Considering the implication of variations within Delphi research

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Delphi research is an increasingly popular method within medical, social and psychological research. It tends to be employed where established theory or knowledge are lacking but where ‘experts’ are thought to hold relevant information. It consists of developing and administering sequential questionnaires that seek to move towards a position of relative consensus. Although the original authors of the technique established a specific method, the literature reveals modifications in the way this is applied. Variations include (i) restricting the ability of experts to respond to the original question, (ii) changing or varying the expert groups used and (iii) the point at which the research ends. This paper provides an overview of the technique and explains these variations and their implications before highlighting possible ways forward.

Keywords. Delphi, methodology, research, variations.

Introduction

Delphi research is an example of a consensus method used in medical, social and psychological research. Consensus methods, like Delphi research, offer systematic ways of gathering information from individuals deemed to hold relevant knowledge (often known as ‘experts’). Such methods tend to be employed when ‘published information is inadequate or non-existent’.1 However, establishing a consensus does not mean that an objective truth has been found; such answers are necessarily relative and tied to the time and contexts of the experts consulted.2

Other consensus methods, such as the nominal group technique (NGT), are also used. The NGT utilizes a structured, face-to-face format that gathers information from experts. However, experts can be located over a wide area, even worldwide, and this can often mean that the NGT is impractical or too expensive. Delphi research, on the other hand, can more easily and cost-effectively embrace a geographically dispersed sample of experts.3 It is also more confidential. In this way, each participant is able to make their unique contribution without undue hindrance or influence from others.4–7

Delphi research

Delphi research was devised by Dalkey and Helmer.8 It involves the development and administration of a series of sequential questionnaires that seek to move towards a position of relative consensus. The first phase (D1) allows each expert to independently contribute any information they deem pertinent to the research question. Open questions are often used to gather wide ranging responses. Following the collection of this data, ‘most researchers summarize, edit, categorize, and eliminate redundant answers’.4 In the second phase (D2), the summarized information is fed back to the original expert group in a reduced questionnaire format. Here, experts are asked to rate the edited statements from D1,6 often in terms of agreement, usefulness or relevance. Researchers then collect the data, typically in the form of Likert scores, and statistics such as median values or interquartile ranges are calculated for each item.9 In traditional Delphi research, the questionnaire statements are then fed back to the expert group to be re-rated (D3), this time with median (or other) values displayed alongside each item. This stage can be repeated (D4, 5, 6, ...) until researchers believe consensus has been reached. Each successive round provides experts with the opportunity to modify their judgements in line with new average scores.5 Researchers claim that data gathered using this methodology is superior to opinions gathered from individuals.6,10

Increasing popularity and variance

Figure 1 suggests that Delphi research has increased in popularity since its invention in the 1960s. Searches
for the graph were conducted on the 7th of June 2009 (accordingly the graph utilizes incomplete data for this year). The four terms were entered into the PubMed database (http://www.ncbi.nlm.nih.gov/pubmed/). No restrictions were placed on where the term could be found in order to maximize search results. The phrase ‘Delphi Method*' was included with a wildcard to capture both the term ‘method' and ‘methodology'. Terms that contained more than one word were searched for within quotation marks to both minimize search results and to increase the likelihood that the article was referring to the research methodology discussed in this article and not the word ‘Delphi' in some other context. The graph demonstrates an increasing number of results for Delphi research related search terms over recent decades, particularly since the turn of this century. Delphi research has been used recently in both primary care11,12 and this journal.13,14

While the proliferation of a research method is often something to be lauded, difficulties can arise if the technique is used inconsistently. A brief examination of some research indicated from the results above quickly reveals marked methodological differences. While many studies continue to employ the exact methodology described earlier, others significantly deviate. Although authors comment that Delphi research can be used in a variety of different ways,15 do these methodological variations impact the integrity of the method? This paper will explore three variations that occur in the literature: (i) restricting the ability of experts to respond to the original question, (ii) changing or varying the expert groups and (iii) the end point of the research (Fig. 2). It will use examples of research from the literature to illustrate its points. Please note, this paper is not suggesting that these variations are the only ones that occur in the literature: other significant deviations may exist. Indeed, researchers and consumers of research should be alert to other variations and the implications of these.

Restricting the ability of experts to respond to the original question

Example 1: Neimeyer and Diamond16 investigated historical and anticipated future directions of counseling psychology. The authors developed a questionnaire through reviewing the literature themselves (D1). When completed, it was sent to the directors of 72 institutional members of the Council of Counseling Psychology Training Programmes. Directors were asked to rate how likely each of the 28 items were to occur over the course of the next 10 years (D2). The results were collected, collated and then the same experts re-rated the items (D3). The authors then discussed the relative importance given to statements.

In example 1, Neimeyer and Diamond16 began their study by reviewing the literature and producing a questionnaire themselves (D1). By adopting this procedure, the researchers impose a rigid starting point for their participants. In this way, expert thinking is severely constrained by the confines of the predesigned questionnaire. Indeed, it appears that the only influence experts can have is over the final order in which the items from the original literature review appear. As such, one might wonder why the authors needed recourse to the experts at all. The research detailed above might be better described as a rating exercise. Although this might be considered an acceptable research methodology, it should be labeled as is and not as Delphi Research. The implication of situations such as this is discussed in the ‘Ways Forward' section of this paper.
Other Delphi research also utilizes methods other than open-ended questions to begin their studies, including the use of statements that have been designed by the research authors, lists that have been based upon literature reviews and clinical experience, focus groups, or lists generated in previous studies. Researchers note that Delphi research methodology becomes weaker if too restrictive a process is imposed on the participants. Although authors also suggest ways to mediate this, there still remains a risk that when experts are presented with strict and restrictive criteria at the beginning of a study their ability to freely express their opinions is reduced. Limitations of this kind potentially restrict one of the core ideas behind Delphi research.

