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PRACTICAL RECOMMENDATIONS FOR MIXED METHODS SAMPLING IN
PSYCHOLOGICAL INTERVENTION RESEARCH: A MIXED METHODS CASE
STUDY

by

Analay Perez

A DISSERTATION

Presented to the Faculty of

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For the Degree of Doctor of Philosophy

Major: Psychological Studies in Education

(Quantitative, Qualitative, and Psychometric Methods)

Under the Supervision of Professor Wayne A. Babchuk

Lincoln, Nebraska

August, 2023

PRACTICAL RECOMMENDATIONS FOR MIXED METHODS SAMPLING IN
PSYCHOLOGICAL INTERVENTION RESEARCH: A MIXED METHODS CASE
STUDY

Analay Perez, Ph.D.

University of Nebraska, 2023

Advisor: Wayne A. Babchuk

Sampling is integral to the research process and, if not appropriately addressed, can affect the meta-inferences of the mixed methods study. Sampling is also closely related to recruitment, retention, and additional methodological components. Sampling issues are magnified in social and health sciences intervention research due to the temporal placement of data collection and analysis. Limited research has examined sampling based on researchers' rationales and decision-making across mixed methods psychological intervention research. This study explored this phenomenon to develop and refine a list of practical recommendations for sampling in mixed methods that were tested using content validity.

Using an exploratory sequential mixed methods case study design, the first phase consisted of a qualitative case study using two data sources, a mixed method research-systematic methodological review (MMR-SMR), and semi-structured interviews with researchers who have conducted a mixed methods psychological intervention study. Forty studies were identified through the MMR-SMR and coded using a codebook. Semi-structured interviews were conducted with researchers (N = 10), and several overarching themes were identified. Through building integration, the qualitative findings informed the development of a list of preliminary

recommendations that was refined using a modified e-Delphi study for the quantitative phase. Experts (i.e., mixed methods research methodologists) were asked to rate each recommendation's relevancy. Agreement consensus was established based on median and item-content validity index (I-CVI) values to test a component of content validity across each recommendation. Participants rated recommendations across Round 1 (N = 10) and Round 2 (N = 9). Recommendations were modified based on participant ratings and open-ended responses.

The final list consisted of 20 recommendations, each demonstrating adequate evidence of content validity. These recommendations span various categories, including recruitment, retention, sampling across mixed methods research designs, data collection, integrating mixed methods samples, and temporal placement of qualitative strand. Multiple audiences, including researchers, mixed methods research methodologists, and grant and journal reviewers, can use the list of recommendations to guide sampling decisions in mixed methods psychological intervention research.

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“Two roads diverged in a wood, and I—
I took the one less traveled by,
And that has made all the difference.”
—Robert Frost

The road to graduate school is one I have described as a serendipitous journey. Although pursuing a doctoral education has always been a life-long aspiration, the details of it have been an open road of exploration. One aspect that remains certain, however, is that I have been accompanied by many on this road, both near and far, who have supported me in more ways than I can count, and for that, I am forever grateful.

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CHAPTER I. INTRODUCTION

Several researchers have asserted that the field of mixed methods research is currently in its mature adolescence stage (Tashakkori et al., 2021) or emerging adulthood (Onwuegbuzie & Hitchcock, 2019), as evidenced by an increase in peer-reviewed publications (Timans et al., 2019) and grant proposal submissions (Coyle et al., 2018). Numerous topics have been advanced in the field, such as methods for integration (e.g., Hitchcock & Onwuegbuzie, 2022), inherently mixed methods analyses (e.g., Onwuegbuzie & Johnson, 2021), and integration of various qualitative approaches in mixed methods research (e.g., Guetterman et al., in preparation). Nevertheless, as noted by Tashakkori and colleagues (2021), “MM [mixed methods] *sampling methods and strategies* [emphasis added] is still in its infancy” (p. 178). This statement is further supported by a recent methodological review conducted by Corrigan and Onwuegbuzie (in press), which found that among all the articles published in the *Journal of Mixed Methods Research* since its inception in 2007 to July 2021, resulting in a total of 403 articles, only five articles (about 1.24%) have included the word “sampling” or a variant of it in the title. In addition, only 21 articles indexed in Scopus exist on sampling in mixed methods research between 1960 to 2021 (Corrigan & Onwuegbuzie, in press; Onwuegbuzie & Corrigan, 2021). Thus, discussions on sampling in mixed methods research are heavily limited, even though sampling affects all levels of the research study.

In general, sampling is an integral part of the research process. Researchers sample from a larger population as it tends to reduce cost and time (Gitlin & Czaja, 2015). Sampling in mixed methods research is an intricate process that entails addressing the sampling approaches for the quantitative strand, qualitative strand, and the full mixed

methods study. In mixed methods research, issues of sampling are augmented due to distinct sampling approaches of quantitative and qualitative research, specifically probability and purposeful sampling. Given the inherent differences between probability and purposeful sampling, researchers are often challenged to find a balance between quantitative power and qualitative saturation in mixed methods research (Corrigan & Onwuegbuzie, 2020). Furthermore, researchers must also consider integrating sampling strategies to develop high quality meta-inferences and enhance the study's validity.

Another critical component of mixed methods research sampling that necessitates investigation is the influence of the temporal features of a mixed methods study on the sample (Song et al., 2010). For example, collecting data either simultaneously (i.e., concurrent timing) or sequentially (i.e., sequential timing) can have a priming effect on how participants respond, thus affecting the validity of a study. From a discipline-specific perspective, these issues are particularly apparent in social and health sciences intervention research due to the ordering effects on intervention outcomes (Song et al., 2010). These ordering effects can permeate and result in issues related to validity or quality, integration, and the effectiveness of a study (Collins et al., 2007). Consequently, it is critical that this is further investigated, specifically in the social and behavioral sciences, given its implications.

Other areas that have received limited research are the challenges of participant recruitment and retention in mixed methods research studies. Participant recruitment is influenced mainly by the sample composition; however, participant retention is mostly influenced by two major factors, the sample composition, and the study design. Hence, given the time and potential increased monetary costs associated with mixed methods

research studies, it is imperative to study sampling by identifying effective recruitment and retention strategies in mixed methods psychological intervention research.

Although sampling in mixed methods research is a prevalent issue across all disciplines, it is especially crucial in the social and health sciences field. The use of mixed methods research has been pivotal in examining health sciences phenomena by capitalizing on integrating quantitative and qualitative research approaches (Curry & Nunez-Smith, 2015). Quantitative methods aid in quantifying the effects of treatment intervention/implementation, while qualitative methods amplify participant perspectives related to the treatment/intervention. Research in the health sciences is grounded in evidence-based practices that typically incorporate patient-centered approaches (Gaglio et al., 2020). This is especially relevant in intervention studies that aim to increase understanding from participants and their families on treatment adherence, engagement in activities, and ways of fostering long-term treatment effects. Several researchers (e.g., Palinkas et al., 2011; Palinkas et al., 2015) have conducted research investigating sampling in implementation health sciences research studies; however, research in areas such as sampling in mixed methods intervention research, issues of recruitment and retention, and the influence on the temporal placement in mixed methods psychological intervention research are absent.

Sampling can influence multiple stages of a research study, including the research questions, objectives, data collection, analysis, recruitment and retention methods, and the overall validity of a study. Given the critical role of sampling in a research study, and the need to further discussions on sampling in mixed methods research, research is needed to promote sound methodological advancements in mixed methods research

sampling within the social and behavioral sciences field. Although there is a copious amount of literature on sampling approaches for monomethod studies, research directed at sampling in mixed methods intervention studies, specifically in the social and behavioral sciences, is lacking.

Purpose of Present Study

The purpose of the current study was to (a) examine how psychological researchers conceptualize and address sampling in their mixed methods intervention research study, and (b) identify effective strategies and challenges to participant recruitment and retention in mixed methods psychological intervention research. The overarching intent of this study was to develop a list of practical recommendations for mixed methods sampling in psychological intervention research. The development of practical recommendations will be used to inform and guide sampling decisions across various audiences, including researchers across disciplines such as the social and health sciences, mixed methods research methodologists, as well as grant and journal reviewers.

To accomplish these goals, an exploratory sequential mixed methods case study design was conducted. The initial qualitative phase consisted of a case study using two data sources (i.e., mixed methods research-systematic methodological review and semi-structured interviews). These two data sources aided in the development of a preliminary list of practical recommendations for mixed methods sampling in psychological intervention research. The subsequent quantitative phase consisted of a modified e-Delphi study that was used to refine and test a component of the content validity of the resultant list.

Research Questions

This study was guided by a series of research questions that are divided into qualitative, quantitative, and mixed methods research questions. For the qualitative case study phase, research questions for the two data sources were developed. The following research questions were addressed in this study:

Qualitative Case Study Questions

Mixed Methods Research-Systematic Methodological Review.

- 1) How does the temporal placement of qualitative data collection and analysis (i.e., before, during, or after an intervention) influence the reasons for conducting a mixed methods psychological intervention study?
- 2) What recruitment strategies do researchers implement across mixed methods psychological interventions targeting a common mental health disorder?
- 3) What retention strategies do researchers implement across mixed methods psychological interventions targeting a common mental health disorder?
- 4) What prevalent recommendations on sampling, recruitment, and retention do researchers report in mixed methods psychological interventions targeting a common mental health disorder?

Semi-Structured Interviews.

- 1) What are effective *recruitment* strategies and challenges researchers encounter when conducting mixed methods psychological intervention research?
- 2) What are effective *retention* strategies and challenges researchers encounter when conducting mixed methods psychological intervention research?
- 3) How do sampling decisions differ across mixed methods core designs?

- 4) What additional information can we learn about the temporal placement of the qualitative strand in mixed methods psychological intervention studies?

Quantitative Questions

Modified e-Delphi.

- 1) What evidence of content validity is supported by the final list of practical recommendations?
- 2) How does the content validity on the list of practical recommendations change across rounds of the modified e-Delphi?

Mixed Methods Question

- 1) How does the integration of a case study design and a modified e-Delphi technique inform the development and refinement of a list of practical recommendations for mixed methods sampling?

Contributions of Present Study

The current study has important substantive and methodological contributions to the field of mixed methods research and the social and health sciences. The overarching contribution of this study is the development and refinement of a list of practical recommendations for mixed methods sampling in psychological intervention research. These recommendations include critical methodological components on sampling and related features to provide guidance to researchers and methodologists on best practices when making sampling decisions for the mixed methods research study. The following sections will provide further details on the substantive and methodological contributions.

Substantive Contributions to the Field of Psychological Intervention

Mixed methods research designs are often used in the social and health sciences. Grant funding agencies have placed emphasis on patient-centered approaches and encourage community engagement to seek a greater understanding of health phenomena (Albright et al., 2013). Consequently, this often necessitates the application of mixed methods research approaches (Albright et al., 2013). Due to the widespread use of mixed methods research in the health sciences field and its utility across complex designs, the development of a list of practical recommendations can provide researchers and methodologists the tools and guidance needed to address sampling of the full mixed methods research study adequately and appropriately.

