Oxford Review of Education, Vol. 27, No. 2, 2001

On Michael Bassey's Concept of the Fuzzy Generalisation

MARTYN HAMMERSLEY

ABSTRACT *This article is a response to Michael Bassey's argument that case study research, and educational and social research generally, ought to be aimed at producing 'fuzzy' generalisations and predictions. His characterisation of these is examined against the background of the other types of generalisation he discusses. The conclusion reached is that what he has identified is not a distinct type of generalisation but a mode of formulation that ought to be employed in all predictions for practical use derived from scientific generalisations.*

In his book *Case Study Research in Educational Settings*, and in a more recent article in this journal, Michael Bassey distinguishes among three types of generalisation: scientific, statistical, and fuzzy (Bassey, 1999 and 2001) [1]. He reports that he has moved away from the view that case study research, and educational research in general, cannot and should not pretend to produce generalisations, towards the conclusion that they can and should generate *fuzzy* generalisations. These differ from the other two types in having an element of uncertainty built into them. They claim that X *may* produce Y, rather than that it *always* produces Y (scientific generalisation) or that it will produce Y in *x% of cases* (statistical generalisation). In putting forward this new kind of generalisation, Bassey appeals to the idea of fuzzy logic. This differs from conventional logic in treating membership of categories as a matter of degree, so that there are not fixed boundaries between categories but, rather, gradients falling away from relatively standard cases to more marginal ones, these possibly lying on the borderlines of several categories. The consequence of this is that truth itself becomes a matter of degree.

Bassey regards fuzzy generalisations as a way of generalising the results of educational research, and especially of case study work, that does not exceed the level of confidence which can reasonably be given to them. Such generalisations also provide the basis for fuzzy predictions which can serve as 'sound bites' that will be found useful by teachers and policymakers. In this brief paper, I want to examine his proposal.

TYPES OF GENERALISATION

Let me begin with the other two kinds of generalisation that Bassey refers to. He clearly sees scientific generalisations as stating deterministic laws: that X *always* produces Y. He notes, but does not given any emphasis to, a very important feature of such generalisations. This is that they are conditional: they state that X will always produce

ISSN 0305-4985 print; ISSN 1465-3915 online/01/020219-07 © 2001 Taylor & Francis Ltd
DOI: 10.1080/3054980120051912

Y, *given conditions a … n* (see Walker & Cohen, 1985). For reasons I will outline, this feature has implications for the distinctiveness of fuzzy generalisation.

A second point worth emphasising is that there can also be probabilistic laws of this conditional kind. These too operate on the basis of a theoretically defined population, identified by their conditions. This population is infinite in extent: it includes all cases of the relevant sort—past, present, future, and possible. It is important to underline that such probabilistic laws are quite different in character from generalisations about finite, extant populations of cases based on systematically selected samples. Bassey seems to conflate these two things in his concept of statistical generalisation [2].

Next, I want to consider fuzzy generalisation itself. What we need to ask here, I think, is how this differs from the other two sorts of generalisation. As already noted, for Bassey, the answer is that, unlike scientific generalisations, fuzzy generalisations do not explicitly claim to apply to every case; their mode of formulation recognises that whether they will apply to other cases is uncertain. This is a feature that he sees them as sharing with statistical generalisations; but they differ from the latter in not specifying the probability with which they are likely to apply to new cases, and in not being based on statistical sampling.

The first of these distinctions is not convincing, in my view. Predictions based on scientific theories make claims about what *will* happen only in relation to cases that fall within the scope of their conditions. And, where the theory involves idealisation, actual cases will only approximate to those conditions. In addition, even with actual cases that meet the conditions, other factors may counter or overdetermine the effects predicted by the theory, so that its predictions may not be accurate. So, outside of the situation where scientific generalisations are being tested, predictions derived from them about future cases should *always* be formulated in terms of what *could* happen; and this is especially true if the conditions of application are not mentioned in the prediction. On top of this, the fallibility of *any* knowledge should prompt cautious formulation of predictions.

This argument applies to probabilistic laws as well. They too are conditional in their application, and the results they predict may be obscured by the operation of other factors. Given this, and the fact that their validity will also be less than fully certain, the proper formulation is again in terms of what *could* happen. The specific probability they indicate only holds within the theoretical domain marked out by the conditions [3].

