more and more piles, until there remain a manageable number. During the process, it helps to take small index cards and write category labels for each pile. Whenever piles are merged or re-made, the name on the card can be edited. The process is fluid, with each coded section of text sometimes moved between piles several times. An advantage of this approach is that it is quite rapid and can easily be replicated by all the members of the research team.

Step 3: Identify, Select, and Edit Q statements

Identify Q Statements

The interviews, as well as any other information consulted for background on the site (transcripts of public hearings, etc.) forms the **concourse** -- a set of all the things that people are saying about an issue.

For just about any topic one can study the concourse will be very large. Typically, a Q study boils the concourse down to between 20 and 60 statements. With fewer statements respondents may not be able to

fully express their viewpoint. More statements will tax people's patience for accomplishing the Q sort. The final set of statements used in the Q sort is called the **Q sample**, because it is meant to represent the larger concourse.

To get from the concourse to the Q sample, begin by selecting a large set (100 – 300) potential Q statements from the concourse. To ensure that all elements of the concourse are equally represented, it is helpful to sort the statements into the conceptual categories developed in Step 2. Go through the transcripts and identify those statements – sentences or short paragraphs – that directly address the general issues that the study is meant to illuminate.

A good Q statement is salient, in other words it is meaningful to the people doing the Q sorts. It must be understandable, but it need not be narrow. It is acceptable and even desirable for Q statements to have “excess meaning,” which means that they can be interpreted in slightly different ways by different people. Above all, Q statements must be something that people are likely to have an opinion about.

Application: People's objectives for emergency response to a marine oil spill

Q statements were chosen by the research team to represent the fullest possible extent of content relative to the topic. From two earlier case studies of marine oil spills the researchers identified stakeholders' objectives. The objectives were grouped into the following broad categories:

- Address needs and concerns of the affected public/communities
- Establish a coordinated and effective response framework
- Gain public support for the response
- Implement an effective and timely response
- Meet legal and regulatory requirements
- Mitigate economic impacts
- Mitigate social nuisance impacts
- Protect cultural resources
- Protect environment and mitigate environmental impacts
- Protect worker and public health and safety

In addition, a review of literature about spill response planning was conducted. Statements for a Q study describing these objectives were then created by sampling from the quotes extracted from the interviews and literature. Ultimately, 42 statements were chosen.

Source: Tuler et al. (2007)

Select the Q sample

Once a large set of Q statements have been sorted into the conceptual categories, select the final set of Q statements by choosing a given number of statements from each category. We do this by printing out all the Q statements in one category and discussing the strengths and weaknesses of each statement, sifting through them all until we have our final set.

The categories provide a means to group statements that have broad similarities. To enhance the diversity of the Q sample, it helps to select, in each category, statements that are as different as possible.

Editing or adding Q statements

There are several good reasons to believe that taking statements verbatim from the concourse should be the default methodological choice. After all, since the participant is intimately linked to the concourse,

statements in the concourse are more likely to contain meaning accessible to the participant, are more likely to be relevant to the participant, and are more likely to reflect salient issues to the participant.

What happens if you use theoretical categories to select from the concourse, but there are no Q statements in a given category? It may mean that that topic was not relevant in this case or it may simply be that the topic did not arise in the interviews, perhaps because not enough interviews were done. One purpose of

generating the categories is to ensure that the full concourse has been represented. Consequently, if one category is absent or thin, it is wise to go back to the concourse to look for more statements.

In many cases, a verbatim statement from one of the interviewees will work well. From the post-positivist research philosophy, this is considered ideal, because it means the researcher has played a minimal role in designing the stimulus. This is an important because it reduces the role of reflexivity in the research. Reflexivity is the idea that, when a researcher designs the stimulus given to respondents, he or she is partially studying him or herself as well as studying the respondents. When Q statements are taken directly from the concourse, there is minimal researcher interference in the design of the study.

Is it acceptable to generate Q statements yourself? Is it acceptable to paraphrase from the concourse or even edit statements? We have already indicated that these answers depend, at least in part, on the research philosophy to which you subscribe. Good research is not simply the blind following of rules. Certainly it involves following the rules of good practice whenever possible, but it also requires making methodological value judgments when the rules are not clear or may not apply. This is why it is often said that research is both a science and an art. The art of good research is to make all methodological judgments transparent and to have convincing explanation for the choices you make.

The Debate over Translation

There is some debate among Q practitioners as to the validity of translating Q statements for different cultural groups. This is not a problem if the concourse includes text from both languages. For instance, background interviews could be done in either language and translated into one language. The Q statements could be selected and then translated into the second language. In our judgment, if the translation is done by a careful and experienced translator (ideally someone with some understanding of the culture and hence knowledge of how the topic is talked about in that language), the advantages of being able to include additional populations in the Q study may outweigh concerns about translation reliability.

See: Brown & Feist 1992.

There are many kinds of arguments that can be made to defend a researcher's choice to generate Q statements. We will not endeavor to summarize those here. But researchers should look to both their research philosophy and their research objectives when making an argument.

Achieving a balance of Q statements

When William Stephenson originally conceived of this method, he envisioned a Q sample to which participants would react positively *and* negatively. The Q sort was structured around a zero point that was presumed to have zero salience to the participant. In the jargon of Q this is called "a distensive zero." This is considered a point of no opinion, a point from which meaning extends in either direction.

It is a good idea to have a balance of Q statements such that participants will sort half the statements on the right side of the distribution and half on the left. This ensures the "distensive zero" lies at the middle of the distribution. (Note that this is *not* the same as having half the statements worded negatively and half positively, as in a survey.) But without knowing what perspectives will emerge from the study, one cannot predict the salience a participant will assign a statement.

We believe that creating a diverse Q sample is wise, but it cannot guarantee that the middle of the distribution will be seen by all participants as zero salience. To get around this problem, we ask each participant to draw a line that demarcates agree from disagree. We emphasize that this need not be the middle of the distribution, but can fall anywhere. We draw on this when interpreting the results of the Q analysis. Whether or not you choose to force a normal distribution, or whether or not you choose to have participants mark a neutral point, it is important to be consistent across all the participants in your study.

Making the Q cards

The statements can be printed out on cards approximately the size of business or playing cards. Each statement should be given an identifying number to facilitate data recording. The number should be written on the front of the card so it can be recorded easily.

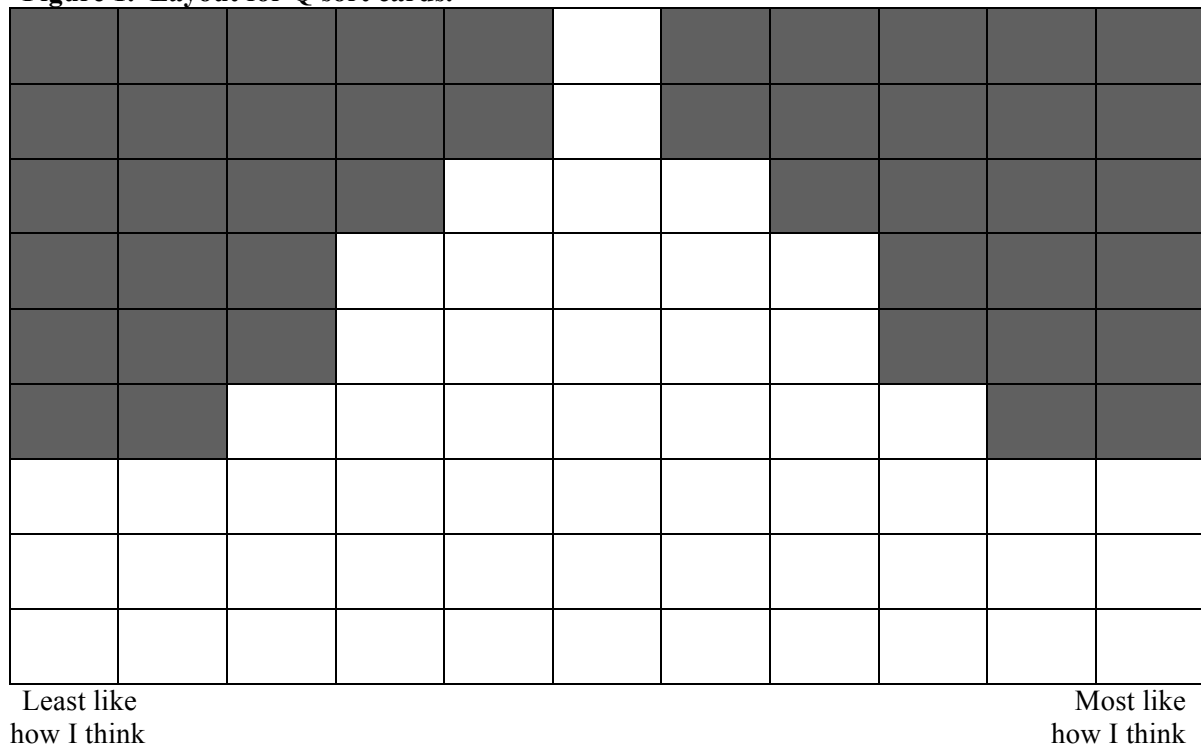
It is smart to have two copies of the Q cards when going out to meet people, in case a card gets lost or damaged. If you are having people do two Q sorts, then make life easy for yourself by printing each set of cards on a different color of cardstock.

Preparing the Response Chart

The Q sorts are laid out in a normal distribution. To facilitate this, make a chart as in the Figure below that can physically hold all the Q cards.

The precise shape of the distribution is a matter of some judgment. A quasi-normal distribution with 11 categories (from +5 to -5) is adequate for Q studies in the range of 40-50 cards. An example is shown in Figure 1 for our study with 55 statements. This distribution is advantageous because it forces people to make distinctions among their priorities (the statements that are most and least like they think).

Figure 1. Layout for Q sort cards.



Making Q cards with ease
 This can be done easily in Microsoft Word -- select your list of statements, then go to Tools > Convert > Text to Table, and select a 2-columned table.
 Next, highlight the table, right-click, and select Table Properties. Under the "Row" tab, check the "Specify height" box and set the height to 1.5 inches. Then select the whole table again, right click, and set "cell alignment" to centered vertically and horizontally. The resulting document can easily be printed out on sheets of cardstock and cut apart into cards

Print out a copy of this distribution in order to record each participant's sort. Note that the only values recorded are the column numbers, the rows are irrelevant. The Q participant is simply giving ordinal scores to groups of cards.

