<> THREE </>

<> INTERNET-MEDIATED RESEARCH: STATE OF THE ART </>

INTRODUCTION

The previous chapter's focus was on how the Internet can be used as a secondary research tool in the social and behavioural sciences. A range of resources were outlined along with instructions on how to use them. The present chapter is concerned with the scope of the Internet for supporting *primary* social and behavioural research. Here we review the current state of the art in IMR, outlining the range of methods that have been tried and tested, as well as the results that have been obtained. We consider some of the most recent developments and speculate on future possibilities. Subsequent chapters follow up on this broad overview, considering in more detail how particular methods can be implemented, including how potential participants can be located and recruited, and outlining caveats regarding the kinds of things that might go wrong, and how researchers may strive to guard against them. Chapter 5 offers a detailed discussion of ethical issues in IMR. First we provide a short history of IMR, followed by a classification scheme for types of IMR study to help frame the ensuing discussion. We include a brief summary of the main advantages and disadvantages of IMR. The methods we discuss are: surveys and questionnaires; interviews and focus groups; observational approaches; experiments; document analysis.

A SHORT HISTORY OF IMR

From around the early to mid-1990s pioneers started considering and implementing IMR methods (e.g. Bordia, 1996; Dillman, 1991; Hewson & Vogel, 1994; Krantz, Ballard, & Sher, 1997; Mehta & Sivadas, 1995; Szabo, Frenkl, & Caputo, 1996). Twenty

or so years later, though the field is still relatively young and evolving, an impressive range of approaches have been conceived and tested. Surveys and questionnaires remain the most widely implemented IMR method, being prevalent in the early days (e.g. Buchanan & Smith, 1999a; Joinson, 1999; Mehta & Svidas, 1995; Stones & Perry, 1997), as well as more recently (e.g. Bigelsen & Schupak, 2011; Gosling, Vazire, Srivastava, & John, 2004; Hewson & Charlton, 2005; Malhotra & Krosnick, 2007; Temple & Brown, 2011). Early pioneers also implemented Internet experiments (e.g. Hewson, 1994; Krantz et al., 1997; McGraw, Tew, & Williams, 2000), interviews (e.g. Chen & Hinton, 1999; Gaiser, 1997; Murray & Sixsmith, 1998) and observational studies (e.g. Bordia, 1996; Herring, Johnson, & DiBenedetto, 1998). While a starting point was often considering how existing offline methods could be adapted to an IMR context, to provide comparable, reliable, valid data, early researchers also considered the ways in which the Internet might enhance and expand methodological opportunities beyond what is possible or practicable offline (e.g. Bordia, 1996; Givaty, van Vaan, Christou, & Bulthoff, 1998; Hewson, Laurent, & Vogel, 1996). Both online IMR methods which strive to mimic closely established offline approaches and novel IMR methods which have attempted to move beyond what has been possible in offline research have flourished since the early days, and technological developments have played an important role in facilitating both types of approach.

For evidence of this growth, consult some of the recent texts on IMR (e.g. Batinic, Reips, & Bosnjak, 2002; Fielding, Lee, & Blank, 2008; Gosling & Johnson, 2010; Joinson, McKenna, Postmes, & Reips, 2007; Salmons, 2011) and the increasing number of reports of IMR studies published in journals such as *Behavior, Research Methods*; *Computers in Human Behavior*; *Social Science Computer Review*. The emergence of dedicated topic-relevant conferences such as General Online Research (GoR), ACM Web Science Conference, and Internet Research also attests to the popularity of IMR methods. Organisations dedicated to discussing issues in IMR, such as the Association of Internet Researchers (AoIR), WebSurveyMethodology (WebSM) and WebDataNet, have also emerged. Finally, the expanse in websites dedicated to hosting collections of IMR studies (e.g. The Web Experiment List, The Web Survey List, Online Social Psychology Studies, Online Psychology Research UK) and other webpage resources which provide specialist information, tuition and advice on IMR methodologies (e.g. Exploring Online Research Methods: ORM) are further indicators. For more information on the aforementioned events and resources see Box 3.1.

BOX 3.1 Resources for IMR-Related Events, Organisations and Repositories of Active Studies

Events

GOR: Annual conference organised by the German Society for Online Research; see http://www.gor.de (accessed May 2014).

ACM Web Science Conference: The 2013 conference website is available at http://www.websci13.org/ (accessed May 2014).

Internet Research: Annual Conference of the Association of Internet Researchers (AoIR); see aoir.org (accessed May 2014).

Organisations and information websites

Association of Internet Researchers (AoIR: aoir.org).

WebSurveyMethodology (WebSM: http://www.websm.org).

WebDataNet (http://www.cost.eu/domains_actions/isch/Actions/IS1004).

ORM (http://www.restore.ac.uk/orm).

Online study clearing houses

The Web Experiment List (http://www.wexlist.net), previously the 'Web Experimental Psychology Lab' founded in 1995 at the University of Tübingen by Ulf-Dietrich Reips, now as named here and housed at the University of Zürich.

Web Survey List (available from the above Web Experiment homepage link).

Online Social Psychology Studies (http://www.socialpsychology.org/expts.htm).

Psychological Research on the Net (psych.hanover.edu/research/exponent.html).

Scouring the IMR literature to date, quantitative approaches seem to have dominated (and particularly, as noted, the online survey), though numerous examples of qualitative approaches (especially interviews and ethnographic studies) also exist, in what has now become a diverse, broad and interdisciplinary methodological strategy. As noted in Chapter 1, observational approaches, particularly those involving unobtrusive 'data mining' techniques, have enjoyed particular growth since we were writing the first edition of this book. This growth has been facilitated by the expanding integration of the Internet into people's everyday lives, and the traces this has created of various aspects of intra- and interpersonal online behaviours and activities. The emergence of Web 2.0 (as discussed in Chapter 1) has played a pivotal role in supporting many of these developments.

One point worth highlighting is the way expansions in the range and scope of IMR methods, and their supporting Internet technologies, has led to blurred boundaries emerging between different methods (see examples offered later in the chapter). Another is the vast reach of IMR methods, across disciplines, research domains and methodological traditions. It would be practically impossible for any individual researcher to keep up with all the ongoing developments. Here we aim to offer a good selection of examples from the key methods that have been used to date, drawing upon both qualitative and quantitative approaches, across

different disciplines in the social and behavioural sciences. The next section maps out the present landscape of IMR by identifying the key methods used to date, and offering a way of classifying these.

A FRAMEWORK FOR CLASSIFYING TYPES OF IMR STUDY

There are now enough examples of IMR studies to start to think about a classification scheme to represent the range and nature of approaches which have emerged. Figure 3.1 presents a framework for classifying key types of IMR study design along the *obtrusive–unobtrusive* dimension, since this dimension becomes relevant to many issues in IMR (e.g. in ethics, sampling, and so on; see below and later chapters). Other ways of classifying IMR methods, such as quantitative or qualitative, can also be useful, but the obtrusive–unobtrusive dimension seems useful for framing the present discussion. As already noted, blurred boundaries between different IMR methods emerge, particularly as new technologies and practices enable innovative approaches which may not have offline equivalents. For example, the distinction between observational approaches and document analysis is not always clear due to new ways of interacting and publishing online (e.g. blogs may be seen as interactively produced, organic documents with multiple authors, individual diaries with regular updates, or something in between; see further discussion below). The distinction between survey and interview methods can become blurred (the distinction is blurry even in face-to-face situations, and on-line administration of surveys and interviews gives surveys and interviews more common properties) when considering strategies which may make use of an *online virtual interviewer*. Also, many approaches may be seen as *more* or *less* obtrusive or unobtrusive, rather than falling into clearly defined discrete categories.

Figure 3.1 shows the key IMR methods we discuss in this chapter placed along the obtrusive–unobtrusive dimension, based largely on the ways these methods have commonly been implemented to date. Broadly speaking, surveys, questionnaires, interviews and experiments are primarily obtrusive approaches, where the norm is to obtain valid consent from participants before they knowingly participate in a process of actively contributing research data. Different design choices may influence the positioning of any particular study, as indicated. For example, a synchronous interview is likely to be more obtrusive than an asynchronous interview, since in the latter participants can respond as and when they choose. Emailed surveys could be seen as more obtrusive (and perhaps 'intrusive') than web surveys, since they arrive in a person's own personal email inbox, and generally require more effort to complete and return. Although it is possible to conceive of experimental designs where participants contribute unwittingly, IMR experiments have generally been carried out obtrusively (though see Chapter 5 for some counter-examples). At the unobtrusive end of the dimension lies document analysis, which is almost always unobtrusive, whether disclosed or undisclosed. Observational methods in IMR span the dimension most broadly, and key design choices will

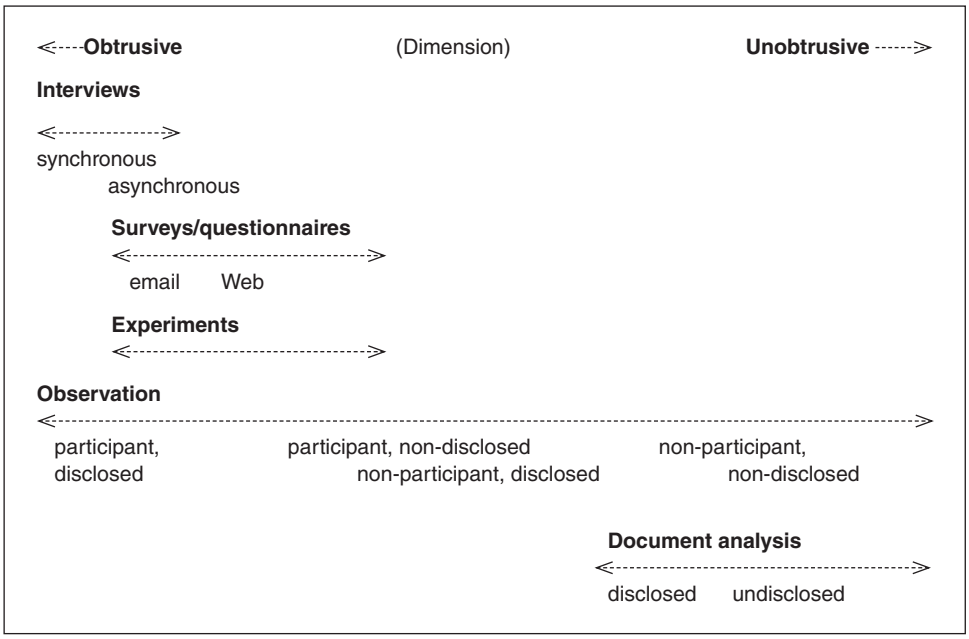

Figure 3.1 Mapping IMR methods along the *obtrusive–unobtrusive* dimension

determine where a particular study falls. For example, participant approaches will typically be more obtrusive than non-participant approaches. Disclosed observations will normally be more obtrusive than non-disclosed approaches. In Figure 3.1 disclosed, participant observation (e.g. immersive ethnographic research) is indicated as the most obtrusive, and non-disclosed, non-participant approaches (such as analysis of stored discussion archives) as the least. Other combinations will fall somewhere in between.

