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Improving the Delphi process: Lessons from social psychological research

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ABSTRACT

The Delphi technique was largely developed to avoid the problems of freely interacting groups such as dominant individuals and pressure to conform to the majority view. Our review of the social psychological literature reveals some obstacles to Delphi achieving its full potential relative to other cheaper and easier methods of aggregating judgment. We identify residual normative and informational pressures towards consensus that potentially reduce process gain that might otherwise be achieved. For instance, panelist confidence may act as a signal of status rather than be a valid cue to expertise, whereas consensus appears to have a strong influence on the final outcome that can reduce its accuracy when there are valid minority opinions. We argue that process gain in Delphi must occur through those further from the "truth" changing their opinion more than those closer to the truth, with the general direction of opinion change being towards the truth. For such virtuous opinion change to occur we suggest the need to both facilitate opinion change and provide good cues as to where the truth lies. Research on Judge Advisor Systems shows that people usually do not change their opinion as much as they should, giving too much weight to their own opinion and too little to the views of others—this bias can be reduced by increasing involvement and motivation. In addition, we propose that the best way to provide good cues as to the direction of the truth is to elicit rich reasoning from panelists about the judgment or choice in question, then use this as feedback. We suggest practical ways of focusing and deepening panelists' consideration and evaluation of such reasoning—such that all proffered opinions are well-evaluated. Additionally, we propose a model of opinion change in Delphi for use as a paradigm for future process-orientated research.

1. Introduction

The Delphi technique was largely developed in order to avoid the problems of freely interacting groups—such as dominant individuals and pressure to conform to the majority opinion—these sources of "process loss" [1] are removed through anonymization and controlled feedback [2–4]. Further, repeated rounds of polling and feedback permit "process gain" as experts converge on the truth,[1] while averaging removes error [5]. But is the process gain the best that could be achieved? Studies suggest that Delphi usually does better than freely interacting groups, or simply taking the average of initial opinion (see e.g. [5] for a review). However, the advantage of Delphi is more equivocal when compared to other "nominal group techniques" that anonymize, but do not use repeated rounds of polling and controlled feedback, and thus are much cheaper and easier to carry out. The questions we wish to address here are whether the Delphi technique is achieving its full potential as a means for improving expert judgment and decision making and, if not, whether there is any scope to modify the Delphi technique so as to enhance its outcomes?[2]

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[1] Although we can talk about true values in certain tasks, such as answers to almanac questions used in some Delphi studies, some readers may be uncomfortable with the use of the word "truth" in other tasks, such as forecasting where the "true" state is yet to occur (and, in fact may never occur, if policies are enacted to ensure it does not). In this paper we will use "truth" as a shorthand to mean the best guess that could be achieved at a particular point in time.

[2] By outcomes we chiefly mean accuracy of the judgment or quality of the decision, however, we will also discuss other outcomes such as accountability and user satisfaction later in this paper.

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Rowe, Wright and McColl [6] argue that the key to answering such questions as these is to look at the *processes* by which Delphi facilitates *opinion change* in groups—and in particular, to investigate opinion change that might lead to improvement in accuracy. We concur with Rowe et al. and in this paper we will look in detail at such processes through the lens of relevant literature on the psychology of groups—in other words, social psychology. Once we understand these processes we can then see whether there are any barriers in traditional Delphi to achieving the maximum accuracy improvement possible—relative to any less costly methods (in terms of time, money, effort etc)—if such barriers are found we will devise means for removing them. To these ends we will develop a model of opinion change in Delphi.

2. Normative and informational social influence

The classic experiments in the 1950s of Solomon Asch [7,8] are well known—they showed people changing their judgments in order to fit in with the majority, even though the correct response to the judgment task, as described to them by the experimenter, was clear and unambiguous. Such "normative social influence" [9], where people conform to the perceived norms of the social context, perhaps in order to avoid negative consequences such as disapproval or ostracization (e.g. [10,11]), is regarded as a major influence on group judgment and decision making. Normative influence increases with the size of the majority view relative to the minority, up to a point—majorities of more than four see little increase in influence (e.g. [12]), while minorities of one are much more influenced than when a when a minority position has an ally (e.g. [13]). Normative social influence has also been found to be greater when the group is perceived as important to the participant (e.g. [14]), and when the group is physically close and/or responds in real-time (e.g. [15]).

