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Major issues in the use of mixed methods in psychology

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# Introduction

Mixed methods research involves the utilization of qualitative and quantitative approaches together in a single study or a programme of related studies. Qualitative approaches typically focus on textual data but collate, conceptualise, and interpret data in very different ways. For example, data may be naturally occurring talk or text that is captured by the researcher or it may be (co-)produced in response to the researcher asking questions; the resulting data may be interpreted for what they reveal about phenomenological experience or be seen as demonstrating the discourses that structure social interaction. Quantitative approaches typically focus on numerical data but again there is much diversity in how data are collated, conceptualised, and interpreted. For example, self-report data may be collected from a large number of survey participants, reaction times to respond to experimental stimuli may be measured, or physiological parameters such as salivary cortisol or patterns of brain activation may be analysed. Given this multiplicity of different qualitative and quantitative approaches in psychology, it is unsurprising that mixed methods research poses multiple challenges that go above and beyond the challenges of conducting single method research.

This chapter explores three sets of challenges faced by researchers working with mixed methods in psychology: epistemological, technical, and professional. Like single method research, mixed methods approaches entail both philosophical assumptions and technical methods of inquiry [18]. Thus mixed methods can be conceptualized in terms of methodology (i.e., a general approach to research that flows from underlying philosophical assumptions) and/or method (i.e., a specific technique for collecting or analysing data; [71]). We argue that it is important to take both of these perspectives, to consider critically both the epistemological foundations and the technicalities of mixed methods research, in order to conduct impactful research. It is also important to consider the issues that mixed methods research raises for the profession as a whole and for the careers of individual researchers. We begin by discussing some epistemological issues that arise in mixed methods research and the challenges they pose, before exploring what we see as the foremost technical challenge – how to integrate the multiple components of mixed methods research. Finally, we focus on professional issues in mixed methods research, reflecting on the challenges that face the individual researcher utilizing mixed methods and the ways in which the discipline as a whole might respond. Throughout, we offer suggestions for how specific challenges can be addressed, providing illustrative examples from the burgeoning mixed methods literature including our own research.

# Epistemological Challenges

Historically, epistemological incommensurability was cited as an insurmountable barrier to mixed methods research. This argument arose from a paradigmatic view which emphasized the different philosophical assumptions underpinning qualitative and quantitative approaches. Quantitative research was characterised as involving realist and positivistic assumptions that lead psychologists to strive for objective knowledge about causal relationships between variables, and to obtain such knowledge by using reliable and valid measures, and controlling and minimizing bias through experimental design and advanced measurement technologies. In comparison, qualitative research was characterised as being underpinned by interpretivist or social constructionist assumptions that lead psychologists to strive for locally- and contextually-situated knowledge that provides novel insights into the human condition, and to obtain this knowledge through methods that emphasize the value of naturalistic data, attend to language and culture, and value rich subjective data showcasing human meaning-making [17; 35; 44; 47]. Such a strong and dichotomous paradigmatic view is unsustainable when one attends to the high degree of diversity within quantitative and qualitative approaches (see above, also [27]) and the overlap across these categories [79]. For example, an attitudinal survey and a phenomenological interview study arguably have more in common with each other than the former has with a neuroimaging experiment and the latter has with a discourse analysis. Furthermore, the characterisation of quantitative research as entailing a positivistic approach to psychology is arguably no longer consistent with actual research practice. Rather, quantitative approaches are now more likely to be underpinned by critical realist and/or post-positivistic assumptions that render them far more sensitive to the role of context and entail a more probabilistic approach to knowledge [80].

While qualitative and quantitative approaches are no longer seen as incommensurable, this does not mean that mixed methods research raises no epistemological issues. On the contrary, it opens up space for discussion on how to think about qualitative and quantitative approaches when they are utilized together in mixed methods research. It also opens up space for unwitting researchers to overlook the persistent epistemological differences between some qualitative and quantitative approaches and the impact of these on how we design, conduct, and evaluate research. For example, in a post-positivistic attitudinal survey it remains important to strive for objective measurement using standardised valid and reliable tools, while acknowledging that bias-free knowledge can never be achieved. Whereas in a phenomenological interview study one strives for rich, subjective data and so it is more important to ask open questions flexibly within the context of the interview. If such differences are overlooked in favour of an exclusive focus on technical issues, then researchers risk taking a superficial approach that fosters uncritical and un-reflexive practices resulting in poor quality research that undermines the potential of mixed methods [74]. Conducting a qualitative component of a mixed methods project from a post-positivist perspective may, for example, lead a researcher to standardise an interview topic guide and thus fail to explore the nuances and richness of individual participant’s perspectives. Conversely, conducting a quantitative component of a mixed methods project from an interpretivist perspective may, for example, lead a researcher to survey a small sample of people and thus fail to obtain the necessary statistical power to test for relationships among variables. These pitfalls can be avoided by appropriately attending to epistemological assumptions about knowledge and its legitimate sources [13; 78]. As Morse [54] argues, it is important to maintain the integrity of each component in mixed methods research in order to maximise the potential benefits.