It is worth noting that very often the scope conditions of a theory are not well-known. In the extreme, they will be covered by a blanket *ceteris paribus* ('other things being equal') clause. Where this is the case *some* of the uncertainty surrounding the application of theory-based predictions can be reduced, and their usefulness thereby increased, by filling out knowledge of the scope conditions. However, this does not deal with all the sources of uncertainty. Furthermore, it does not seem to distinguish scientific from fuzzy generalisations, since Bassey believes that the latter can also be developed in this way. Indeed, he suggests that this will reduce their fuzziness (Bassey, 2000, pp. 11–12).

The implication of all this would seem to be that fuzzy generalisations are simply scientific generalisations that are not yet (and perhaps never will be) fully developed, in that their scope conditions are not specifiable. Thus they are not a distinct type. Indeed, I have argued that cautious formulations, in terms of what *could* happen, are the proper way of presenting *any* scientific generalisation as a prediction about future cases (except where it is being subjected to test).

DIFFERENCES BETWEEN TYPES OF GENERALISATION IN HOW THEY ARE PRODUCED

It is also worth considering how Bassey's different types of generalisation are produced. The classic technique for establishing what he calls scientific generalisations is the experiment. This involves comparing situations in which the level of an independent or treatment variable is different, and across which various confounding variables are held constant or their effects minimised. The aim here is to find a law-like relationship, perhaps probabilistic but usually deterministic (albeit condition-dependent). By contrast, Bassey sees statistical generalisations as being produced through survey research, in which a sample from a population is selected so as to provide a secure basis for generalisation to that population, with a small and specified level of likely error. As I have already indicated, here he runs together two quite different forms of generalisation. In my view, survey research cannot produce strong evidence for probabilistic laws unless the population conforms to the terms and conditions of the theory. Moreover, there is no reason why the evidence it produces would be more relevant to probabilistic than to deterministic laws. As Lieberson points out, for a variety of reasons the evidence available for any theoretical claim does not usually all point in one direction, and so the support for it is always a matter of degree (Lieberson, 1992, p. 107). But there is no reason to conclude from this that all laws are probabilistic, or that truth is itself a matter of degree.

To elaborate on this, it is important to underline that the development and testing of theories involves searching for formulations of cause and effect variables, of the relation between them, and of the associated scope conditions, that capture a real causal relationship. In doing this, none of these elements must be treated as fixed on the basis of considerations external to the task, such as a concern with practical relevance. The aspect of this that perhaps needs most emphasis is the way in which even the effect variable should be open to reformulation. This is a central feature of scientific method according to proponents of analytic induction, which is often seen as the 'logic' behind case study research. However, it is neglected in the practice of much survey research. Robinson recognised this long ago in his attempt to show that analytic and enumerative induction are simply superficially different conceptualisations of a single process of scientific inference (Robinson, 1951); and it remains true. Indeed, this requirement is also neglected in much case study research today.

As regards fuzzy generalisations, Bassey sees these as the product of case studies: investigation of one or a small number of cases without physical control being exercised over variables. A number of questions arise here too. One concerns the type of inference he assumes to be operating in the production of fuzzy generalisations. The forms of inference involved in scientific generalisation and generalisation from sample to finite population are reasonably well understood, even if the distinction between them is sometimes neglected. What Bassey seems to have in mind in the case of fuzzy generalisation is that, when a case study produces evidence for a relationship between variables in a particular case or in several cases, a fuzzy generalisation can then be tentatively formulated to the effect that the same relationship may be found in other cases. However, this is questionable. It neglects a crucial feature of causal attribution: that it is intrinsically general in character. To say that a causal relationship operates in one case is necessarily to imply that the same relation *will* (not that it *may*) hold in other similar cases (even if we cannot specify what 'similar' means in exact and reliable terms). It is precisely this feature which enables scientific generalisations to be discovered through experiments; that is, through the study of a relatively small number of specially constructed cases.

The problem that arises here is how to determine what is sufficient support for a fuzzy generalisation. Ultimately, Bassey seems to believe that this depends on 'professional judgement' about trustworthiness. There is a sense in which this is necessarily true, in natural science as much as in educational research (Polanyi, 1958). However, a key feature of science, and in my view of academic research generally, is that putative research findings are assessed by the relevant research community on the basis of the evidence available, and only put forward as of sufficient likely validity where there is substantial agreement within that community. While Bassey emphasises the importance of research reviews (Bassey, 2000), he seems to believe that all educational research reports should present fuzzy predictions designed for use and accompanied by best estimates of trustworthiness. This circumvents the role of the research community in validating findings.