The list of practical recommendations for sampling in mixed methods research may be helpful not only to researchers planning or conducting a mixed methods intervention research study, but also when writing grant proposals. It can reinforce researchers to thoughtfully consider the sampling elements of a mixed methods intervention research study that are often rarely discussed in grant proposals, though necessary. Thoughtful consideration of sampling and related methodological components in mixed methods psychological intervention research can have a positive impact on the delivery of the treatments and interventions and inform researchers on best practices as it relates to recruitment and retention in mixed methods psychological intervention research.

Methodological Contributions to the Field of Mixed Methods Research

The major methodological contribution of this study is the list of practical recommendations for mixed methods sampling in psychological intervention research.

Mixed methods research sampling is an area that has received limited investigation (Tashakkori et al., 2021; Onwuegbuzie & Corrigan, 2021) despite the critical role of sampling in research studies and its influence on multiple stages of the research process. Traditionally in mixed methods research studies, many researchers address sampling of each individual strand, with little information on the full mixed methods sampling approach. Thus, by advancing a list of practical recommendations grounded in evidence synthesis and empirical research, researchers will be able to make thoughtful sampling decisions of their mixed methods psychological intervention to increase the rigor of mixed methods research.

Another important methodological contribution of this study is the use of a complex mixed methods design, a mixed methods case study design, that involves the use of multiple qualitative data sources for the case study to produce more robust conclusions. The use of a mixed methods research-systematic methodological review (MMR-SMR) followed by semi-structured interviews augmented the findings from each data source and enhanced the credibility of the preliminary list of sampling recommendations in mixed methods research through the case study design. Specifically, using an embedded single case study approach, the empirical articles were considered the embedded component of the case, with the case defined as researchers who have conducted a mixed methods research empirical study in psychological intervention research. Data were gathered from empirical mixed methods research articles as well as semi-structured interviews to obtain a deeper understanding of the phenomenon.

Audience

Several audiences can benefit from this study, including (a) mixed methods research methodologists, (b) researchers in the social and health sciences fields, and (c) journal and grant reviewers. Mixed methods research methodologists may find the results of this study and the resultant list of practical recommendations of use when conducting their own mixed methods research study or serving as lead methodologists within a psychological intervention study team. Furthermore, methodologists may also use this list to guide discussions on mixed methods research sampling across a variety of modalities, including seminars, workshops, and courses. Doing so could further increase dialogue on mixed methods research sampling. Second, the development of a list of practical recommendations for sampling in mixed methods research may be particularly helpful to researchers conducting social and behavioral sciences intervention studies and aid in the conceptualization and sound applications of methodological components related to sampling, recruitment, and retention.

Lastly, journal and grant reviewers may find the recommendations on sampling in mixed methods psychological intervention research beneficial when reviewing grant proposals and manuscripts. These recommendations aim to provide systematic methods for assessing and evaluating sampling of mixed methods psychological intervention studies and can help provide authors with details on areas to expand in the grant proposals and manuscripts if sampling details are lacking. Grant agencies and journals may also adopt these recommendations to reinforce their use during the conceptualization and conduct of a mixed methods psychological intervention study. Collectively, the

resultant list of recommendations may be of benefit to several audiences in varying applications.

Conceptual Foundations

The foundations of this study are grounded in various conceptual foundations, including philosophical assumptions and conceptual framework. Philosophical assumptions include various paradigms or philosophical worldviews, such as the constructivist, postpositivist/positivist, transformative perspective, and pragmatist perspectives (Tashakkori et al., 2021). The philosophical paradigm that informed this study was pragmatism. The conceptual framework that guided this study was the socio-ecological framework for the field of mixed methods research developed by Plano Clark and Ivankova (2016). A rationale is first provided explaining why the pragmatist paradigm was the most appropriate for this study. Then, a description is provided on ways the socio-ecological model for mixed methods research was adapted to fit the context of the current study.

Philosophical Assumptions

Creswell and Poth (2018) noted three reasons why philosophical assumptions are important: (a) they provide researchers with a direction on the research objectives and outcomes, (b) assumptions are influenced by a researcher's training and research experience, which are applied throughout the research process and (c) allow researchers to evaluate a study using diverse philosophical perspectives. The philosophical worldview that was used for this study was pragmatism. Pragmatism rejects an either-or belief to research, such as only using a constructivist or only postpositivist view. Instead, it embraces the reality that both quantitative and qualitative methods can be used within a

study to answer the research questions (Tashakkori et al., 2021). Pragmatism also asserts that as researchers, we examine phenomena and use the evidence to support the conclusions of a study, while also acknowledging that these conclusions are tentative as a growing body of studies contributes to research (Johnson & Onwuegbuzie, 2004). Nonetheless, the evidence that supports the conclusions from studies helps to “move us toward larger Truths” (Johnson & Onwuegbuzie, 2004, p. 18). This study used a variety of methods, both quantitative and qualitative, and inductive and deductive approaches to answer all research questions using a pragmatist worldview.

Conceptual Framework

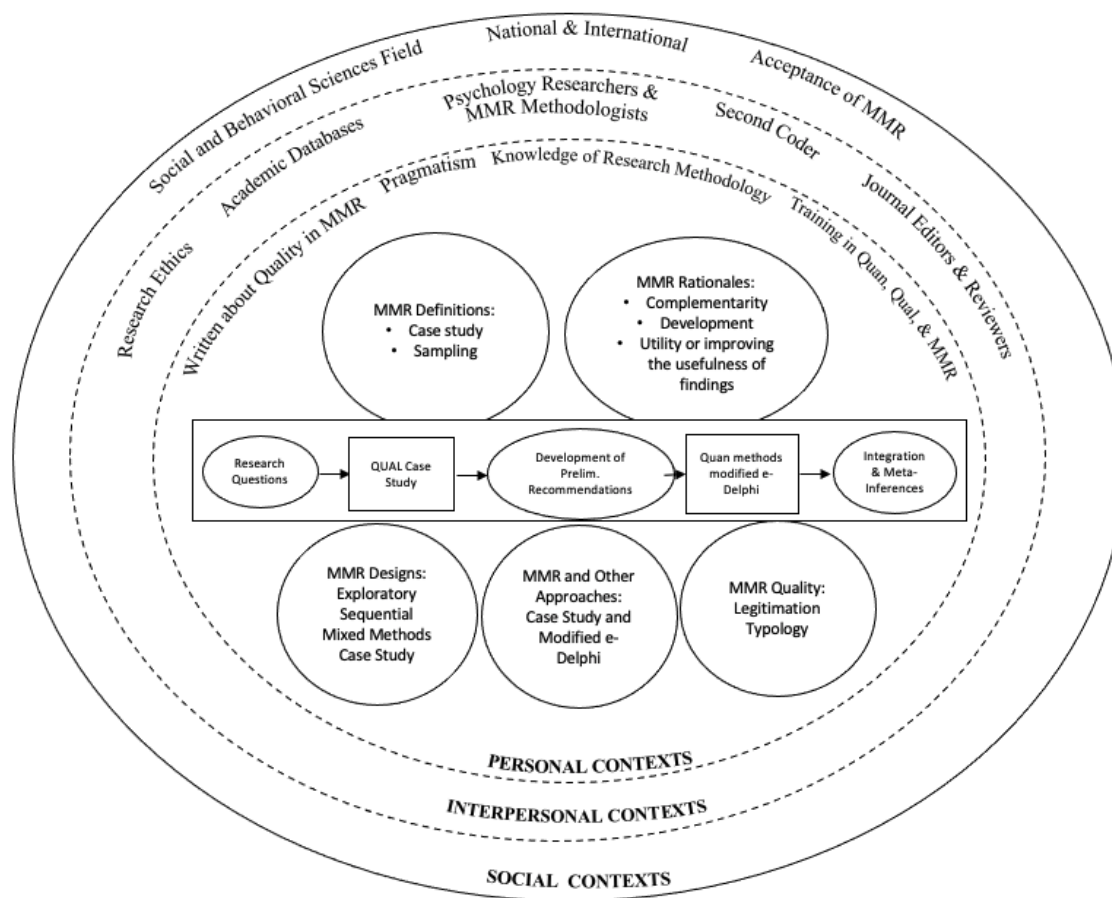
A conceptual framework has been described as “a group of concepts and/or constructs that are broadly defined and systematically organized to provide a focus, a rationale, and a tool for the integration and interpretation of information and data” (McGregor, 2018, p. 65). Conceptual frameworks can include knowledge from various disciplines, theories, and research (McGregor, 2018). This study was informed by the socio-ecological framework for the mixed methods research developed by Plano Clark and Ivankova (2016). The socio-ecological model was adapted from Bronfenbrenner’s (1979) model with the purpose of applying it to the field of mixed methods research. The socio-ecological framework for the mixed methods research recognizes the ongoing relationships that exist in the mixed methods research field between individuals and environmental factors (Plano Clark & Ivankova, 2016).

Located in the middle of the mixed methods socio-ecological model are features central to a mixed methods research study such as mixed methods research definitions, rationales, quality, mixed methods research approaches and design, along with a

simplified procedural diagram of the mixed methods study (Plano Clark & Ivankova, 2016). This model is divided into three tiers: personal, interpersonal, and social contexts. The personal tier, which is at the center, includes the researcher and their philosophical assumptions, theoretical models, and background knowledge they possess (Plano Clark & Ivankova, 2016). The second tier, the interpersonal contexts, includes the research ethics of a study, study participants, research teams, and editors/reviewers (Plano Clark & Ivankova, 2016). The third tier, the social contexts, includes institutional structures, disciplines, and societal precedence (Plano Clark & Ivankova, 2016, p. 15). Figure 1.1 depicts the mixed methods socio-ecological model within the context of this study and the interrelationships that exist across tiers.

Figure 1.1

Socio-Ecological Framework for the Field of Mixed Methods Research to Examine Mixed Methods Research Sampling in the Social and Behavioral Sciences



Note. Adapted from *Mixed Methods Research: A Guide to the Field* (p. 15), by V. Plano Clark and N. Ivankova, 2016, Sage.

MMR = mixed methods research

Researcher Reflexivity

Creswell and Poth (2018) refer to reflexivity as the way researchers “position themselves” in a study (p. 44). To address researcher reflexivity, it is recommended that researchers address their background such as personal experiences related to the study and research experiences, how this can inform interpretations of the study, and the

researcher's goals for the study. In doing so, researcher reflexivity brings researchers' values, biases, and perspectives that can influence a study to the forefront (Maxwell, 1992). As a doctoral student in the Quantitative, Qualitative, and Psychometric Methods (QQPM) program, I have received extensive methodological training ranging from quantitative, qualitative, mixed methods, and psychometrics research. During this time, I have primarily gravitated towards investigating and advancing mixed methods research methodology, given its emphasis on pragmatism when examining research phenomena. Although numbers are critical and can help convey the magnitude of an effect to various audiences, including stakeholders, participant experiences can amplify these effects and help uncover stories that numbers might not be able to solely portray. If the research questions warrant a mixed methods research design, I find value in mixed methods research, particularly when studying complex and intricate phenomena.

