**HOW TO APPLY Q METHODOLOGY**

by Simon Moss

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| **Introduction** |

 Sometimes, researchers want to be able to characterize the variety of subjective opinions individuals adopt on various issues. For example, researchers might want to describe the range of opinions people have formed towards

* the best approaches to conserve energy and the environment
* the strategies they like to use to improve learning or memory
* how politicians or managers should prioritize funding
* the circumstances in which euthanasia should be legal
* specific people, such as the president or celebrities

Q methodology is a suite of techniques that can be applied to characterize these subjective opinions. This approach can be traced to the work of Stephenson (1935). In essence, researchers

* first instruct participants to sort a range of statements—such as statements about the main drawbacks of some proposal—from most favourable to least favourable
* then, subject these rankings to statistical techniques that resemble factor analysis, except each item is a separate person instead of a separate question

After you skim the following illustrations, the benefits of Q methodologies will become more apparent.

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| **Collect statements about your topic** |

 Before you begin your study, you need to develop a series of statements or insights about your topic of interest—the statements that participants will rank. The following table clarifies the activities you should initiate to generate these statements.

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| Activity | Example or clarification |
| **Review your topic**. Conduct a literature review or consult other sources to extend your knowledge about your topic of interest.  | You might, for example, conduct a literature review about various responses to crime, such as prison and community service.  |
| **Construct the concourse.** Attempt to collate and enumerate all the opinions about this topic you can—sometimes called a concourse.  | You might, for example, collate about 200 statements about this topic, such as* encourage perpetrators to meet victims
* impose suspended sentences
* organize anger management
 |
| **Develop a Q sample**. Identify a subset of these opinions or statements that you want to present to participants. This subset, called a Q sample, might comprise around 30 statements | To identify this sample, you could* classify the original set of statements into themes—such as traditional practices, progressive practices, and untried practices.
* ensure your Q sample represents each theme proportionately
* include statements that are unambiguous and perhaps interesting
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| **Choose your participants** |

 The second activity is to choose suitable participants—sometimes called the P set or persons set. To choose suitable participants, ask yourself a series of questions like

* who would have developed strong attitudes towards these opinions or statements
* whose attitudes are most relevant to my goals and objectives

To illustrate, suppose your topic revolved around the allocation of health funding. Your participants might include politicians, hospital executives, medical practitioners, and patients. In contrast, suppose your topic revolved attitudes towards immigration. Your participants might include anyone from the general public. Typically, the number of participants might range from 15 to 50.

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| **Ask participants to sort the statements** |

 The third activity is to invite these participant to sort these statements. The following table illustrates how you could achieve this goal.

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| Activity | Example or clarification |
| Write each statement on a separate piece of paper  | You could, for example, write each statement on a small Post-it note or piece of cardboard |
| Ask participants to classify these statements into three rough piles | The three piles could represent the statements they agree with to the greatest extent, to a moderate extent, and to the least extent respectively  |
| To help participants sort these statements more precisely, present a Q-sorting form—a form that represents a quasi-normal distributions | See the form below |

Here is a Q-sorting form. This form helps participants sort the statements more precisely. This form is suitable if the number of statements is about 35. If the number of statements is less than 35, you might need to delete rows or columns. If the number of statements exceeds 35, you might need to add rows or columns.

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| -4Most disagree | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4Most agree |

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| **Enter the data into a spreadsheet** |

The fourth activity is to enter the data into a spreadsheet, such as Excel. If you use statistical software such as SPSS, SAS, or Stata, you can enter the data into this software instead. To enter the data properly

* Each column should represent one person. In contrast, for many other statistical techniques, each row represents one person
* Each row should represent a different statement. The order is not important, although researchers usually arrange these statements into clusters
* Each cell should represent the score that participants assigned the label, often ranging from -4 to 4. Below is an extract of this spreadsheet

