COMBINING BAYESIANISM AND REFLEXIVITY IN INTERPRETIVIST RESEARCH

ABSTRACT

A trio of researchers with very different backgrounds present an argument towards using a combination of qualitative and quantitative methods in Interpretivist research. Drawing upon an ongoing study where this approach has been put into practice, and continues to evolve, the advantages of remaining open-minded when choosing methods and resisting external pressure to be restricted by "boxes" of acceptable methods is illustrated using examples. The importance of conducting insider research is emphasised, and comparisons are drawn between reflexivity in management research, and the philosophy behind Bayesianism. Strong emphasis is placed upon the requirement for **good** research, rather than that which can be classified simply as either quantitative or qualitative.

Keywords: *Bayesianism, Reflexivity, Interpretivism*

INTRODUCTION

In this paper, we discuss the merits of using a Bayesian philosophy to incorporate quantitative methods into a qualitative study. Through exploring the similarities between taking a Bayesian approach to a quantitative problem, and embarking on a reflexive qualitative study, we discuss the not-insignificant overlap between the two approaches. Despite a seemingly commonly held belief that research cannot be considered interpretivist once a quantitative element has been introduced, we argue that this is too reductive, and that quantitative methods can be used effectively to complement and add to the findings from a qualitative study. The key determining factor is how data and information are analysed and considered, not the form they take. A recent exploration of how threshold concepts presents is used to illustrate this argument and, more specifically, the advantages and further insights which were enabled by the addition of the methods in question.

It should be noted that this paper is intended to serve as a high-level indication of an approach which is currently evolving, and further exploration and development is ongoing. In this sense, the paper is primarily a musing around some methodological issues in a somewhat disorganised thinking process, a conversation between three researchers that spans various areas of the methodological and philosophical realm of research, including theoretical and meta-theoretical levels, methods, tools, methodological approaches and the philosophical underpinnings of the same, ways of thinking, inferences, as well as reflection and reflexivity. Our motivation was simply trying to do good research and coping with barriers that were shown to us – and that we believe not to exist in reality. We believe that, at the end of the day, there are only two kinds of research, good and bad. Any other separations are artificial and unnecessary. The boxes created to put our thinking in may be useful, as long as they help orientation and make things

faster, but if we think that they are real, they can become obstacles in the way of quality research.

An excellent example of this problem is the duckbill (platypus). Biologists created boxes organised into a hierarchy, in order to help with classifying living creatures. In these boxes, animals either lay eggs (birds and lizards) or breastfeed their babies (mammals). Then they came across the platypus, a semi-aquatic mammal from Australia, that does both. The response from the biologist community is worrying: the platypus is an exception. No, thank you very much, the platypus is a perfectly normal animal – you just forgot that your boxes are the constructs of your mind, they are not real…

Any decent course in research philosophy or research methodology emphasises that positivism does not necessarily mean quantitative research methods, and Interpretivism does not need to be qualitative. Moreover, there are examples of positivist qualitative studies, mostly thanks to the case study methods of Katie Eisenhardt (Eisenhardt 1989, Eisenhardt and Bourgeois III 1988, Eisenhardt and Graebner 2007, Eisenhardt et al. 2016). However, it is incredibly difficult to find any quantitative studies in the Interpretivist arena, although there has been some effort to challenge the exclusion of quantitative data from qualitative research more generally (Maxwell 2010, Sandelowski 2001). As in all variants of Interpretivism, the focus is on the meaning and on the intentions, it is natural that qualitative studies would dominate – however, is it possible that Interpretivists never do quantitative studies? Well, we intend to. Not because we want to do a quantitative (or qualitative) study, but because we want to do the best research we possibly can.

At a particular stage of the empirical study used for illustration here, which was at that point qualitative, we realised that there is some potentially interesting quantitative data and we went

on to incorporate it – and then we have received some really strange comments, that we were unprepared for: we expected researchers to be open-minded, and some of the comments indicated the opposite. This paper is the first step of our attempt to respond convincingly and forcefully to such comments, bearing in mind one single goal: to conduct good research.