I have also carried out several research projects on methods for further developing this methodology. For example, the topic of quality or validity is an area I have continued investigating, focusing on appropriate methods to address validity in mixed methods research studies to enhance the generated meta-inferences (i.e., integrated conclusions from the quantitative and qualitative strands). I have also collaborated on research projects and learned from my mentors, Drs. Wayne A. Babchuk, Timothy C. Guetterman, and Michelle C. Howell, on methods for improving the conduct of mixed methods research. Due to my methodological training, I believe research should be conducted to the highest level of rigor, beginning with a study's conceptualization to the dissemination stage. I strive to conduct rigorous research through thoughtful planning, especially during

the conceptualization stage, as thoughtful consideration during this stage will heavily influence the entire study and its validity.

Definition of Key Terms

The purpose of this section is to provide a definition for key terms that will be used often throughout this study. The terms are divided into two sections, substantive and methodological.

Substantive Terms

Randomized Control (or Clinical) Trial. An experiment that incorporates two or more interventions, including a control or no treatment group, that are compared by randomly assigning participants to an intervention (O’Cathain, 2018).

Intervention Research. Research that incorporates an experiment aimed to test the causal relationship between the treatment and the outcome(s). Efficacy and effectiveness trials can be considered as a type of intervention, each having different purposes.

Hybrid Design. Integrates an intervention and an implementation within a trial design to assess both an intervention and its implementation and is classified by three different types that vary based on whether the emphasis is placed on the intervention, implementation, or balances both. Hybrid designs are also known as effectiveness-implementation hybrid design

Methodological Terms

Mixed Methods Research. Mixed methods research is a research methodology that intentionally integrates quantitative and qualitative research methods including data

collection and analysis to better understand the research phenomenon (Plano Clark & Ivankova, 2016).

Case Study Research. A qualitative research approach that focuses on a case, or a bounded system, and uses multiple data sources to investigate the phenomenon (Merriam & Tisdell, 2016).

Delphi Method. The purpose of the Delphi method (also known as the Delphi technique) is to generate consensus on a given topic from a group of experts through iterative questionnaires (known as rounds). The Delphi method was developed by the RAND Corporation in the 1950s and has been predominantly used in the health care field (Keeney et al., 2011).

Meta-inferences. Integrated conclusions from the quantitative and qualitative strands.

Sample. A subset of a representative population.

Sampling. The process by which participants are selected for a study.

Sampling Scheme. Methods for selecting participants, either using probability (or random) sampling or purposeful (nonrandom or purposeful) sampling (Onwuegbuzie & Collins, 2007).

Concurrent Timing. Data collection and analysis of quantitative and qualitative data are conducted at the same time, thus independent from each other.

Sequential Timing. Data collection and analysis of quantitative and qualitative data are carried out in a sequence, with one occurring before the other, thus dependent of each other (Plano Clark & Ivankova, 2016).

Strand. The individual quantitative and qualitative components of a mixed methods research studying, each consisting of its own research questions, data collection, analysis, and inferences (Plano Clark & Ivankova, 2016).

Summary

The intent of this chapter was to provide a foundation for the current study and describe why the development and refinement of a list of practical recommendations for sampling in mixed methods psychological intervention research are needed. This study is intended to offer both methodological and substantive contributions to the mixed methods research field and the social and behavioral sciences to further enhance the conduct of mixed methods intervention research. As a result, various audiences may benefit from the contributions of this study, including mixed methods research methodologists, psychology researchers, as well as grant and journal reviewers. This study was conducted through a pragmatist lens that identified the benefits of both quantitative and qualitative research when answering research questions to gain a deeper understanding of the research study. Moreover, the socio-ecological mixed methods research model helped guide this study, given its emphasis on the researcher and their environmental relationships. Based on my methodological training, I have described how these experiences and my values could influence the interpretation of the study's findings.

CHAPTER II. LITERATURE REVIEW

This chapter provides a detailed overview of mixed methods research sampling, noting its methodological challenges. It extends this discussion to the social, behavioral, and health sciences fields, particularly within intervention research. The first section reviews sampling methods in quantitative and qualitative research and how these differ. The second section expands on mixed methods research sampling and its challenges. It also presents how the different mixed methods research sampling typologies and models have evolved. The third section capitalizes on the importance of mixed methods research in the health sciences and includes a foundation for intervention research and its implications on sampling. This section also provides details on mixed methods intervention procedural frameworks. The fourth section presents methodological research on sampling in mixed methods within the social and health sciences field and discusses how sampling is discussed in health sciences grant proposals. To conclude, the fifth section illustrates participant recruitment and retention issues in research studies and their relationship to sampling. The culmination of these topics reinforces the need for a list of practical recommendations for mixed methods sampling in psychological intervention research.

Sampling in Quantitative and Qualitative Research

This section aims to provide a comprehensive foundation of sampling across quantitative and qualitative research. Particularly, this section expands on three main elements of sampling across quantitative and qualitative research: sampling methods (i.e., probability or purposeful sampling), sample size determinations, and the types of

generalizations. Descriptions are provided on the differences between a sample and sampling and how sampling differs across quantitative and qualitative research.

Differences Between Samples and Sampling

Samples are a fundamental study component that influences various stages of the research process. Researchers rely on samples rather than an entire population for multiple reasons. For example, using a sample rather than the whole population can be more cost effective, time efficient, facilitate recruitment and data collection methods, and reduce heterogeneity by solely focusing on specific population characteristics (Gitlin & Czaja, 2015). When selecting a sample, several factors should be considered, including the research purpose and questions, target population, study design, and the study's feasibility concerning resources such as budget, personnel, and participant availability (Gitlin & Czaja, 2015). The sample composition should closely resemble characteristics that align with the purpose of the study by applying clear inclusion and exclusion criteria to achieve the most representative sample.

Sampling is the process in which a researcher selects an appropriate sample to investigate a study's research question(s) and objective(s). Sampling is embedded throughout multiple stages of the research study, including the objectives, research design, data collection, and analyses. The sample and sampling procedures are critical in the research process as they are closely related to the external validity of a study and the extent to which findings can be generalized to other populations, settings, treatments, and outcomes (Shadish et al., 2002). By ensuring a representative sample, a researcher can more confidently and accurately generalize to the target population and mitigate issues of sampling bias, specifically in quantitative research. Researchers must decide whether a

homogenous or heterogenous sample is most appropriate for a study. Sampling methods are divided into two main categories known as probability and purposeful sampling, each serving its purpose(s) in quantitative and qualitative research.

Sampling in Quantitative Research

Several distinct characteristics affect sampling in quantitative research. Generally, probability sampling tends to be associated with quantitative research approaches. In quantitative research, researchers should determine an a priori sample size by conducting a power analysis before beginning a study to ensure an appropriate effect size can be reached. As a result, the sample size is one component that influences the validity of a study, specifically the statistical generalizations. In quantitative research, three elements influence the *representativeness* of a sample: sample size, sampling attrition, and sampling method (i.e., probability or purposeful sampling) (Gitlin & Czaja, 2015). These elements are described in further detail below.

Probability Sampling

Probability sampling ensures that individuals from a target population have an equal opportunity to be selected and, thus, are probabilistically representative of the chosen population (Creswell & Guetterman, 2019). Probability sampling aims to generalize quantitative results from the sample to the target population and is predominantly used in quantitative research. Probability sampling can be divided into five types: simple, systematic, stratified, cluster, and multi-stage random (Corrigan & Onwuegbuzie, 2020; Onwuegbuzie & Collins, 2007). Simple random sampling is the most popular type of probability sampling. Simple random sampling ensures that every individual from the sampling frame has an equal chance to be chosen for the study

(Creswell & Guetterman, 2019). As a result, it aims to reduce sampling bias through equal distribution among the sample, though it may not always be the case. Another type of probability sampling is systematic sampling, which involves selecting the n th individual or site from a sampling frame until a researcher reaches a predetermined sample size (Creswell & Guetterman, 2019).

A third type of probability sampling is stratified sampling, which requires researchers to divide the sampling frame into subsets based on specific characteristics and then apply simple random sampling to sample from each subset (i.e., stratum) of the sampling frame. Stratified sampling ensures that the desired sample comprises specific attributes specified by the researcher (Creswell & Guetterman, 2019). A fourth type of probability sampling is known as cluster sampling, and it involves having the researcher select intact groups that represent clusters instead of randomly selecting individuals (Onwuegbuzie & Collins, 2007). The fifth type of probability sampling is multi-stage random sampling which involves choosing a sample in multiple stages (Onwuegbuzie & Collins, 2007). Often, multi-stage sampling can be beneficial when identifying the appropriate population to sample from or when the population is too large (Creswell & Guetterman, 2019). These five probability sampling strategies help researchers identify the most appropriate methods to sample individuals for their study given the research objectives, questions, recruitment, and data collection methods.

Sample Size Determinations

After selecting the probability sampling approach most appropriate for a study, a researcher must determine the appropriate sample size. Determining appropriate sample sizes in quantitative research is typically a prescriptive process. To determine an adequate

sample size for a quantitative study, a researcher must consider three parameters: the level of significance (i.e., alpha), expected effect size, and statistical power. In quantitative research, the larger the representation/random sample size, the more likely it is for the sample to be representative of the target population and reduce bias. Alternatively, a small sample size can result in an underpowered study, leading to Type II errors and thus affecting the statistical generalizations. Sample size calculations are performed using a power analysis with software tools such as G*Power (Faul et al., 2007). Sample sizes will vary depending on the statistical analyses the researcher chooses (e.g., F , t , χ^2 , Z , and exact tests).

Relationship Between Sampling and Statistical Generalizations

Sampling is directly related to the external validity of a study. External validity is the degree to which inferences from a study can be generalized to different persons, settings, treatments, and outcomes (Shadish et al., 2002). In quantitative research, statistical generalizations are essential and can be traced to the Central Limit Theorem. The Central Limit Theorem posits that samples randomly selected from a given population, regardless of skewness, will approximate a normal distribution as the sample size increases. Sampling error will decrease as the sample size increases (McEwan, 2020). Sampling error refers to the amount of error estimated from the sample and is calculated using the standard error of the mean statistic (McEwan, 2020). The standard error measures the average distance between the sample and the population mean and indicates how well the population represents the sample data (Gravetter & Wallnau, 2013). Sampling errors can arise when using a convenience sample to generalize findings from a selected sample different from the target population.

In addition to the Central Limit Theorem, power is another concept that affects a study's inferences. Power is influenced by three components: the significance level (i.e., alpha), sample size, and effect size. As noted, larger sample sizes can result in a sample statistic distribution that more closely reflects the population statistic distribution (McEwan, 2020). Nevertheless, power can also be negatively affected if the sample is too large (i.e., overpowered study) and thus leads to Type I errors. A Type I error occurs when a researcher rejects the null hypothesis and concludes that there is a statistically significant treatment effect when there is not present or weaker than expected.