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Person 1 | Person 2 | Person 3 | Person 4 | Person 5 |
| Impose prison time | -4 | 2 | -3 | 2 | 0 |
| Impose home detention | -3 | -1 | 3 | -1 | 3 |
| Impose a suspended sentence | 2 | 3 | -4 | 4 | -4 |
| Impose community work | 0 | 4 | 4 | 1 | 4 |
| Encourage perpetrators to meet victims | -1 | -4 | 0 | 2 | -3 |
| Encourage perpetrators to help victims | -3 | 1 | -1 | 0 | 1 |
| Ask an elder to punish the perpetrator | 3 | -1 | -3 | -4 | 0 |
| Organize anger managenement | 2 | -4 | 3 | 2 | -1 |
| Organize psychological counselling | -4 | 1 | 2 | 4 | 3 |
| Inject a tranquilizer  | 2 | 3 | -1 | -4 | 1 |

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| **Compute correlations** |

 The fifth, albeit optional, activity is to generate a correlation matrix. This matrix is merely a table that represents the correlation between each pair of participants. To demonstrate, the following table illustrates this correlation matrix.

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| --- | --- | --- | --- | --- | --- |
|  | Person 1 | Person 2 | Person 3 | Person 4 | Person 5 |
| Person 1 | 1 |  |  |  |  |
| Person 2 | 0.32 | 1 |  |  |  |
| Person 3 | 0.01 | -0.03 | 1 |  |  |
| Person 4 | -0.03 | 0.02 | 0.41 | 1 |  |
| Person 5 | 0.24 | -0.18 | 0.01 | -0.27 | 1 |
| Person 6 | -0.39 | 0.32 | 0.24 | 0.32 | 0.01 |
| Person 7 | 0.02 | 0.03 | -0.03 | -0.18 | -0.39 |
| Person 8 | -0.27 | 0.01 | -0.39 | 0.02 | 0.24 |
| Person 9 | 0.01 | 0.04 | 0.32 | -0.03 | -0.02 |
| Person 10 | -0.02 | -0.03 | -0.27 | 0.24 | 0.32 |

 In this table

* High positive numbers represent pairs of participants who assigned similar scores and thus expressed similar opinions
* High negative numbers represents pairs of participants who assigned very different scores and thus expressed conflicting opinions
* Numbers that approach zero represent pairs of participants who assigned moderately different scores; their opinions were unrelated to each other
* To illustrate, in this example, Persons 1 and 2 assigned similar scores. Persons 1 and 6 assigned conflicting scores.

Excel, SPSS, Stata, R, or indeed most statistical software can be utilized to generate this correlation matrix. For example, in SPSS, you would merely need to

* Choose the “Analyze” menu. Select “Correlate” and then “Bivariate”
* Transfer the column labels, such as “Person 1” and “Person 2”, into the box called “Variables”
* Press OK.

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| **Subject the data to factor analysis** |

 The sixth activity is to conduct a factor analysis. If you are familiar with factor analysis already, this activity will be straightforward. If you are unfamiliar with factor analysis, you should still be able to understand this illustration. But, to conduct this technique, you might need to read a simple textbook on factor analysis or seek some advice. To illustrate, if you wanted to conduct this factor analysis in SPSS, you would merely need to

* Choose the “Analyze” menu. Select “Data reduction” and then “Factor analylsis”
* Transfer the column labels, such as “Person 1” and “Person 2”, into the box called “Variables”
* Press the “Extraction” button and perhaps choose the option “Principal Axis Factoring”, although other options are equally suitable. Press continue.
* Press the “Rotation” button and perhaps choose the option “Varimax rotation”, although other options are equally suitable. Press continue.
* Press OK to generate the following output.
* For Stata and other software, the procedure should be similar. For R, you need to write the appropriate code

You now need to interpret the output this factor analysis generates. First, skim the table that resembles the following—a table that includes information called “Eigenvalues”. To use this table, simply

* Locate the column that lists all the eigenvalues—in this instance, the leftmost blue column
* Determine the number of eigenvalues that exceed 1—in this instance 3
* This finding merely indicates the participants can be divided into three clusters. Participants in the same cluster assigned similar values to each statement. Participants in different clusters assigned different or even conflicting values to each statement.