Figure 3.1 provides a rough sketch of how different IMR methods may be classified as obtrusive or unobtrusive, and how different design choices can affect this. Of course, other factors will also be important in determining the level of obtrusiveness in any study (e.g. whether multimedia technologies are used, such as in an online interview, levels of actual and perceived anonymity, and so on). These factors will be discussed throughout the present chapter. Before turning to look at each of the key methods outlined in the figure, we briefly summarise some general advantages and disadvantages of IMR methods, compared with offline methods.

ADVANTAGES AND DISADVANTAGES OF IMR

The general advantages and disadvantages of conducting a study via the Internet have by now been well rehearsed (e.g. see the reviews in Birnbaum, 2004; Hewson & Laurent, 2008). The examples offered throughout this book serve to illustrate

the potential and demonstrated benefits of IMR approaches, as well as highlight caveats. Established advantages include: broad reach leading to potentially very large, diverse samples (e.g. Birnbaum, 2001; Musch & Reips, 2000); the collapsing of geographical boundaries (e.g. facilitating cross-cultural research; see Pohl, Bender, & Lachmann, 2002) and facilitated access to specialist and traditionally hard-to-reach populations (e.g. Bigelsen & Schupak, 2011); cost and time efficiency compared with many traditional offline methods (e.g. Grandcolas, Rettie, & Marusenko, 2003; Hessler, Downing, Beltz, Pelliccio, Powell, & Vale, 2003); potential enhanced reliability due to automated procedures which can help reduce problems associated with human error (e.g. Hewson & Laurent, 2008); heightened levels and perceptions of anonymity, which may lead to enhanced candour and levels of disclosure (Hessler et al., 2003; Hewson et al., 1996); convenience to participants of being able to participate remotely, which may lead to empowerment and possibly elicit richer data (e.g. Madge & O'Connor, 2002). As we noted in the first edition, some of these features could be particularly important for smaller institutions which may have limited time and funding available for supporting research projects. Potential disadvantages of IMR include: limited scope for obtaining probability samples (discussed further in Chapter 4); reduced levels of researcher control over and knowledge of procedural aspects (e.g. Couper, 2000; Hewson & Laurent, 2008) and participant characteristics (e.g. BPS, 2007); technology-related issues and constraints, such as the need for expertise and/or training in computing techniques, and potential unreliabilities in hardware systems and software (e.g. Jowett, Peel, & Shaw, 2011). We highlight below, and further in Chapter 6, where these advantages and disadvantages become particularly relevant to the various methods, techniques and procedures discussed. A key focus throughout the book is the ways in which different methods, design choices and characteristics of the online environment might impact upon the validity, quality and integrity of the data obtained, and conclusions reached.

SURVEYS AND QUESTIONNAIRES

Proliferation of Web-Based Surveys

The proliferation of survey and questionnaire methods in IMR more recently has been assisted by the widespread availability of cost-effective software solutions (these solutions are discussed further in Chapter 6). These have made programming implementation guides (such as those offered by Batinic, 1997; Birnbaum, 2001; Goritz & Birnbaum, 2005; our own in the first edition of IRM) less necessary and enhanced the accessibility of IMR survey methods (particularly web-based survey methods). There are now a number of texts wholly dedicated to the approach (e.g. Balch, 2010; Couper, 2008; Sue & Ritter, 2012). The 'quick evolution of web surveys from novel idea to routine use' (Dillman, 2007, p. 447) over the last

10 years or so is reflected in the increasing number of studies reported in peer-reviewed journals (e.g. Bigelsen & Schupak, 2011; Göritz & Schumacher, 2000; Gosling et al., 2004; Hewson & Charlton, 2005) and the examples available via IMR study clearing houses (see Box 3.1). Many of the latter involve psychological research (such as the examples available at www.onlinepsychologyresearch.co.uk). However, survey and questionnaire approaches in IMR have extended well beyond the discipline of psychology, and examples also appear in marketing research, political science, sociology, geography, economics, and medical, health and nursing research (e.g. Im & Chee, 2004; Mehta & Sivadas, 1995). Researchers have used IMR approaches to implement very large-scale surveys (e.g. Reece, Rosenberger, Schick, Herbenick, Dodge, & Novak, 2010), psychometric test instruments (e.g. Anderson, Kaldo-Sandstrom, Strom, & Stromgren, 2003; Hewson & Charlton, 2005; see also the myPersonality Project, information available at myPersonality.org [accessed October 2014]), and market research (Pincott & Branthwaite, 2000) and consumer attitudes surveys (Grandcolas et al., 2003). Resources such as the WebSM site (see Box 3.1), which have been set up to provide guidance and advice on web-based survey methodology, further reflect the recent interest in this method. Email-based methods are also an option for delivering surveys via the Internet (for examples see Dommeyer & Moriarty, 1999; Welker, 2001), but by far the most widely used approach these days is the *web-based survey*.

The enhanced accessibility and growth of IMR survey methods have led to talk of the 'democratisation of the survey' (e.g. Couper, 2000). It is now relatively easy to construct and disseminate a web-based survey at low cost. While this may facilitate high-quality social and behavioural research projects by helping researchers with fewer resources or tighter budgets to gather data (Carter-Pokras, McClellan, & Zambrana, 2006), some authors have also noted caveats. The ease with which it is now possible to create and publish a survey on the Web opens up possibilities for an influx of badly constructed and/or intrusive examples (Lee et al., 2008). This could lead to negative public perceptions of survey-based research, just as telemarketing has arguably negatively impacted on telephone survey methodologies (Couper, 2000; Tourangeau, 2004). Anyone who regularly uses the Internet for activities such as shopping, banking, social networking, and so on will be familiar with the proliferation of the Internet 'pop-up survey', used by many corporations wishing to gain customer feedback and satisfaction data quickly, cheaply and in large volumes (in Chapter 6 we outline strategies to help maximise perceptions of credibility, value and integrity of a piece of research).

Advantages and Disadvantages of Web-Based Surveys

Web-based surveys may have a number of advantages over traditional methods (for a comparison of different offline modes – postal, telephone, face to

face – see Bowling, 2005). Some of the earliest examples of IMR surveys used email (e.g. Dillman, 1991; Mehta & Sivadas, 1995; Tse et al., 1995), which at the time had the advantage over web-based methods of ease of implementation. Sending survey questions in the body of an email was technologically straightforward compared with writing programming code and setting up server configurations to enable web-based survey presentation and data collection. Email methods[1] continue to be used (e.g. Bigelsun & Schupak, 2011), but as well as the enhanced accessibility of web-based methods due to the emergence of affordable dedicated software packages, they also offer greater functionality, flexibility and reliability over email approaches. The generation of reliable, high-quality data from very large sample sizes using web-based survey methods has been demonstrated by a number of researchers (e.g. Chang & Krosnick, 2009; Gosling et al., 2004; Meyerson & Tryon, 2003; Pettit, 1999). Others have successfully obtained high-quality data from smaller, specialist samples (e.g. Bigelsen & Schupak, 2011; Coomber, 1997a; Stones & Perry, 1997). Some researchers also report obtaining very large sample sizes from specialist populations; for example, Hirshfield et al. (2010) obtained a sample of 7,000 men who have sex with men. Web-based approaches are often reported as being able to recruit large and/or specialist samples far more cost- and time-effectively than is possible using offline methods (e.g. Meyerson & Tryon, 2003; Pettit, 1999). Box 3.2 offers an illustration of a web-based survey which generated responses from a very large sample. Box 3.3 presents an example of an email-based survey which acquired data from a specialist sample.

BOX 3.2 Featured Research: Reece et al. (2010)

Method

In all, 25,294 gay and bisexual men were recruited to complete a survey on sexual behaviours, by sending email messages directly to registered users of a popular Internet site for men seeking social and sexual interactions with other men who resided in the United States. A $10 voucher for merchandise reward was offered in return for participation. The email contained a description of the study and a link to the web survey, which took around 20 minutes to complete. A total of 127,489 individuals opened the email invitation; 34% of these clicked on the study website link, and 60% of those went on to complete the study.

[1]In which the survey itself is sent in the body of an email (including as an attachment) for completion and return via email, as opposed to emailing potential participants and asking them to follow a link to access a *web-based* survey.

Results

Demographics as well as survey data on sexual behaviours were collected. Participants were well represented across age group categories (18–23 to 60+) and educational levels. The majority of participants were white (82%).

Conclusions

The data provided useful insights into the use of vibrators by gay and bisexual men, allowing relationships between demographic factors and behaviours and experiences to be explored. However, although a very large sample of men from the United States was obtained, it was a convenience sample of men from a single Internet social and sexual networking site, thus limiting the extent to which the findings can be generalised to the entire population of gay and bisexually identified men in the United States. Challenges remain for establishing true nationally representative samples of gay and bisexual men for research.

Comment

This study is a good example of how it is possible to obtain very large sample sizes using the Internet, in ways that would often be difficult (and more costly and time consuming) offline. However, it also highlights concerns regarding the representativeness of Internet-accessed samples, even though in this case obtaining representative samples of the population of interest is also difficult using offline methods. The sample obtained here did support the diversity of Internet samples, at least in relation to the variables of age and educational level. It is worth noting that while IMR methods are generally *more* cost effective than traditional offline methods, the costs in participant fees for this study were significant (over $250,000 worth of merchandise vouchers).

BOX 3.3 Featured Research: Bigelsen and Schupak (2011)

Method

A volunteer sample of 75 female and 15 male participants who self-identified as excessive or maladaptive fantasisers was recruited via posts to a health-related website. Interested individuals were asked to make contact via an email address, and were then emailed a questionnaire on excessive daydreaming, which they were asked to complete and return by email.