Sampling bias can arise in a study when the sample is not representative of the target population, thus affecting the generated inferences. Several factors can influence sampling bias, including restricting the sampling frame, nonresponse bias, self-selection bias, overcontrol bias, confounding bias, and endogenous selection bias (McEwan, 2020). Overall, concepts of the Central Limit Theorem and power have been demonstrated to be rooted in sampling issues and directly influence the external validity of a study. Failure to attend to these issues will heavily compromise the generalizability of a study's findings to other persons, settings, treatments, and outcomes in quantitative research.

Qualitative Research

Similar to quantitative research, several components influence sampling in qualitative research, although for vastly different reasons. Generally, purposeful sampling tends to be associated with qualitative research approaches, although it can and is often used in quantitative research. Generalizations based on the sample take less precedence in qualitative research as the emphasis typically shifts from generalizations to generating thick descriptions. In qualitative research, determining an appropriate sample size before

collecting data is not feasible; however, other methods, such as saturation and information power, are used to determine appropriate sample sizes. The following will expand on these elements of qualitative research.

Purposeful Sampling

Purposeful sampling, also known as nonrandom or nonprobability sampling, relies on selecting individuals based on information-rich cases or participants or a specific criterion, and therefore selection is non-random. In most cases, purposeful sampling is often used in qualitative research, although quantitative studies also employ purposeful sampling, particularly convenience sampling. Researchers employing purposeful sampling methods aim to obtain a more in-depth understanding and rich descriptions of phenomena from participants' perspectives. Thus, the researcher purposefully selects this sample to maximize understanding of the phenomena (Onwuegbuzie & Collins, 2007). A total of 19 current types of purposeful sampling schemes (i.e., methods for selecting participants) have been identified that differ based on the timing of data collection—selecting a sample either before data collection or after data collection has commenced (Corrigan & Onwuegbuzie, 2020; Onwuegbuzie & Collins, 2007).

There are various types of purposeful sampling methods; however, a researcher should choose the sampling strategy most appropriate given their research objectives and questions. Some common types of purposeful sampling are convenience, snowball, and maximum variation. Convenience sampling techniques are used when a researcher selects participants based on convenience/availability or due to characteristics that are of interest in the study (Creswell & Guetterman, 2019). Snowball sampling involves asking

participants in the current study to recruit or inform others to participate. Maximum variation sampling is used when the aim of the study is to obtain a wide variation of perspectives from either individuals or cases (Creswell & Guetterman, 2019).

Sample Size Determinations

In qualitative research, one of the guiding concepts traditionally used for determining an adequate sample size is saturation and information power, the latter primarily employed in the health sciences based on its conceptualization in the health sciences field (e.g., Malterud et al., 2016). The concept of saturation heavily depends on the breadth and depth of the phenomena. This concept was developed by Glaser and Strauss (1967), and it posits that new participants should be added to a study until no new information is identified from the data. This term is predominantly used in grounded theory methodology; however, other qualitative approaches, including case study, narrative inquiry, phenomenology, and ethnography, among others, also use the concept of data saturation to establish an adequate sample size. Several scholars (e.g., Creswell & Poth, 2018; Guest et al., 2006; Guest et al., 2020; Guetterman, 2015) have developed guidelines for determining adequate sample sizes in qualitative research across distinct qualitative approaches; nevertheless, no consensus has been reached, leaving most researchers to default to the concept of data saturation. A critical consideration of saturation is that it cannot be determined a priori using power analyses like quantitative research; therefore, planning beforehand can be challenging.

Another concept used to determine adequate sample size in qualitative research is information power. Information power suggests that sample size is dependent on (a) the aim of the study, (b) sample specificity, (c) implementation of established theory, (d)

quality of interaction, and (e) analysis strategy (Malterud et al., 2016). In other words, the more information a researcher has available in a study based on these factors, the more ‘conceptual’ power that can be attributed to a study. More recently, Guest et al. (2020) advanced a method to calculate and assess the appropriate sample size for a qualitative study based on the base size, run length, and new information threshold. The base size is the minimum number of data sources that should be analyzed to calculate the amount of information already collected. The run length is the number of interviews that generate new information. The new information threshold is a ratio of the run length over the base size, which yields the proportion of newly identified information based on saturation (Guest et al., 2020). The new information thresholds follow a p -value cutoff of < 0.05 or < 0.01 , with saturation $\leq 5\%$ deemed as new information and saturation equal to 0% deemed as no new information. These novel methods have challenged researchers to think of alternative approaches when determining the adequate sample size of a qualitative study; nonetheless, limited methodological research has examined how often these methods are applied in comparison to the traditional concepts of data saturation or information power, the validity of these methods, and whether they are appropriately applied.

Guetterman (2015) conducted a systematic review examining sampling practices across qualitative health sciences and education studies, including phenomenology, ethnography, case study, grounded theory, and narrative inquiry. Findings demonstrated two major concerns of qualitative sample size considerations, including the breadth of the sample size and its appropriateness. As a result, several recommendations were provided to researchers, such as reporting thorough details about the sampling procedures, strategy,

sample size, and its appropriateness. Generally, when determining adequate sample size in qualitative research studies, researchers should be transparent about a study's sample size and sampling rationales regardless of the methods (e.g., saturation, information power) or qualitative design used. Researchers are also encouraged to be reflexive throughout the research process, with a particular focus on issues of sampling. Journal reviewers and editors should also provide thoughtful comments on the sampling approaches and ask authors to include additional sampling details should they be relevant (Guetterman, 2015).

Types of Generalizations

Concerning generalizations, qualitative research aims to primarily obtain rich descriptions of the phenomena of the human experience (Polit & Beck, 2010). Some have argued that in-depth exploration of a phenomenon can lead to higher-level concepts and theories that could allow for extrapolation, thus resulting in generalizations (Glaser, 2002). In other cases, however, some researchers might be interested in generating analytic or case-to-case (or transferability) generalizations (Onwuegbuzie & Collins, 2007). The types of generalizations that are made are related to the sampling strategy of the research design.

Firestone (1993) posited a typology for generalizability categorizing it into three types, statistical, analytic, and case-to-case (or transferability) generalizations. As noted, *statistical generalizations* are primarily developed in quantitative research and refer to generalizing from a sample to a target population using random sampling (Polit & Beck, 2010). *Analytic generalizations* refer to generalizing from specifics to broader constructs of a theory and are typically employed in qualitative research (Polit & Beck, 2010).

Analytic generalizations are developed during the analysis and interpretation phase of a qualitative study and help researchers identify what is relevant to *most* participants in the study rather than solely focusing on participants' unique individual experiences (Polit & Beck, 2010).

Case-to-case transfer, or *transferability*, refers to using the study's findings to generalize to different groups and settings. This type of generalization in qualitative research resembles statistical generalization; however, case-to-case transfer aims to provide detailed descriptions. In qualitative research, the researcher cannot specify the external validity, but they can provide thick descriptions (Lincoln & Guba, 1985). These thick descriptions inform readers and stakeholders when deciding whether a study's findings can be extrapolated to other people and settings (Polit & Beck, 2010; Lincoln & Guba, 1985). To provide detailed descriptions, researchers should use thick descriptions about the sample characteristics, such as the setting, participants, observations, and processes of the interaction(s) (Polit & Beck, 2010). Researchers should, however, avoid generalizing research findings to specific people or cases (Polit & Beck, 2010; Donmoyer, 1990). Although other types of generalizations in qualitative research exist (i.e., naturalistic, moderatum), the typology developed by Firestone (1993) widely captures the most common types of generalizations in both quantitative and qualitative research.

Polit and Beck (2010) developed several strategies that can be used to enhance generalizations in both quantitative and qualitative research. Replication of sampling is one strategy where researchers are encouraged to carefully choose the purposeful sampling strategies that will influence the generalizability and replicability of findings.

Polit and Beck (2010) also support the replication of studies and integrating evidence from multiple data sources such as meta-analyses and meta-synthesis. Researchers are also encouraged to think conceptually and reflexively, familiarize themselves with the data to make meaning of it, develop thick descriptions, and employ mixed methods research when appropriate (Polit & Beck, 2010). Overall, there are differences in the types of generalizations developed for quantitative and qualitative research. These generalizations are closely related to the selected sampling method in the study (i.e., probability or purposeful sampling). Sampling methods can vary based on the research methodology; therefore, these differences are important to acknowledge and address when integrating quantitative and qualitative research methodologies in mixed methods research.

Mixed Methods Research Sampling

This section provides an in-depth review of the foundations of mixed methods research, capitalizing on various sampling elements. This is further expanded by presenting the challenges of mixed methods research and how sampling is affected by all these challenges. Next, mixed methods research sampling typologies and models are explained to highlight how sampling has been addressed in mixed methods research across time. Due to the emphasis of several mixed methods research sampling typologies and models on time orientation (i.e., concurrent or sequential), the impacts of the temporal features of mixed methods research sampling are discussed to highlight an understudied area that could affect the conduct of a mixed methods research study. To conclude, details are provided on a few prevalence studies that have examined mixed

methods research sampling designs in the health sciences that capitalizes on the need to further advance this topic in research.

Foundation to Mixed Methods Research Sampling

Mixed methods research involves *intentionally* integrating quantitative and qualitative research approaches to obtain a more comprehensive understanding of the research phenomena. Three commonly accepted core designs in mixed methods research are the convergent, explanatory sequential, and exploratory sequential designs. The convergent design (also known as concurrent or parallel design) is implemented when a researcher collects and analyzes data from the quantitative and qualitative strands independently and then merges results to obtain a more complete understanding of the research aims. The explanatory sequential design is implemented when a researcher first collects and analyzes quantitative data to either explain or expand on these results by following up with qualitative data collection and analysis (Creswell & Plano Clark, 2018). The exploratory sequential design is implemented when a researcher first collects and analyzes qualitative data followed by quantitative data collection and analysis, typically to build or adapt an instrument, intervention, or identify variables (Creswell & Plano Clark, 2018).

Given the importance of integration in mixed methods research, researchers employing a mixed methods design must make sampling decisions pertinent to the quantitative, qualitative, and full mixed methods study. Researchers must also consider the temporal relationship between data collection and analysis of the quantitative and qualitative strands and how it affects sampling (Collins, 2010). This is known as the timing in a mixed methods research study. Concurrent timing occurs when data collection

and analysis of quantitative and qualitative components are conducted simultaneously, thus independent from each other. However, it is important to note that this is not the case for all convergent designs as a variation of convergent designs is the interaction between the two strands. Sequential timing occurs when data collection and analysis of quantitative and qualitative components are carried out in a sequence, with one occurring before the other, thus dependent on each other (Plano Clark & Ivankova, 2016). Time orientation is a critical aspect of mixed methods research sampling that is intertwined throughout a mixed methods research study regardless of the research design employed.