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|  | Initial eigenvalues | Extraction sum of square loadings |
| Factor | Total | % variance | cumulative % | Total | % variance | cumulative % |
| 1 |  2.87 | 31  | 31 | 2.87  | 31  | 31 |
| 2 |  2.54 | 28 | 59 | 2.54 | 28 | 59 |
| 3 |  1.32 | 18 | 77 | 1.32 | 18 | 77 |
| 4 |  .87 | 7 | 85 |   |   |   |
| 5  |  .65 | 5 | 89 |   |   |   |
| 6  |  .26 | 4 | 93 |   |   |   |
| 7  |  .21 | 3 | 96 |   |   |   |
| 8  |  .10 | 2 | 98 |   |   |   |
| 9  |  .08 | 1 | 99 |   |   |   |
| 10  |  .05 | 1 | 100 |   |   |   |

Next, locate and interpret a table called the rotated factor matrix or pattern matrix. The following table resembles this matrix. To utilize this table

* Circle or embolden the numbers that are higher than other numbers—usually numbers that exceed .32
* These numbers indicate which participants correspond to each cluster, called a factor
* For example, in this instance, Persons 1, 2, and 3 correspond to the first cluster or factor
* Persons 4, 5, and 6 correspond to the second cluster or factor
* Persons 7 to 10 correspond to the third cluster or factor
* Unfortunately, in practice, and in contrast to this example, the factor to which person belongs is not always as obvious.

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|  | Factor |
| Factor | 1 | 2 | 3 |
| Person 1 | **0.37** | 0.02 | 0.02 |
| Person 2 | **0.41** | 0.04 | 0.01 |
| Person 3 | **0.51** | 0.03 | 0.03 |
| Person 4 | 0.04 | **0.54** | 0.04 |
| Person 5 | 0.09 | **0.39** | 0.09 |
| Person 6 | 0.02 | **0.61** | 0.02 |
| Person 7 | 0.07 | 0.07 | **0.47** |
| Person 8 | 0.01 | 0.01 | **0.51** |
| Person 9 | 0.02 | 0.02 | **0.42** |
| Person 10 | 0.02 | 0.32 | **0.62** |

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| **Interpret the results** |

 The final activity is to interpret the factors or clusters. In essence, your task is to clarify how the responses of participants in the same cluster are similar. To illustrate

* You might notice that Persons 1 to 3—the participants in the first factor—tended to recommend harsh punishments such as custodial sentences. You would thus conclude the first factor represents harsh punishments
* You might notice that Persons 4 to 6—the participants in the second factor—tended to recommend progressive practices, such as restorative justice. You would thus conclude the first factor represents progressive approaches.
* You might notice that Persons 7 to 10—the participants in the third factor—tended to recommend a blend of custodial sentences and counselling.

You would thus conclude that participants can be divided into one of three constellations: harsh sentences, progressive approaches, or a blend of harsh sentences with counselling. You might even conduct additional data analysis to clarify the characteristics of each cluster. You might reveal, for example, that participants who prefer harsh punishments tend to be older. In contrast, participants who prefer a blend of custodial sentences and counselling might tend to be more educated, and so forth.

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| **Variations** |

 Besides the topic, most participants utilize similar procedures to implement a Q methodology. However, some features vary across research projects.

**Repetitions with one participant**

For example, sometimes, only one participant completes the Q sort. However, this participant completes the Q sort many times under different instructions. To illustrate

* Each statement could represent one characteristic, such as extraverted, diligent, or moody
* The participant might first be asked to complete several Q sorts in which they order the characteristics from most suitable to least suitable
* However, each Q sort would correspond to a different occupation
* For example, during the first Q sort, they would order the characteristics from most suitable for doctors to least suitable for doctors
* During the second Q sort, they would order the characteristics from most suitable for accountants to least suitable for accountants and so forth

**Other variations**

 In addition, you should be aware of other variations. In particular

* Some researchers do not use a Q sort form. Participants might simply assign a number, perhaps ranging from 1 to 9, to each statement. This approach is simpler, although the numbers are not always dispersed enough to generate compelling results
* Sometimes, you might not be able to conduct Q sorts in person. You could send the statements and Q sort forms to participants. You could send the participants a Q sort in Powerpoint—and participants could be asked to move the statements into suitable spots in the Powerpoint slide. Or you could use online software to enable participants to complete these Q sorts on computer.

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| **Software** |

 People have developed software to facilitate Q sorts. Some of the software enables you to collect data online. Other software facilitates the analysis. Often, but not always, this software is free. For an example, google Ken-Q data and Ken-Q Analysis.

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| **References and examples** |

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