Pragmatism has now emerged as a popular and perhaps dominant approach to addressing the epistemological challenges of mixed methods research [14; 16; 23; 32; 53; 69; 79]. (Although the transformative-emancipatory approach is also viable and popular; [50]) It is important to be clear that pragmatism should not be equated with a ‘practical’ or ‘expedient’ approach to mixed methods research [21]. Employing a pragmatic epistemology does not simply involve doing what is easiest or quickest. Nor does a pragmatist approach mean that mixed methods research should be judged purely in ‘practical’ terms. Rather, adopting a pragmatist epistemology for mixed methods research means drawing on pragmatist philosophers such as John Dewey, William James, Charles Sanders Peirce, and Richard Rorty, to inform a more sophisticated approach [e.g. 16; 44; 79].

The philosophical literature includes multiple diverse positions on pragmatism, which have been summarised in their historical context by Hookway [40]. Similarly, the methodological literature also includes multiple interpretations of pragmatism. There are however some broad similarities which can be said to characterise pragmatist mixed methods research [44]. One, pragmatist approaches recognise but do not overstate the epistemological differences between qualitative and quantitative approaches. The epistemological differences are not seen as rendering qualitative and quantitative approaches incommensurable, but are seen as important to attend to in the design, conduct, and evaluation of mixed methods research. Two, pragmatist approaches advocate a shared aim for all research, whether that be qualitative, quantitative, or mixed methods: to produce positive change in the world. In this way, pragmatist research should focus on its external consequences. For psychology, this might entail a focus on the impact of research on outcomes such as mental health, wellbeing, and happiness. Three, pragmatist approaches tend to reject objective-subjective dualism, disarming hierarchical approaches to knowledge [e.g. 36] that can devalue qualitative and mixed methods research and encouraging a more critical approach to the psychological knowledge produced through advanced technologies such as neuroimaging. Four, pragmatist approaches typically view scientific truths as provisional and achievable through diverse sources of experience and experimentation; this viewpoint is somewhat consistent with post-positivist and constructionist assumptions, facilitating the creative use of qualitative and quantitative approaches in mixed methods research. Five, pragmatist approaches tend to view knowledge as both constructed and grounded in the world. This epistemological middle-ground addresses the concerns of those coming from a constructionist epistemology to highlight the role of socio-cultural and linguistic factors in creating knowledge while also addressing the concerns of those coming from a post-positivist epistemology to ensure material and physiological factors are not overlooked.

Cornish and Gillespie [16] and Yardley and Bishop [79] explain how pragmatism for mixed methods research can be interpreted in terms of its implications for evaluating or appraising research quality. In particular, the fundamental pragmatist aim - to make a positive difference in the world - requires a shift in our thinking about how we judge research. From this perspective, research should not be judged according to the extent to which the knowledge produced accurately represents ‘reality’. Rather, research should be judged according to the extent to which the knowledge produced has valuable external consequences in the context of the researcher’s own time and place. Examples of such consequences might include, for social psychologists: informing the prevention and resolution of intergroup conflict; for cognitive psychologists: optimising teaching and learning strategies for human memory; for developmental psychologists: improved support for families facing challenging circumstances; for clinical psychologists, better therapeutic interventions leading to improved mental health for individuals; for forensic psychologists, better understanding of information processing biases in witness questioning leading to reduced miscarriages of justice; and for health psychologists, more effective public health services targeting a specific health behaviour.

From this pragmatist perspective, then, all research should be evaluated according to the extent to which it achieves its own particular desired external consequences. One potential difficulty with this approach is that it may involve postponing judgements of quality to permit the time required to translate research findings into actions. However, such a shift to a broader, longer term perspective that extends research beyond the peer review journal and into the real world would certainly be consistent with the ever-growing emphasis on impact in science and higher education [49].

Focusing on the external consequences of research does not mean that mixed methods research should abandon other ways of evaluating research quality. In particular, addressing method-specific quality criteria in the quantitative and qualitative components of mixed methods research should help achieve the desired external consequences [79] and may provide early indicators of the potential for doing so. Part of this involves attending to methodological texts on how to design and conduct good quality studies using specific methods. It is also important to attend to guidelines on how to write-up studies using specific approaches; such reporting guidelines have proliferated and cover multiple quantitative designs as well as qualitative research (for example, see: <http://www.equator-network.org/> ) while many psychology journals also provide their own method-specific reporting guidelines.