(Continued)

(Continued)

Results

Participants were of diverse nationalities (including from the United Kingdom, United States, Canada, India, South Africa, and other countries). Age ranged from 18 to 63, though 90% of participants fell in the 18–39 years age group.

Conclusions

The IMR design enabled access to a very specialist and widely geographically dispersed population which could not otherwise have been obtained. The study allowed further insights into the perceptions and behaviours of people who identified as excessive fantasisers, and was the first to study a large, non-exclusively traumatised sample. The bias towards respondents under 40 could be due to their over-representation in the online medium used for recruitment, or their greater willingness for disclosure. The higher proportion of females remains unexplained. Recruitment from websites which discuss fantasy distress is likely to have generated a biased sub-population of excessive fantasisers.

Comment

This study demonstrates how the Internet, via its online communities and information-sharing potential, can allow minority (and possibly stigmatised) groups to become more vocal, visible and accessible as participants for research. Interestingly, the researchers report that after a paper they had published on compulsive fantasising became available online, they were contacted by a number of individuals seeking advice and help on their own related experiences. This led to the present study. The researchers note: 'members of our study sample are representative of a self-concealed population that has only recently revealed itself via the anonymity of the Internet; and thus has not been previously recognized by the research and mental health communities' (p. 1635). This demonstrates how the Internet can facilitate research with specialist, hidden populations.

Web-based survey approaches may also offer enhanced data quality over offline approaches, particularly postal surveys, due to their being able to implement reliability checks, such as response completeness and format prompting. However, they also have potential disadvantages. Concerns over the representativeness of Internet-accessed samples have been voiced. While the IUP has clearly expanded and diversified a great deal over the last 10 years, reliable sampling methods which can allow generalisation to a national (or similarly broad) population have not yet been well established (though some encouraging results have been achieved;

see Chapter 4). A further potential issue for web-based surveys (though some similar concerns arise in relation to offline postal surveys) is the lower levels of researcher control compared with offline methods. Possible procedural variations due to technological (hardware and software) issues is one potential source of reduced control, although recent technological developments, and present-day software solutions, have helped address this issue. Not being able to monitor survey respondents' behaviours, due to the lack of physical proximity (Are they intoxicated? Multi-tasking? Who they say they are? and so on), creates another source of reduced control. On this point, it has been noted that in IMR a level of trust of participants will always be needed (Hewson, 2003). Situations where richer cues are available (e.g. a structured survey interview using Skype) may alleviate these concerns somewhat.

IMR Validation Studies

Reassuringly, despite the above caveats, there is now a substantial body of research indicating that IMR studies can generate data of comparable quality to that generated by offline methods. A common approach in survey and questionnaire research has been to compare equivalent implementations in both offline and online modes. For example, studies have tested the validity of web-administered psychometric scales by comparing their psychometric properties and norms with those when the same scales are administered offline, the typical finding being equivalence (e.g. Brock, Barry, Lawrence, Dey, & Rolffs, 2012; Hewson & Charlton, 2005; Kosinski et al., 2003; Riva, Teruzzi, & Anolli, 2003; Weigold, Weigold, & Russell, 2013). Similar approaches in non-psychometric contexts have compared response patterns, relationships between variables, effects of demographic factors (e.g. gender), and so on, also often finding equivalence (e.g. Best, Krueger, Hubbard, & Smith, 2001; Birnbaum, 1999; Epstein, Klinkenberg, Wiley, & McKinley, 2001; Stephenson & Crete, 2010). Though far fewer, there have also been some reports of non-equivalence between online and offline administrations (e.g. Barbeite & Weiss, 2004; Davis, 1999; Fouladi, McCarthy, & Moller, 2002). However, it is not always clear that these findings lead to the conclusion that the online data are inferior. Further research will help clarify the nature of such observed differences. Hewson and Charlton (2005) note that studies finding a lack of equivalence have tended to use multidimensional rather than unidimensional psychometric scales, but in their own validation of the Multidimensional Health Locus of Control Scale (Wallston & Wallston, 1981) they found equivalence of online and offline administrations. Box 3.4 describes this example, taken from our own research, as an illustration of an IMR validation study.

BOX 3.4 Featured Research: Hewson and Charlton (2005)

Method

A comparison of offline (pen and paper) and online (web-based survey) administrations of the Multidimensional Health Locus of Control (MHLC) Scale (Wallston & Wallston, 1981) was carried out in order to assess the robustness of the MHLC Scale when delivered online. Offline participants consisted of 200 respondents recruited from undergraduate students at the start of lectures and members of the general public (convenience sample). The Internet sample (n = 167) was recruited by posting invitations to a selection of newsgroups, asking interested parties to visit a webpage link in order to view and complete the questionnaire.

Results

The Internet sample was found to be more balanced in terms of sex and age than the offline sample and displayed higher representation in the high-earning, highly educated, and professional and IT-related occupation categories. The Internet sample was more diverse in nationality. Scale reliabilities (Chronbach's alpha) and factor structures were found to be at least as good for the Internet as for the offline data. MHLC scores were comparable for paper and Internet administrations, although the Internet sample scored significantly lower on the Powerful Others subscale (indicating a lower tendency to attribute one's state of health to 'powerful others'). Comparing this result with existing norms, the most parsimonious explanation is that the higher socioeconomic status of the Internet sample could account for this finding (this factor having been found to produce similar results in previous studies). Overall, MHLC scores observed in the present study were comparable with previously established norms.

Conclusions

The authors conclude that, overall, the results show administration of the MHLC Scale via the Internet can produce data comparable with those obtained by pen and paper methods. However, it is also concluded that generalisation of these findings beyond the psychometric test instrument and sampling procedures used here is not warranted. Further such studies are needed to determine whether IMR methods can produce results comparable with offline methods in different contexts.

Comment

This study shows how comparing offline and online administrations of a psychometric scale can help determine whether IMR methods are able to produce results equivalent to those obtained offline. Both scale properties and scale norms can be compared in this way. Such validation studies are important in determining whether different IMR methods and instruments can produce valid, reliable data, comparable with data obtained using offline methods.

Some studies which have found a lack of mode (online versus offline) effect have used equivalent samples, such as undergraduate students randomly assigned to either online or offline administration modes (e.g. Epstein et al., 2001; Herrero & Meneses, 2006), rather than use Internet-based sampling methods (for the online mode) as was done by Hewson and Charlton (2005). However, we would question how useful such designs are in assessing the validity of IMR methods, which would seem most beneficial when participants are recruited via the Internet. It cannot be assumed that mode equivalences demonstrated using random assignment from the same sample to each mode will generalise to these more naturalistic IMR contexts where both mode and sampling method vary. Given the mostly positive results to date, in terms of comparability of IMR and traditional methods, we would argue that the most fruitful direction for validation studies (and the most efficient use of research resources) is to use Internet-accessed samples in such comparisons. Most validation studies have adopted this approach.

Enhanced Anonymity of Web-Based Surveys

A noteworthy feature of the Internet is the scope it offers for maintaining high levels of anonymity (e.g. for participants and/or researchers) while also enabling high degrees of interactivity. Modern web-based survey methods can support degrees of flexibility and functionality (e.g. question-tailoring based on previous responses; answer-format checking; incorporation of video and audio; etc.) while also ensuring complete anonymity for participants. Offline methods cannot achieve this, since postal methods, which can allow for high degrees of anonymity, lack the same flexibility and functionality. Face-to-face (FTF) survey methods, on the other hand, support flexibility but reduce levels of anonymity. As we have previously speculated (e.g. Hewson et al., 1996) this might make web-based survey methods unique in some respects, such as their potential for reducing biases due to perceptions of biosocial attributes, or researcher demand characteristics, while maintaining desired levels of interactivity and flexibility. This could enhance opportunities for gathering data with high levels of candour, and perhaps facilitate disclosure of sensitive, personal information. There is some evidence that computer-mediated communication (CMC) contexts can lead to higher levels of self-disclosure than FTF contexts (e.g. Bargh, McKenna, & Fitzsimons, 2002; Joinson, 2001; Joinson & Payne, 2007). Also, there is evidence that such effects may be constrained to *visually anonymous* CMC settings (Joinson, 2001). Further investigations on this topic would be informative, and potentially relevant to IMR survey methods.

Future Directions

So far, we have considered some existing examples of survey and questionnaire methods in IMR, and highlighted some of the benefits, and caveats, which emerge.

Validation studies have demonstrated that high-quality data can be obtained using a range of IMR survey designs, across a variety of disciplines and research domains. Considering future possibilities, a number of promising avenues seem noteworthy. The emergence and increasingly widespread ownership of smart phones and other mobile Internet-connected devices create opportunities for contacting participants on the move, which can support mobile surveys and approaches using ongoing continuous or time-sampled measurement (Vehovar & Manfreda, 2008). The latter, for example, might involve prompting participants when a response is required by sending an audio alert to their smart phone, and providing either a link to survey questions or some other means of responding. The 'Mappiness' project (see http://www.mappiness.org.uk/ [accessed August 2014]) is an example of this approach, in which participants (anyone with an iPhone can take part by visiting the above link, at the time of writing) download a smart phone app which bleeps daily to prompt them to report on their current level of happiness, and answer some additional questions (where they are, who they are with, etc.). Taking advantage of such possibilities (which some researchers have already started to do) may lead to innovations in survey research, which were not previously easily achievable using offline methods. These may include immersion in real-life contexts and physical locations as an integral feature of survey design, allowing participants to provide responses when situated in a particular specified setting. Additional contextual information (e.g. geolocation data, multimedia data) may also be collected (the aforementioned Mappiness project allows participants to upload pictures of their current location). Benefits arising from such approaches might include less reliance on recalled information, scope for collecting richer response data (pictures, videos, spoken word, etc.), enhanced possibilities for examining context effects, and so on.