Within mixed methods research, failure to attend to and appropriately integrate quantitative and qualitative sampling methods for each strand and the full mixed methods study can result in compounded threats to validity, thus affecting the generated meta-inferences of the full mixed methods study. Meta-inferences refer to the findings from integrating the quantitative and qualitative strands, whereas inferences refer to a monomethod study's generated conclusions. Kemper and colleagues (2003) identified two overarching threats that affect the validity of a mixed methods research study as it relates to the sample: (a) choosing a sample that is not representative of the research questions and objectives (threat to internal validity) and (b) inability to transfer/generalize to other people or settings (threat to external validity).

Five different types of probability sampling schemes and 19 purposeful sampling schemes have been identified, resulting in 24 mixed methods sampling schemes (Onwuegbuzie & Collins, 2007). Researchers must decide the most appropriate sampling scheme of the quantitative and qualitative strands, respectively, and the full mixed methods study to maximize the validity of the meta-inferences. Nonetheless, there has

been a paucity of research examining mixed methods research sampling, and there is a dire need to examine this area more closely, particularly given the potential effects of the temporal placement of quantitative and qualitative data collection and analysis, and its effect on the overall study.

Mixed Methods Research Sampling Challenges

Researchers have identified four primary challenges when conducting mixed methods research. These challenges are representation, legitimation, integration, and politics (Onwuegbuzie, 2007; Corrigan & Onwuegbuzie, 2020). Sampling is present at the core of each of these challenges. The *representation* challenge suggests that sampling issues are present in both quantitative and qualitative research. For example, in quantitative research, an underpowered study can limit the ability to accurately conclude a statistically significant treatment effect (Onwuegbuzie & Collins, 2007). Studies that use effect-size indices instead of null hypothesis testing are also subject to sampling issues if the discrepancy between the sample effect size and the population effect size is large due to a small sample size (Onwuegbuzie & Levin, 2003). As a result, this can lead to biased estimates. Representation is violated if a researcher makes statistical generalizations based on small or inadequate sample sizes.

In qualitative research, issues of representation can arise by inaccurately capturing participants' lived experiences. Appropriate representation in qualitative research includes acknowledging the 'Other' and using appropriate descriptions to accurately capture participants' experiences, as noted by Denzin and Lincoln (2018). If the qualitative findings do not align with participants' viewpoints, then issues of representation can arise and compromise the findings in a qualitative research study.

Consequently, issues of representation in mixed methods research are magnified when a researcher inappropriately integrates individuals' lived experiences with numerical findings derived from an inadequate sample size.

The second challenge of mixed methods research is *legitimation* or validity. Onwuegbuzie and Johnson (2006) advanced a binomial nomenclature by coining the term *legitimation* to refer to validity in mixed methods research. Validity issues in quantitative research have been well-established, with most researchers commonly referring to Shadish et al.'s (2002) restructured validity typology, which includes internal, external, construct, and statistical conclusion validity. In qualitative research, Lincoln and Guba (1985) advanced the following types of trustworthiness: credibility (i.e., internal validity), transferability (i.e., external validity), dependability (i.e., reliability), and confirmability (i.e., objectivity). Issues of legitimation are augmented in mixed methods research due to “the difficulty in obtaining findings and/or making inferences that are credible, trustworthy, dependable, transferable, and/or confirmable,” while also attending to quantitative validity (Onwuegbuzie & Collins, 2007, p. 303). Therefore, researchers must address the validity of the quantitative strand, the trustworthiness of the qualitative strand, *and* the legitimation of the full mixed methods research study. If validity issues are present in any strand, these issues will be amplified in the full mixed methods research study.

The third challenge of mixed methods research is *integration*. Issues of integration are present when quantitative and qualitative research approaches are inadequately combined or integrated and ultimately fail to address the research objective(s), purpose(s), and research question(s) (Onwuegbuzie & Collins, 2007).

Specifically, issues of integration related to the sample can arise if different samples and sample sizes are used for each strand when integrating findings. Given that sampling is deeply interwoven in the integration of mixed methods research studies, researchers must carefully consider issues of sampling that can affect the integration of data collection, analysis, and findings in a mixed methods research study. The fourth challenge of mixed methods research is *politics*. Issues of politics occur when contradictions are present due to the differences in quantitative and qualitative research approaches and their intersection (Onwuegbuzie & Collins, 2007). Issues of politics related to the sample can be present when researchers fail to use efficient or realistic sampling designs given their research objective(s) and question(s) (Onwuegbuzie & Collins, 2007).

There are several ways these four challenges can be mitigated in mixed methods research, resulting in more robust sampling procedures. *Representation* can be enhanced in a mixed methods research study by selecting a sample for each strand that aligns with the mixed methods research design. This includes selecting samples that can generate thick descriptions and an adequate sample size, leading to a well-powered study to make valid statistical generalizations and enhance the meta-inferences (Onwuegbuzie & Collins, 2007). *Legitimation* can be enhanced by developing inferences drawn directly from the sample(s) (Onwuegbuzie & Collins, 2007) and appropriately addressing legitimation types pertinent to the sample. For instance, Johnson and Christensen (2020) describe sample integration legitimation as the extent to which appropriate conclusions are made about the quantitative and qualitative samples and are appropriately integrated, leading to high-quality meta-inferences. Although using the same sample for the quantitative and qualitative strands could yield robust meta-inferences, often, it is not

feasible to use the same sample or sample sizes for both strands. Thus, it is critical to address sampling of each strand, their integration, and the full mixed methods study to generate high-quality meta-inferences related to the mixed methods research sample.

Integration can be enhanced in a mixed methods research study using sampling designs consistent with the quantitative and qualitative approaches and assigning appropriate priority to each strand (Onwuegbuzie & Collins, 2007). In turn, this will also affect the overall meta-inferences. Issues of *politics* can be diminished in mixed methods research by ensuring that selected sampling designs are “realistic, efficient, practical, and ethical” (Onwuegbuzie & Collins, 2007, p. 305). Overall, these strategies can reduce challenges in mixed methods research studies, particularly regarding sampling. Given the integration of quantitative and qualitative research, and the sampling decisions made for each strand, these challenges can lead to either “additive or multiplicative effects,” negatively affecting the quality of the mixed methods research study if not adequately addressed (Onwuegbuzie & Collins, 2007, p. 307).

Mixed Methods Research Sampling Typologies and Models

Several mixed methods research sampling typologies and models have been developed throughout the past two decades. One of the first conceptualizations of mixed methods research sampling was advanced by Kemper et al. (2003), who developed a 3 x 3 matrix that incorporated sampling strategies (i.e., probability, purposive, and mixed methods) by data type (i.e., quantitative, qualitative, or mixed methods). The purpose of the matrix was to display the frequency of sampling strategies with associated data types. For example, the generation of quantitative data happens *often* in probability sampling, *rarely* for purposive sampling, and *occasionally* for mixed methods sampling approaches.

The cells running diagonally on the matrix represent the most frequent combinations of sampling techniques across data types, such that probability sampling is mostly applied in quantitative data, purposive sampling in qualitative data, and mixed sampling in mixed data.

This 3 x 3 matrix demonstrated the sampling strategies most often incorporated with different data types across varying methodologies. In addition, this model introduced the concept of multilevel sampling in mixed methods research. Multilevel sampling strategies are critical as they allow researchers to investigate hierarchical structures, particularly in education and the health sciences. Nevertheless, this initial framework excluded a critical component of mixed methods research designs known as the time orientation (i.e., concurrent or sequential) and how it influences the mixed methods research sampling design.

Teddlie and Yu (2007) extended Kemper and colleagues' (2003) matrix by developing a mixed methods research sampling typology divided into five different sampling types: basic mixed methods sampling strategies, sequential mixed methods sampling, concurrent mixed methods sampling, multilevel mixed methods sampling, and sampling using multiple mixed methods sampling strategies. The basic mixed methods sampling strategies included more common sampling types such as stratified purposive sampling and purposive random sampling. The sequential and concurrent mixed methods sampling strategies are related to the timing of data collection and analysis of the quantitative and qualitative strands in a mixed methods research study. The multilevel mixed methods sampling accounted for the hierarchical structure of samples involving two or more levels or units of analysis (e.g., community, hospitals, hospital units, hospital

chiefs, physicians, nurses) (Teddlie & Yu, 2007). Lastly, sampling using multiple mixed methods sampling strategies refers to mixed methods designs that use a combination of multiple strands with multiple levels of sampling embedded in each strand (e.g., sequential multilevel sampling with multilevel mixed methods sampling or concurrent sampling with multilevel mixed methods sampling) (Teddlie & Yu, 2007). This mixed methods research sampling typology highlighted the relationship between time orientation and sample selection in a mixed methods research study.

Onwuegbuzie and Collins (2007) advanced a two-dimensional mixed methods sampling model comprised of two features: (1) time orientation (i.e., concurrent or sequential) and (2) the relationship of the quantitative and qualitative samples. The time orientation of the quantitative and qualitative phases was consistent with previous models; however, this typology also accounted for the priority of each phase (QUAN or QUAL dominant, quan or qual less dominant, or equal status) (Collins, 2010). In addition, another distinct feature of the two-dimensional model was the relationship between the quantitative and qualitative samples (e.g., identical, parallel, nested, or multilevel) (Onwuegbuzie & Collins, 2007). An identical relationship incorporates the same sample for the quantitative and qualitative strands of a mixed methods study. A parallel relationship refers to including different samples for the quantitative and qualitative strands of a mixed methods study. However, both samples are drawn from the same underlying population (e.g., emergency room nurses from different hospitals). A nested relationship is characterized by selecting a sample for one strand of the study and a subsample of those participants for the other strand (e.g., a subset of emergency room nurses). A multilevel relationship includes using two or more types of samples from

different populations (e.g., hospital chiefs, physicians, and emergency room nurses). This two-dimensional mixed methods research sampling model differed from Kemper et al.'s (2003) model and Teddlie and Yu's (2007) typology in that it accounted for the relationship between the quantitative and qualitative samples, provided increased structure and considered the priority of each methodology within the mixed methods design.

Collins (2010) developed an integrative typology to aid in mixed methods research sampling decision-making comprised of five criteria: (1) the relationship between samples and time orientation of phases, (2) the relationship between quantitative and qualitative strands, (3) the relationship between a combination of sampling schemes (e.g., random and maximum variation) and type(s) of generalizations, (4) relationship between the types of data collected and the research questions, and (5) relationship between the emphasis of each strand (dominant, dominant-less, equal) and appropriate meta-inferences. These criteria are derived from a combination of previously published sampling typologies in mixed methods research (Collins, 2010). However, due to the comprehensive nature of this model, it is unknown whether researchers apply this model to make mixed methods research sampling decisions or how it is applied in practice. Moreover, the inclusive sampling model is predominantly grounded in theoretical underpinnings.