*Changing or varying the expert group*

Example 2: Kennedy and Llewelyn set out to establish expert's perception of the future direction of UK clinical psychology training. The authors sent open-ended questionnaires to key staff in the 26 UK clinical psychology training programmes (D1). Participants were asked to indicate what they thought would be the most likely elements of training in the first decade of the 21st century. The authors reduced these predictions to 151 representative items and sent them to three different groups (D2). These individuals were asked to rate the statements on a three-point scale according to likelihood that the issue would be relevant to training. The authors discussed the predictions that were rated as being most likely and most unlikely using median data.

The above research begins by consulting one group of experts (D1), before getting three different groups of individuals to rate the information (D2). Other Delphi research shows similar departures between D1 and D2. Graham and Milne explicitly use two different groups, one known as 'the Delphi group' (D1), the other known as 'respondents' (D2). The literature reveals that this is not unusual. For example, the results of D1 have been simultaneously considered by three different groups each containing different populations—teachers, parents and health professionals; five different groups of people from the same geographical area and seven groups of the same profession (psychiatrists) from different countries.

Traditional Delphi research would use the same expert pool in both D1 and D2. It is unclear whether using a different expert group or even a non-expert group for D2 could be detrimental to the results of the research. However, any instance where information is being rated by individuals other than the original experts may well detract from the validity of responses. At the very least, if D2 no longer involves the original expert group, the conclusions of the study cannot be said to derive from them. It is of course possible and sometimes useful to get other groups to rate the data, but this does not preclude the experts involved in D1 also rating it.

*The end point*

The literature suggests that many examples of Delphi research reach their end point before that laid out in the exemplar methodology described above. For example, many studies stop after D2 (see example 2). In these instances, experts only rate the statements once (if at all), and although mean or median data about how the statements are initially rated are often used in research reports these data are often not presented to expert or other groups alongside the statements for re-rating in further rounds (D3, 4, 5, ...).

In some ways, it is unclear why experts should need to repeatedly re-rate the research statements unless researchers feel a point of total agreement needs to be reached. Taking such a stance might suggest that a position of absolute truth is being sought (or is even possible) when, in reality, Delphi research is most likely to produce a time-limited snapshot of expert opinion with areas of agreement, overlap and divergence. Indeed, it could be argued that any change in expert opinion that does take place between D2 and D3 (or 4, 5, 6, ...) would be a result of experts being influenced by the opinions of others. This might seem odd when the lack of influence of this kind is one of the unique selling points of Delphi research. Of course, there is probably a marked difference between being influenced by the opinions of colleagues within the context of a nominal group technique (when they might be sat opposite you at a table) and being influenced by the anonymous opinions of others whose views you can consider privately and in your own time.

Another reason for legitimately ending Delphi research after D2 is to reduce the task demands placed on experts, which may become arduous if successive rounds take place. Indeed, in instances where D3 (4, 5, 6, ...) are carried out, it is possible that an apparent consensus might actually be a sign of an attritional regression towards the mean.

This paper does not suggest that latter rounds of Delphi research should be abandoned but only that they should be balanced against the demands put on the expert group and that researchers consider and discuss possible reasons for any changes that are recorded. Indeed, repeatedly rating items can be particularly useful if Delphi research is being used to develop consensus practice standards or indicators of quality. In these instances, repeated rounds can be used to uncover which statements can be agreed by all (or most) experts (i.e. which can help identify universal standards) and which can only be agreed by some (i.e. identifying exemplars).
Ways forward

The three areas of divergence outlined above indicate that different research methods coexist under the overall umbrella title of Delphi research. Worryingly, it seems possible that in certain instances somewhat weaker research may escape scrutiny because it shelters under the protection of this title. Legitimate arguments can, of course, be made for using different techniques—for example, for stopping the research after D2 (variation 3); however, the implication of imposing rigid starting criteria on Delphi research is more serious (variation 1). In these instances, it is possible that the authors have had a much greater influence on the study than the experts on which they call and the limiting influence this places on the experts needs to be highlighted so that future researchers, reviewers and readers are aware of it.

The implication of using different groups in D1 and D2 also warrants discussion (variation 2). There is a significant difference between only wanting to know what a single group of experts think about an issue and wanting to know what a different group think about what the original group thought. It would perhaps be useful to label Delphi research accordingly. For example, studies that use the same groups in D1 and D2 could be said to have an internal focus while those that use a different group in D2 could be said to have an external focus.

Even in this latter case, it may still be useful to get the original experts to rate the material they created.

One final solution would be to phase out the use of the term ‘Delphi research’ in academic papers. In this case, authors would be obliged to transparently describe the methods that they used without hiding behind the apparent strength of the title ‘Delphi research’. It is, of course, possible that such an approach is already taking place, but neither reviewers nor readers will be aware of this, as the work will not refer to Delphi research. Indeed, this is the approach taken by the author of this article who carried out Delphi research but described the methods used without referring to the term at any point.

Perhaps, in the past, reviewers have assumed that because Delphi research methodology is referred to, this indicates that one, established, method is being followed. The distinctions explored above suggest that this is not so. It is important to understand the pitfalls in assessing all Delphi research studies on a like-for-like basis or assuming that all studies follow the same protocol. Instead, the methodology of each Delphi research study needs to be individually examined and understood before any judgement can be made about the claims of its research. Similarly, research papers that claim to use a ‘modified’ Delphi research design need to be clear about how it has been modified so that the readers of the research can assess the impact of these changes accordingly.

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