Forcing a normal distribution

Q researchers sometimes find that Q participants refuse to abide by the normal distribution. Do their data need to be discarded? Or is a participant's free-form distribution more authentic? Does forcing the data into a normal distribution distort the participant's expressed subjectivity? Answers are debated. Most published Q studies *have* forced participants to sort cards according to a normal distribution. However, Steven Brown has argued that the distribution shape has no impact on the statistical outcome (2008). Indeed, the PQMethod analysis software written by Peter Schmolck will accept data in a non-normal distribution.

The key point made in defense of normal distribution is that it forces participants to contemplate the Q statements in a thoughtful way. Despite what he has said above, Brown encourages researchers to use a forced normal distribution because it helps participants reveal their preferences (2008). If participants are encouraged to assign statements any ranking, then some will quickly divide the pile into two extremes and claim to be "finished." Revealing preferences sometimes takes more work than this.

Our position on this question is to force a normal distribution and to also inquire into the participant's relative ranking of categories. We ask if they discern a meaningful difference among the categories. Some people may assert that the columns at the two extreme ends of the distribution are essentially equivalent for them. When this has happened, we asked the participant to re-examine each statement and to assure us that they all have equal salience. Above all else, we strive to ensure that the participant has organized the statements into ordinal categories.

Clarifying the "indifference point" in the distribution

Frequently the question arises: What is meant by an "indifferent" ranking? Where does a participant sort a card that she or he sees as irrelevant or has no opinion about it? Is the middle of the distribution equivalent to having no opinion? The answer from experts in Q method is clearly that the zero point in the distribution is intended to mean zero salience. In other words, a participant is assumed to assign no importance to statements that are sorted in the zero category.

McKeown and Thomas (1988, pg. 35) wrote:

While performing a Q-sort, the subject draws distinctions on the basis of *psychological significance*. The poles of the opinion continuum thus represent a common unit of measurement in that items under +5 and -5 are assumed to hold 'greater importance to me' than items elsewhere in the Q-sort. But what is of 'greater importance to me' is *not* an artifact of an a priori designation by the researcher. It is a determination that only 'I' (the

Making the response chart with ease

To easily create a distribution chart, set a Word document to Landscape (Page Setup > Paper Size). Then insert a table (Table > Insert > Table) with a number of columns equal to the number of categories in your Q distribution, and a number of rows equal to one more than the number of statements in the largest category.

Type the numbers +5 through -5 or +4 to -4, etc. depending on how many columns you have. Note that most Q analysis software requires an odd number of columns in the bottom row.

Finally, highlight the cells that will not correspond to places for statements and gray them out (highlight a group of cells, then right click and select Borders and Shading. Under the Shading tab, pick a gray color). It is also helpful to add some lines under the table to write information about the sort -- the name of the sorter, date, project name, etc.

sorter) can make by ranking at the poles those items that hold positive or negative salience vis-a-vis other items *in my opinion*. Hence, the middle score (0) is not an average but a point neutral in meaning and without psychological significance. All Q-sorts, therefore, are anchored in the same way, that is, at a point with no meaning where only the dispersion or variation of Q-sample items around it is dependent upon individual self-references (Stephenson 1978).

While this is readily straightforward, it is unclear how this idea can be realized in the context of a forced normal distribution. A forced normal distribution presupposes that each and every Q participant will assign zero salience to the exact same number of cards. Furthermore, it presumes that identical numbers of cards will be assigned positive and negative salience by each participant. This is unlikely to be the case in practice. Some participants may find *none* of the statements to be of neutral meaning. Others may find *many* statements to be of neutral meaning.

Realizing a Q sort based around a neutral point with zero salience also requires that the Q sample contain about equal numbers of statements with positive salience (are agreed to) and negative salience (are disagreed with). The problem is that, in many instances, the researcher cannot predict the meaning of the narrative, thereby making it impossible to discern what a positive or negative statement would be (see box).

Neutrality and the sorting instruction

The “condition of instruction” is Q-jargon for the researcher’s instruction for the participant as to how to sort the cards. A better name for this is simply the “sorting instruction.” It should be based on the question or goal that motivates the study. The sorting instruction defines the context in which the Q participant’s perspective is being sought.

For example, a sorting instruction might ask participants to sort the statements in a manner that reflects an actual situation. Another may ask them to sort the statements based on how well they describe how they *would like* things to be.

Much of the literature on Q method presumes that the sorting instruction asks the participant to sort from disagree to agree (Brown, Durning, Sheldon 2007). This is consistent with the idea that there should be a midpoint in the Q sort which has zero salience. It furthermore presumes that the Q participant will disagree and agree with some statements.

Consider the possibility that the Q participant agrees with *all* the Q statements. The researcher selected statements from the concourse that all had positive salience for a participant. In such a case, “disagree” would have no meaning and forcing the participant to disagree with some statements would not reveal subjectivity, but distort it.

Positive or negative salience?

Can the researcher make a Q sample that has perfectly balanced positive and negative salience? In a study to reveal perspectives on dolphin intelligence, the following Q statement was used:

Dolphins draw on their memory to interpret new situations.

What is the likelihood that half of the Q participants would assign this positive salience? There is no way to know. If a Q sample has too many with positive salience, some scholars recommend reversing polarity of the statement. Should this statement be reversed to say:

Dolphins do not draw on their memory to interpret new situations.

Having a mix of positively and negatively worded statements is probably wise, if it can be feasibly done. But it does not guarantee that every participant will assign half the statements positive salience and have negative salience. We believe that it is impossible to presuppose how participants will assign salience.

Source: Sickler et al. 2006.

We believe that:

- (1) it is not possible to predict what salience a Q participant will read into a Q statement.
- (2) All Q participants will not read the same salience into every statement.
- (3) Some participants might assign positive or negative salience to every statement.

Application: Empowering Local Communities in Superfund Cleanup

Sorting instruction

In this study, we asked Q participants to each do two Q sorts, one on their ideas about how the process should work and one on their preferences for the outcomes. The sorting instructions were:

- When you think about where the process is now, what should happen next? Sort the statements according to most like I think the process needs to be to least like I think the process needs to be.
- When you think about the remediation of the Toms River Ciba Geigy site, what do you think about what has been done in the past and is being done currently? Sort the statements according to most like how I think to least like how I think.

Source: Social and Environmental Research Institute (2008)

We conclude that the most proper sorting instruction is to ask participants to sort the Q statements from *least like how I think* to *most like how I think*. This leaves open the possibility that the participant could agree (or disagree) with any number of Q statements and, consequently, the location of the zero point, for each individual, if there even is one, could occur anywhere in the continuum.

We do believe that knowing the zero point is of interest. To reveal this, we ask participants, at the end of their Q sort, to point out the point that demarcates agree from disagree. We ask, “Can you identify a column where you disagree with statements to the left and agree

with statements to the right?” This information is useful in writing up the social perspectives.

Step 4: Recruit Participants

Q method works best with people who are knowledgeable about the issue and have well formed opinions. The goal is to get people who have different perspectives, although a certain amount of overlap is also desirable. Q participants are a sample of a population, but not in the same way that respondents in a survey study are a sample of a population. In a Q study, the aim in recruiting participants is to capture the range of opinions present in a concourse. Decision-makers and opinion leaders are often good participants. Typically, one to three dozen people are sufficient for a Q study.

Application: Recruiting Q participants

A project consisted of doing Q sorts with individuals involved in nine different public participation processes across the USA. Having no familiarity with any of these cases, we contacted other scholars who had studied each case and relied on their expertise to suggest twelve people with differing points of view to complete the Q sort. After writing up the narratives, we had them proofed by the participants and by our local collaborating experts.

Source: Webler and Tuler (2006)

There are several good ways to recruit Q participants. One is to use a source familiar with people who are involved and knowledgeable about the concourse (see box). Of course, it is critical that the source person understand the need to select people with differing perspectives.

Another way to recruit Q participants is through snowball sampling. With snowball sampling, start with person central to the subject and ask them to recommend several other people who would be good participants. These people are contacted and asked also to

recommend several other good participants. Certain names will come up more often than others and these are good people to start a Q sort with. If background interviews were done, those interviewees can be asked to recommend appropriate people for the Q sort.

Q participants can also be selected based on their contributions to the concourse. Particularly when there is a written record of the concourse, it is possible to identify people with strong, well-formed perspectives.

The ideal number of Q participants is a tradeoff between two rules of thumb. The upper end is determined by the rule that it is wise to have more observations than variables in a study where statistics will be used to analyze the results. In a Q study, the “observations” are the Q statements and the “variables” are the Q sorts (which is inverted from normal survey research). Q researchers often aim for a 1:3 ratio. Thus, for every three Q statements, have one Q participant. It is not unusual to see this ratio drop to 1:2 (see Table below).

The lower end is set by the need to have enough Q sorts to adequately summarize the perspectives that make up the concourse. It is impossible to know ahead of time how many perspectives are in a concourse, but studies usually produce between two and five. The rule of thumb is that, for each perspective, you want at least three people to load highly on it. Of course, it also impossible to know ahead of time how people will load on the factors. Therefore it is wise to plan for excess participants.

Application: Revealing Fundamental Arguments in Conservation Biology Strategies

In a study by Malan, Q statements were extracted from key editorials, research articles, and books about how to achieve conservation biology goals in Africa. Q participants were selected from the pool of people who authored these writings. Many of these individuals interacted with each other regularly, so once one was onboard, it was not difficult to gain the others’ support.

Source: Malan (2008)

Choosing the Number of Q Participants	
Minimum	Maximum
2 perspectives x 3 people = 6	1:3 - 30 Q statements = 10
3 perspectives x 3 people = 9	1:3 - 36 Q statements = 12
4 perspectives x 3 people = 12	1:3 - 42 Q statements = 14
5 perspectives x 3 people = 15	1:3 - 45 Q statements = 15

The table above gives four examples in which the minimum and maximum number of participants are computed. The first column runs calculates the minimal number of participants if the study reveals 2, 3, 4, or 5 perspectives. The second column gives the maximum number of participants for a study with a certain number of Q statements (here, 30, 36, 42, or 45 statements). The table shows that it would be difficult to uncover 5 perspectives with less than 45 Q statements. A balance needs to be struck between the two rules. If one expects to reveal four perspectives, a good balance is to use about 45 Q statements and 15 Q participants. Of course, it is impossible to predict how many perspectives will be revealed. Consequently, Q researchers are accorded quite a wide breadth of tolerance for their choices of numbers of Q statements and Q participants.²

² We note that one of our reviewers found this table too formulaic and instead advocated using much larger sets of Q participants. We believe that this table does provide new researchers some guidance in designing new studies, even if not all studies or researchers subscribe to these numbers.