The mixed methods representation analyses (MMRA) is the most recent framework for mixed methods research sampling (Corrigan & Onwuegbuzie, 2020). The MMRA incorporates elements of the two-dimensional model as well as other features such as the selection of sampling frame (i.e., random or purposeful), time orientation (i.e.,

concurrent or sequential), priority (i.e., dominant/less/equal), the relationship between or among samples (i.e., identical, parallel, nested, multilevel), as well as the degree of mixing (i.e., partial or full), the sample size, and the total number of sampling units in the study (e.g., people, cases, texts, observations) (Corrigan & Onwuegbuzie, 2020). The MMRA provides comprehensive guidelines on critical elements needed to address mixed methods research sampling. Given its recent development, how researchers apply it in their empirical work is not yet known. Table 2.1 presents descriptions and highlights the contributions of each mixed methods research sampling typology or model across time.

Table 2.1

Descriptions and Contributions of Mixed Methods Research Sampling Typologies and Models Across Time

| Mixed Methods Research Sampling Typology or Model | Components of Typology or Model | Purpose | Contribution(s) |
|--|---|--|--|
| Kemper et al. (2003) | 3 x 3 model: Sampling strategy by data type | Reported the frequency of sampling techniques associated with data collection based on qualitative descriptors (e.g., often, occasionally, rarely) | Demonstrated common sampling strategies used across different research methodologies and introduced multilevel sampling in mixed methods research. |
| Teddlie and Yu (2007) | Expanded on five sampling types: (1) basic mixed methods sampling strategies, (2) sequential mixed methods sampling, (3) concurrent mixed methods | Demonstrated the relationship between time orientation and sample selection. | Underscored the relationship between time orientation and the selection of a sample in a mixed methods research study and was the first to introduce the concept of time |

| | | | |
|---------------------------------|---|---|---|
| | sampling, (4) multilevel mixed methods sampling, and (5) sampling using multiple mixed methods sampling strategies | | orientation as it relates to mixed methods research sampling. |
| Onwuegbuzie and Collins (2007) | Two-dimensional model: (1) Time orientation and (2) relationship between quantitative and qualitative samples | Reinforced the relationship between time orientation and relationship between the quantitative and qualitative samples. | Incorporated the time orientation of each phase, the priority of each methodology, and the integration of sampling techniques for the quantitative and qualitative strands. |
| Collins (2010) | Comprised of three components: (1) integrative model, (2) mixed methods research sampling process, and (3) quality criteria related to mixed methods research sampling | Comprehensive model that includes varying influences of mixed methods research sampling including meta-inferences. | Combined previous mixed methods research sampling literature into one comprehensive model. |
| Corrigan and Onwuegbuzie (2020) | Incorporated elements from the two-dimensional model by Onwuegbuzie and Collins (2010), and additional sampling elements in mixed methods research (e.g., degree of mixing, sample size, sampling units). | Included multiple sampling components related to the mixed methods research design. | Reinforces researchers to achieve representation and interpretive consistency through elements included in model. |

Influence of Temporal Features on Mixed Methods Research Sampling

Sampling issues are closely intertwined with temporal features of a mixed methods research study, such as the timing (e.g., concurrent or sequential) and data collection's priming effects, ultimately affecting a study's validity and meta-inferences. Specifically, issues of timing and priming effects are magnified in intervention studies within the health sciences. Priming effects arise when an individual's attitude or choice is altered or influenced based on a prior question(s) (Vitale et al., 2008). If priming occurs, any data collected following priming will be faulty and lead to biased measurements and inferences (Vitale et al., 2018). Interactive effects can arise from collecting different types of data during the same data collection session. For example, participants' responses during a qualitative interview on their experiences with depression could influence the way they respond to subsequent questions on a depression questionnaire administered immediately after the interview (Song et al., 2010).

Similar issues can also arise if administering the depression scale immediately before the interview and, thus, influence participants' responses during the interview (Song et al., 2010). Moreover, conducting quantitative and qualitative data collection with a considerable time lag could further compromise the validity of a study. Therefore, thoughtful planning and considerations on the implications of the timing (e.g., concurrent or sequential) of data collection methods are paramount to reducing priming effects and enhancing the overall generated meta-inferences of a mixed methods study. The influences of the temporal placement of data collection methods on sampling are also suggested across various mixed methods research sampling typologies and models. The primary components of the two-dimensional mixed methods sampling model by

Onwuegbuzie and Collins (2007) suggest the relationship between the time orientation of the quantitative and qualitative phases and the relationship between quantitative and qualitative samples.

Corrigan and Onwuegbuzie (2020) assert that sequential designs can have the most issues related to sampling as sampling errors in the first phase of a study are likely to transfer to the second phase, thus affecting the meta-inferences. When examining the relationship between quantitative and qualitative samples, one could argue that sampling errors are minimal in mixed methods research studies employing concurrent timing; however, sampling errors using concurrent timing are not lessened simply because data collection was conducted independently of each other. Researchers must also consider the relationship between the quantitative and qualitative samples (e.g., identical, parallel, nested, and multilevel). For instance, sampling errors can be prominent in a mixed methods research study using concurrent timing with parallel samples if the quantitative and qualitative samples are drawn from different populations.

For parallel samples, data are collected for each strand from different samples but from the same underlying population. Therefore, if the samples are derived from different underlying populations even though the timing of data collection is concurrent, the selected samples will not adhere to the principles based on the relationship between the quantitative and qualitative samples or research objective(s) and question(s), thus further comprising the validity of the study. This suggests that the temporal features of data collection (i.e., time orientation) and the relationship between samples, collectively, have a vital role on the mixed methods research sample and the generated meta-inferences. Sampling decisions of a mixed methods research study should reinforce the thoughtful

consideration of the temporal placement of data collection, time orientation, and relationship between samples to further enhance the validity and meta-inferences of the study.

Methodological Reviews on Mixed Methods Research Sampling

A limited number of prevalence studies have investigated the use of mixed methods sampling designs in research studies (e.g., Collins et al., 2006; Collins et al., 2007). These prevalence studies have primarily been conducted within the social and health sciences field. Collins et al. (2006) conducted a prevalence study exploring mixed methods research sampling designs in the social sciences, particularly in school psychology. A total of 42 articles were included in the sample. Results demonstrated that the most prevalent mixed methods research sampling designs were concurrent designs using identical samples (14.3%) and concurrent designs using multilevel samples (14.3%), with no studies employing concurrent designs using parallel sampling (0%).

Regarding the sample size, results demonstrated that only 57.1% of studies specified the sample sizes for both the quantitative and qualitative strands of the mixed methods research study, with 40% of studies failing to include the sample size for either the quantitative or qualitative phase (Collins et al., 2006). The lack of sample size information further contributes to potential legitimization issues and the study's validity. Specifically, failure to provide this information leaves readers with insufficient evidence to determine whether results are generalizable or how saturation was achieved. Regardless of sample size omission, Collins et al. (2006) found that researchers still developed meta-inferences of the full mixed methods study; however, in some cases, these meta-inferences were not supported, thus leading to issues of interpretive

consistency (i.e., validity). As a result, Collins and colleagues (2006) explicitly called to advance methodological research on mixed methods research sampling to guide researchers on this topic and increase the validity of meta-inferences.

Collins and colleagues (2007) conducted a mixed methods research study extending Collins et al. (2006) by examining the mixed methods sampling designs and interpretive consistency of mixed methods research studies in social and health sciences research. To assess the mixed methods sampling designs, they were guided by the two-dimensional model of mixed methods research sampling based on time orientation and the relationship of the quantitative and qualitative samples. A total of 121 mixed methods research studies were identified using 15 different electronic databases meeting inclusion criteria (e.g., empirical mixed methods research study and published in an English peer-reviewed journal). Overall, the most prevalent mixed methods research sampling designs were concurrent designs using identical samples (28.9%), followed by concurrent designs using nested samples (19.8%), and concurrent designs using multilevel samples (16.6%). The two least implemented mixed methods research sampling designs were the concurrent designs using parallel samples (0.8%) and sequential designs using identical samples (7.4%).

Overall, identical sampling designs were most prevalent across concurrent and sequential time orientations. Moreover, 91.7% of the studies claimed to have used purposeful sampling, but no specific types were provided based on the 19 different purposeful sampling types. For the majority of the articles (58.7%), researchers made statistical generalizations even though 53.7% of studies included small sample sizes that would not warrant a valid statistical generalization, thus leading to issues of interpretive

consistency (Collins et al., 2006). These results also clearly demonstrate how the four mixed methods research crises, including representation, legitimation, integration, and politics, are affected as it relates to sampling.

These two prevalence studies shed light on three crucial issues: (a) mixed methods research studies are not clearly outlining the sample size of the quantitative and qualitative strands, (b) mixed methods research studies are not explicitly stating the type of purposeful sampling used, and (c) statistical generalizations are made with underpowered studies, thus affecting the overall meta-inferences. Collectively, the samples used in these prevalence studies demonstrate apparent issues of mixed methods research sampling. Although there is a paucity of research on this topic, with only two prevalence studies examining the phenomena of mixed methods research sampling in applied fields (i.e., social and health sciences), it is evident that mixed methods research sampling issues are prominent. Specifically, researchers must clearly address the sample size, provide sufficient details on the sample composition and the specific types of sampling schemes used, and address validity issues related to mixed methods research sampling.

Sampling issues permeate all levels of a study, and it is evident that sampling is directly related to the generated meta-inferences. Therefore, there is a critical need to examine issues of mixed methods research sampling further and develop a list of practical recommendations for mixed methods sampling that addresses various sampling components, as failure to attend to these issues can greatly compromise a study's validity and the generated meta-inferences. Doing so will help ensure researchers and consumers of mixed methods research fully address mixed methods research sampling of a study and

determine whether the meta-inferences are valid and generalizable to other related studies.

Mixed Methods Social and Health Sciences Research

This section includes specific applications of mixed methods research within the health sciences. Details are provided on intervention research, including hybrid designs, noting their implications on sampling and the study's validity. Mixed methods intervention procedural frameworks are introduced and described to demonstrate how qualitative research has been integrated into randomized controlled trials (RCTs) and how its placement (i.e., before, during, or after an RCT) influences the conduct of a mixed methods research study. In general, this section situates the value of mixed methods research in the social and health sciences and its implications for intervention research.

Applications of Mixed Methods Research

Mixed methods research approaches are often employed in the health sciences discipline to study complex research phenomena, including issues in public health “such as disparities among populations, age groups, ethnicities, and cultures; poor adherence to treatment thought to be effective; behavioral factors contributing to disability and health; and translational needs for health research” (Creswell et al., 2011, p. 2). The value of mixed methods research stems from the integration of quantitative and qualitative research approaches to obtain a more holistic understanding of the research phenomenon that one methodology alone might not be able to capture (Palinkas et al., 2011). This becomes pivotal in health sciences research with the integration of qualitative (e.g., patient records, in-depth interviews, field studies) and quantitative (e.g., participant

response to interventions and clinical trials, attitudes and beliefs surveys, and epidemiological measures) data collection and analysis that aims to obtain a comprehensive understanding of health issues and how to mitigate them (Creswell et al., 2011).