In addition to ensuring and appraising the quality of each component of mixed methods research, it may also be important to consider the quality of the mixed methods research overall. Again, within a pragmatist perspective, one would argue that poor quality mixed methods design and conduct would render mixed methods research less likely to achieve its desired external consequences. Quality criteria for the overall mixed methods design have been proposed but are somewhat contentious [e.g. see 14; 15; 38; 61]. The Mixed Methods Appraisal Tool [or MMAT, 62] may help as it offers an efficient means of sensitizing researchers and enabling readers to evaluate quality issues related to individual components and the overall mixed methods design. It is a simple checklist intended to be used to describe and/or appraise the quality of studies in systematic reviews that incorporate qualitative and quantitative and/or mixed methods studies. The MMAT was developed systematically [61] and can be used quickly and reliably [58] to appraise the quality of mixed methods research design and reporting. It comprises two screening questions followed by five separate five-item sets of questions to appraise the quality of (1) qualitative methods, (2) randomized quantitative studies, (3) non-randomized quantitative studies, (4) descriptive quantitative studies, and (5) the combination of mixed methods used. This means that one tool can be used to assess the qualitative component, the quantitative component, and the mixed methods work. Furthermore, the mixed methods items include an explicit assessment of whether “the different components of the study adhere to the quality criteria of each tradition of the methods involved.”

In summary, early attempts to advocate mixed methods research were dogged by claims of epistemological incommensurability between qualitative and quantitative approaches. While the differences between qualitative and quantitative approaches have been overstated and are no longer seen as incommensurable, there are still important differences between individual qualitative and quantitative approaches meaning that mixed methods researchers need to attend to epistemological issues. Pragmatism has emerged as a leading epistemology for mixed methods research in psychology, with an emphasis on the coherence and external consequences of research. Box 1 gives an example of a pragmatist mixed methods project in which multiple qualitative and quantitative studies were used to inform the development of an intervention which was then tested quantitatively.

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| **Box 1. Illustrative example of pragmatist mixed methods research to develop and test an intervention to improve patients’ ability to give informed consent to the chance of receiving placebos in a trial**  In this programme of research a pragmatist approach guided the utilisation of a series of qualitative and quantitative studies building towards a final trial demonstrating the significant effect of an intervention on a real-world outcome. A number of small, in-depth qualitative studies were conducted to explore how patients in clinical trials experience placebos. These studies established that patients develop their own mental models of placebos and their effects and these can be shaped by, among other things, a therapeutic misconception that the purpose of clinical trials is to benefit the individual patient participant [e.g. 11]. A content analysis of existing patient information leaflets used in placebo-controlled clinical trials was then undertaken, which suggested that patients are told very little (and sometimes virtually nothing) about placebo treatments and that this is inconsistent with modern scientific understanding of placebos [9]. Building on the qualitative and content analysis studies, a questionnaire tool was developed to identify knowledge gaps about placebos that are most prevalent among the general public [42]. This information, combined with the insights from the qualitative studies, was used to inform the development of web-based information about placebos for patients with back pain, prototypes of which were iteratively refined using qualitative think-aloud methods to understand patients’ reactions to the new website [34]. Finally, in a randomised controlled trial, a quantitative comparison (using the previously-validated questionnaire tool) showed that the new website significantly increased the proportion of patients able to make an informed choice about taking a placebo [10]. |

# Technical Challenges

A major issue for psychology researchers in undertaking mixed methods research is how to integrate qualitative and quantitative data. Integration refers to the use of quantitative and qualitative data to answer the same research question [55]. Researchers have described three different levels of integration in primary mixed methods research at the stage of design, methods and interpretation/reporting [19; 26].

Integration of mixed methods at the design level is probably most familiar to researchers. Various designs can be used to ensure that qualitative and quantitative components gather useful and practical data for answering the research question. Basic designs, including exploratory sequential, explanatory sequential and convergent, mean that qualitative and quantitative components of the work are planned to follow on from each other or to inform one another across a study period [20; 26]. More advanced frameworks can be uses for specific studies, for example in an intervention mixed methods framework, researchers may use qualitative methods to understand what contextual factors are important to help inform the development of the intervention and to explain the effects of the intervention.

Integration at the methods level refers to how qualitative and quantitative data are used together to answer the research question [19; 26]. Data sets may be connected through sampling as qualitative and quantitative data are collected from the same participant. Data of one type may build on and inform data collection for another type, for example qualitative data may help to design items for a survey (as in Box 1). Data may also be merged to answer a research question, here qualitative and quantitative data collection is designed to facilitate such merging. For example, interview guides for qualitative data collection may be written to ask similar questions to surveys collecting quantitative data. Lastly, data may be integrated though embedding, or linking data sets at multiple points through a study. The link may be through connecting, building or merging findings, as above, while embedding is the recurrent linking of mixed methods data [26].