Contacting Q participants

Contact the Q participants by phone or email and explain the study. Arrange a meeting to do the Q sort in a place that is quiet and where there is a large flat surface to work from (a conference room is a good place). Meeting in a coffee shop is not a good option, unless it is virtually empty, because doing a Q sort takes a lot of focus and attention. Because Q is a one-on-one technique, it can be scheduled for a time and place convenient to the participant. Many lay people with whom we have worked have preferred to conduct the sort in their own home, while professionals usually want to do the sort at their workplace. The main criterion is that there will be privacy and freedom from distractions, and a large table or desk (about one square meter is adequate) to set out the cards on.

Step 5: Conduct the Q sorts

At the beginning of each sort, explain again the Q process and what you hope to learn from it. It is often easier to explain Q when you can show the person the cards and the distribution chart. Emphasize that you are interested in their authentic perspective, that there is no “right” or “wrong” answer. Some people may want to express their “official” organizational views. You need to be clear about which “hat” you want your Q participant to wear while doing the sort.

If the project is based in a University, it will be necessary to have the person sign a consent form (approved by your university committee on human subjects) explaining their rights as a participant, particularly their right to have personal identifying information kept private. It is always good practice to keep the results of Q studies anonymous.

It helps to have the sorting instruction printed on a large card. Set it in front of them and read it out loud to be sure they understand it fully. It may be necessary to remind them of the instruction periodically during the sorting.

Gathering data during the sort

The analysis will be aided by data gathered at this step. Encourage the participant to “think out loud” while performing the sort. With their permission, audio-record this conversation. Note that some people prefer to do the sort without speaking, others like to talk about every Q statement. These comments will provide important contextual information for understanding the results of the study. Write down all of these comments. It is particularly helpful to get the participant’s opinion of Q statements that can be interpreted in multiple ways. In our research, we highlight Q statements that we specifically want to ask about during the sort.

Doing the Q sort

A common sorting procedure that works well is for the person to first read through all of the statements, then to sort them into three piles of indeterminate size – a “most like I think” pile, a “sort of like I think” pile, and a “less like I think” pile. Next, have them take the “most like I think pile” and sort that into three more piles. Take the most extreme pile from this and have them begin to lay the Q cards out onto the distribution board. They can work in from the end, selecting the few highest priority cards to fill in one end of the distribution. Remember that the rows statements are placed in have no significance; only the columns matter.

After laying out a few cards at that end of the distribution, the participant may want to go through the same procedure with the “less like how I think pile.” Divide this into three piles and choose the most

extreme cards for the distribution board. Use this strategy to move back and forth between the two ends of the board until reaching the middle.

Discarding “bad” data.

Sometimes the researcher loses faith in the capacity of the participant to perform the Q sort. When this happens, it may be wise to discard the data.

In one Q sort we did with a busy participant, the person read through the cards and rapidly divided them into three piles. He then went on to lay the cards onto the distribution board in a seemingly haphazard manner. He refused to be interrupted during his sorting, which took at most five minutes. In the end, a dozen cards were stacked up at the extreme end and all the rest were in the middle. He refused to speak about his perspective or to re-organize the cards. He claimed this represented how he thought and that he was finished. In the end, we had to discard his Q sort as invalid because he believed the man did not authentically represent his subjectivity.

In another Q sort we did with an elderly gentleman, the man continually forgot which end of the spectrum was “for” and which was “against” (despite the fact that the ends were labeled, “more like how I think” and “less like how I think.”) It took the man an hour to do a sort. At the end, we began to question the man about the placement of some statements. Several times, the participant took statements placed near one extreme and moved them to the other end, without offering any explanation. He often asked if he was doing it “right.” Despite several attempts to clarify the instructions, we gave up, thanked the man, paid the honorarium, and left. The data were not used because we did not believe the man expressed authentic subjectivity.

The participant should feel free to move cards around in the sort at any time. Some people may complain about the normal distribution, wanting to put many cards in the highest and lowest groups, but you should emphasize that one of the points of Q is to force them to prioritize. Q researchers have found that deviations from the normal distribution do not greatly effect the results, so if a sorter has a great deal of difficulty fitting the statements into the forced distribution, you may allow them to put more or fewer statements in some categories. Even if you do allow deviations from the assigned distribution, you should ensure that all sorters use the full width of the distribution, and that every statement is ranked somewhere.

Avoiding bad data

Sometimes a person is unable to complete a Q sort, although this rarely happens (see box). If they get frustrated and want to quit, by all means, don’t pressure them. Occasionally, we lose faith in the

Q participant during the sort. Q sorts that are done too rapidly are suspect. Q sorts which, at the end of the sort, the participant is still moving cards from one extreme to another without being able to provide clear justifications for his or her actions are also suspect.

Record the data

When the participant is satisfied with their sort, record it by writing the card numbers on a data record page. Be careful not to reverse the polarity of the salient categories. This is easier to do than you may think, especially if you are sitting across from the participant and reading the Q statement numbers upside down. It is best to change seats with the participant while you record the numbers of the statements.

This is also a good point to ask some questions. A most useful question is to ask them to interpret their sort, to ask if it captures their perspective on the issue. This information is very helpful in defining the social perspectives during the data analysis phase.

As discussed above, you may also want to ask them to indicate where they would put the zero salience line. That is, where would they draw the midpoint between cards they feel positively and negatively about (see above). Emphasize that there is no “right” answer, it is purely subjective.

This is also a good time to get information that will improve the Q sample or improve future research. Ask if there were any important Q statements missing from the sample. If something critical is missing, it may be necessary to start again. Most of the time this information is useful for future studies.

Step 6. Use factor analysis techniques to arrive at social perspectives

Factor analysis is a mathematical technique that reveals underlying explanations for patterns in a large set of data. In the case of Q method, the factor analysis identifies patterns among the Q sorts. The analysis produces some number of “factors,” which are particular arrangements of the Q statements. Factors actually are Q sorts. These are called “idealized sorts” since they are produced by the analysis, not a participant. They are also called “social perspectives” because they comprise many people’s subjective expressions. The job of the analyst is to read the idealized Q sorts and write a narrative describing each one, that is, to compose the social perspectives.

It is simple to use the free software from Peter Schmolck's web page at <http://www.rz.unibw-muenchen.de/~p41bsmk/qmethod/>. This page has links to download PQMethod (the version for Windows) and MQMethod (for MacIntosh OS9). This software is much easier to use for Q analysis than standard statistical software (such as SPSS), because it produces outputs that are easy to interpret in a Q context. (The following discussion assumes that you are using PQMethod, but both programs are essentially identical, as they are compiled from the same source code.) Following is a step-by-step guide, much of which will seem relatively self-explanatory when you start up the program.

Figure 2: Starting screen in PQMethod

```

C:\ PQMETHOD
C:\PQMETHOD\PROJECTS>set EDITOR=c:\pqmethod\ed.com
C:\PQMETHOD\PROJECTS>set VIEWER=c:\pqmethod\view86.com
C:\PQMETHOD\PROJECTS>c:\pqmethod\PQMethod.exe

+-----+
|               PQMethod - 2.11               |
|               <November 2002>               |
+-----+
| by Peter.Schmolck@unibw-muenchen.de         |
| Adapted from Mainframe-Program QMethod     |
| by John Atkinson at KSU                    |
+-----+
| The QMethod Page:                           |
| http://www.rz.unibw-muenchen.de/~p41bsmk/qmethod/ |
+-----+

Enter [Path and] Project Name:

```

Starting the program

When you start PQMethod, it will ask you to name your project (see Figure 2). If you are just starting your project, just type a short name for it (8 letters) and the program will automatically create the

necessary files. In the future, when you start PQMethod you will just need to re-type the project name to re-load the data you previously entered.

Entering the data

Once you name your project or enter the name of a previous project, you will see the main menu, as in Figure 3.

Figure 3: Main menu in PQMethod

```

PQMETHOD
-----
The QMethod Page:
http://www.rz.unibw-muenchen.de/~p41bsmk/qmethod/
-----

Enter [Path and] Project Name:
WHoutc

Current Project is ... C:\PQMETHOD\PROJECTS\WHoutc
Choose the number of the routine you want to run and enter it.

1 - STATES   - Enter (or edit) the file of statements
2 - QENTER  - Enter q sorts (new or continued)
3 - QCENT   - Perform a Centroid factor analysis
4 - QPCA    - Perform a Principal Components factor analysis
5 - QROTATE - Perform a manual rotation of the factors
6 - QUARIMAX - Perform a varimax rotation of the factors
7 - QANALYZE - Perform the final Q analysis of the rotated factors
8 - View project files WHoutc.*
X - Exit from PQMethod

Last Routine Run Successfully - <Initial>

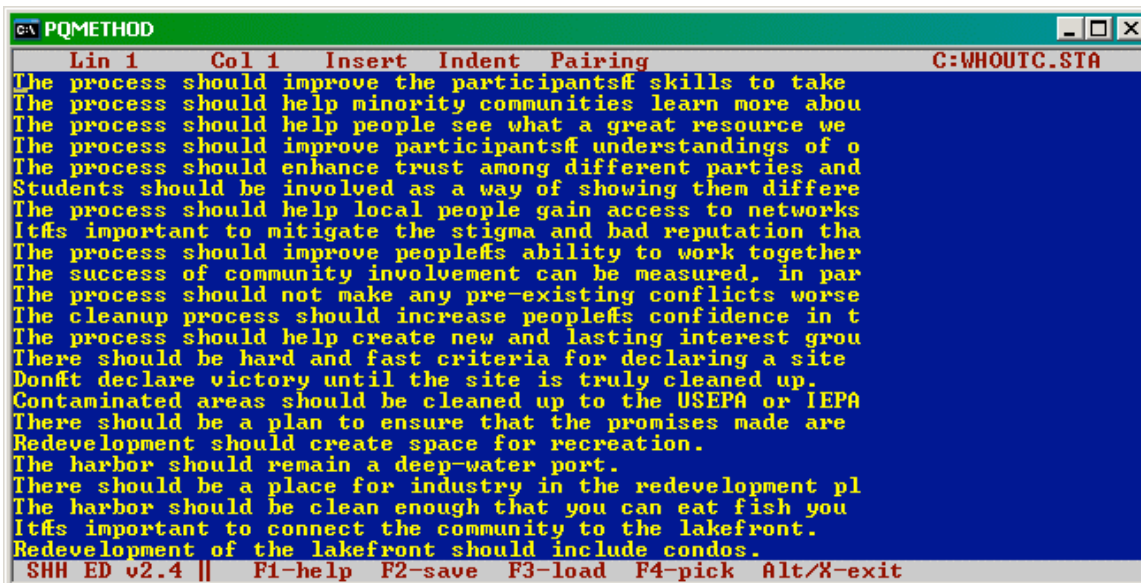
```

The next step is to import your list of statements. The easiest way to do this is to copy your list of statements (in order, but without numbers) into a text file, with an additional carriage return after the last statement. Save this file in the same directory as the project (usually C:\PQMETHOD\PROJECTS). Then hit “1” (STATES) and type the name of your file. The statements will load in a special blue text editor (Figure 4).