In mixed methods social and health sciences research studies, the quantitative strand can be used to test and support hypotheses by examining significant predictors in an intervention study, while the qualitative strand can aid in understanding the reasons for the success or failure of an intervention or implementation design and make modifications to the intervention (Palinkas et al., 2011). Within the social and health sciences field, mixed methods research has shown promise by not only investigating the conditions in which treatment was successful but also exploring reasons for *why* the treatment failed under different parameters or with a different sample. In other words, the quantitative strand focuses more closely on the *outcomes*. *In contrast*, the qualitative strand focuses more closely on the *processes* (Albright et al., 2013), thus elucidating a more holistic and comprehensive understanding of the phenomenon.

Mixed methods research approaches in the social and health sciences are also used to conduct exploratory and confirmatory research. For example, an exploratory sequential design can be carried out where the qualitative strand aims to explore a phenomenon and develop a conceptual model and hypotheses, followed by the quantitative strand used to test and confirm the validity of the model based on the generated hypotheses from the first phase (Albright et al., 2013). The intentional integration of quantitative and qualitative research approaches contributes to a deeper

understanding of the study by combining exploratory and confirmatory research into one overarching mixed methods study.

In other instances, a mixed methods approach can be implemented to offset the weakness of the complementary strand (Bryman, 2006). For instance, in implementation research, adequate statistical power can often be challenging to achieve in studies examining nested structures such as teams or service providers (Albright et al., 2013). Thus, in these scenarios, the qualitative strand can be particularly beneficial in elucidating thick descriptions and providing further meaning to the statistical results stemming from a small sample size. For these reasons and several others, mixed methods research approaches are often employed in the health sciences, particularly in intervention research.

Intervention Research in the Social and Health Sciences

Several trial designs are widely applied in social and health sciences research, including intervention, implementation, and hybrid designs. All these designs have distinct purposes and methodological implications. One of the most common is intervention studies. The following provides fundamental information on intervention research and hybrid trials in the health sciences.

Intervention Trials

The purpose of intervention research is to assess the efficacy or effectiveness of clinical intervention (Eldh et al., 2017). Intervention research permeates all health sciences subfields, including primary, acute, rehabilitation, and long-term care settings (Sidani, 2015). Rapid advancements in intervention research have led to the development of standardized intervention protocols and treatment manuals, shed light on the

importance of involving multiple stakeholders throughout the development and implementation of an intervention, as well as identifying specific strategies based on participants' needs, characteristics, and culture (Gitlin & Czaja, 2015). Researchers conducting intervention studies assess an intervention's appropriateness, safety, and how well the intervention addresses and reduces health-related issues to improve participant health (Sidani, 2015).

Intervention research is vital to mitigating public health concerns for several reasons. First, intervention research focuses on reducing public health challenges such as addictions, chronic disease, mental illness, and health disparities (Gitlin & Czaja, 2015). Next, the focus of intervention research has shifted to evidence-based practices as these practices are typically unbiased, have strong internal validity, and results can be generalized with a high level of confidence (Gitlin & Czaja, 2015). Specifically, evidence-based practices integrate rigorous scientific evidence, clinical expertise, and individual patient needs that contribute to the evidence base of an intervention's efficiency and effectiveness (McKibbin, 1998; Sidani, 2015). Moreover, intervention research examines the causal relationship between interventions and their expected outcomes. Assuming validity threats have been mitigated to the highest degree, a researcher can confidently assert that the treatment was a direct effect of the intervention and that no other contextual variables are responsible for the change (Sidani, 2015).

Several types of intervention trials exist, such as efficacy and effectiveness. The focus of efficacy trials is on examining the benefits and harms of the treatment intervention under *ideal* and *controlled* settings (Singal et al., 2014). Efficacy research aims to answer the question: "Is this treatment successful under controlled conditions?."

Due to the importance of experimental control in efficacy trials, validity emphasis is usually placed on the internal validity of a study (Rosqvist et al., 2011; Bauer & Kirchner, 2020). Thus, efficacy trials typically use stringent inclusion and exclusion criteria resulting in a more homogenous sample (Singal et al., 2014). These stringent inclusion and exclusion criteria are designed to generate a sample of individuals with a certain condition or disorder and exclude individuals who may not respond well to treatment (Singal et al., 2014).

Effectiveness trials in intervention research aim to answer the question: “How will this invention work in a ‘real-world’ setting?” In other words, effectiveness trials emphasize the generalizability of a study’s results, given its focus on emulating real-world conditions (Singal et al., 2014). These ‘real-world’ conditions may involve including heterogeneous clinical populations, using less-standardized treatment protocols, and ensuring treatment delivery occurs in a routine clinical setting (Singal et al., 2014). Although effectiveness trials tend to include a more heterogenous sample and do not incorporate as many exclusion criteria as efficacy trials, this can affect the sample composition. For instance, effectiveness trials tend to have higher levels of participant non-compliance. Furthermore, the sample can include an increased number of participants with multiple health comorbidities due to the sample heterogeneity (Singal et al., 2014).

Hybrid Trials

Hybrid trials, also known as effectiveness-implementation trials, simultaneously test the effects of an intervention in a real-world setting (e.g., effectiveness) and the implementation strategy used (e.g., implementation) (Bernet et al., 2013). There are three

different types of hybrid designs. The main difference across the three types is whether the emphasis is placed on the intervention, implementation, or balances both. The purpose of type 1 hybrid designs is to primarily test the effects of an intervention while gathering data to inform the implementation or delivery of the intervention in a real-world setting (Curran et al., 2012; Bernet et al., 2013). Type 2 hybrid trials emphasize both the intervention and implementation strategy as both are tested simultaneously (Curran et al., 2012). Type 3 hybrid trials emphasize testing the implementation strategy while also gathering data on the intervention and its outcomes (Curran et al., 2012; Bernet et al., 2013). Since hybrid trials involve both intervention and implementation trials, often, evaluation methods are used to explore the implementation strategies. Specifically, process, formative, and summative evaluation methods are the most common (Bernet et al., 2013).

Samples in hybrid designs tend to be more heterogenous, which leads to increased variability (Zhu et al., 2020). This can lead to smaller effect sizes and, thus, require a larger sample size than solely intervention trials (Zhu et al., 2020). Given the heterogeneous nature of the sample composition in hybrid designs, increased emphasis is placed on the external validity of a study rather than internal validity (Zhu et al., 2020). Some hybrid trials might have more flexible inclusion and exclusion criteria to allow eligible participants to engage in the study; however, other hybrid designs might include a subset of participants with more strict inclusion and exclusion criteria as they include an intervention component (Zhu et al., 2020).

In sum, a researcher should be cognizant of the sample characteristics, communities, and organizations involved in the study across intervention research

studies. This is paramount to executing an intervention that will have lasting effects (Gitlin & Czaja, 2015). When embedding an intervention within a mixed methods study, these elements must be thoughtfully considered for the quantitative, qualitative, and full mixed methods study to enhance the validity of the findings. Identifying sampling elements of the quantitative and qualitative strands in intervention studies can also further enhance the treatment effectiveness and aim to reduce the time lag in effectively bridging research into practice through the conduct of sound methodological approaches.

Mixed Methods Intervention Procedural Frameworks

Some mixed methods intervention procedural frameworks have been developed to enhance the conduct of mixed methods interventions (e.g., Creswell et al., 2009; Linnan & Steckler, 2002; O’Cathain et al., 2013). The use of these frameworks helps guide researchers on how to plan their study grounded in sound methodological procedures and translate the findings to various stakeholders (O’Cathain, 2018). Three mixed methods intervention frameworks have been advanced: the temporal framework, the process-outcome framework, and the Aspects of a Trial framework.

The temporal framework advanced by Creswell and colleagues (2009) expands Sandelowski’s (1996) work describing the purposes of collecting qualitative data at different times during a mixed methods RCT. This framework provides various purposes for embedding the qualitative strand before, during, or after an intervention and its implications for the outcome of a study. For example, suppose the qualitative strand is embedded before the intervention (i.e., exploratory sequential core design). In that case, this can help with instrument development, identifying participant recruitment, or better understanding the intervention's needs (Creswell et al., 2009). Suppose the qualitative

strand is embedded during the intervention (i.e., convergent core design). In that case, this can help to explore participants' experiences during treatment, identify mediating and moderating variables, and assess the fidelity of intervention procedures and their implementation (Creswell et al., 2009). Suppose the qualitative strand is embedded after the intervention (i.e., explanatory sequential core design). In that case, this can facilitate researchers' understanding of study outcomes, obtain participant feedback on ways to alter the intervention, and explain treatment fidelity (Creswell et al., 2009; Creswell & Plano Clark, 2018).

Another type of mixed methods intervention procedural framework is the process-outcome evaluation framework uses process evaluation methods to evaluate a mixed methods intervention and mitigate Type III errors (Linnan & Steckler, 2002). Type III errors can arise from making inaccurate conclusions about a program that has not been appropriately implemented. By conducting a process evaluation of the intervention, researchers can conclude whether issues with the intervention were present or whether the intervention was poorly delivered (Drabble & O'Cathain, 2015). Specifically, this framework describes the features of an intervention that led to its success as well as the components that led to ineffective results. Lastly, the Aspects of a Trial Framework developed by O'Cathain and colleagues (2013) detail how qualitative research has been used in RCTs based on empirical systematic evidence. O'Cathain et al. (2013) conducted a systematic mapping review by reviewing 296 studies between 2008 to 2010 of RCTs. Researchers identified 22 ways qualitative research was used in the RCTs and divided these into five overarching categories: intervention, trial design and conduct, outcomes, process and outcome measures, and health condition (O'Cathain et al., 2013).

Collectively, these procedural frameworks on mixed methods intervention research have focused on the strengths of embedding qualitative methodology in an RCT. Although this research has outlined specific reasons for embedding qualitative research either before, during, or after an intervention, additional research may be needed highlighting the role of sampling and potential issues in intervention research. This is evident and further emphasized in a study by Drabble and colleagues (2014). Drabble et al. (2014) conducted a documentary analysis of proposals of funded studies in the United Kingdom to investigate how qualitative research was discussed in grant proposals of RCTs. A total of 32 proposals were analyzed, and findings indicated that key methodological aspects of the qualitative research, such as the methods, sampling strategy, and size, were rarely addressed. Therefore, given the role of qualitative research in mixed methods intervention designs, methodological research must address the influence of the temporal placement of qualitative research in mixed methods intervention designs and sampling components of mixed methods research studies through empirical evidence, particularly within psychological intervention research. Developing a robust list of practical recommendations for mixed methods sampling in psychological intervention research can help guide researchers when making sampling decisions and further elucidate how the temporal placement of data collection and analysis can influence sampling.