Not quite so famous are experiments on what is known as "informational social influence" [9,16]. In situations where the correct response is unclear or ambiguous people may look to others as a source of information, and base their judgments and consequent decisions on this information. Informational social influence has been used to explain why bystanders may fail to intervene (everyone looks at everyone else in order to determine whether they should help) and social contagion (for example, the My Lai massacre may have begun because a single soldier panicked, began firing and others followed suit, believing that they were under attack).[3] The likelihood of susceptibility to informational social influence increases when other people are perceived as being expert (e.g. [17]), and when there is a perceived crisis or an emergency (e.g. [18]) such that a decision must be reached quickly.

From this early social psychological research we learn that people in groups may be subject to certain normative and informational forces that may lead them to change their opinion towards:

- that held by the member considered to be the most expert, by virtue of his or her knowledge, or most authoritative, by virtue of his or her position
- that of the majority, particularly when the group is seen as being important (and temporally and spatially close), the correct response is unclear or ambiguous, those in the minority feel inexpert, and a decision needs to be made quickly.

We will now consider the impact of each of these forces on opinion change in Delphi groups in turn.

Anonymity is the feature of Delphi that one might expect to remove normative social influence, but there are reasons to question whether it does entirely. Often confidence is attached to judgments and fed back to other panelists. If confidence is well-related to expertise then this would be a valid cue that might facilitate opinion change in the right direction (i.e. panelists might infer expertise from expressed confidence and shift opinion in the direction of the most confident). However, there is evidence to suggest that confidence and expertise are not necessarily well-correlated (e.g. [19–21,6]). It is possible that confidence is more related to self-esteem than it is to expertise—if this is the case then confidence may serve as a proxy for the personality traits supposedly banished by anonymity. Further, in many non-laboratory applications of Delphi panelists will likely know each other and may be identified, especially if there is feedback of opinion in addition to choice or judgment, an issue we will return to later.

If the choices or judgments of panelists are individuated, as is sometimes the case in Delphi feedback, then there is potential for the majority opinion to be apparent, and this may act as pressure on those in a minority position to change their opinions. Clearly, if the majority opinion is nearer the truth than the minority opinion(s), then this pressure will serve to push opinion towards truth, especially if averages are fed back. However, following the accepted point of view is probably not going to help panelists to think "outside the box"—as documented by the phenomenon of "strategic inertia" [22,23]. Failure to share information that is perceived as being known by oneself, but not by others, has been documented in groups by Social Psychologists (e.g. [24]). This phenomenon could also reduce potential process gain within Delphi if individual panelists perceive a consensus against their position—again this is most likely to occur when rationales are fed back alongside choices or judgments.

On a positive note for Delphi, the nominal nature of groups means that group involvement should not usually be perceived by a group member as being close either spatially or temporally, although the move towards real-time Delphi online [25,26] might affect the latter. Also on a positive note, real-world Delphi groups are likely to consist of people of approximately equal expert status thus reducing informational social influence, however, for a particular question posed to a panel some people may *feel* inexpert and this feeling might be reinforced by feeding back others' high confidence and/or consensual opinions. The other pressures that have been found to induce opinion change towards the majority—the importance of group membership to

[3] Asch's findings could be interpreted as possibly resulting from informational rather than normative social influence—despite the fact that the required response was unambiguous, as per the experimenter's instructions, the responses of the fake participants (confederates of the experimenter) may have led the true participants to question their understanding of the required response thus the situation as a whole may have been ambiguous. This is an important point for Delphi because it suggests that there might still be strong conformity pressures despite removal of normative social influence through anonymization.