You may have to edit your statements into shorter paraphrases in order to fit the character limits for each line. Note that these shortened statements are simply placed in the final output to help you more easily remember which statements are which -- your interpretation of the output should still be based on the full statement that the sorters read. Hit F2 to save and Alt-X to exit the statement editor and return to the main menu.

Next, hit “2” (QENTER), then “A” to enter new Q sorts. The first time that you run the program you will be asked to enter the shape of the statement distribution, that is the values of your end columns (e.g. 5 and -5) and the number of statements in each column. If some of your participants did not fit the assigned distribution, don’t worry. You will still be able to enter and analyze their sorts as long as they used the correct number of columns.

Figure 4. Editing statements in PQMethod



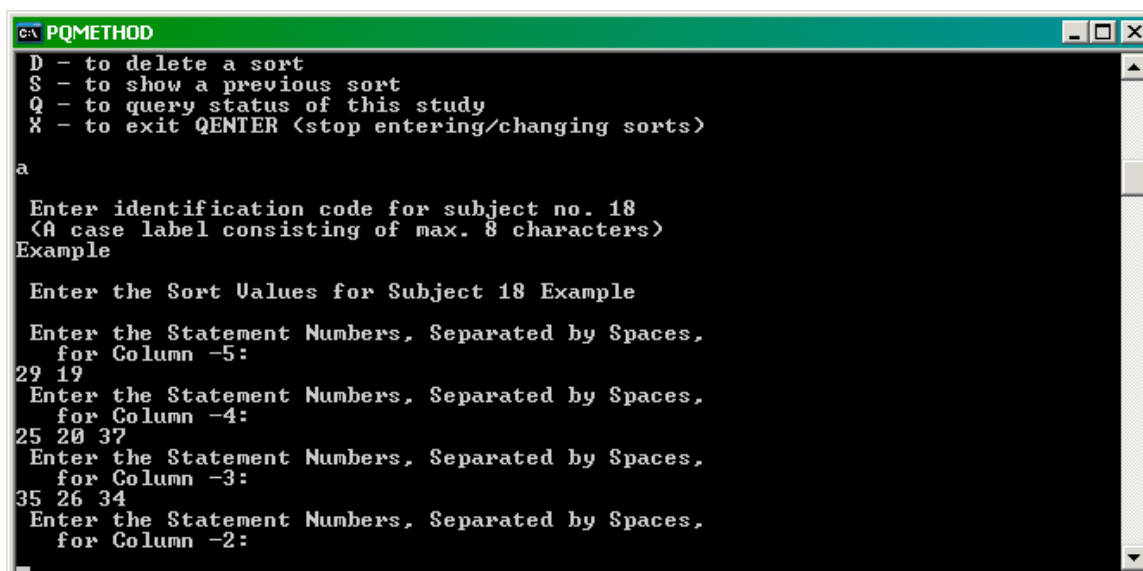
```

C:\ PQMETHOD
Lin 1 Col 1 Insert Indent Pairing C:WHOUTC.STA
The process should improve the participants skills to take
The process should help minority communities learn more abou
The process should help people see what a great resource we
The process should improve participants understandings of o
The process should enhance trust among different parties and
Students should be involved as a way of showing them differe
The process should help local people gain access to networks
Itfs important to mitigate the stigma and bad reputation tha
The process should improve peoplefs ability to work together
The success of community involvement can be measured, in par
The process should not make any pre-existing conflicts worse
The cleanup process should increase peoplefs confidence in t
The process should help create new and lasting interest grou
There should be hard and fast criteria for declaring a site
Donft declare victory until the site is truly cleaned up.
Contaminated areas should be cleaned up to the USEPA or IEPA
There should be a plan to ensure that the promises made are
Redevelopment should create space for recreation.
The harbor should remain a deep-water port.
There should be a place for industry in the redevelopment pl
The harbor should be clean enough that you can eat fish you
Itfs important to connect the community to the lakefront.
Redevelopment of the lakefront should include condos.
SHH ED v2.4 || F1-help F2-save F3-load F4-pick Alt/X-exit

```

For each person, you should enter a name. It is easiest to use the sorter's real name, but in the interest of protecting confidentiality, it is better to assign pseudonyms. If you do use real names, make sure to remove them from any reports that you show to others, in order to protect the research participants' privacy). The program will then ask you to input the statements in each column (Figure 5).

Figure 5: Entering a Q sort for sorter "Example"



```

C:\ PQMETHOD
D - to delete a sort
S - to show a previous sort
Q - to query status of this study
X - to exit QENTER (stop entering/changing sorts)
a
Enter identification code for subject no. 18
(A case label consisting of max. 8 characters)
Example
Enter the Sort Values for Subject 18 Example
Enter the Statement Numbers, Separated by Spaces,
for Column -5:
29 19
Enter the Statement Numbers, Separated by Spaces,
for Column -4:
25 20 37
Enter the Statement Numbers, Separated by Spaces,
for Column -3:
35 26 34
Enter the Statement Numbers, Separated by Spaces,
for Column -2:

```

When you finish with all of the columns, the program will display the final sort and prompt you to correct any errors. The program checks that every statement is entered once and only once (Figure 6). Note that if the Q participant has not put the data in a nice normal distribution, those data can still be entered, although it is necessary to use the same column numbers that are used for all the Q sorts.

Figure 6: Completed Q sort, with errors

```

C:\ PQMETHOD
? 29 ? 25 ? 35 ? 15 ? 36 ? 27 ? 7 ? 17 ? 30 ? 21 ? 32 ?
? 19 ? 20 ? 26 ? 1 ? 6 ? 23 ? 39 ? 24 ? 18 ? 31 ? 44 ?
? 37 ? 34 ? 11 ? 10 ? 43 ? 24 ? 5 ? 16 ? 33 ?
? 2 ? 9 ? 3 ? 28 ? 14 ?
? 41 ? 38 ? 8 ?
? 4 ? 12 ? 42 ?
? 40 ?
? 13 ?

SubjNo: 18 ID: Example

The following statements have been entered more than once.
24
The following statements have not been entered
22
The sort must be re-entered. Look at the problems above
and decide what column you want to modify first.
Give the value of the column you want to change:

```

Running the factor analysis

Once you have entered all of your Q sorts, the next step is to run the factor analysis itself. PQMethod offers two factor analysis algorithms -- Centroid and Principal Components Analysis (PCA). PCA is the most common type of factor analysis, but Centroid is popular among Q users who wish to use hand rotation. One distinguishing attribute of the two methods is in how much they draw on individual specificity when constructing factors. Centroid analysis is based solely on the commonality among Q sorts and ignores the specificity of individual sorts. PCA, on the other hand, considers both commonality and specificity. In our experience with Q studies of environmental topics, PCA and Centroid both tend to give fairly similar results but this should not be presumed to be the case for all studies.

Figure 7: Factor analysis

```

C:\ PQMETHOD
4
Eigenvalues      As Percentages  Cumul. Percentages
-----
1  5.1377       30.2220       30.2220
2  2.2433       13.1961       43.4181
3  1.4760       8.6823        52.1004
4  1.4059       8.2701        60.3705
5  1.1563       6.8015        67.1720
6  0.9011       5.3003        72.4723
7  0.8521       5.0122        77.4845
8  0.7363       4.3311        81.8156
9  0.6086       3.5800        85.3957
10 0.5207       3.0631        88.4587
11 0.4892       2.8778        91.3366
12 0.3669       2.1583        93.4949
13 0.3335       1.9620        95.4569
14 0.2574       1.5141        96.9710
15 0.1989       1.1701        98.1411
16 0.1640       0.9646        99.1057
17 0.1520       0.8943       100.0000

Press <ENTER> to continue

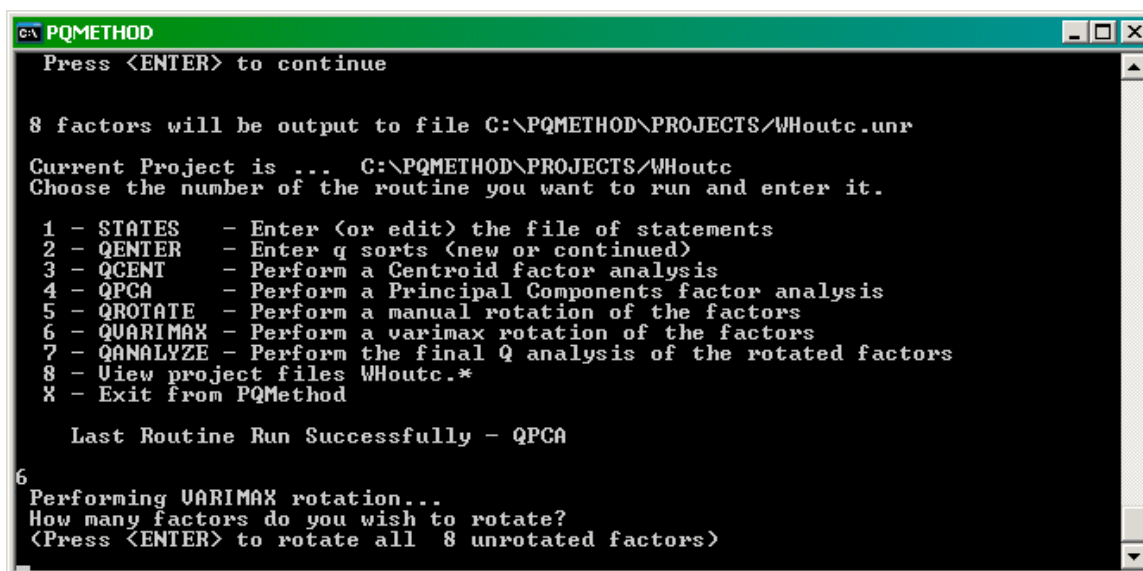
```

To use PCA, hit “X” to return to the main menu, then choose “4” (QPCA). The program will do the factor analysis and display a table of Eigenvalues (Figure 7). The procedure for doing a Centroid factor analysis is similar -- hit “3” (QCENT), then hit enter again to generate 7 centroids (you will be able to discard some of them during the rotation step).