Based on this motivation, the rest of the paper is structured as follows. First we describe the Bayesian philosophical approach that we have found to be a useful starting point for building a philosophical position that does not exist yet – at least, not in a fully developed form. Subsequently, we make links between the Bayesian approach and reflexivity. Later, we describe the ongoing research which is used as an illustration of how our approach is currently being applied, discussing the ways in which a combination of qualitative and quantitative methods has allowed us to uncover, explore, and present a richer representation of the research topic than could have been achieved had we limited ourselves to pre-existing boxes, before concluding by addressing some potential criticisms of using this approach.

Bayes, not Bayes' Theorem

Perhaps one of the most important points to note while considering this argument is that the terms "Bayes" and "Bayesian" do not relate specifically to Bayes' Theorem (Bayes and Price 1763), but to the philosophical works of Thomas Bayes. Given his background as a Presbyterian minister and philosopher, Bayes appears to have discussed his theories on probability in quite a subjective manner, stressing the importance of prior knowledge in assessing probabilities. Perhaps not surprisingly, it was not Bayes himself who constructed the theorem as we know it today; rather, this was developed later based on his writings (Hooper 2013, Stigler 1983) and is, therefore, an interpretation right from the start. This will be discussed later in the paper, in conjunction with the value of insider experience in interpretative

research. One excerpt from the essay which formed the basis of Bayes' Theorem seems particularly pertinent to this argument of compatibility with more widely-accepted qualitative approaches, that is "all men may know the works of God, and through those works know God, but only men of great faith know God directly" (Stigler 1982).

While we acknowledge that it is impossible to know exactly what Bayes was thinking when he wrote this essay, given both that it was only published posthumously and that the introduction and some explanations are missing from those published records, this paper will outline how, despite numerous differing interpretations of Bayes' true intention behind this words, we consider this to be an indication of the scope to interpret quantitative data in a way which is compatible with qualitative research. Indeed, the wide range of interpretations of Bayes' work, and applications of the resulting theorem are, in themselves, evidence of its subjectivity. Furthermore, not unlike in the Bayes Theorem itself, we can see subjectivity conditional to other subjectivity; we therefore, based on our previous experience, choose to take that Bayes meant to incorporate subjectivity explicitly, and in many ways we can consider him a precursor of the intentionalist and subjectivist turn commencing by Husserl's (1913a, 1913b, Husserl 2006) work on phenomenology (see also Heidegger 1975).

It is in order then to tell a few words about this background of our choice. Out of the three authors of this paper, one has a purely qualitative educational background with focus on humanities, one is an applied mathematician educated in rigorous quantitative sense, and the third one is an applied mathematician who went rogue, ending up as qualitative researcher with high appreciation of the beauty and rigour of mathematical thinking and language, but considering mathematics primarily a philosophical, qualitative endeavour. In some ways, there was only one aspect of thinking that we have shared: open-mindedness. And, independently of one another, we have each figured that Bayes is subjective.

Relating Bayes to Reflexivity

Reflexivity, or "the process by which research turns back upon and takes account of itself" (Alvesson et al. 2008), is considered to be an essential component of good qualitative research (Alvesson and Sköldberg 2000, Cassell et al. 2009, Haynes 2012, Hibbert et al. 2014). In fact, many argue, and we think legitimately, that reflection and reflexivity are characteristics of any good research. Bayesian approaches can also be described as utilising the meta-process by which a process turns back upon and takes account of itself. Again, this will be illustrated and discussed later in the paper, however, the key point is that just as considering quantitative data without taking into account the assumptions, subjectivities, and prior knowledge is overly-reductive, so too is any refusal to acknowledge that even those interpretive works which employ solely soft methods and qualitative analysis do, in fact, involve some level of "quantities", whether explicitly or otherwise.

While analysing qualitative data, those themes which are considered important are those which appear most frequently. What is this, if not putting a qualitative interpretation on the frequency, or quantity, of mentions of that particular theme? As qualitative researchers, we do, of course, understand that this is very simplified account of what happens during the analysis process, however, it remains valid. Indeed, although one of the objections we have encountered is that "once you include numbers, you are not an Interpretivist", numbers themselves are qualitative concepts. Put very simply, a number has no meaning in itself, other than that which has been assigned to it – a point which has been discussed at length by researchers studying the history and sociological impact on how mathematical theories, notation, and similar were created (Restivo 2017), as well as those arguing in favour of a more rounded approach to qualitative research (Dey 2005).