Innovations in survey research arising from Internet technologies may lead to blurred boundaries between surveys and other methods (additional to those that occur for offline methods). The possibility of a 'virtual survey interviewer' has been mentioned (e.g. Vehovar & Manfreda, 2008). This could potentially incorporate multimedia features, using graphics, video, audio and perhaps language and speech recognition software (e.g. Couper, 2005). Fuchs (2009) has piloted the use of video recordings of interviewers to administer survey questions (about relationships and sexual behaviours) to participants, noting that gender-of-interviewer effects occurred, similar to those found in proximal FTF contexts. The use of audio and video technologies could also enable real-time survey interviews with a live human researcher to be carried out. Such approaches might blur the boundaries between survey and interview approaches. The distinction between survey and observation methods might also become blurred, in approaches incorporating multimedia and on-the-move response features (geolocation information, audio and video recordings, and so on). This could potentially lead to new ways of conceptualising and categorising social and behavioural research methods. Perhaps these types of innovations will enhance and facilitate mixed

methods research. It is certainly conceivable that IMR approaches may facilitate the simultaneous collection of both quantitative and qualitative data within a single research study (for discussions of mixed methods research in IMR, and some examples, see Hesse-Biber & Griffin, 2013; Hewson, 2008). As researchers continue to try out these various possibilities in survey-based IMR, their scope and benefits will become clearer.

INTERVIEWS AND FOCUS GROUPS

One of the intriguing features of the Internet, as already noted, is its ability to facilitate fairly sophisticated levels of interaction while enabling high levels of anonymity (due to reduced visual and extralinguistic cues). This feature becomes particularly relevant and interesting in relation to online interview approaches, since in traditional offline interviews the interviewee and interviewer are typically physically present in an FTF setting. In an IMR interview, even when using real-time synchronous contexts (e.g. online chat software), the whole process can be conducted with each conversational partner knowing little or nothing about the other's physical and biosocial attributes. While early accounts (including our own in the first edition of this book) speculated on what this might mean for online interview approaches, a body of evidence is now available from researchers who have used this method. Qualitative researchers conducting online interviews have generally strived to overcome the more detached, anonymous nature of online interactions, for example by devising carefully constructed techniques for establishing rapport (such as the use of personal disclosure; Madge & O'Connor, 2002). Such strategies contrast with our own early speculations that highly anonymous, richly interactive settings might be beneficial in helping reduce biases normally present in offline FTF interactions. Here, we draw upon the experiences of online interview researchers to consider how the online medium might impact upon levels of candour, establishing rapport, depth and reflexivity, and data integrity and quality in IMR interviews.

Levels of Candour

The idea that online forms of communication might encourage more candid responses and greater disclosure is of interest in the context of online interview methods. Joinson (2005) suggests that visual anonymity enhances identification with a group by increasing the perceived homogeneity of the group, and that this can reduce inhibitions and increase levels of candour due to a reduction in the social cost of disclosure. Reports from online interviewers have supported the idea that candour can be enhanced, and inhibitions reduced, in this medium (e.g. Madge & O'Connor, 2002; Murray & Sixsmith, 1998). For example, Madge and O'Connor report that their online synchronous discussion group interviewees

(mothers with young children) displayed a lack of inhibition that the researchers felt would not have been shown in an FTF context. The suggestion that enhanced candour and self-disclosure effects may be constrained to visually anonymous CMC contexts (Joinson, 2001) has implications for the use of video in online interviews. Video interview approaches have not been well used to date, and are currently hindered by issues of low reliability and poor image quality. Whether such approaches might lead to lower levels of candour and disclosure remains largely to be explored. For the time being, issues related to choppy video and low-quality audio are likely to impede the flow and quality of an online interview using this approach.

Establishing Rapport

While there is some evidence that heightened levels of anonymity associated with many online communication contexts (i.e. text-based) can enhance disclosures of personal and sensitive information, establishing good rapport with participants has also traditionally been considered important for obtaining rich, candid qualitative interview data (e.g. Barratt, 2012). However, high levels of anonymity seem unlikely to be very helpful for establishing good rapport. Indeed, the types of techniques that have been adopted in attempting to establish good rapport with participants have used strategies aimed at reducing anonymity and enhancing levels of personal disclosure and engagement (e.g. Madge & O'Connor, 2002). Thus, trade-offs seem to emerge here. Barriers to rapport have been identified as a lack of proximal contact, and reduced extralinguistic cues, in online interview settings (e.g. Jowett et al., 2011; O'Connor, Madge, Shaw, & Wellens, 2008; Orgad, 2006). Strategies to overcome these barriers have thus been considered an important part of IMR interview design (Barratt, 2012; Bowker & Tuffin, 2004; Gaiser, 1997; Madge & O'Connor, 2002). In general, rapport-building strategies have worked well and led to acquiring rich, elaborate, high-quality data. Researchers reporting poor levels of rapport have generally not taken steps to implement clear, explicit, rapport-building strategies (e.g. Strickland, Moloney, Dietrich, Myerburg, Cotsonis, & Johnson, 2003). Thus it would seem that careful planning of rapport-building strategies is important in IMR interview methods. Jowett and colleagues (2011) also point out that, in IMR, rapport building should be treated as an ongoing process which requires attention throughout the interview. One caveat, however, emerges from a comment made by Madge and O'Connor (2002) who explain that their strategy of posting up photographs of themselves as part of the rapport-building process might have influenced the interview process by encouraging 'white 30-something women' to feel more comfortable talking to them than other groups. This is a consideration worth bearing in mind, depending on the study context and target sample.

Depth and Reflexivity

The extent to which depth and reflexivity can be achieved in an IMR interview (a common goal in qualitative interview research) has emerged as a question due to the 'impoverished' communication medium. That is, text-based exchanges lack extralinguistic information present in FTF interactions (tone of voice, body language, etc.). Asynchronous IMR approaches, such as using email, may better facilitate reflexive, detailed responses due to their extended, more relaxed timescale, compared with synchronous approaches (e.g. using online chat). Thus in an email interview participants can respond as and when they please, enabling time for reflection. Asynchronous approaches alleviate the immediate pressure of needing to provide a quick response, which is present in traditional FTF settings and synchronous IMR approaches (O'Connor et al., 2008). Researchers using asynchronous IMR approaches often report obtaining rich, reflective qualitative data (e.g. Bowker & Tuffin, 2004; Kenny, 2005; McDermott & Roen, 2012; Murray & Sixsmith, 1998). Less successful reports tend to have used synchronous approaches (e.g. Bowker & Tuffin, 2004; Davis, Bolding, Hart, Sherr, & Elford, 2004). It has been noted that 'online chat' has a reputation for being rather playful, flippant and less serious than other online conversational contexts (e.g. Davis et al., 2004; Gaiser, 1997). However, some researchers have nevertheless reported obtaining rich, detailed data using synchronous approaches – for example, Barratt (2012), who conducted one-to-one synchronous interviews with young drug users, and O'Connor and Madge (2001), who carried out synchronous online focus groups with new parents (primarily mothers). Thus, it does seem possible to achieve rich, high-quality data using synchronous technologies. Both Barratt (2012) and O'Connor and Madge (2001) devised careful rapport-building strategies, in which they engaged in personal disclosure to try and establish good levels of interpersonal connection with their participants, prior to commencing the interviews. Thus, as noted earlier, this seems to be an important factor for success. Experience in using online synchronous communication technologies (for both participants and researchers) may also be a relevant factor (Barratt, 2012). Bowker and Tuffin (2004) compared both synchronous and asynchronous IMR interview approaches, and report that the latter was better able to generate rich, elaborate data.

One important beneficial feature of asynchronous approaches may be the ability to look back over the discussion, which might help encourage reflexivity, compared with either synchronous online, or offline FTF, approaches (e.g. Hewson, 2007). However, the greater opportunity for reflection in asynchronous interview approaches has also been noted as a possible disadvantage, since a response that has been so well considered might produce a 'socially desirable' answer, rather than a more genuine, spontaneous one (Gaiser, 2008; O'Connor et al., 2008). However, an alternative point of view is that 'gut' responses may be likely to conform to accepted, socially desirable norms, while more reflective, considered responses might be more truthful and honest. We are not aware of

research findings which directly explore this issue. A further possible disadvantage of asynchronous approaches is that they may hinder conversational 'flow', and reduce the coherence and continuity of an interview conversation. This might particularly affect focus group approaches, where participants will come in to comment on particular themes, topics and threads at different times (Gaiser, 2008). However, synchronous approaches may also be subject to issues related to reduced flow, due to the need for proficiency with this relatively new communication medium, including familiarity with relevant technologies, typing dexterity, and so on. Gaiser (2008) has also pointed out that a researcher may be faced with additional challenges when attempting to moderate an online asynchronous focus group discussion, compared with a synchronous discussion, since it will not be practicable to be present the whole time. This issue may be further compounded when a focus group contains participants from geographically diverse locations.

Data Integrity and Quality

As well as the levels of depth, reflexivity, candour and rapport that can be achieved in IMR interviews, other factors may affect the integrity and quality of data obtained. One issue concerns how to avoid misunderstandings, and detect disingenuous or deceptive responses, given the lack of extralinguistic cues available which are present, and informative, in FTF contexts. The enhanced scope for deception online has been a popular theme (e.g. see Epstein, 2007: http://www.scientificamerican.com/article.cfm?id=the-truth-about-online-da [accessed October 2014]). Deliberate intentions to deceive may be unlikely to occur in an online interview context, participants having volunteered their time and commitment, and likely being keen to offer their own genuine insights and experiences on the topic at hand. The experiences of IMR interview researchers to date indicate this to be the case (e.g. Barratt, 2012; Madge & O'Connor, 2002). It should also not be forgotten that determining the authenticity of interview data is an ongoing challenge in offline research. Genuine misunderstandings and conversational ambiguities might be more likely to occur in an IMR context, however, and researchers have sometimes reported this to be the case (e.g. Davis et al., 2004, who conducted synchronous interviews using online chat).

Multimedia approaches which use audio and video might help to reduce the chance of such misunderstandings, at least when the relevant technologies have evolved to allow better quality output and levels of reliability. Hanna (2012) reports using Skype to conduct interviews, and concludes that despite some 'technical hitches' the approach has potential where a closer approximation to FTF interviews is desired, and may be beneficial in offering a greater level of control to participants than offline FTF contexts since the intrusiveness of the researcher into the interviewee's personal space is reduced. This could potentially lead to a more equal relationship between 'researcher' and 'researched' (Hanna, 2012),

with possible implications for data quality. The use of emoticons (e.g. :-)) and acronyms (e.g. ROTFL: Rolling On The Floor Laughing) might help to disambiguate what might otherwise be ambiguous written text, in non-multimedia contexts. These extralinguistic devices tend to be more often used in synchronous than asynchronous communications.