After the factor analysis, you will need to rotate the factors to get the best solution. PQMethod offers two rotation methods -- manual and varimax. Varimax is an algorithm that attempts to rotate the factors so that individuals tend to be associated with just one factor. Manual rotation is useful for testing particular hypotheses about how certain individuals’ perspectives relate. Less experienced Q users will usually find the varimax rotation sufficient.

To do a varimax rotation, hit “6” (QVARIMAX). When beginning a rotation, the program will ask you how many factors to rotate (Figure 8).

Figure 8: Choosing the number of factors



```

PQMETHOOD
Press <ENTER> to continue

8 factors will be output to file C:\PQMETHOOD\PROJECTS\WHoutc.unr
Current Project is ... C:\PQMETHOOD\PROJECTS\WHoutc
Choose the number of the routine you want to run and enter it.

1 - STATES   - Enter (or edit) the file of statements
2 - QENTER   - Enter q sorts (new or continued)
3 - QCENT    - Perform a Centroid factor analysis
4 - QPCA     - Perform a Principal Components factor analysis
5 - QROTATE  - Perform a manual rotation of the factors
6 - QVARIMAX - Perform a varimax rotation of the factors
7 - QANALYZE - Perform the final Q analysis of the rotated factors
8 - View project files WHoutc.*
X - Exit from PQMethod

Last Routine Run Successfully - QPCA

6
Performing VARIMAX rotation...
How many factors do you wish to rotate?
(Press <ENTER> to rotate all 8 unrotated factors)

```

Rotation is a matter of judgment. It is best to rotate different pairs of factors and compare the final outputs. To produce the output file, you will need to run the program separately each time you complete a series of rotations. Try starting with only 2 factors and see how rotation changes the meanings of those factors, perhaps comparing the results with the output of a varimax routine. How to compare the outputs and decide among the different numbers of factors will be discussed below.

After computing the rotation, PQMethod will ask you if you want to use the new PQROT program (say “Y”), and then bring up a screen with all of the sorts’ loadings. Factor loadings are the degree to which an individual’s sort correlates with a factor. This is illustrated in the table below. Be warned that the PQROT program will take over your entire screen, but you can hit Alt-Enter at any time to minimize it. PQROT is only available in PQMethod, so users of MQMethod will have to use the older rotation program, which displays the rotation in the same window as the rest of the program, and walks you through the same steps that will be described here for PQROT.

Loadings can theoretically range from 1 (complete agreement) through 0 (no agreement) to -1 (complete disagreement) (note that in the older rotation program, loadings are displayed without the decimal point --

so a loading of 77 is actually 0.77). You will need to “flag” those sorts that load highly (positively or negatively) on each factor.

Flagging is important because the final description of each factor will be based on a weighted average of *only those sorts flagged* as loading on that factor. This is a very important and much-ignored consideration. PQMethod has an option for automatic pre-flagging, as well as manually editing the flags. We generally flag a sort anytime its factor loading is greater than $ABS(2.58 \div \sqrt{N})$.

Hit F6 to automatically pre-flag the sorts. This will place an X next to each loading that PQMethod thinks is significant. If there are additional loadings you’d like to flag, or ones you’d like to remove, hit F7 to bring up a pair of red boxes. You can use the arrow keys to move these boxes around, and hit Enter to flag or un-flag the loading that they cross on (Figure 9).

Negative loadings are as important as positive ones. Both positive and negative salience have equal influence in defining the meaning of a factor. Most factors produced in Q analyses are uni-polar, which means that people ascribe *to a degree* to the beliefs that comprise that factor. When participants *oppose* the beliefs that comprise a factor, then the factor is called “bipolar.” Bipolar factors emerge when participants place the same cards at opposite ends of the distribution.

Figure 9: Manual flagging

	1	2	3
1	0.8170X	0.1015	-0.0555
2	-0.0910	0.1603	0.7220X
3	0.0801	0.1530	0.7688X
4	0.4243	0.4237	0.1891
5	0.7062X	-0.0930	0.1270
6	0.3144	0.3553X	0.1497
7	-0.0126	0.8308X	0.0073
8	0.0550	0.5975X	0.4578
9	0.7853X	0.1326	0.1351
10	0.0628	0.6180X	0.0182
11	0.7216X	0.1875	0.2727
12	0.6596X	0.1595	-0.0980
13	0.4503	0.2746	0.3897
14	0.5183X	0.5314X	-0.1614
15	0.2779	-0.0999	0.4203X
16	0.2051	0.6769X	0.0678
17	0.0770	0.7773X	0.2207

Once you are happy with your flags, save the rotation. (In PQROT, hit F8, then *, then F9) and return to the main program. (If the rotation program causes PQMethod to take over your entire computer screen, hit Alt-Enter to return it to the small window.)

The final step in PQMethod is to hit “7” to output the final analysis. You will be asked whether you want to change the number of lines per page -- say “n.”

The program will output a file in the C:/PQMETHOD/projects folder called [NAMEOFPROJECT].lis. You can open this .lis file in a word processing program. It is helpful to change the pages to landscape

orientation, and in some cases to narrow the margins, so that all of the tables in the output line up properly.

Save the .lis file as a Word document in another location. This allows you to return to PQMethod and re-run the analysis with a different number of factors rotated. Deciding how many factors to use in your final analysis is easier when you can place the outputs side-by-side to compare the results.

The .lis file contains a great deal of information. The important sections for a basic Q analysis are:

1. *Factor Matrix with an X Indicating a Defining Sort*: This is essentially the factor loadings table that you saw during the rotation and flagging stage. It tells you which people agreed with each factor, and by how much.
2. *Correlations Between Factor Scores*: These tell you how similar pairs of factors are.
3. *Normalized Factor Scores for each factor*: These tables are essentially idealized Q sorts for each factor. They show you how far each Q statement is from the midpoint of the sort. Statements with high positive values are at the far right of the Q sort.
4. *Descending Array of Differences between factors*: These help to make sense of factors by showing which statements factors ranked most differently. They are made for each pair of factors and ordered from the statements that the first factor ranked much higher, to the ones that the second factor ranked much higher. These tables are useful when you are trying to clarify the difference between two factors.
5. *Distinguishing Statements for each factor, and Consensus Statements*: These tables list the statements that were ranked significantly differently between a given factor and all other factors, and the statements that were not ranked differently by any factors.

Deciding on the final set of factors

Before the detailed analysis begins, you should settle on how many factors you will be analyzing. There is no one objectively correct number of factors to use, and any number of factors will give you some insight into how people think about the issue. Nevertheless, there are several criteria that you can use to decide between different numbers of factors:

1. **Simplicity**: All else being equal, fewer factors is better, as it makes the viewpoints at issue easier to understand. Of course, simplicity should not be taken so far that you lose important and interesting information about differences in people's views.
2. **Clarity**: The best factor solution is one in which each sorter loads highly on one, and only one, factor. You should try to minimize the number of "confounders" (people who load on multiple factors) and "non-loaders" (people who do not load on any factor). If a few confounders persist, that indicates that those people have truly hybrid views.
3. **Distinctness**: Lower correlations between factors are better, as highly correlated factors are saying similar things. Nevertheless, it is not necessarily bad to have high correlations, as long as the factor is otherwise satisfactory. It may be that two factors agree on many issues, but their points of disagreement are particularly important (e.g. if they disagree about a remedy that is being proposed as the next step at your site).
4. **Stability**: As you compare the results of using different numbers of factors, you will notice certain groups of people tend to cluster together. This is an indicator that those individuals really do think similarly. A good set of factors will preserve as many as possible of these stable clusters.

Interpreting the meaning of factors

After you select the number of factors that you will be keeping, you can proceed to interpret the .lis file associated with that solution. The first place to look is the Normalized Factor Scores. These scores are basically equivalent to a Q sort. The highest-ranking statements are those that loaders on this factor said were most like how they think. As you read over the highly ranked statements, you should be able to weave them together into an explanation of how people who loaded highly on this factor see the world. The low-ranked statements are equally important, as they indicate what ideas that the participants felt were less like how they think. Depending on where individuals located a zero salience point, it may be correct to interpret these as items of disagreement, but this must be done cautiously.

The PQMethod output file provides a list of distinguishing statements. Pay especially close attention to these. These are statements that were significantly different among the factors. Statements with high salience in only one factor are a good place to start from when generating a narrative.

As you interpret the factors and begin to draft the social narratives, it helps immensely to refer back to the comments made by the Q participants during the Q sort. These comments can help you understand why people who load on a certain factor placed a certain statement where they did (and why, for example, they ranked one statement very high but a similar statement much lower). It is very helpful to organize the notes you took during the Q sorts by statement, so that you can quickly retrieve every comment made about particular Q statements.

Generating descriptions of social perspectives is something of an art. Experience helps immensely, as does familiarity with the topic. However, too much familiarity can also be dangerous because people can end up re-creating what they believe rather than reflecting what is really in the data. It also helps if the researcher has done the Q sort as well and has a sense of the perspective taken in the sort.