OUTLINING OUR APPROACH

Before the discussing the specifics of how this approach has been used, it is perhaps important to provide some background information on how and why the approach was first taken. While further work is ongoing to develop it more broadly, the basis for this paper lies in the process of applying this approach to a specific study into how threshold concepts (Meyer and Land 2003) present in autistic adults. Contemporary autism research, centring on theories of neurodiversity and neurodivergence (Singer 2017), primarily takes a very social constructionist perspective where disability is mainly as a result of social norms (Oliver 2013), and participatory research is, quite rightly, demanded (Milton et al. 2019). As such, the lived experience of autistic people is considered to be the reality, with each treated as equally valid and valuable in creating works which champion the strengths of neurodiversity and challenge the myths and untruths of classic autism research.

As a member of the community which was studied, research was initially intended to be fully qualitative, taking the form of an exploration of transformation learning through collecting accounts of personal lived experience. This proved to be incredibly valuable and, as expected, a source of very rich information, however, as this was not specifically autism research, but research about the underlying experience of transformational learning, it felt as though something was missing, and that there was more left to explore. It also became apparent that, while accounts of lived experience are of paramount importance when conducting research into any community, particularly those which are marginalised, not all accounts were equal, toxicity and extreme views do exist, and simply being a member of a community does not automatically equate to being representative of that community. In short, it became evident that there was a need for something more, in this instance.

As Twitter was used as a source of data, due to the strong autistic community(-ies) and resulting ease of communication (Bellon-Harn et al. 2020, Beykikhoshk et al. 2015), this additional stage of research involved using keyword analysis (naïve Bayes classifiers) and network analysis in further exploration. It was at this point that it became clear that a traditional, social constructionist, interpretive perspective did not fit. There were clear benefits to using these methods of social media analysis, however, through incorporating these more quantitative methods, did the research cease to be interpretative?

While the underpinning philosophical approach is now perhaps more 'critical relativist' than social constructionist, we argue that, no, it is not any 'less interpretative' for the use of quantitative methods. Importantly, these methods have been used as a tool to *aid interpretation*, and would not have had value had they not been interpreted through the lens of an insider.

THE IMPORTANCE OF AN INSIDER PERSPECTIVE

As we have mentioned, the context in which good research takes place has; or, at least, should have; a significant impact across the work. There is a perspective and understanding which can only be achieved by an insider. This has been discussed in detail in previous papers published by the authors, for example (Harrington et al. 2020), but will be outlined briefly here for context.

In that earlier paper, we discussed the importance and implications of choosing methods which are population-sensitive, referring in this case to those autistic adults who felt they had experienced a threshold concept. The lead author's lived experience as an autistic person was used in the first instance to build the foundations of understanding life within the community,

through reflecting upon experiences and constructing an auto-ethnography (Harrington 2020), which was, in turn, then used to identify a potential threshold concept and initiate conversation with fellow members of the community.

From the beginning, this research highlighted the shortcomings of existing methods of data collection and analysis, necessitating the need to develop our own approach, which both enabled the gathering of truly informative data from a widely misunderstood population, and the analysis of this data acknowledging the underlying nuances and shared experiences of the autistic community. It was essential for the research to focus not only on the verbal communication and actual words used, but to encompass what the participants were communicating via other means. While using Twitter data for research, the use of emoji is perhaps one of the most apparent forms of non-verbal communication (Kralj Novak et al. 2015), but we found that we needed to go far beyond this, focusing to some extent on what people were not saying explicitly, but was strongly implied in their recounting of their own experiences.

This was another point in the research at which the importance of insider perspectives was highlighted – without being an insider, and fully understanding life as a member of the community, it would have been impossible to recognise what was not being said (Cunliffe and Karunanayake 2013). Had the participants' words all been taken at face value, some incredibly valuable, rich insights would have been overlooked.