Overall, while there have been a number of successful examples of online interview approaches, this IMR method has not taken off in quite the same way as survey and questionnaire methods. Researchers have been particularly reluctant to follow up on the early pioneering examples of *synchronous* online interview approaches (O'Connor et al., 2008). This may in part be due to reports of limited success, and perhaps also because of the additional time and effort required in setting up the technical aspects for a synchronous interview, compared with using email, for example (O'Connor et al., 2008). Given the goals of qualitative researchers, and particularly the emphasis on obtaining rich, reflective personal narratives, it is perhaps not surprising that there has been a reluctance to engage with IMR interview methods, which may seem impersonal and detached compared with traditional FTF contexts. However, considering the experiences of researchers who *have* engaged with IMR interview approaches, it is clear that rich, intimate, personal exchanges can occur online. Some of the benefits that an IMR approach can offer are also appealing. These include access to participants who may otherwise be excluded, such as those not living within a reasonable travelling distance of the research site, or participants with time and/or mobility constraints (such as the new mothers interviewed by Madge & O'Connor, 2002). IMR approaches can also facilitate access to other hard-to-reach groups, such as the young drug users interviewed by Barratt (2012). When considering sampling and accessibility issues, the synchronous–asynchronous distinction becomes relevant. Asynchronous approaches are generally better able to facilitate participation by widely geographically dispersed participants, especially in focus group research. They may also be most suitable when participants with limited typing dexterity are involved, as well as those who cannot dedicate a block of time to attend a 'live' synchronous session (see Chapter 6 for further discussion of design considerations and strategies). Research on sensitive topics might also benefit from IMR interview approaches, due to the possible effects of enhanced candour in online communication contexts.

Future Directions

Looking to the future of IMR interview methods, video-based approaches are bound to become more feasible as the associated technologies become more reliable (Fielding & Macintyre, 2006; Gaiser, 2008; O'Connor et al., 2008). These may offer the closest approximation to traditional offline FTF methods. As the user base of these technologies expands (which it no doubt will due to the benefits offered; for example, Skype allows users with a good Internet bandwidth to enjoy free calls

to any country in the world), so does the pool of potential participants for video-based interview research in IMR. The expansion in the availability and use of mobile technologies (smart phones, tablets, etc.) also has potential for impacting upon the direction of IMR interview methods. As discussed in relation to survey-based approaches, enhanced opportunities for creating *in situ*, immersive settings, using real-time geolocation information, incorporating multimedia technologies to gather richer data, and so on, emerge. Such possibilities may support innovative techniques such as 'walking interviews' (e.g. Jones, Bunce, Evans, Gibbs, & Hein, 2008) and 'visual methods' (e.g. Bagnoli, 2009), for example.

Other possibilities include using online virtual reality environments (VREs) such as Second Life (see Chapter 6) as a platform for conducting 'virtual face to face' interviews and/or focus groups (Gaiser, 2008). Such developments could imaginably start to resolve issues related to the reduced flow and/or greater difficulty in establishing rapport in current IMR approaches. Stewart and Williams (2005) (citing Williams, 2003) discuss an attempt at implementing an online focus group in a virtual graphical environment, using avatars. Discussions took place in an open field, which was set up as a virtual private space for research purposes. Finally, while some researchers have strived to create online interview contexts which mimic as closely as possible the processes of offline FTF settings (e.g. James & Busher, 2006),[2] for which approaches using video or VREs might hold most promise, others have questioned whether this is the most effective strategy for IMR methods (O'Connor et al., 2008). Rather, it may be more useful for researchers to think about alternative, creative and novel ways in which IMR approaches might best support and enhance interview research. The value of combining both online and offline interview methods should also not be overlooked. This may allow researchers to reap the benefits of each approach. Indeed, comparison of data obtained from offline and online modes is a research topic in its own right. However, some researchers have expressed concerns about the use of both online and offline interview methods (as done by James & Busher, 2006; Orgad, 2006; Sanders, 2005), arguing that this strategy perpetuates the unhelpful view that online interviews are not credible as stand-alone methods (O'Connor et al., 2008). Such comparisons are nevertheless of value if framed within a context of exploring commonalities and differences between online and offline methods.

OBSERVATION STUDIES

The distinction between observation and document analysis methods can sometimes become blurred in IMR, as noted earlier, but a useful working definition is that observation involves looking at *behaviours* and *interactions* (whether these be

[2]Though, interestingly, James and Busher (2006) used asynchronous email interviews in striving to achieve this goal.

traces of these, such as discussion group archives, or live in real time), and document analysis involves looking at static, published documents and media placed on the Internet as an authored, final product (e.g. a published article, webpage, song, photo album, a virtual exhibition of an artist's works, or the virtual tours of museum collections as discussed in Chapter 2). Another way to think about the distinction is that observation approaches consider the *processes* of online interaction that individuals engage in, while document analysis considers the final products they generate. Previous working definitions seem too narrow in today's IMR context; for example, Hewson (2007) suggests that online observational research 'uses logs of interactions (typically verbal exchanges) between participants, as opposed to document analysis which makes use of static records constructed specifically for the purpose of dissemination via the Internet, and whose primary purpose is not to facilitate an ongoing dialogue-type communication between individuals' (p. 416). However, not all online observational research uses logs, since it can also be conducted in real time. Also, online observational research may now draw upon a wealth of data sources and materials which extend beyond 'verbal' exchanges. Our working definition proposed here is quite broad, but serves to focus the present discussion without excluding any of the observational approaches we wish to cover.

Referring back to Figure 3.1, observational approaches span the obtrusive–unobtrusive dimension most broadly. Here, we discuss a range of approaches, including those which make use of primarily linguistic data and those that move beyond linguistic data.

Linguistic Observation

Discussion Group Archives. Observation of text-based sources using unobtrusive, non-participant approaches (a least obtrusive design) can proceed by accessing online linguistic discussion group *archives* (discussed further in Chapter 6). This approach opens up opportunities for searching and locating topic-specific content quickly and cheaply. Bordia (1996) used this approach to locate instances of rumour transmission using Usenet, Internet and Bitnet far more easily than is possible using offline methods. Brady and Guerin (2010) collected discussion board posts, covering a two-week period, from archives of a parenting support group website, and subjected these to qualitative analysis. In many respects such unobtrusive linguistic observation techniques in IMR are unique, and do not have offline equivalents, since offline conversations are not so readily recorded, stored and easily searched for topic-specific content. The closest offline equivalent may be to use corpora, such as the British National Corpus (BNC; see www.natcorp.ox.ac.uk [accessed October 2014]) – a large, searchable database of written documents and spoken language sources, including both formal (e.g. radio shows) and informal (unscripted dialogues recorded by volunteers) conversations. Traditional corpora derived from offline sources are unlikely to offer the breadth, diversity and scope of online traces of human conversational interactions, however. For the most

part, readily accessible online archives involve asynchronous communications, synchronous conversations being less likely to be automatically recorded.

Asynchronous 'Live' Discussion Groups. An alternative to accessing stored archives is to follow asynchronous discussions in 'real time', by logging on regularly and collecting posts as they appear. Since online asynchronous communications occur over an extended time period, and it is not practicable for a researcher to be constantly online monitoring a discussion, date and time stamps are useful to show the time any individual post was made. Such information is also available in stored archives, of course, but one advantage of following an asynchronous discussion as it unfolds in real time is the scope for participant observation. Further, it is more likely to be possible to gain consent from participants of a live, active forum (archived discussions might involve participants who have since left, even if the forum itself is still active). Fox, Ward, and O'Rourke (2005) conducted a participant observation on a pro-anorexia website, participating in discussions on message boards (posting up questions) and engaging in personal exchanges with individuals who contacted them directly. They fully disclosed their role as researchers. Brotsky and Giles (2007) carried out a similar participant observation, but without disclosure. One researcher joined a selection of pro-anorexia websites, posing as a plausible persona and taking part in discussions, in an attempt to gain insights into the beliefs, perceptions and behaviours of group members. Aho, Paavilainen, and Kaunonen (2012) adopted a non-participant observation approach. After disclosing their intentions as researchers, and obtaining consent from group members, they carried out a longitudinal qualitative study (over five years) of mothers' experiences after the death of a child, by collecting messages unobtrusively from a private Internet support group website.

Participant observation approaches, such as those just mentioned, can support ethnographic IMR, or 'virtual ethnography' (Hine, 2000; see also Markham, 1998). Here the researcher aims to become 'immersed' in a target community. See Hine (2008) for a more up-to-date overview of virtual ethnography methods.[3] Examples of the approach include Ward (1999), who carried out interviews and observations within two feminist online communities, and Baym (2000), who used participant observation, online surveys and interviews, and systematic message content analysis. A more recent example is presented by Tackett-Gibson (2008) who studied online communities engaged in exchanging drug use information. Interestingly, Tackett-Gibson reports that intentions to disclose the research fully were blocked by moderators, who gave permission only to lurk and carry out observations unobtrusively, and access stored archives. One argument for non-disclosure is to avoid disrupting existing online social structures. As these examples

[3]Recent accounts have emphasised the importance of also considering participants' offline lives in 'virtual ethnography' approaches, as well as questioning whether virtual ethnography actually brings any 'radical methodological innovation' to the ethnographic methods (e.g. Hine, 2008).

demonstrate, online ethnographers have drawn on a range of methods, including online surveys, interviews, observation techniques, and use of existing documents, to gather data within a single research study. For further discussion of such mixed and multi-methods approaches in IMR, and their potential benefits, see Hewson (2008) and Hesse-Biber and Griffin (2013). For a discussion of 'Netnography' – originally conceived of as online ethnographic research in a consumer and marketing context[4] – see Kozinets (2002); for some recent examples, see Björk and Kauppinen-Räisänen (2012) and Rageh, Melewar, and Woodside (2013).