When interpreting and reporting mixed methods studies results are typically presented narratively. Sometimes quantitative and qualitative components of the work are analysed and written up separately, as a ‘staged approach’ [26]. Occasionally mixed methods work may be written up as one report within which the qualitative and quantitative components are presented and discussed separately, a ‘contiguous approach’ [26]. Lastly, reports may weave findings from qualitative and quantitative work together to explain the phenomenon of interest, a ‘weaving approach’ [26].

Throughout each of the methods and designs above, qualitative and quantitative data collection are collected and analysed separately. When interpreting results authors commonly refer to what each data set reveals about the topic under exploration and comment on any similarities and differences in what has been found from use of different methods. This approach provides a broad overview of how findings relate to one another which, while useful, may miss some important comparative insights across the data sets [7].

Researchers may not be aware that there are recommended methods available for systematically integrating quantitative and qualitative data sets at the analysis and interpretation stage. O’Cathain and colleagues (2010) present three techniques for integrating data in mixed methods studies; a “triangulation protocol”, “following a thread” and use of a “mixed methods matrix” [55].

Triangulation describes studying the same phenomena using different methods to obtain a better understanding [55]. A triangulation protocol encourages researchers to look beyond findings in each data set to identify findings which cut across the qualitative and quantitative data sets [25].In order to do this one type of data must be converted into the other type of data through “data transformation” [26]. Qualitative data may be converted to quantitative data by counting the presence of themes or findings using content analysis. Quantitative data can be transformed into qualitative data by describing the quantitative findings through text. Quantitative and qualitative findings are then listed and compared to look for agreement (convergence), similarity (complementarity) and contrast (dissonance or discrepancy). Where there is agreement or similarity “expansion” may occur where one data set expands insight in to the phenomena of interest. Where dissonance occurs, researchers may seek new data or develop explanations.

Following a thread is an approach coined by Moran-Ellis and colleagues [52]. Here researchers study each data set to identify key ideas or questions which need further exploration. After identifying a question the researchers then follow this through all data sets in order to seek explanation, this describes the “thread” running through the data. This approach can be helpful to identify how qualitative and quantitative data sets may be able to provide additional explanation on a key finding of the research study.

A mixed methods matrix can be used when quantitative and qualitative data have been collected from the same cases, often individual participants. For example, all participants in a trial may have answered a standardised questionnaire and a subset may also have taken part in a semi-structured interview. Here different types of data can be compared within individual participants rather than across the whole data sets. Data can be tabulated with rows representing cases, similar to a meta-matrix [51]. Cases may be individuals, groups, organisations or other meaningful categories. Comparing the qualitative and quantitative data can highlight what information can be gleaned about cases using different methods and help identify any discrepancies between data sets for further exploration. An example of a study using a mixed methods matrix is shown in Box 2.

In summary, there are important benefits to be had by integrating qualitative and quantitative components in mixed methods research. This can be achieved at the level of design, methods, and/or reporting. Newer, systematic approaches to integration have now been described in the literature and provide helpful options for addressing the challenges of inter-relating qualitative and quantitative components.

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| **Box 2: An example of use of a mixed methods matrix to integrate data on participants’ engagement with a web-based lifestyle intervention on coronary heart disease.**  A large randomised controlled trial was carried out to investigate the effect of providing different types of information about coronary heart disease (CHD), alongside lifestyle advice, on health-related behaviours [68]. The trial recruited 956 blood donors across England aged 40-84 with no previous history of cardiovascular disease (CVD). Participants were allocated to either no intervention (control group), or one of three interventions; web-based lifestyle advice only, web-based lifestyle advice plus information on estimated 10-year CHD risk as a percentage, heart age (the chronological age of someone with the same absolute risk of CHD but with healthy risk factors), and comparison with someone of the same age and gender who had a healthy lifestyle based on phenotypic characteristics; and Web-based lifestyle advice plus information on estimated 10-year CHD risk, heart age, and healthy comparison based on phenotypic and genetic characteristics. The primary outcome was change in objectively measured physical activity.  Qualitative data were collected through 41 interviews and two focus groups with participants as part of the main trial [67]. Participants were purposely selected from those who received medium to high risk scores (a 10-year CHD risk >10% or heart age at least two years older than their real age). For the mixed methods analysis only 37 interviews with participants who received either a phenotypic or phenotypic plus genotypic risk score were included [72]. Quantitative data were collected by tracking which pages of the web-based intervention participants had accessed during the trial. Participants were considered high engagers with the website if they completed all three sessions for either diet, physical activity, or smoking, and low engagers if they did not. Student’s t-tests or Chi-squared tests were used to assess differences between the high and low engagers with significance set at P<.05.  To integrate data, thematic analysis was used to first analyse the qualitative data. An inductive approach was taken to develop a coding framework which captured how participants reacted to risk information, their prior experiences of health behaviour change, their views on the web-based intervention and their engagement with the intervention. Following coding qualitative and quantitative data were combined in a mixed-methods matrix with one row for each of the 37 participants interviewed. Quantitative data on website engagement was used to divide participants into high or low engagers and chi-square tests were used to test associations. Themes associated with website engagement were explore in depth by returning to the qualitative data.  Quantitative data identified 13 participants as low engagers and 24 participants as high engagers. Four themes were identified in the qualitative data which distinguished participants in the two groups. Low engagers appeared to have more negative emotional reactions to risk information which led to confusion rather than acceptance of information seen in high engagers. Low engagers were seen to report more often that the intervention had no new information and were felt less obligated to complete all sections of the website than high engagers. Lastly, low engagers appeared to have less successful attempts at changing their behaviour in the past than high engagers. The authors concluded that tailoring web-based health interventions to take account of participants’ prior perception of their health risk, any previous attempts and behaviour change and their current health behaviour knowledge may improve engagement. |