In brief, taking this approach has enabled us to capture the essence of lived experience as an autistic person who is experiencing major change. In the first instance, the data has been collected and analysed whilst maintaining "the attitude of relative openness" (Giorgi 1994: 212), continually revisiting assumptions and understanding of own lived experience through

"bracketing preunderstandings and exploiting them reflexively as a source of insight" (Finlay 2009: 13). That is, the research was carried out using the primary researcher's own lived experience to build some understanding of the setting in which the participant's own accounts were based. Understanding and interpretation of these accounts was built upon comparisons with our own experiences, and the intuition of an "expert" in the field (Dörfler and Stierand 2017).

To reduce researcher bias, initial understanding of the interview findings were discussed with both fellow community members, maintaining anonymity and confidentiality at all times, and with supervisors, in a form of "interviewing the researcher" (Chenail 2011, Frels and Onwuegbuzie 2012). This was intended to prompt further challenging of any presumptions, beliefs and previous knowledge which may have had an impact on the interpretation of the data, even if subconscious (Brannick and Coghlan 2007, Hibbert and Cunliffe 2015, Hibbert et al. 2014). The member-checking with participants also served to increase the accuracy and credibility of the interpretations (Abma 2003, Anand et al. 2007, Hemetsberger and Reinhardt 2006), with the inclusion of the auto-ethnographical element in a publication edited by prominent autistic and otherwise neurodivergent academics (Harrington 2020) further confirming this.

While what we have outlined here so far is primarily qualitative in nature, the quantitative elements of the research were also incorporated from a relatively early stage. Twitter keyword and sentiment analysis was used while identifying the potential threshold concept – self-acceptance as an autistic person – used to prompt conversation and explain the purpose of the research to participants. Similarly to metaphor analysis (Dodd 2002) of interview transcripts , Twitter data can be analysed using hashtags, which can indicate membership of a community, or by keywords relating to a specific topic and classifiable by theme or tone (Bae and Lee

2012). At varying stages of this research, posts using the hashtags #ActuallyAutistic and #AutisticsInAcademia were explored, filtered by keywords and sentiments such as self-acceptance as an autistic person, and viewed in terms of networks or communities.

While arguments may be made around the limitations of Twitter data, the limitations imposed by the character limit, and self-selection bias, we strongly believe that the strengths illustrated by previous research into sentiment analysis (Cabosky 2016) translate into interpretative research of this kind. Rather than forcing our participants into contributing in a way which worked for other studies, through communicating with them how and where they choose to communicate themselves (e.g. email rather than traditional interview, and Twitter, where there is a strong autistic community), we added a further layer of relevance and accuracy to our insider perspective.

SHARED CHARACTERISTICS OF BAYESIANISM AND REFLEXIVITY

Ultimately, our position is that quantitative and qualitative methods can successfully be combined in good Interpretivist research, and is not strictly limited to Bayesian methods. However, as previously stated, this remains a work in progress, and the similarities between Bayesianism and reflexivity serves as a starting point.

In very simple terms, both Bayesianism and reflexivity involve starting with a viewpoint, beginning a study, and continually revisiting and revising initial views based on what is found. Reflexivity, firstly, has been defined as the process where research examines itself (Alvesson et al. 2008), developing ways of exploring not only what we see while we research, but also how we see it, and why we see it that way, and the inevitable impact which previous knowledge

and experiences have upon research (Hibbert et al. 2014), and "thinking about how our thinking came to be" (Haynes 2012: 73). When contemplating reflexive research, one may think of the approach in terms of a combination of both reflection and interpretation , and must always treat reflexivity as a process, whereby all philosophical, theoretical, methodological and other assumptions are challenged and revised in the context of the research in question (Cunliffe 2003). While taking a reflexive approach, there is no absolute truth or knowledge, only those which exist within a specific context.