When we write social perspectives, we look for the key elements of each perspective, focusing first on the primary theme before turning to secondary or tertiary themes. Primary themes are the ones with the most salience. A good measure of salience is the z-score. Z-scores are measures of how far a statement lies from the middle of a distribution. The units of z-scores are standard deviations. Hence, a statement with a z-score of -3.0 is three standard deviations below the mid-point of the distribution. That would be a statement at the very far left end of the Q sort.

One way to do the analysis is to examine the total value of z-scores associated with statements that are all relevant to one specific theme. Sometimes we add z-scores by category and normalize the sum to the number of Q statements comprising that category so that the salience can be compared across categories.

Application: Perspectives on Dolphin Intelligence

Results of this study showed strong agreement among the perspectives with most of the differences being about the level of emphasis given to a few different themes. All the perspectives gave low scores to Q statements about the mystical healing powers of dolphins, but these received strong negative scores in two perspectives (suggesting that they were rejected) and scores around zero in one perspective (which suggested some openness to the possibility). These differences turned out to be significant in defining the perspectives among each other.

Source: Sickler et al. (2006).

Of course, what we are really looking for is the underlying rationale that explains the story beneath all of these themes. The goal is to uncover an explanation that tells a convincing narrative about the research topic.

Generating the narrative.

Here is an example of how a set of Q statements can be turned into a narrative about a factor. This is taken from our process sorts for our Ciba-Geigy superfund case study. The table below shows the statements that would fall into columns +5, +4, and +3 of a Q sort representing Factor 1. That is, all these statements are close to the “more like how I think” end of the spectrum.

No.	Statement	Column
6	EPA should use public input in making decisions.	+3
7	Information EPA has given out should be unbiased and accurate.	+3
20	EPA should use the best scientific information and analysis in making decisions.	+4
24	Independent experts outside of government should review technical studies.	+5
28	EPA staff should be sufficiently knowledgeable about the technical issues.	+4
37	State agencies should be involved.	+3
38	There should be technical review meetings to create a place for detailed discussions among experts.	+3
44	EPA should set up an advisory group of community leaders (e.g., CAG) to review what the agency is doing.	+5
45	There should be an independent community watchdog group examining what EPA and Ciba are doing.	+5
46	Local officials should be involved.	+4

Looking at these statements, several things jump out. First, based on statements 24, 44, and 45 all of which were ranked +5, we conclude that this perspective thinks oversight is *very* important. Information is another major theme. It appears in statements 7, 20, and 28. These observations help to provide the basic framework of the interpretation of this factor.

The text of the perspective is written in a manner that keeps it very close to the Q statements that were instrumental in defining it. These are referenced by the numbers in parentheses. The narrative we finally constructed about this perspective said, in part:

The core belief in this perspective is that the process needs independent oversight. There are three important aspects to this: an independent community-based watchdog group (45), establishment of an advisory group of community leaders (44), and independent experts outside of government who review technical studies (24).

This view highlights the importance of technical information in the policy and decision-making process (20, 28). Primarily it emphasizes verification (24) over trust (8). It advocates holding technical review meetings (38) where experts can meet with EPA and other scientists and discuss the technical dimensions of the issues. EPA should use public input in its decision-making (6). All information needs to be unbiased and accurate (7).

A secondary belief of this viewpoint is that local officials and state agencies both play important roles in the process and their participation needs to be secured (46, 37).

Comparing and contrasting the social perspectives

Once the social perspectives are complete, the final step is to examine the similarities and differences between the perspectives. A good place to start is by looking for widespread agreement across all perspectives. These points of consensus may be essential to each perspective. Caution is important here, however, since consensus statements and distinguishing statements can conceal differences in understandings (Brown 2008). It is essential that the researcher understand how the participant interpreted the statement. This is why being present at the Q sort, encouraging the participant to talk about the sort, and taking notes is so important. This attribute is often missing in Q sorts that are done via the internet.

Perspectives may clash directly with one another or they may differ in non-confrontational ways. The comparative analysis should pick up on points of contention before moving to examine non-confrontational points of difference.

A strong attribute of Q method is that each social perspective has an importance score for each Q statement. This allows direct comparison of the salience of specific themes across perspectives. One needs to exercise caution in interpreting the values of individual Q statements across perspectives because the statements were sorted in a relativist context. That is, they were sorted relative to all the other statements. Examining the values of each Q statement in the manner that survey analysis is done would be inconsistent with the philosophy of Q method.

Be sure that in your discussion of distinguishing and consensus statements, you consider the statements in the context of the overall factors, not just as isolated statements. Different factors may be related to different aspects of meaning in the same statement. This is particularly possible if the statement has “excess meaning.”

Validating the narratives

Once you finish writing the narrative, it is very helpful and highly recommended to send copies of the social perspectives to participants who loaded very high on the factor. Ask them for feedback on the accuracy of your analysis. Keep in mind that an individual will almost never match up exactly with a social perspective, in fact, it is often possible to predict what complaints an individual will have about a social perspective by looking at which statements they sorted differently from the factor.

Step 7: Report findings and make recommendations*Sharing results with the Q participants*

The Q participants will want to know the results of the analysis and where they fell on the social perspectives. To respect the anonymity of all the participants, mail each person the narratives and the factor-loading matrix with pseudonyms replacing people's actual names. Highlight the pseudonym for each person to whom you mail the results. If they choose to reveal their identities to others, that is their decision. It is good practice to make certain that no information that would enable any participant to recognize another is released.

Disseminating the results to the Q participants in consensus-making processes

One of the intriguing uses of Q is to help groups clarify what they agree and disagree about. Such results can be very helpful to clarify differences and to give direction for how the group can move forward. Toward this end, it is helpful to present results from three categories:

1. *Points of agreement* across perspectives (consensus points).
2. *Points of disagreement* across perspectives (compromise points).
3. *Non-consensual and non-confrontational points* from each perspective.

The first is the easiest and simplest. Highlight the points that all the perspectives agreed upon, if any. Re-stating these points and making it clear to everyone that there are points of agreement can be energizing for a group.

The second is to identify points of disagreement where compromise is possible. Look for points of disagreement among the perspectives that are not particularly strong or ideological. Many of these can be resolved with compromises. The Q analysis can suggest compromise solutions.

The third is to look at each perspective independently and highlight the points that were not consensual and also not in strong disagreement (i.e. “non-confrontational”) with each other. For example, imagine finding three perspectives on the topic of how hazardous waste should be cleaned up. Perspective B wants increased monitoring. Neither perspective A nor C were opposed to more monitoring. Consequently, monitoring is *non-consensual* but it is also *non-confrontational*. Increasing monitoring might increase overall satisfaction without decreasing satisfaction of any one perspective. That is an example of a non-consensual and non-confrontation point.

Another strategy is to share the results of the Q analysis with a key group of stakeholders and have them generate recommendations using the three strategies above. This may lead to increased sense of ownership and more lasting success.

If the Q study was conducted in a multi-lingual community, it would be wise to have the final analysis translated so that all members of the community can read it.

Benefits of Q studies

A benefit of a Q study is that it clarifies the positions held by stakeholders. It is not necessary to violate the privacy of Q participants to use this knowledge constructively. It gives insight into the ways stakeholders see the issue, revealing the logic behind their position, and putting the most important issues in context. Consensus statements point to areas where all participants can agree on a way forward through conflict.

Q studies can help individuals understand their own thinking on an issue as well. They can contemplate the role that different beliefs play in their overall mindset and reflect on points where learning might be helpful.

Organizers of processes that bring people with different people together will benefit from knowing the social perspectives that exist. They can intentionally involve people with different viewpoints, to achieve a balance and design learning activities that fill in vital informational gaps.

Q method is a technique to explore how people think and to look for patterns in their thinking. It can reveal completely original categories. Survey methods take advantage of such categories to measure prevalence in a population or causal associations among categories. Thus, Q method can help inform survey research.

Q methodology is not difficult to grasp, although there are some finer points where completing the analysis can be tricky. Experience helps. It is a skill that can be learned and, once learned, can be added to the toolbox of methods available to understand human subjectivity.

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GLOSSARY

Clearly different opinions

The participants of a Q study should be people with well-formed and clearly different opinions. Different opinions means people have different attitudes, beliefs, feelings, or conceptions of causality about a phenomenon. Ideally, it is best to involve individuals who have thought about the topic. Sorting Q statements can be difficult, and people with more familiarity on the issue find it easier to do it.

Coding

A process of identifying patterns of meaning in qualitative data files by associating segments of data with conceptual categories. Coding can be done by hand. This involves writing in the margins of the print-out or underlining text with colored pencils. It can be done “by hand” on word files, highlighting text and copying and pasting it into different documents for each category. It can also be done using computer software such as Atlas-ti, n-Vivo, Ethnograph, or HyperResearch.

Concourse

A concourse is all the expressions made with regard to the topic of study. The concourses customarily studied in Q method studies usually takes the form of text, although they can also be images, sounds, smells, experiences, and so on. In this document we focus only on textual concourses. A concourse expresses all of the existing social perspectives. It also refers to the specific group of people or segment of society that holds the perspectives. For example, if the topic of study is the reasons the United States invaded Iraq in 2003, and if we are interested in what perspectives exist within the American electorate, then the concourse would be all the things written or said that by the American electorate on this topic. It would include private conversations as well as public speakers and letters. Obviously this is an overwhelming concourse, so it is necessary to identify a sub-concourse as the basis for the study.

Condition of instruction

This is jargon for what is better called the “sorting instruction.” This is the instruction given to the Q participant for how they should think about arranging the Q statements. Usually it specifies the topic and the ends of the sorting distribution, just as a Likert scale anchors the endpoints of an interval scale.

Discourse analysis

The name of a family of academic research methods that examine, describe, and analyze texts. Q method is one type of discourse analysis. Other examples include: conversation analysis, ethnography, functional grammar, rhetoric, and interactionism.

Factor loading

This is a correlation coefficient. Each solution of the factor analysis is called a factor. Each factor is expressed as a particular Q sort. When qualitatively interpreted these are drafted into social perspectives. For each factor, we compute a correlation coefficient for each Q participant’s Q sort. This value is the “factor loading.” A Q participant can load highly on one factor, two factors, all the factors, or none of the factors. Ideally, each Q participant loads highly on one factor. A solution where no Q participant loads highly on any factor is a poor solution.