## Integration of qualitative and quantitative secondary data

The difficulties of integrating mixed methods data continue when psychology researchers want to review the quantitative and qualitative literature together. The literature on systematic reviewing has been heavily weighted to reviewing quantitative research studies, with a focus on meta-analysis as a gold standard, which historically has led to the omission of qualitative evidence in reviews [22].To address this, several researchers have proposed methods for producing qualitative systematic reviews or meta-syntheses including meta-ethnography, thematic synthesis and critical interpretative synthesis [4]. As for primary data, researchers may tend to stick with the methods with which they are familiar and avoid integrating evidence from research studies undertaken from different epistemological positions [2]. However Dixon-Woods et al (2005) argue that “complex problems demand complex forms of evidence” (pp. 45) and therefore psychological research requires mixed methods systematic reviews in order to answer questions of importance [22].

The attraction of integrating secondary mixed methods data is the potential to gain multiple perspectives on an issue, helping to inform theory development and empirical evaluation [31]. Harden (2010) describes a mixed methods systematic review as “combining the findings of qualitative and quantitative studies within a single systematic review to address the same overlapping or complementary review questions" [37]. Some advantages of mixed methods reviews include answering multiple research questions within one review, identifying research gaps and providing explanation for any heterogeneity between trials [59].

There are various approaches available for the synthesis of mixed methods evidence [22; 60]. Approaches vary in how much guidance is available for researchers wishing to use the techniques in their own work. Some approaches such as meta-ethnography stem from qualitative methods and do not provide advice relevant to systematic reviews on selection of studies or number of studies to include in a mixed methods review [22]. Other approaches do not provide information on how to appraise studies for inclusion in a review or give guidance on what types of evidence should be included (whether evidence has to be published research or whether it can take other forms) [22]. As for primary data, when synthesizing mixed methods evidence one type of data will need to be transformed into the other type; typically this involves transforming quantitative data into qualitative data. Dixon-Woods et al (2005) highlight that although approaches propose this, a method on exactly how to “qualitise” quantitative data has not been proposed [22].

Realist approaches to undertaking mixed methods reviews have gained momentum in recent years and guidance on realist reviews has been published, available from the Realist and Meta-narrative Evidence Syntheses: Evolving Standards (RAMESES) [76; 77].Realist reviews seek to go beyond traditional quantitative reviews which focus on the effectiveness of a certain intervention, instead realist reviews seek to answer ‘What works, for whom, under what circumstances, how and why?’ [75].Mixed methods evidence is used to refine and develop theory which can then inform future research. An example of a realist review integrating mixed methods evidence is provided in Box 3. As guidance exists on how to conduct a realist review, researchers have information on which types of evidence to include and advice on how to appraise evidence. In this respect the value of realist approaches is also being recognised in wider frameworks for research discussed below [12].

A mixed methods review is perhaps unsurprisingly more complicated and therefore potentially more time consuming than a purely qualitative or quantitative systematic review. Researchers new to mixed methods reviews may struggle with a lack of guidance in how to conduct reviews with no universally adopted methods available [60]. Researchers are also required significant methodological skills to be confident in working with and interpreting different types of data as well as summarising and subsuming both qualitative and quantitative findings to create higher-order interpretations [22; 60]. Mixed methods reviews can also be more resource intensive. Often more time is needed to search for and identify relevant evidence, to interpret and assess evidence, and to summarise data and develop new theories. Lastly, mixed methods reviews are not inherently reproducible because of the iterative nature of the interpretative process [60].