Web 2.0 and Social Media Technologies. Web 2.0 technologies open up possibilities for unobtrusive linguistic observation approaches which go beyond using the rather earlier (but still enduring) Internet newsgroup and discussion forum technologies discussed above. For example, Tonkin, Pfeiffer, and Tourte (2012) analysed 600,000 tweets on the August 2012 riots in the United Kingdom, looking for evidence that Twitter served as a central organisational tool to promote illegal group action (which the authors report finding not to be the case). Moreno et al. (2011) carried out an observational study on Facebook by analysing the status updates of 200 undergraduate students who had public profiles, in order to look for evidence of depressive symptoms. These examples demonstrate the blurred boundaries that can emerge between observation and document analysis methods in IMR. What constitutes an interaction or a document online can be ambiguous, as can what is labelled an 'archive' or 'live', real-time interaction. It is the ongoing logging of traces of online interactions and activities on a massive scale that creates these ambiguities, which does not occur in the same way in offline contexts. Blogs[5] present a good illustration; starting off primarily as frequently updated, text-based, personal diaries published online (typically in the public domain), they later came to include more interactive, multimedia elements, including commentaries and contributions by various people other than the author. Nowadays, blogs are often viewed as more dynamic and interactive multimedia social spaces (e.g. Wakeford & Cohen, 2008). Herring, Scheidt, Bonus, and Wright (2005) point out, however, that blogs now appear in many diverse forms, existing on a continuum between standard HTML documents and asynchronous CMCs (such as newsgroups). They argue that the recent characterisation of blogs as interactive, fluid, eclectic and outwardly focused has been exaggerated; in their analysis of around 200 blogs they found less evidence of the blogs being externally focused than intimate, individualistic forms of self-expression (Herring et al., 2005). Halavais (2006) has described blogs as 'thinking-in-progress' (perhaps implying avenues for supporting IMR in some areas of cognitive psychology). Wakeford and Cohen (2008) discuss the use of blogs as

[4]Though the term has also been used more broadly (e.g. Janta, Lugosi, & Brown, 2012).

[5]Note that the term 'blog' is short for 'web log', but that the latter can also mean a 'log' of server activity (the latter not the intended meaning here).

spaces for placing field notes, during an ongoing study. Existing examples of blog analysis in IMR include Marcus, Westra, Eastwood, & Barnes' (2012) unobtrusive qualitative analysis of blogs of young adults with mental health concerns. In an attempt to gain an unbiased understanding of young adults' experiences, they report acquiring rich, informative data which offered important insights into young peoples' mental health experiences. Clarke and van Ameron (2008) conducted a qualitative analysis of the blogs of 45 men and 45 women who self-identified as depressed, and likewise gained useful data. Fullwood, Sheehan, and Nicholls (2009) conducted a content analysis of MySpace blogs, with the aim of examining the purpose, format and style of these compared with blogs from other blogging-dedicated sites. Again this study was reported to be successful. Blogs, then, provide a valuable potential source of data in IMR.

Synchronous Discussions. Observational IMR approaches, including ethnographic approaches, may also observe *synchronous* live discussions in real time. This approach, on the face of it, seems more likely to require disclosure than accessing asynchronous archives, or even following asynchronous discussions in 'real time'. Particularly in small groups, where lurking is unlikely to go unnoticed, disclosure would seem appropriate. However, some researchers have reported lurking and observing synchronous discussions without implementing any explicit disclosure or consent procedures, but without encountering any reported problems (e.g. Al-Sa'Di and Haman, 2005; Rodino, 1997). On the other hand, other researchers have presented evidence that lurking *can* be problematic, though disclosure has not necessarily proved any more helpful in resolving the difficulties encountered. Thus Hudson and Bruckman (2004) conducted a quantitative study in which they observed responses of chat room participants to disclosures of observation intent (recording the discussion) by researchers, compared with reactions to undisclosed entry and lurking. Hostility was experienced in both cases and these researchers report often being kicked out, though interestingly this happened less often when merely entering and lurking than when explicitly requesting permission. Hudson and Bruckman conclude that disclosure when using such observational methods in IMR may thus be untenable, and detrimental to a research project. However, it should be noted that Hudson and Bruckman made no attempt to engage with participants in any way that resembles the types of good-practice strategies for establishing rapport that were noted earlier as having been successful in online interview and focus group research (such as used by O'Connor & Madge, 2001). A number of researchers to date have reported successfully carrying out observations of online synchronous chat (e.g. Panyametheekul & Herring, 2003; Rollman, Krug, & Parente, 2000; Subrahmanyam, Greenfield, & Tynes, 2004). Both participant and non-participant observation approaches seem viable when following synchronous, live discussions. The choice made will affect the level of obtrusiveness of the study (participant approaches being more obtrusive).

Beyond Linguistic Observation

Social Media Websites. Web 2.0 has enhanced opportunities for observation of interactive behaviours online, including approaches incorporating multimedia. Thus, expanded social networking and sharing opportunities which incorporate audio, images and video have emerged. While these resources (Facebook, Twitter, Blogger, and so on; see also the list in Chapter 2) provide rich opportunities for collecting linguistic data, as discussed above, many also provide rich opportunities for collecting data which go beyond pure text. Several researchers have used multimedia sharing websites, such as YouTube (e.g. Frohlich & Zmyslinski-Seelig, 2012; Thelwall, Sud, & Vis, 2012), with a focus on either analysis of textual data (e.g. comments about shared YouTube videos), or the multimedia content itself. For example, Yoo and Kim (2012) carried out a content analysis of YouTube videos, analysing 417 obesity videos in order to explore how topics of obesity are framed, and how obese people are portrayed. Facebook has been a well-used source of data for observational studies; for example, Zhao, Grasmuck, and Martin (2008) examined identity construction on Facebook by carrying out a content analysis of 63 individual Facebook accounts (though much of their analysis did focus on text-based material as well as pictures that users posted on their profiles). In an analysis of 412 published studies which conducted research on Facebook (from journals and conference proceedings), from a range of disciplines, Wilson, Gosling, and Graham (2012) identify five categories of study type (ordered from most to least frequently occurring): the role of Facebook in social interactions (27%); descriptive analyses of users (24%); privacy and information disclosure (18%); motivations for using Facebook (19%); identity presentation (12%). Other SNSs have also been used to source multimedia, as well as linguistic, data; for example, McCreanor, Lyons, Griffin, Goodwin, Moewaka Barnes, and Hutton (2013) conducted an analysis of the way in which SNSs have been used by alcohol marketing agencies to promote advertising campaigns for their products, considering the role of such networking sites in promoting and supporting youth drinking cultures.

Virtual Reality Environments. Observational IMR researchers have also used VREs (also called MUVEs: Multi-User Virtual Environments) including those that support gaming applications (e.g. Massively Multiplayer Online Games: MMOGs). Such online interactive graphic environments (often 3D) where users (or players) interact with each other in a 'virtual world' hold intriguing possibilities for a variety of IMR methods, including observational and ethnographic research. Schroeder and Bailenson (2008) present a review of IMR approaches using MUVEs (which they describe as 'technologies that allow users to interact via digital representations of themselves in a virtual place or space', p. 227). Most of their examples are from computer science and educational contexts, and tend to use experimental designs. Indeed, one of the advantages of MUVEs is the scope for controlled manipulation of a range of parameters. Bainbridge (2007) also provides

a discussion of the scope and opportunities for VRE research, highlighting the potential for supporting ethnographic and interview methods. An early example of VRE research is Givaty et al.'s (1998) study on visual cognition, where participants (recruited via the Internet) were asked to navigate around a 3D virtual environment – which had been set up specifically for the experiment – and then recreate the location of various objects in that environment on a 2D map. Givaty, var Vaan, Chirstou, and Bulthoff (1998) explain how the IMR approach was able to facilitate access to a much larger sample size than is typically possible in this area using offline laboratory methods, leading, they argue, to potentially more valid results. Another early example is reported by Kendall (2002) who carried out an ethnographic study within an MUD (Multi-User Dungeon) environment. More recently, Williams (2007) describes an ethnographic study conducted in the graphical world *Cyberworlds*, where he was able to collect detailed field notes by observing avatars. Williams highlights the advantage (compared with offline methods) of being able readily to record field notes covertly during the observation period. For further discussion of the scope for gathering research data in virtual worlds, see Ross, Castronova, and Wagner (2012). Chapter 6, in this volume, discusses some of the different design choices, and their pros and cons.

Observing Structures and Processes. As well as methods accessing and analysing content found on the Web, or using experimental designs (as discussed above), the observation and analysis of structures and processes in online interaction are noteworthy. Couper (2005) talks about 'paradata' (also referred to as 'metadata') in the context of survey-based approaches; paradata is information about the completion process (e.g. how long was spent on each page or question, which pages were revisited, and so on). Automatic logging of paradata can usefully supplement survey responses. In observational IMR paradata can become primary data. Thus, it is possible to look at webpage navigations, Google searches, social network links (who is friends with who), and so on. For example, online social network analysis (SNA) studies the links which exist between people and groups online (e.g. who has messaged who, and how often, who has befriended who on Facebook, 'liked' or shared another's posts, commented on status updates, etc.). Hogan (2008) discusses SNA approaches in IMR, explaining that essentially these methods adapt principles from offline SNA to an online medium. Thus online SNA is fundamentally concerned with discovering information about the movement, structural properties and relationships of online social groups and communities. Graphical network visualisations are often used to represent the outcomes of SNA (see Hogan, 2008; also the examples available at www.visualcomplexity.com). Now that 'a growing segment of the social world is self-documenting and self-archiving in machine-readable form' (Wesler, Smith, Fisher, & Gleave, 2008, p. 117), online SNA seems a promising area of future development. One drawback of online SNA is that it is less easy to implement than some other IMR methods (e.g. interviews and surveys), requiring more

technically advanced data scraping techniques, involving the use of scripting languages, for example. A compelling feature of the approach, however, which may make seeking the required technical support worthwhile, is the ability to capture many weak ties, creating links that a person may otherwise not have remembered in a traditional offline self-reported study (Hogan, 2008). Of course, online social networks are also a legitimate field of enquiry in their own right, so of interest for this reason.

Since data traces obtained using unobtrusive data mining techniques, such as those used in SNA, may potentially include contributions from thousands, millions or billions of individual users, obtaining consent may be practically implausible, or impossible (see Chapter 5 for further discussion of ethical issues in unobtrusive research). One approach to addressing the ethical issues this raises is to collect data while also providing a valuable service to those who contribute the data. Locket and Blackman (2004) present such an example, in a marketing research context. They wanted to collect data on foreign exchange charges made by credit card companies to business travellers. Rather than try and collect the data using survey methods, they developed an online Travel Expenses Calculator (www.xe.com/tec) and Credit Card Charges Calculator (www.xe.com/ccc) which allowed business travellers to calculate the cost of a business trip in their own currency. They made these calculators freely available online. This allowed them to collect successfully the data they required by aggregating the inputted calculations. These authors argue that their data collection procedures were also beneficial to their participants, by offering them a valuable service.