Sub-concourse

A sub-concourse is an abbreviation of the concourse and is generated to enable a Q study. Frequently, a sub-concourse is generated via open-ended dialogue-based interviews with a group of informed people. This strategy is particularly useful when there is not a clear public record of the discussions.

Q exercise (aka Q sort)

The research act the Q participant does when he or she sorts the Q statements into the sorting sheet.

Qmethod.org

Web site for all things Q related, including announcement of the annual meeting for the International Society for the Scientific Study of Subjectivity (ISSSS).

Q sample

This is the set of Q statements that are used in the Q sort. A Q sample represents the content of the discourse in exactly the same way that a sample represents a population. Most of the time the Q sample, like the concourse, is text. But it could also be art works, images, sounds, etc.

Q statements

Q statements are sentences or short vignettes of text that are selected to represent the concourse. By necessity, because people find it difficult to sort too many statements, a set of Q statements is limited to about 60. In academic jargon of post-positivist research, the concourse is the population and the Q statements are a sample of the population. The set of Q statements used in a Q study is often called a Q sample. The variables of a Q study are the Q sorts.

Q sort

The product of a Q participant sorting the Q sample. It can be done face-to-face, via mail, or interactively, on-line.

Social perspectives

A social perspective is a coherent pattern of opinions about a topic (Stephenson 1965). It is a narrative, a system of beliefs, or a “story that makes sense” about the topic. A social perspective is composed of core and secondary beliefs. For example, if the topic of study is the reasons the United States invaded Iraq in 2003, then one social narrative might center around core beliefs about Iraq possessing weapons of mass destruction and their pursuit of a nuclear bomb. A second narrative might center on Iraq’s involvement with al-Qaeda in the 9/11 bombings.

Social perspectives can have shared elements with each other; they do not need to be mutually exclusive, although exclusive perspectives are interesting.

Social perspectives are distinguished from individual perspectives. Individual perspectives are held by individuals. Social perspectives are coherent stories comprised by studying the commonalities as well as individuals’ specific opinions among participants’ Q sorts.

Statistical techniques used in Q analysis

The analysis done on the Q sorts is called “inverted factor analysis.” Factor analysis is typically used in survey research to look for patterns underlying the answers to dozens of survey statements. Whenever there are many variables, factor analysis simplifies the patterns down to a small handful of “factors” or “factor variables.”

Q methodology uses inverted factor analysis, which means that, instead of looking for patterns across people’s responses, we look for patterns across Q statements. In a survey the variables are the questions and the responses come from people. In Q method, the variables are the people’s Q sorts, and the “responses” come from each Q statement. In other words, the customary survey analysis data file is “inverted.”

Factor analysis produces a small number of variables (i.e. new or idealized Q sorts) that explain much of the variation in the variables (i.e. the participants’ Q sorts). Each “factor” corresponds with a Q sort. Another name for “factor” is “perspective.”

APPENDIX A

An Example of an Interview Guide for gathering background information and re-creating the concourse.

Briefly introduce project to interviewee, and that we are interested in understanding:

- a) How people view the community involvement processes.
- b) Community preferences for outcomes related to clean-up.

A. General opinions and motivations

- A.1. What has been your main interest in the site and its cleanup? What is driving your involvement with the clean-up related process and activities?
- A.2. What has been your history of involvement with the clean-up activities in Waukegan Harbor – EPA Superfund and EPA Great Lakes Legacy Act?

B. Views about the community involvement process

- B.1. What types of CI activities did you participate in (e.g., Public meetings? Public availability meetings, Technical Review meetings, CAG)?
- B.2. What were their strengths and weaknesses? [PROBES: What kind of CI activities would you like to see in the future? Did these meet your needs? How – get examples and what were those needs? What was important to you about each activity? What were you hoping they would accomplish--process and outcomes? In what ways did those CI opportunities NOT meet your needs. In what ways were they enough? Not enough? Communication too one-way, etc.?)
- B.3. What do you see as the purpose or objective of CI for this site? What do you see as the purpose of objective of CI for a possible GLLA project?
- B.4. What did you see as your role in past CI efforts? [PROBES: Did your view of your role ever change? Who did you represent? How did you participate? When did you participate?]
- B.5. Do you think that the CI process was successful? Why or why not? What would make it more successful? [PROBES: When you think about whether the CI effort was successful, what ways are you defining “success”? Can you give me an example of something that was particularly successful? How did you determine whether the CI effort was successful? What did you want to get out of the CI effort? Why did you participate in the process? Were your expectations about the effort met? Why or why not? Where there some principles that you believe were central to the effort? What kinds of things could have been done to make the effort perform better on these principles? Were there any disagreements or conflicts among different stakeholders?]
- B.6. What kinds of things really stand out for you about the CI effort? What was really positive? Why? What was really negative? Why?
- B.7. As the City et al. continue the new effort of working within the GLLA to secure additional clean-up of the Harbor, if you could make some changes to the (CI) process right now to improve it, what kinds of things would you change? [PROBES: What should EPA do? IEPA? Waukegan City? Lake County? Other stakeholders do?]

C. Views about the outcomes

- C.1. What do you hope is achieved by a new GLLA effort and CI process at this site? What are the outcomes you hope for?
- C.2. Specifically in regard to the remedies already chosen for the site, how do you feel about them? Why do you feel that way? Is there something else that you preferred? If so, what and why was it preferable?
- C.3. Was there any conflict/disagreement about outcomes? If so, what was it about? What was the source of the conflict? Among whom? Etc.

APPENDIX B. AN EXAMPLE OF A Q-METHOD STUDY IN THE SUPERFUND PROGRAM

An example of how Q method has been used to investigate what people think can be done to improve public participation at a Superfund site

To gain insight into people's views about the community involvement effort for clean-up of a contaminated sediment site we asked those participating in our Q study to sort statements on the based on *when you think about where the process is now, what should happen next?* Two distinct and coherent perspectives on the process emerged from the analysis.

The **first perspective** focuses on widely involving the public. To achieve successful widespread participation, there are a number of outreach strategies that are positively endorsed in this perspective. For one thing, it is important to go beyond holding public meetings, to using multiple ways for gathering public input. Second, a particular challenge is to find ways to involve the Latino community. The process should make a conscious effort to engage this element of the community. A third strategy is to engage the kids in schools as one way of reaching the parents. What is important is that people and groups come together, listen respectfully to each other, in an atmosphere where people can speak their minds, and build trust with one another.

While reaching out to the larger community is the central focus of this perspective, for the process to be successful it also needs the support and commitment of the local politicians. Having the commitment of key stakeholders is also essential, as is having support from government programs like Superfund. Another thing the process needs is clear standards on how clean is clean enough. Finally, when people are engaged, they need to be reasonable in their expectations of that the City or the agencies can do. At the same time, this perspective seems to trust in the reasonableness of people to talk together. It did not give much importance to having strict ground rules for discussion or having a moderator.

While the first perspective focused on broad democratic participation, the **second perspective** envisions a process that is focused more on the importance of key stakeholders, including government agencies, in a successful process and good governance. Good government informs people as to what is going on, by giving periodic updates. In further contrast with the first perspective, this perspective does not emphasize asking the public what they think, reaching out to the public in a multitude of ways, or getting different groups together to talk through their differences.

Commitment and clarity are central elements of this perspective. The committed involvement of key stakeholders, including governmental agencies, who are willing to put serious time and effort into this process is essential if anything is to happen. But having committed individuals is not enough. Also essential is the clear support of the government and more clarity over which entity has responsibility for the problem so that the problem is not passed back and forth between governmental agencies. The organizations that participate in the process should also come with clear goals and expectations. It is interesting to note, however, that this perspective did not feel that the involvement of local leaders was critical to success, which suggests they see the process as driven by the regulatory agencies, not local government. Once these preeminent issues of clarity and commitment are addressed, several other qualities of the process become important. One concern is that the governmental units involved communicate effectively and this includes sharing information widely. Clearly the solution to the problem involves cooperation among many levels and units of government. This perspective is focused on the process being efficient and practical. This is why it emphasizes that technical discussions should happen outside of the public space.

The Q analysis revealed two different perspectives on the process for cleaning up the lakefront area. These perspectives share certain elements, but disagree on other things. Insights and recommendations should be drawn from four different sources:

- 1) points of agreement across perspectives (consensus points),
- 2) points of disagreement across perspectives (compromise points),
- 3) perspective 1 (non-consensual and non-confrontational points), and
- 4) perspective 2 (non-consensual and non-confrontational points).

Items (3) and (4) refer to elements of the perspectives that differ, but are not in conflict with one another. For instance, perspective 1 highlighted not pursuing the clean up as a criminal case. Perspective 2 did not react strongly to this opinion one way or another. Therefore, accepting this as a recommendation may be optional .

A. Consensus Points -- Non-Controversial improvements

(In the following text, the numbers in parentheses refer to Q statements used in the study. These are included in Appendix C.)

Both perspectives placed strong emphasis on the importance of having all important stakeholders – including federal, state, and local agencies -- involved and committed to the process (9). Associated with this was the strongly-endorsed statement about having clear support from key government programs such as Superfund (29). Based on these two statements, those implementing the clean-up process might consider emphasizing that the process should periodically review who may be missing and work to find ways to ensure that all key governmental parties are active and committed.

There were several other key points of consensus across the two perspectives. It would be worthwhile to consider changes to the process based on these points of consensus as well. The following statements were all strongly supported:

1. Have clear standards for how clean is clean enough so that the clean up can move ahead efficiently (48).
2. Have people involved who are willing to put the necessary time and energy into the process is key (8).
3. Have information that is readily available to anyone (22).
4. Give periodic updates of process to the larger community (37).

There were also several questions on which the two perspectives assigned similarly low scores. For instance, they both disagreed with the idea of excluding people living outside Waukegan from the process (44). Other things were seen as unfeasible, such as equalizing the power relations among the key parties involved (38) or giving the CAG funds to do its own research (26). Providing childcare for parents to attend meetings was also not seen as important (43). One person told us, “If people want to go to the meeting, they’ll find someone to watch their kids.”