In summary there are several approaches available for synthesising mixed methods evidence, for varying purposes. It is important that psychology researchers are aware of the various approaches and can identify the strengths and weaknesses of each. The literature requires more high-quality examples of such approaches and further guidance for researchers who are wishing to use these methods to answer their own research questions in psychology.

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| **Box 3: An example of a realist review to integrate mixed methods research evidence.**  The review aimed to synthesise evidence on the psychosocial and environmental factors associated with school participation of 4–12-year-old children with disabilities to inform later intervention development [48]. Previous reviews in the area had focused on evidence from RCTs and intervention studies which rarely focused on context or mechanisms of action of interventions. The authors selected a realist review approach to understand which mechanisms of change led to which outcomes within certain contexts. The research question was: what are the mechanisms and contexts which determine successful participants in 4-12 year old children with disabilities in school?  Authors carried out an initial scoping search and following discussion with the research team and the advisory board developed a list of mechanisms, contexts and outcomes for the target population, in order to formulate an initial theory. Systematic searches of databases were then carried out to identify any literature which provided relevant theoretical insights into the topic of interest. The final selection of papers to be included in the review was based on whether articles were appropriate for the research question (relevance) and quality of evidence (rigour). A total of 72 articles were included in the review with 33 quantitative studies, 18 qualitative studies, 17 reviews and 4 mixed-methods studies.  Data from relevant articles were extracted and synthesized using qualitative methods (content and thematic analysis) using realist concepts as a framework. Contexts and mechanisms were operationalized using codes and sub-codes typical to a qualitative study. Researchers collected evidence on which contexts and mechanisms were important to develop the initial theory. The initial analysis identified 72 contexts and 79 mechanisms and further analysis revealed three synthesized mechanisms and five synthesized contexts. Mechanisms included: 1) identity, the thoughts and feelings a child had about themselves; 2) competence, what the child did at school (following rules, being confident) and 3) experience of mind and body, experience of symptoms such as pain or fatigue. Contexts included: 1) structures and organisation of the school, whether organisation was flexible to child’s needs 2) peers, whether peers provided practical and emotional support 3) adults, whether teachers and adults were creating opportunity for participation 4) physical spaces, whether spaces were accessible and usable and 5) objects, whether wheelchairs and assistive devices were available.  The realist review produced a new theory about the contexts and mechanisms which were important in addressing school participation for children with disabilities. Researchers presented their theory for consideration in the development of future interventions. |

# Professional Challenges

The preceding sections have described some key epistemological and technical challenges of mixed methods research, and offered promising ways to address these. Mixed methods research also poses challenges for individual psychologists and the profession as a whole; addressing these challenges is essential to equip researchers to deal with epistemological and technical issues and thus support advances in mixed methods research in psychology.

Working as a professional psychologist conducting mixed methods research can entail certain challenges that, at least in part, stem from psychology’s broader historical, social, and politico-economic context. The historical origins and development of psychology as an empirical science privileging the experimental method [28] led to a dominance of quantitative approaches across mainstream psychology [1]. This persisted until at least the 1980s [41] when it was challenged primarily in social psychology with a turn to language that saw the publication of landmark books on topics such as social constructionism [29] and discourse analysis [63]. Qualitative approaches have since gained acceptance in some if not all fields of psychology. There are now subsections of psychological societies that focus on qualitative research, including for example the qualitative methods section of the American Psychological Association’s Division 5: Quantitative and Qualitative Methods; the British Psychology Society’s Qualitative Methods in Psychology Section; and the Association for European Qualitative Researchers in Psychology (EQuiP). These groups set out to promote qualitative research and how qualitative enquiry can contribute to psychology as a discipline. Even more encouragingly, the American Psychological Association has recently published journal article reporting standards not only for qualitative but also for mixed methods research in psychology [45]. However, there is also evidence of ongoing dominance of quantitative approaches. For example, the Handbook of Psychology has a volume devoted to Research Methods in Psychology that contains 25 chapters [73], in which the only real consideration of qualitative methods comes in the form of a single chapter on mixed methods [70]. The discipline as a whole also remains somewhat divided, with many departments specializing (sometimes exclusively) in quantitative or qualitative approaches [65]. There are important implications of this broader context for those wanting to forge a successful professional identity and conduct mixed methods research. For example, research methods training in psychology tends to perpetuate the false dichotomy between qualitative and quantitative methods, while mixed methods are often overlooked. This can contribute to a paucity of the necessary skills among psychologists to both conduct and evaluate mixed methods research, with associated detrimental effects on opportunities to obtain funding for and publish this work. It can also mean a lack of understanding and respect from colleagues [64].