Big Data. Approaches such as those discussed above can lead to extremely large data sets being generated. The notion of 'big data', a term originating in computer science to mean data sets of such magnitude that they are difficult to process computationally, has recently received a good deal of discussion. In an IMR context, big data sets may involve behavioural traces collated across numerous individuals, for example all Google searches over a certain period, which can generate a very large number of data points. Google Analytics (see http://www.google.co.uk/analytics/) is a service, primarily aimed at marketing and business applications, which allows users to generate detailed statistics on a website's traffic, by tracking visitors and their navigation behaviours (including searches initiated, purchases made, etc.). The practicalities of, and possibilities for, obtaining big data sets online for use in social science research is a young, ongoing research area (a detailed review of which is beyond the scope of the present discussion). Investigative projects exploring this topic are already underway, such as the Oxford Internet Institute's 'Accessing and Using Big Data to Advance Social Science Knowledge' (see http://www.oii.ox.ac.uk/research/projects/?id=98; accessed November 2015). At the time of writing, the journal *Social Science Research* was calling for contributions to a planned special issue on 'Big Data' in social science research. The value and role of such data sets in social science IMR remain very much to be explored.

Future Directions

Considering future possibilities in observational IMR, again Web 2.0 technologies and services, and mobile Internet access devices, hold potential for facilitating various imagined avenues. The expansion of Internet access on the move via smart phones, tablets, and so on may open up possibilities similar to those discussed in relation to interview and survey methods, including measurement while participants are immersed in real-life contexts, and the use of geolocation information. Observation of people's movements around a city, or a building, might be one option, for example. Enhanced opportunities for reliably recording video and audio could enrich such approaches. Smart phone and tablet apps offer opportunities for collecting potentially vast volumes of *in situ* data while participants are on the move; indeed, data may be collected as a by-product of personal usage of a service offered, in a similar way to Lockett and Blackman's (2004) collation of data on foreign exchange charges (see above). Some such examples have already emerged (e.g. the 'Mappiness' project, mentioned above). Other imaginable contexts with research potential include fitness, health and dieting apps (and we suspect examples in some of these domains already exist). The 'Internet of things' refers to the integration of everyday objects and online technologies, to create an ever-expanding array of Internet-connected devices. Such devices are already moving well beyond the more common examples of smart phones, tablets and televisions. Already there are prototypes for 'tablets' of the medicinal variety (smart pills) which are Internet connected, so that they can monitor and send data about when medication has been taken, for example. Smart running shoes which monitor performance (distance, speed, route, and so on) and can automatically upload data to an online networking site are currently on sale. Domestic central heating and lighting systems which can be controlled from a smart phone are now readily available. As the Internet becomes more and more integrated into everyday objects, and consequently everyday lives, the scope for collecting all sorts of data in a range of everyday contexts will only expand. The extent to which these data will be of use in social and behavioural research remains largely to be seen. What we have presented here are just a few ideas, some of which have already been piloted. As with the other methods discussed in this chapter, future implementations and innovations will enhance our understanding of what is achievable, and what holds most promise.

EXPERIMENTS

While not usurping the popularity of the web-based survey, web-based experiments have become very much more prevalent over recent years. For examples and discussion of the approach, see Birnbaum (2000) and the special edition of the journal *Experimental Psychology* (Reips & Musch, 2002). Other examples of IMR experiments include Laugwitz (2001), Horton, Rand, and Zeckhause (2011),

Lenzner, Kaczmirek, and Lenzner (2010) and Reips (2001). In the first edition of this book we outlined four key types of IMR experiment: those using only static materials (e.g. text and images); those using video or audio; reaction-time experiments; and experiments involving interpersonal interaction between people. At the time, scope for the first two approaches was promising, but for the latter two less so. Most examples available at the time used text- and graphics-based presentations of stimulus materials. Now there are additional examples using more sophisticated techniques, with success. As well as general improvements in Internet technologies and software (e.g. faster bandwidths), the emergence of a range of packages to assist in developing and disseminating web experiments has helped facilitate the scope and accessibility of the approach. For information on some of the software available, see Rademacher and Lippke (2007), Reips and Neuhaus (2002) and Schulte-Mechlenbeck and Neun (2005), as well as the further discussion in Chapter 6. A large, searchable collection of examples of IMR experiments can be found on The Web Experiment List,[6] and some examples are also available via the other online study clearing houses mentioned in Box 3.1 (see above).

Static Text and Graphics

Approaches which present static text and graphics remain well supported in experimental IMR; these designs tend to place the least demands on the technical skills of the researcher and the technical equipment (hardware and software) required. An early example from our own research which used a very simple, low-tech approach in which experimental materials (vignettes) were emailed to participants is presented in Box 3.5.

BOX 3.5 Case Study: Empirical Evidence Regarding the Folk Psychological Concept of Belief (Hewson, 1994)

Purpose

The study set out to examine the common-sense concept of belief by testing some claims made within the folk psychology debate about the nature of our everyday common-sense (folk psychological) notion of belief (Double, 1985; Stich, 1983).

(Continued)

[6]Reips and Lengler (2005) present statistics on the submissions to this list to show that web experiment implementations are on the rise, and that cognitive followed by social psychology experiments are the most common.

(Continued)

Procedure

The study was advertised on a selection of Usenet newsgroups, after recruitment during seminar sessions at a university campus proved time consuming and generated few responses. Within two weeks of posting the advertisement 135 responses had been obtained. Respondents were emailed study materials, with instructions, and asked to return their responses by email. The experimental procedure involved participants reading two short stories, each followed by a question.[7] They emailed their responses back to the researcher's email address. Since materials comprised plain text it was a simple matter to cut and paste the appropriate text into the body of the email message. Participants were assigned to experimental conditions pseudo-randomly, and a record of allocations was kept using email addresses for identification. Each participant's response was saved to a unique file and stored on a secure university account upon receipt. A 'thank you' and debrief message was sent back by email. Data were collated and anonymised, for later analysis using BMDP software.

Discussion

Advantages. The Internet procedure successfully generated a good sample size (compared with the offline approach) cost-effectively and quickly, using only a small number of newsgroups. Photocopying costs were eliminated by sending materials in electronic format, and demands on researcher time were reduced due to the efficiency of email administration (compared with visiting an offline site) and data coming back in electronic format ready for storage and manipulation. The Internet sample was clearly more diverse than what could be achieved using the offline recruitment methods, and the Internet data generated included detailed and elaborate answers compared with what had been achieved in a pilot study offline (which could be due to procedural or sample differences).

Disadvantages. The lack of tight control over procedural factors led to some unanticipated events which could have been problematic. For example, a small number of respondents sent their answers from a different email account to their original response. Thus the tracking procedure which identified participants by email addresses failed in these cases (though all these respondents did in fact alert the researcher to the use of a different email address). More robust procedures for participant tracking are discussed further in Chapter 6 in this volume. Also, a few participants returned their responses without including the original materials sent, which had not been expected, though the tracking procedure employed made this unproblematic in this case. Further discussion of the importance of making participant instructions clear and explicit, and carefully piloting study procedures, is also offered in Chapter 6. Another issue concerned the oversight in contacting moderators prior to advertising the study, which lead to a hostile response from a moderator in one instance, and the removal of the post.

[7]See Hewson (1994) for further details of the experimental manipulation and materials.

Limitations and Suggestions for Improvement

The sampling methodology employed here used a convenience sample; newsgroups targeted were selected because they were familiar to the researcher. In the present context this was not considered to be overly problematic, but follow-up studies could usefully consider broader and more carefully selected sampling procedures. The present approach was likely to reach respondents working in academia, and with an interest in psychology. The decision to collect information about educational experience was useful, however, confirming the aforementioned bias, and allowing the conclusion that having training in cognitive science and/or logic influenced answers. Collecting information on a range of further demographic details (not done here) would also have been useful to investigate further sampling bias issues. No expiry date for participation adverts was set here, though this can be useful as it gives the researcher more control over the data collection, and allows monitoring across the exposure period. Creating data backup files would have been a more effective (and cost-effective) method of protecting against data loss than printing out hard copies of individual responses, as was done here. Chapter 7 offers guidance on procedures for the secure, safe storage of data. More rigorous informed consent and debriefing methods could have been implemented to maximise adherence to ethics principles, as discussed further in subsequent chapters.

The example in Box 3.5 demonstrates how experimental designs can be implemented without requiring complex technological solutions, though it also raises issues related to the reliability of such methods and the lack of researcher control (e.g. over response parameters). The scope for implementing experimental manipulations by sending different materials to different participants is, however, straightforward. Quasi-experiments in which differences between groups is of interest also can be done relatively simply in this way. Other manipulations may involve some participants having to take part in a further task or procedure prior to, or in between, measurements. Incorporating graphics into materials should not be too difficult (e.g. as done by Senior, Phillips, Barnes, & David, 1999a), though may present greater scope for reliability issues related to different platforms used by participants, and potential variations on presentation parameters. As well as email, technologies such as ftp, telnet, and so on can also be used to make experimental materials available to participants. Further examples of such relatively technologically simple implementations in experimental IMR exist (e.g. Ahmed & Hammarstedt, 2008; Hewson & Vogel, 1994; Strassberg & Holty, 2003). More advanced implementations using more complex interactive procedures (e.g. see Ruppertsberg, Givaty, Van Veen, & Bulthoff, 2001) will of course be more challenging to develop.

While the above type of approach has been useful, particularly in earlier examples of IMR experimental research, nowadays experiments using technologies such

as email, telnet, ftp, etc., are rarely conducted (Reips, 2007). Rather, the Web is typically used as a platform for experiment delivery; participants visit a webpage and interact with experimental materials and processes via their web browser (much in the same way that online surveys are now routinely conducted). There are many examples of this approach available (e.g. Lenzner et al., 2010; Nückles & Bromme, 2002; Pohl et al., 2002; Senior, Barnes, Jenkins, Landau, Phillips, & David, 1999b). The emergence of dedicated web experiment implementation packages, improvements in Internet connection speeds and enhancements in browser capabilities have been important in facilitating this move towards web-based methods for IMR experimental research. Thus the variation in presentation of HTML code across different browsers that we noted in the first edition is less likely to cause problems with implementations developed using software packages which carefully adhere to cross-platform web-based standards. Of course, maintaining levels of control – one of the features which has been raised as potentially problematic in IMR approaches – is particularly crucial in experimental designs. In order to be able to make precise cause–effect inferences (between independent and dependent variables) internal validity must be assumed; keeping tight control over all potentially confounding variables is important in making this assumption. Recent technological developments which have helped to maintain control over presentation parameters in web-based research have thus been important in maximising the validity of web-based experiments.