Bayesianism, on the other hand, while perhaps most commonly associated with Bayes' Theorem (Bayes and Price 1763), refers to a related set of perspectives which have been explored across an array of subjects including statistics, psychology, education, and philosophy of science (Bertsch McGrayne 2012). Bayesianism involves rejecting the notion of absolute truth, focusing instead on degrees of belief (Eriksson and Hájek 2007, Hawthorne 2005), updating existing knowledge based on new knowledge and, generally, recognising the strengths of subjectivity while taking a pragmatic approach to research and science (Goldstein 2006). Bayesian thinking involves recognising that there is more to a situation that can be determined from a single observation or experiment, and there is a tendency amongst Bayesians to criticise others for their lack of transparency around their own subjectivities (Greenland 2006). Where does a prior come from, if not previous experience and knowledge? In other words, it is not very far removed from the basic principles of reflexivity. While there are Bayesians who approach their work in a more objective manner, we argue that the ability to use a Bayesian approach in a varying range of manners indicates that it is, in fact, subjective and context dependant.

The Bayes' quote used earlier in this paper, "all men may know the works of God, and through those works know God, but only men of great faith know God directly" (Stigler 1982), appears

to us to share the appreciation of experiential learning, and learning within a specific context, as both reflexivity and researching as an insider. You may learn about a subject, and feel you know it well, but you do not truly know it until you have experienced it.

As we have been discussing and exploring these similarities between Bayesianism and reflexivity, and their use in explaining the use of both quantitative and qualitative methods in Interpretivist research, the viewpoint which we have, to date, come to an agreement upon is that both approaches involve:

- Conducting research with an open mind, adapting to any new information or knowledge which arises

- Avoiding any assertion of absolute truth, focusing instead on what emerges, rather than how, or if, it can be generalised

- The importance and impact of context, and previous beliefs and knowledge

- Working towards a "process of becoming", rather than a definitive answer or outcome

An attempt has been made to create an illustration of the process which has been undertaken so far while working on the research involving threshold concepts and autistic adults (see Figure 1). The image provides a brief overview of how the qualitative and quantitative methods were combined along the way, and complemented one another. Some element of revisiting earlier stages of the research as developments arose has been included, however, it should be noted that this has been heavily simplified to avoid confusion. The process itself has been significantly more complex, and involved multiple instances of revisiting and revising.

CONCLUDING REMARKS: ADDRESSING CRITICISMS OF USING THIS COMBINATION

The argument in favour of using both qualitative and quantitative methods in Interpretivist research is not an entirely new one. When we look at the philosophical and social underpinnings and contexts which contributed to the development of mathematical theory – such as the work of Thomas Bayes – and more contemporary studies into the sociology of science (Bourdieu 2004), it becomes evident that the distinction between soft and hard research is relatively recent. In fact, some of Bourdieu's work, such as Homo Academicus (Bourdieu 1988), suggest that he and Bayes may have shared some deeper views on science than one may initially think.

While the reasons behind the development of this distinction are beyond the scope of this paper, it would appear that perhaps the dogmatic use of solely qualitative methods in Interpretivist research is a strong reaction to the dogmatic use of objective quantitative methods in positivism, and something which is yet to settle at a more moderate, and more realistically applicable, middle ground. That middle ground is, we propose, the utilisation of a combination of methods which are appropriate to the study in question, whichever form they may take.

When considering a real-life situation, such as this research into transformative learning in autistic adults, the Interpretivist argument that using statistical analysis is reductionist and isolationist is, in fact, reductionist in itself. To gain a truly holistic and contextual understanding, both words and numbers must be considered, should it fit with the research. We believe that the distinction lies in how all data and information is interpreted in the context of the research, not in the form in which it is presented. However, as this relates to Interpretivist research, and belonging within a specific community, it is also important to be clear that we

are not advocating for a rule that both qualitative and quantitative methods be employed, merely an open-mindedness that allows both to be considered where appropriate.

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Figure 1: Overview of research process to date

Considering own lived experience

Exploring Twitter community, engaging, exploring own place within community

Exploring extant literature around autism and threshold concepts

Identifying potential threshold concept

Discussing experiences with participants

Discussing experiences with co-researchers

Analysing community, own experience, blogs, etc for themes

Exploring similarities between how lived experience feels vs how it presents

Quantitative, e.g. twitter keyword analysis, network analysis

Qualitative, e.g. interviews thematic analysis

Exploring how these changes can be identified through communities

Synthesis Following Analysis