Training for psychology researchers in mixed methods approaches is key to raise awareness of the value of such approaches and to equip researchers with the skills required to undertake and review advanced mixed methods research designs [57]. Although many psychology degree courses offer training in quantitative and qualitative approaches, following recommendations from national organisations such as the British Psychological Society in the UK, these are often taught separately, by different academics and few provide dedicated mixed methods teaching [30]. The availability of such modules may reflect the choice or ability of senior researchers to teach such material. Qualitative methods teaching may be a relatively new addition to undergraduate programmes in some countries, only being added to the BPS undergraduate curriculum in 2004 and some critics highlight that qualitative teaching still only has “tokenistic engagement” in some departments [30].Given this it may be some time before mixed methods teaching can be integrated into programmes in a meaningful way, although as others have argued the inclusion of mixed methods in the undergraduate curriculum would seem an appropriate and desirable goal [66]. In terms of content, training in mixed methods research needs to equip students and researchers with an appreciation of both epistemological and technical issues for mixed methods research. In relation to the latter, it would seem particularly important to provide training in the integration of quantitative and qualitative data not only at the design stage (currently this is the most common approach to integration) but also at the analysis and interpretation stages (currently rarely attempted and not straight forward).

Training in research methods might also usefully encompass training in team working, and this could help prepare students to work collaboratively on mixed methods studies. Many mixed methods projects will have different researchers conducting the quantitative and qualitative components. This means one can recruit researchers with specific expertise in individual data collection and analysis methods, given that individuals are unlikely to be skilled in all methods. Researchers can work independently to answer the specific quantitative and qualitative research question(s) for their component. Researchers do not need to be employed by the same organisation, or even work in the same country to contribute to the project, facilitating collaborative working.

A project is likely to benefit from a senior investigator who is familiar with all the approaches being used to study the phenomena of interest. This can help ensure that sufficient resources have been allocated to each component of the work at grant application stage and can help when drawing qualitative and quantitative findings together at dissemination stage. To get the most out of a mixed methods approach resources are also required for researchers to come together to consider integration. Integration, as mentioned above, starts at the design stage and means that researchers need to consider epistemological issues from the outset when planning the quantitative and qualitative components and need to understand how each component addresses the research question(s). Forward planning may help to identify research questions which could be answered by a mixed methods approach, informing data collection decisions enabling researchers to compare qualitative and quantitative findings at suitable stages and design research activities to maximise potential for mixed methods integration of data at analysis stage. If the necessary preparations have been made, the integration of mixed methods data at the analysis stage need not take up significant time and resources. Following a triangulation protocol, transformation of one type of data into another can be undertaken by a single researcher who knows the data set to be transformed in detail. Once a data set is transformed other researchers can then make comparisons between data sets. It can therefore take little additional work for researchers to obtain answers to research questions which provide a “whole rather than the sum of the parts” [3; 20].

The benefits that training and team working might have for mixed methods research will only be realised if mixed methods research is supported by research funders. Funders may often have a history of supporting traditional research designs such as gold standard RCTs however it is now common to see research funding specifications asking for “innovative research approaches” and “novel methodology” [24]. This type of language is encouraging for mixed methods researchers who want to apply or develop novel integration techniques. However, the call for funding may not reflect the decision process by which funding is allocated. Members of research boards need to be convinced about the value of novel methodologies and boards also need to have sufficiently wide expertise be able to judge applications which may use methodologies originating from different disciplines and epistemologies. Applications may also be directed to sub-boards assigned by broad discipline themes. For psychology this may mean being limited to a funding board which funds cognitive and neuroscience projects or one more aligned to social psychology with no or few alternatives [24]. Such categorisation within funding boards may hamper both what researchers submit for consideration of funding and what ultimately is funded.

Awareness of the potential for mixed methods research to impact on practice and policy can be low among research funding board members particularly if there are few examples of mixed methods research providing evidence which changes policy. Encouragingly, recent work particularly in the health sciences has sought to identify the benefit of introducing qualitative components in to traditional quantitative designs [46; 56]. Others have highlighted the potential for how realist methods could work alongside RCTs [12; 43].However, authors have stressed that researchers need to be “explicit within their articles about the learning for trials and evidence-based practice” [56].In this respect researchers may be in a “chicken and egg” situation where they need to write papers to show the value of mixed methods research in order to obtain funding for mixed methods research.

More published examples of mixed methods research may help educate funders, familiarise psychologists, and improve quality through the formation of an active critical community of researchers. In particular, there are still very few examples of integration of mixed methods data in the literature and researchers may still not know about the emerging techniques described above [20]. However, disseminating mixed methods research poses its own challenges in psychology as in other disciplines. Particularly pertinent challenges for publishing in mainstream peer review psychology journals include the word limits placed on articles, the methodological focus and/or bias of some journals [e.g. see 33], and the comparative lack of expertise in mixed methods among editors and peer reviewers [6].