B. Points of Disagreement -- Compromise improvement

There were only a few points of strong disagreement among the two perspectives. One important one was that the process should ask members of the public what they think (23). This principle is central to the first perspective. While it was rejected fairly strongly in the second perspective, it does not appear to be inconsistent with the positive message of that perspective. Rather, the view expressed in the second perspective seems to be that spending too much time reaching out and listening to the public may delay the process and make it more costly in terms of time invested by the agency personnel. Their time is better spent working on solving the process than going to public meetings.

Based on this interpretation of the data, it may be reasonable to consider the idea that methods should be developed to find ways to listen to the public that do not require a huge commitment of time from agency

personnel. It is still important that agency personnel attend some public meetings so people feel they are being listened to, but the CAG could also run some outreach meetings without agency involvement and relay the results to agency personnel indirectly.

Another point of strong difference was whether the process should address all the contaminated sites in one process, or deal with each independently (19). The second perspective felt there was an economy of scale in dealing with everything at once, while the first perspective was concerned that this would amount to too much work. This interpretation suggests that it may be useful to establish benchmarks for progress on the clean up of the lakefront and to establish a plan for working on the entire lakefront in a holistic manner provided that the benchmarks are being met.

C. Improvements from the view of those ascribing to Perspective 1 (non-consensual and non-confrontational)

There are several assertions that are important to perspective 1, which do not show up strongly in perspective 2. Changes that could be made to the process based on these items will please people who ascribe to perspective 1 and will not please or offend people who ascribe to perspective 2. For example, those who ascribe to perspective 1 might like to see a process where:

- the CAG does not receive money to conduct its own research program,
- special efforts are made to connect with the minority communities in Waukegan,
- the local leaders are encouraged to endorse and support the process, and
- the CAG does not determine the area of concern. Instead this should be a collaborative effort involving the CAG, the community, stakeholders, and all levels of government.

D. Improvements from the view of those ascribing to Perspective 2 (non-consensual and non-confrontational)

Likewise, for perspective 2, the some changes to the process may be appealing, since they do not engender strong reactions from people ascribing to perspective 1. For example, those who ascribe to perspective 2 might like to see a process where:

- the roles and responsibilities among the governmental agencies involved are better clarified,
- all governmental entities share information and communicate with each other effectively, and
- separate (non-public) meetings are held to deal with complex technical matters.

APPENDIX C: A SET OF Q STATEMENTS FOR PERSPECTIVES ON PUBLIC PARTICIPATION PROCESS

These statements were developed over several research projects and tested in a ten-case study of public participation in four different policy areas: National Park Planning, Forestry Management, Watershed Management, and Health Effects from Nuclear Contamination and Remediation. They are intended for cases where a government agency is organizing a public participation process.

The statements appear in the right-side column in the Table below. As means of illustration we have selected to represent ATSDR/CDC as the agency that was organizing the public participation.

They were sorted from the categories shown in the left-hand column of the Table below.

They are a good place to start from if you want to plan for or evaluate a public participation process.

Process Q sort

Category	Q Statement
A. Features of interaction	
A.1 Promotes listening and consideration	1. Set up a situation that encourages all participants to listen to what others say and to consider it carefully.
A.2 Promote courtesy and respect	
A.3 Promote constructive collaboration (relationship-building, team-building)	3. Establish relationships that promote constructive collaboration among participants.
A.4 Promote accountability and sincerity	
A.5 Promote reasonable expectations of the sponsoring organization	
A.6 Promoting committed and stable participation	
A.7 Promoting a competent process	5. Develop a common language and understanding among participants.
A.8 Promoting trust	7. Work to build trust among the different participants during the process.
B. Features of good participants	
B.1 Listen, consider, be openminded	
B.2 Courteous, friendly, and respectful	9. Participants should be courteous and respectful to one another.
B.3 Collaborative orientation, constructive	11. Participants should see beyond their individual interests to what is good for the larger community.
B.4 Accountable, sincere, reliable, and trustworthy	13. Participants should be accountable for what they say, sincere in their promises, and reliable in carrying them out.

B.5 Reasonable	15. Participants should have reasonable expectations about what the sponsoring agencies are able to do.
B.6 Committedness, stability, reliability, and a sense of ownership	17. Participants should attend meetings regularly and see tasks through to completion.
B.7 Competence	19. Participants should be able to deal with complex technical issues.
C. Atmosphere and format of interaction	
C.1 Comfort & Safety	21. Participants should feel comfortable and safe at the meetings.
C.2 Rules	23. There are clear groundrules that govern how people should interact.
C.3 Discussion format	
C.4 Physical setting	25. Pay attention to the physical arrangement of tables and chairs at the meetings.
C.5 Enjoyable	
D. Substance of deliberation	
D.1 Values and facts and the order they are discussed	27. Discuss the values underlying people's opinions about the issues.
D.2 Agenda setting and content	31. Everyone has an equal chance to put their concerns on the agenda.
	33. The process has to be able to limit topics of discussion in order to avoid quagmires.
D.3 Facilitation and mediation	35. The process requires unbiased and independent facilitation.
D.4 Clarity within the process	37. The purposes and goals of the process are clear to all involved.
E. Access to information	
E.1 Sharing information	39. All participants have equal access to information.
	41. There is full disclosure of information at all times.
	43. The staff involved is receptive to questions or requests for information from the public.
	45. Get the right information.
E.2 Local expertise and professional scientific knowledge	
	47. The process taps the knowledge and experiences of local people.
F. Leadership	
	49. The process needs an effective leader.

G. Administrative support	51. There is adequate administrative support (e.g., funding, staffing) for the life of the process.
H. Timing and duration	
H.1 When in the policy issue does process occur	52. The process is well-timed to the sponsoring agency's window of opportunity to act.
H.2 Does it end?	18. It is clear under what conditions the process will end.
H.3 Stick to timetable	54. Allow time to re-visit issues and decisions, even if it means extending the timetable.
H.4 Adequate notification	53. There is adequate notification of meetings, comment periods, etc.
I. Quality of analysis	
I.1 Involve participants in interpretation and design of analysis	55. Participants are involved in deciding <i>what</i> studies ought to be done.
	56. Participants are involved in deciding <i>how</i> studies ought to be done.
I.2 Qualities of good analysis	
	2. Use the best available science in the analysis.
	29. Validate all information to make certain it is correct.
	4. Acknowledge and explore uncertainties.
J. Representation, outreach, and fairness	
J.1 Openness	6. Reach out in a number of different ways through different mechanisms to different communities on different issue points, throughout the process.
	8. Hold meetings at different times and places so no one is excluded from participating.
	10. Provide financial resources that enable people to participate effectively (e.g., travel, hire experts).
	12. The process cannot be open to just anyone who wants to participate, participation has to be restricted in some way.
	40. All important stakeholders are taking part in the process
J.2 Voluntary participation	
K. Decision-making	
K.1 Advisory vs. veto power	14. The process gives recommendations to the sponsor who then make the final decisions.

K.2 Consensus	16. All important decisions are made according to consensus (including the agenda).
	22. Consensus is used to decide what rule is used to make decisions (simple majority vote, 2/3 majority vote, etc.)
K.3 Basis for decision making	20. Every recommendation is justified with evidence.
K.4 Legitimacy	
L. Responsiveness of sponsoring organization	24. The sponsoring agency responds in a timely way to all questions, comments, and requests.
	26. Opportunity can't be an empty shell; there need not only be opportunities to be heard but there also has to be some way for the public to see that the decision makers are listening.
M. In-group / out-group communication	28. There are mechanisms for communicating to the broader public about what decisions are being considered and made.
	30. Participants who represent groups check in with their memberships regularly to ensure that they represent their views accurately.

APPENDIX D: A SET OF STANDARDIZED Q STATEMENTS FOR PERSPECTIVES ON THE OUTCOMES OF PUBLIC PARTICIPATION PROCESS

These statements were developed over several research projects and tested in a ten-case study of public participation in four different policy areas: National Park Planning, Forestry Management, Watershed Management, and Health Effects from Nuclear Contamination and Remediation. They are intended for cases where a government agency is organizing a public participation process.

The statements appear in the right-side column in the Table below. As means of illustration we have used ATSDR/CDC as the agency that was organizing the public participation.

They were sorted from the categories shown in the left-hand column of the Table below.

They are a good place to start from if you want to understand peoples' different opinions or preferences for the outcomes of a public participation process.

Outcomes Q sort

(We recognize that outcomes may manifest during the process, at the end of the process, or they may be delayed and occur some time after the process.)

Category	Q Statement
S. Social capacity	
S.1 Skills	1. The process improves the participants' skills to take part effectively in processes like this (e.g., problems solving, conflict resolution, communication)
S.2 Knowledge	
S.2.1 Knowledge about the issue	2. The process improves participants' understandings of the issues.
S.2.2 Knowledge about others' perspectives	3. The process improves participants' understandings of others' beliefs, values, and perspectives.
S.3 Trust	4. The process enhances trust between the community and the CDC / ATSDR.
	5. The process enhances trust among different parties/stakeholders in the community.
S.4 Networks	6. The process develops access to networks that allow new resources to be brought to the community (e.g., financial, technical).
S.5 Sense of place	7. The process promotes a regional sense of place.

S.6 Cooperative attitudes	8. The process improves people's ability to work together better.
S.7 Strengthen democracy	9. The process strengthens democracy and rebuilds people's faith in government.
S.8 Reduce conflict	10. The process does not make any pre-existing conflicts worse.
S.9 Self esteem and confidence	11. The process builds the confidence and self-esteem of the participants.
S.10 Formation of new groups	12. The process helps create new and lasting interest groups that can continue to work on the issues.
T. Substantive aspects	
T.1 Is the outcome clear?	13. The process results in clear outcomes.
	14. There is a clear plan for how to implement the outcomes.
T.2 Outcomes of process should contribute to progress on policy objectives	20. One outcome of the process is a plan to ensure that the promises made are actually followed through, that organizations are accountable for their promises.
T.3 Justice and equity	15. Costs and benefits of the outcomes are distributed in an equitable way.
T.4 Satisfaction	16. The outcomes are personally desirable to me or my organization.
	17. The outcomes satisfy the CDC and ATSDR
	18. The outcomes have broad-based support within the community.
	19. Participants feel a sense of ownership in the outcomes of the process.