It is also important to emphasise that judgement in scientific research communities takes place within a framework which treats different kinds of evidence as varying in their ability to support particular types of conclusion. And Bassey's appeal to fuzzy generalisation does not deal with the problem of *how* we can provide convincing evidence for causal claims about social and psychological processes and outcomes. The fundamental problem is that, on his account, it is not clear what precautions are to be taken by case study researchers to make sure that what is proposed as a fuzzy generalisation has a reasonable chance of general validity based on causality; given that case study does not employ experimental manipulation. Is the assumption that causal relations can be perceived *in situ*? Or is a decision about what generalisation to put forward achieved through reliance on a form of comparative analysis [4]? The idea that causal relations are observable is not defensible, it seems to me; and while comparative method is a more promising route it still involves some difficult problems (see Hammersley *et al.*, 2000). The crucial point for my argument here, though, is that comparative method has the same logic as the experiment; and so it is difficult to understand why it would produce a different *kind* of generalisation.

FUZZY GENERALISATIONS, QUASI-LAWS, AND PROVERBS

It may be worth comparing the notion of fuzzy generalisations with what Scriven, writing in the context of the philosophy of history, referred to as quasi-laws (Scriven, 1959). He sees these as having neither the precision of scientific laws nor as providing a basis for prediction. An implication of this is that they are not open to systematic testing. In fact, he regards them as having the character of 'truisms'. They are principles that have been extracted from experience, including from historians' professional knowledge of the past, which represent plausible patterns of relationship among motives, actions, and/or effects. By their very nature, like Bassey's fuzzy generalisations, they can only indicate what *could* happen in new cases. In practical terms, they tell us: watch out for this, or take precautions against that, or this path may lead in the direction you want to go etc. However, by contrast with Bassey, Scriven does not see much scope for the development or refinement of quasi-laws.

It seems unlikely that Bassey would see fuzzy generalisations as truisms, since this would give them little news value. At most they could only be reminders of what is already well known. Here they would be close in character to proverbs, so it may also be worthwhile thinking about the nature of these and comparing them with fuzzy generalisations. In one of his lectures, Sacks puts forward the idea that proverbs are 'correct about something', in the sense that while they are known to apply to some situations we do not (and perhaps cannot) have prior knowledge of *when* they will or will not apply. He claims that if the use of a proverb is questioned it is its appropriateness not its validity that is at issue (Sacks, 1989, pp. 366–7) [5]. This explains how proverbs whose implications are contradictory continue to survive, and may be used by the same person on different occasions. Sacks goes on to suggest that proverbs are a way of preserving information in 'mnemonically efficacious ways' (p. 371); and one might say the same about sound bites, including those that consist of fuzzy generalisations. What seems to be involved here is a rather different kind of knowledge processing from that usually taken to be characteristic of science. But, in principle at least, science could still be a source of the information encapsulated in sound bites, and even in the formulation of new proverbs.

These arguments suggest that what is faulty about the use of natural science as a paradigm by social scientists and educational researchers is not the conception of generalisation which this involves but the model—supposedly derived from science—of the relationship between the knowledge produced by research and practical action. In other words, what needs to be rejected is the idea that research can produce scientific laws that tell us, with certainty, what the consequences will be of the various courses of action open to us as actors. In fact, even if educational research were to produce scientific laws, these would only tell us what *could* happen; and users would have to draw on knowledge of the context, and on their practical experience, in order to decide wisely about whether to act on the basis of those predictions. In other words, 'fuzziness' is not a feature of a particular type of generalisation but rather a mode of formulation that ought to be characteristic of all generalisations, *including those produced by scientific research*, when they are intended to guide future action in the world [6].

CONCLUSION

Bassey's discussion of fuzzy generalisations is of considerable value. It focuses attention on an important topic that is often dismissed as irrelevant to case study and qualitative research. It is also useful in suggesting that we can have theoretical knowledge of causal relationships before we can produce precisely and fully formulated scientific laws—indeed, perhaps even when such precision and completeness are unattainable. However, it is not clear that the term 'fuzzy generalisation' refers to a distinct kind of generalisation. While scientific laws should be formulated in terms of what causes what (always, or in x% of cases), predictions derived from these laws about future cases ought to be formulated in terms of what *could* happen (except where the laws are being tested). Once one accepts that scientific generalisations are conditional, the distinctive character of fuzzy generalisations disappears. At the same time, such theoretical generalisations, both deterministic and probabilistic, *do* need to be contrasted with empirical generalisation from the features of a sample to those of a finite population.