As described above, Fetters (2013) has identified three ways of presenting mixed methods research the staged approach (qualitative and quantitative components analysed and written up separately), the contiguous approach (single report discussing components separately), and the weaving approach (single report weaving together findings from the components) [26]. Publishing qualitative and quantitative components separately allows different components to be targeted to different audiences, which can help to ensure the components are evaluated by appropriate quality criteria and can help get the message out to the most appropriate audience, going some way to helping to achieve the pragmatist aim of making a difference. However, it can preclude integration and coverage of other mixed methods considerations. Publishing qualitative and quantitative components together in a single paper facilitates integration and encourages a more detailed consideration of the mixed methods nature of the project, but it can be difficult to do justice to both components. From a pragmatist perspective, it may also encourage excessive blurring between and the application of inappropriate quality criteria to the individual components. Alternatively, one may publish components separately in discipline-specific outlets and then also publish an overarching mixed methods paper. This retains the strengths of the staged and weaving approaches while somewhat mitigating their limitations [8]. Related to the weaving approach, one may structure dissemination and publish multiple papers based on the different messages that emerge from the research, rather than according to the methods used [6]. This approach focuses on conveying the findings and implications of the research in a persuasive manner to the most appropriate audience, regardless of the extent to which each key message rests on qualitative and/or quantitative approaches. The timing of and cross-referencing between multiple papers would be important to consider to reduce repetition of methodological details and avoid accusations of “salami slicing”. As open-access and online publications become the norm, restrictions on length may ease, encouraging publication strategies to be increasingly based on more fundamental pragmatist concerns about how to reach the audience best placed to implement the knowledge produced by the research. Although it is of course important to acknowledge that the publication of a peer-review journal article is just one (often small) part of implementing research knowledge and ensuring it has an impact beyond academia [5].

# Conclusions and Recommendations

This chapter has explored three sets of challenges faced by researchers working with mixed methods in psychology: epistemological, technical, and professional. We have argued that it is important to consider critically both the epistemological and technical challenges posed by mixed methods research, in order to conduct impactful research. Pragmatism offers a coherent epistemology for mixed methods researchers, while promising techniques that go beyond integration of design and move towards integrating qualitative and quantitative data include the triangulation protocol, following a thread, and a “mixed methods matrix” [55]. Methods for mixed methods reviews are still developing, but realist reviews provide one way forward in this challenging area.

We suggest some specific actions that the psychological profession as a whole could take, in order to advance mixed methods research in psychology and support individual researchers. In particular, training in mixed methods research needs to become part of the undergraduate and postgraduate curriculum in a meaningful, non-tokenistic, way. Such training, particularly at postgraduate level, needs to equip students with the knowledge and skills to address the epistemological and technical challenges of mixed methods research and (arguably) prepare them to work in mixed methods teams. Alongside training, formal guidance may have a role for established researchers, peer reviewers, journal editors, and funding bodies. For example, researchers have argued that formal guidance would support researchers to factor integration of mixed methods data into early stages of study design, maximising the potential of efficient data collection to support subsequent integration [39]. Professional psychology societies that accredit education providers, research funders and journal editors are hugely influential. It is perhaps here that we need to encourage the changes that will facilitate improved opportunities for psychologists to produce high quality, impactful, mixed methods research.

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| **Summary**   * When planning mixed methods research it is important to consider critically both epistemological and technical challenges, in order to maximise the potential quality and impact of the work. * Pragmatism offers a coherent epistemology for mixed methods researchers, and emphasizes that good quality mixed methods research is work that achieves its desired external consequences while also addressing method-specific quality criteria in the quantitative and qualitative components. * There are multiple promising techniques for mixed methods research that go beyond integration of design and move towards integrating qualitative and quantitative data. These techniques include the triangulation protocol, following a thread, and a “mixed methods matrix” [60]. * The professional challenges encountered by those conducting mixed methods research could be assuaged with greater awareness of mixed methods work among psychology societies that accredit education providers, research funders and journal editors.   **Further Reading**  Fetters MD, Curry LA, Creswell JW. Achieving integration in mixed methods designs-principles and practices. Health Serv Res 2013;48(6 Pt 2):2134-2156.  Morgan DL. Integrating qualitative & quantitative methods. A pragmatic approach. Thousand Oaks, CA: Sage, 2014.  O’Cathain A, Murphy E, Nicholl J. Three techniques for integrating data in mixed methods studies. *BMJ* 2010;341.  Yardley L, Bishop FL. Mixing qualitative and quantitative methods: a pragmatic approach. In: C Willig, W Stainton Rogers, editors. The Sage Handbook of Qualitative Research in Psychology. London: Sage, 2008. pp. 352-369. |

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