Audio and Video

Since writing the first edition of *IRM* the scope for using audio and video in IMR has expanded greatly. In that first edition we raised the issue of problems related to download times when using larger files of the type required to support multimedia approaches, including even simple graphics, and concluded that only relatively small, easily downloadable file sizes should be used. Developments in Internet connection speeds have alleviated such problems to a large degree; whereas dial-up used to be a standard way of accessing the Internet, including web-based materials, broadband is now widely available, and widely used. Watching YouTube clips, for example, should not be problematic for many users, and thus taking part in experiments incorporating video clips should also not pose major issues.[8] As new developments such as fibre optic broadband continue to emerge and become more widely available, such issues will become even less problematic. In the first edition, we referred to psycholinguistic studies concerned with speech recognition, and musical perception studies, as domains where manageable-sized sound clips might be used; examples of both types of approach have now been forthcoming (e.g. Knoll, Uther, & Costall, 2011; also see the BBC musicality test at https://ssl.

[8]Exceptions may be where very precise timings are required.

bbc.co.uk/labuk/experiments/musicality [accessed October 2014]). We noted that experiments using larger sized video clips may become more plausible in the future; some examples are now also available (e.g. Caro et al., 2012).

Reaction-time Experiments

Experiments involving very precise reaction-time measurements (i.e. to the millisecond) seemed unlikely in the early days of IMR, largely due to inadequate Internet data transfer speeds and low reliability due to network traffic variations, different user platforms, etc. In a traditional setting such approaches are possible by getting the participant to interact with a computer program which can present materials and measure reaction times to the required level of precision, in a very tightly controlled environment. However, more recently examples of successful reaction-time studies in IMR have been presented (e.g. Corley and Scheepers, 2002; Eichstaedt, 2002). These approaches can thus support experiments in cognitive and behavioural science which in the early days seemed implausible. Caveats still emerge; for example, if participants are using older technologies (e.g. dial-up) such implementations may not run without problems, though faster broadband connections now tend to be the norm. Network traffic fluctuations can also lead to issues in reliably sending and receiving data. Still, as technologies and their widespread adoption continue to evolve, these issues can only become less problematic. The impact of Internet traffic, bandwidths, etc., should nevertheless be considered when designing studies which require precise timings, both for presenting stimuli and measuring responses. Solutions which involve downloading a program to a user's own computer to be run offline may still offer a possible solution which can help enhance reliability where it is thought this could be an issue (e.g. as in a user having only a dial-up connection).

Multi-user Experiments

The final type of experiment we outlined in the first edition was where, instead of an individual participant interacting with a computer program, two or more participants are brought together to interact with each other. Experiments on cooperation, for example, have used such an approach in offline contexts (e.g. Locey, Safin, & Rachlin, 2013). Recent technological enhancements have also increased the scope for implementing such designs in IMR. Web-based interactions now abound in many different contexts, such as MUVEs (discussed earlier) and collaborative networking settings where, for example, two or more participants may work together simultaneously on creating a document, graphic, presentation, etc. (e.g. using Google Docs, or one of the many hosted wiki services). Horton et al. (2011) report carrying out online experiments in which participants (recruited via the online labour market Mechanical Turk, see www.mturk.com) interacted

in versions of the paradigmatic prisoner's dilemma game. They successfully replicated offline lab-based results using this method. However, they point out the present lack of developed, accessible software tools for implementing more sophisticated interactive online experiments of this type, noting that bespoke solutions will often be necessary. As noted earlier, virtual environments such as MUVEs hold particular potential for facilitating collaborative, interactive *experimental* designs in IMR. Schroeder and Bailenson (2008) discuss some examples (e.g. Becker & Mark, 2002; Slater, Sadagic, Usoh, & Schroeder, 2000). They mention headcam studies, which take place in a laboratory and a virtual environment at the same time (potentially blurring boundaries between offline and online methods). In such situations participants could potentially be engaging in online virtual interactions with other participants, as well as with the experimenter in a non-virtual laboratory.

Future Directions

As indicated above, the scope and possibilities for conducting IMR experiments have expanded substantially over the last 10 years or so, and this trend will likely continue. Enhanced technological developments, and the development and refinement of software packages that make IMR experiments easier to construct and disseminate, should facilitate the approach. Advantages of an IMR approach include many of those outlined earlier (broader geographical reach, time and cost savings, convenience to participants, etc.). Given the popularity of online gaming activities, the novelty value afforded by online experiments which, for example, ask participants to interact and perform tasks in MUVEs could be appealing and enhance recruitment success. Reips (2002b) discusses the various benefits, as well as disadvantages, of IMR experiments, making the noteworthy point that the greater technical variance in IMR contexts may actually be an advantage, since it can enhance the external validity (i.e. generalisability across diverse contexts) of a study compared with very tightly controlled lab-based studies. This challenges the common perception that greater variability in web-based experiments (due to a lack of control over the participation environment, and so on) is a problem to be overcome and minimised (e.g. Horton et al., 2011; Reips & Musch, 2002). Web-based experiments may therefore have a useful role to play in replicating offline findings. Of course, uncontrolled and unknown variability *is* a problem where precise causal relationships between particular variables are being tested for the first time. However, when attempting to replicate established offline findings using online experiments, obtaining equivalent results in an IMR context arguably is a test of the external validity of a demonstrated effect, as Reips (2002b) suggests. IMR validation studies were mentioned earlier in the context of online survey methods; similarly encouraging results have been obtained in experimental research (e.g. Horton et al., 2011; Knoll et al., 2011; Pohl et al., 2002). This

bodes well for the ongoing prevalence of experimental IMR. Future innovations may make use of the various emerging technologies that have been mentioned in relation to other methods, such as mobile applications, the Internet of things, and enhanced multimedia possibilities. For a useful discussion of some of the current methodological issues to consider in IMR experimental design, see Reips and Krantz (2010), as well as the further discussion in Chapter 6.

DOCUMENT ANALYSIS

There are fewer examples of document analysis in IMR, compared with other methods, but examples of both quantitative and qualitative studies do exist. Analysis of blogs has been a thriving direction in some disciplines, including marketing research and linguistics. Given the volume of published documents available online, the approach has great potential. Thus webpages, blogs (at least those which maintain the traditional role of an individually published personal diary), news articles, scientific articles, online repositories of, for example, photos, musical compositions, artwork, and so on, are all potential sources (see also the online resources outlined in Chapter 2). As already noted, some online resources straddle the boundary between being a static, published final product and an interactive, fluid, regularly updated collaborative 'work-in-progress'. Twitter seems a good example: tweets are short comments, ideas, links to information, and so on, posted by individuals. These elicit comments, and shares (retweets) from other tweeters. Given the size of its user base (at the time of writing, 271 million monthly active users, see https://about.twitter.com/company [accessed August 2014]), Twitter potentially offers access to massively big data sets, of people's passing thoughts, ideas, comments, interjections, observations and information sources (e.g. new articles) that they are interested in. There is really no offline equivalent to tweets as a source of data. The use of Twitter as a source of data for observational research was noted above; the ready access to shared documentary sources via this service also makes it a potential useful site for use in document analysis IMR.

Existing Documents

A number of studies have used existing online sources to carry out document analysis. For example, Thoreau (2006) carried out a qualitative analysis of text and images from *Ouch!*, a magazine website produced largely by and for disabled people, in order to examine representations of disability by disabled people. This approach enabled the gathering of data not easily obtainable via traditional offline media sources (radio, press, television), such as first-hand reports of personal experiences. Another example is Heinz, Gu, Inuzuka, and Zender's (2002) rhetorical–critical examination of texts and images on gay, lesbian, bisexual and

transgender (GLBT) websites. These authors conclude that the Web provides a particularly important source of information on transformations in the cultural construction of GLBT identities, noting in particular the transnational nature of many online spaces, which can enable a comparison of 'shifting cultural identities' in a way that would be difficult and time consuming offline. This study illustrates the way IMR methods can collapse geographical boundaries and facilitate cross-cultural research.

As already noted, some authors have undertaken an analysis of blogs, with positive results (e.g. Clarke and van Ameron, 2008); Marcus et al. (2012) emphasise how the use of IMR methods helped them to reach a traditionally under-researched and under-treated population (young adults with mental health concerns). Hou, Chang, and Sung (2010) used content analysis to examine what types of knowledge teachers share on blogs (in this study a blog was set up as part of the research). See also Huffaker and Calvert (2005) who analysed teenagers' blogs to examine issues of identity, gender and language use. A more recent discussion of content analysis methods using data sources from the Web, particularly blogs, can be found in Herring (2010).

Solicited Documents

Another approach is to solicit documents online, rather than access what is already there, as was done in the above-cited studies (except Hou et al., 2010, who set up a dedicated blog space for teachers to use). Hessler et al. (2003) took this approach, asking adolescent participants to submit daily diary entries via email, in a study looking at risky behaviours. This generated rich narratives, and encouraged open, candid responses. In this way, the IMR methodology resolved difficulties in establishing rapport with this target group, which can often be an issue in offline FTF research. These researchers suggest that an IMR approach can be particularly beneficial when conducting sensitive research with young people, as the use of email may offer a 'comforting air of informality'. However, email also has security risks which must be taken into account when using this transmission method. Hessler et al. addressed this issue by setting up email accounts using fake names, to reduce threats to participant anonymity. They also used rigorous informed consent procedures involving gaining signed offline consent from an adult gatekeeper. Possibilities for incorporating multimedia data into document analysis approaches emerge, for example allowing the use of image uploads in elicited diary studies (ethics considerations permitting), or accessing online multimedia sources when using existing documents (e.g. multimedia sharing sites, artists' homepages, etc.).

Of the document analysis approaches reviewed above, document solicitation approaches will be generally less time and cost efficient than searching for and

locating existing archives on research-relevant topics. However, as the research of Hessler et al. (2003) has shown, they can still prove to be cost effective when compared with traditional offline methods, and bring particular benefits to a research study. Both approaches seem to hold promise for the future, as the Internet, the documents it hosts and its population of users continue to expand.

In this chapter we have reviewed and illustrated a range of key methods in IMR, considering their strengths, weaknesses and future potential. Integral to any research project is the planning and design of sampling strategies. We now turn to look in detail at sampling issues, opportunities and procedures in IMR, in Chapter 4.