Whether fuzzy logic offers any help in clarifying and resolving the problems that social researchers face remains to be seen. In fact, Bassey does not rely on any of the apparatus of fuzzy logic to develop his notion of fuzzy generalisations; and the rationale for that type of logic is controversial (see Haack, 1996). Bassey rightly emphasises the difficulties facing social researchers arising from the multiplicity of interacting variables operating in most situations. But these problems are not unique, they also arise in some areas of physical science, such as meteorology. So it is not clear that they indicate the need for a form of generalisation that is distinctive to case study, educational research or social science.

Finally, I suggested that Bassey's arguments raise questions about the idea that generalisations of any kind, including those based on research, can tell us what *will* happen in the particular situations in which we must act as practitioners. Rather, it seems that even scientific laws can be no more than resources available for use, along with those from other quarters, to make sensible judgements about what is likely to happen, and about what is the best course of action for us to take.

NOTES

[1] In the later of these two publications he refers to statistical generalisations as probabilistic generalisations. For clarity of exposition, I will use the former term here.

[2] It must be said that he is by no means alone in this, and the distinction is a contentious one. In the terms I have used elsewhere, I see probabilistic laws as relying on theoretical inference, whereas generalisations from samples to finite populations rely on empirical generalisation (Hammersley, 1992; see also Gomm *et al.*, 2000).

[3] By contrast, generalisation from sample to finite population is not conditional in this sense; and, if the procedures have been properly followed, the specified probability will apply to the relevant population.

[4] Bassey sees the development of fuzzy generalisation as involving replication (Bassey, 2000b), but he seems to have in mind simply the study of other cases of the same kind, rather than cases of the same putative kind selected to provide comparative leverage for assessing the validity of the developing generalisation.

[5] Scriven makes the same point about truisms (Scriven, 1959, pp. 459–60).

[6] There may be some generalisations that we can take as telling us what *will* happen; but these will only arise in situations where a small number of variables determine what happens. As Bassey points out, this is rarely if ever the case in the social world.

REFERENCES

BASSEY, M. (1999) *Case Study Research in Educational Settings* (Buckingham, Open University Press).

BASSEY, M. (2000) Reviews of educational research, *Research Intelligence*, 71, pp. 22–9.

BASSEY, M. (2001) A solution to the problem of generalization in educational research: empirical findings and fuzzy predictions, *Oxford Review of Education*, 27, 1, pp. 5–22.

GOMM, R., HAMMERSLEY, M. & FOSTER, P. (2000) Case study and generalisation, in: R. GOMM, M. HAMMERSLEY & P. FOSTER (Eds) *Case Study Method: Key issues, key texts* (London, Sage).

HAACK, S. (1996) *Deviant Logic, Fuzzy Logic: Beyond the formalism* (Chicago, University of Chicago Press).

HAMMERSLEY, M. (1992) *What's Wrong with Ethnography*? (London, Routledge).

HAMMERSLEY, M., GOMM, R. & FOSTER, P. (2000) Case study and theory? in: R. GOMM, M. HAMMERSLEY & P. FOSTER (Eds) *Case Study Method: Key issues, key texts* (London, Sage).

LIEBERSON, S. (1992) Small N's and big conclusions: an examination of the reasoning in comparative studies based on a small number of cases, in: C.C. RAGIN & H.S. BECKER (Eds) *What is a Case? Exploring the foundations of social inquiry* (Cambridge, Cambridge University Press).

POLANYI, M. (1958) *Personal Knowledge* (London, Routledge & Kegan Paul).

ROBINSON, W.S. (1951) The logical structure of analytic induction, *American Sociological Review*, 16, 6, pp. 812–8.

SACKS, H. (1989) Lecture Thirteen: on proverbs, in: G. JEFFERSON (Ed.) Harvey Sacks: Lectures 1964–5, *Human Studies*, 12, 3–4, pp. 365–75.

SCRIVEN, M. (1959) Truisms as the grounds for historical explanations, in: P. GARDINER (Ed.) *Theories of History* (New York, Free Press).

WALKER, H.A. & COHEN, B.P. (1985) Scope statements: imperatives for evaluating theory, *American Sociological Review*, 50, pp. 288–301.

Correspondence: Professor Martyn Hammersley, Faculty of Education and Language Studies, The Open University, Walton Hall, Milton Keynes MK7 6AA, UK.