Methodological Research on Sampling in Mixed Methods Health Sciences Research

The purpose of this section is to highlight the relevant methodological literature on sampling in mixed methods research, particularly implementation research. In addition, this section describes research centered on mixed methods grant proposals that

establish the need to appropriately address sampling across mixed methods research grant proposals. Collectively, this section illustrates the limited amount of methodological research on sampling in mixed methods intervention research and how this gap and its effects are excluded in grant proposals, specifically within the health sciences field.

Relevant Methodological Studies on Mixed Methods Research Sampling

Several challenges exist in sampling in social and health sciences mixed methods research, especially within intervention and implementation research. As previously noted, two areas of concern include the timing and priming effects of the data collection methods (Song et al., 2010). This refers to whether data in a mixed methods study were collected and analyzed concurrently or sequentially, as these decisions can affect different aspects of sampling and the validity of a study. This is of most concern in intervention studies due to the influence of ordering effects on intervention outcomes (Song et al., 2010). These ordering effects are heightened by issues of validity or quality, integration, efficiency, practicality, and ethical standards of a study (Collins et al., 2007, p. 270). Researchers must ensure that the inferences of each independent strand are addressed, as well as the meta-inferences of the full mixed methods study. Most of the methodological research on mixed methods research sampling in the health sciences has been conducted particularly within implementation research, to examine some of these concerns.

Palinkas and colleagues (2011) conducted a systematic methodological review (SMR) examining the use of mixed methods designs across mental health services research studies. Researchers identified 22 mixed methods research studies in peer-reviewed journals from 2005 to 2009 using the PubMed Central database. To assess each

article, researchers coded for different mixed methods elements, including the study's aims, rationale, structure, function, and process (Palinkas et al., 2011). 'Function' referred to whether quantitative and qualitative methods were used to answer the same research questions or related questions through either convergence, complementarity, expansion, development, or sampling, per Greene et al.'s (1989) mixed methods research conceptual framework for evaluation designs.

Findings indicated that the function of sampling was particularly important in mixed methods research designs when research questions could not be answered by one method alone, especially in sequential designs (Palinkas et al., 2011). Moreover, researchers noted that thoughtful consideration of the sampling scheme enhanced the validity of the mixed methods research study. For example, sampling enhanced the validity of the quantitative strand by using qualitatively informed comparison groups. Alternatively, sampling also enhanced the validity of the qualitative strand by using quantitative methods to inform the selection of purposeful sampling for the mixed methods research study. Overall, this SMR provided evidence of the role of sampling in mixed methods research mental health services research. This SMR demonstrated the link between sampling and validity in mixed methods research and the overall role of sampling in mixed methods research to achieve a more comprehensive understanding of the research questions that one method alone could not accomplish. One limitation of this study was that researchers did not examine the most common sampling strategies of each monomethod approach in implementation research or the influence of choosing one sampling strategy for one specific strand of the mixed methods research design and its effect on the subsequent strand.

Palinkas and colleagues (2015) reviewed the most current standards and practices of purposeful sampling in implementation research. To address a few limitations from Palinkas et al. (2011), researchers reexamined the previous 22 studies and included an additional six, yielding a total of 28 mental health sciences mixed methods research studies between 2005 to 2009. From this sample, only five studies provided an explicit reference to purposeful sampling, and three studies included a rationale for their sample selection; however, they failed to provide an explicit description on the use of purposeful sampling. The remaining 20 studies provided no sampling rationale for the qualitative strand. Moreover, out of 28 studies, 21 (75%) used at least one type of criterion sampling, known as either a criterion of inclusion (criterion-i) or criterion external to a category or group of interest (criterion-e) (Palinkas et al., 2015). Palinkas et al. (2015) argued that criterion sampling might fail to adequately capture participants' experiences who are part of other groups and encouraged using other types of sampling approaches such as maximum variation, extreme case, homogenous, and snowball sampling dependent upon the purpose of the study. For example, by focusing only on practitioners, researchers might have failed to capture the perspectives of others involved, such as consumers, family members, and stakeholders. Palinkas et al. (2015) also suggested that multistage purposeful sampling might be particularly beneficial in implementation and hybrid designs.

Overall, Palinkas and colleagues (2015) noted the lack of guidelines on purposeful sampling in mixed methods implementation studies and encouraged further methodological research examining the different types of purposeful sampling most appropriate in mixed methods implementation research. Furthermore, based on Palinkas

et al.'s (2015) review, researchers noted it was unclear which types of purposeful sampling are most appropriate for mixed methods research studies dependent upon the limitations of the quantitative and qualitative strands in a mixed methods research study. Therefore, further research is needed to examine how different types of purposeful sampling strategies are used in mixed methods research. Although Palinkas et al.'s (2015) review is one of the first to investigate the issue of sampling in mixed methods health sciences research studies, it focused only on limited types of purposeful sampling (i.e., criterion), thus necessitating further examination across other sampling strategies (e.g., convenience, quota, and snowball sampling) in mixed methods health sciences research studies. Therefore, the field is ripe for continued discussions and methodological approaches and innovations on sampling in mixed methods health sciences research.

Role of Sampling in Mixed Methods Grant Proposals

The absence of a mixed methods research sampling model in mixed methods health sciences research studies and its effects are further evidenced in grant proposals. Guetterman et al. (2019) reviewed 40 summary statements of funded and unfunded mixed methods proposals across various health sciences funding agencies, including the National Institutes of Health (NIH), Patient-Centered Outcomes Research Institute, and Agency of Healthcare Research Quality, among others. Various mixed methods features were coded based on reviewer comments on summary statements. A priori codes were developed following the NIH criteria, including Significance, Investigators, Innovation, Approach, and Environment (and specific criteria for K mentored scientist grants), and inductive codes were also developed. Guetterman et al. (2019) found that reviewers noted more limitations of sampling strategies in unfunded studies ($n = 38$) rather than in funded

studies ($n = 12$). Moreover, reviewers noted a lack of methodological inclusion of qualitative sampling strategies, which affected the validity of the mixed methods meta-inferences.

Regarding mixed methods research sampling, reviewers of mixed methods health sciences grant applications frequently reported the need for investigators to provide a sampling rationale that connects the quantitative and qualitative strands of a mixed methods study. Reviewers emphasized the importance of addressing sampling strategies in a mixed methods study, particularly features that enhance the overall rigor of the study. Reviewers also noted not being aware of mixed methods studies that employ identical sampling of the quantitative and qualitative strands.

Concerning generalizability, Guetterman and colleagues (2019) found that reviewers were applying statistical generalizability to the qualitative strand. This is not only methodologically inaccurate, but it minimizes the role of the qualitative strand in obtaining a more in-depth understanding of lived experiences and human complexities from participants involved in the study, particularly on more sensitive topics such as addiction, racial disparities, and mental health (Guetterman et al., 2019). Thus, it is clear from reviewers' comments on grant applications in the health sciences field that investigation of sampling methods in mixed methods research is needed to increase the rigor of mixed methods research studies and grant proposals. Doing so will increase awareness among researchers and grant and journal reviewers to foster methodological advancements and rigor in the field. Findings from Guetterman et al. (2019) examining mixed methods research grant reviews demonstrate the need for a list of practical recommendations for mixed methods sampling that not only guides researchers on ways

to address sampling in mixed methods research studies but also informs grant and journal reviewers of more nuanced sampling methods and how to assess these in a mixed methods research study.

Participant Recruitment and Retention in Mixed Methods Research

The intent of this section is to provide examples of participant recruitment and retention strategies used across research. Specifically, this section elaborates the factors influencing participant recruitment and retention and how this can translate to mixed methods research designs. Specific details on recruitment and retention strategies are provided. Specifically, retention strategies are discussed by drawing on current research from longitudinal designs. Lastly, this section describes how ineffective participant retention methods can affect the validity of a study in both quantitative and qualitative research.

Participant Recruitment and Retention Strategies

Issues related to participant recruitment and retention in the social and health sciences are highly prevalent and can have detrimental effects on the conduct of a study and its generalizability. Common issues with participant recruitment and retention include not identifying an appropriate sample from the target population, unclear inclusion/exclusion criteria, slow recruitment rates, and inability to meet recruitment goals for the study (Jimenez & Czaja, 2015). At a fundamental level, these issues stem from a study's sample. Participant recruitment methods are essential for obtaining an appropriate sample in a research study consistent with the research question(s) and objective(s). Conversely, retention methods are used to ensure participants remain engaged throughout the length of the study. Failure to attend to effective participant

recruitment and retention methods can compromise a study's validity. While participant recruitment strategies tend to focus on the sample composition, participant retention methods are predominantly influenced by both sample characteristics and study design. Some study designs (e.g., longitudinal) can influence retention methods regardless of the sample composition.

Recruitment

Participant recruitment is the process researchers use to find, inform, and invite participants into a study (Begun et al., 2018; Sidani, 2015). Recruitment processes are intended to engage a larger number of participants in a study that appropriately aligns with the target population. Researchers often overestimate the number of individuals willing to participate in a study (Begun et al., 2018); therefore, it is critical to be mindful and use various recruitment strategies that are most effective for the target population. Since the sample demographics greatly influence recruitment methods, there are a variety of common recruitment strategies researchers have reported using across various research designs.

Recruitment Methods

Participant recruitment methods can be categorized into two main types: active (direct or proactive) or passive (indirect or reactive) strategies. Active strategies involve maintaining direct contact between the research team leading recruitment efforts and potential participants. This may include, face-to-face meetings with potential participants, such as visiting clinics participants attend, giving presentations to a group of potential participants, attending health-related events where potential participants may attend, and having a booth at a health fair distributing information about the study (Sidani, 2015).

There are several advantages to using active recruitment strategies, including having direct contact with potential participants, providing more in-depth information about the study, and research staff can start building relationships with potential participants in doing so (Sidani, 2015). However, some disadvantages of active recruitment strategies are that they tend to be costly and time intensive (Sidani, 2015).

Passive recruitment strategies involve indirect contact with potential participants. This may include, using a variety of media outlets, such as social media, newspaper, television, or radio, to inform individuals about a study, using printed materials such as flyers and brochures and placing them in clinics and centers where potential participants attend, and word-of-mouth referral by healthcare professionals. There are several advantages to using passive recruitment strategies, such as potentially reaching a larger and more diverse audience and potentially being less costly (Sidani, 2015). Nevertheless, one of the challenges is that researcher personnel involved in recruitment efforts may receive many inquiries from individuals, which can be time intensive (Sidani, 2015).

Retention

Participant retention is the process of keeping participants engaged throughout the duration of the study and can be both voluntary and involuntary (Begun et al., 2018). Retention issues can lead to participant withdrawal from the study, commonly known as attrition, mortality, dropout, or loss of follow-up (Sidani, 2015). Participants can withdraw from a study at varying stages, including before the study has started, during, or after receiving treatment. Pre-inclusion dropout refers to the withdrawal of consenting participants before receiving the intervention; in other words, these participants have not been exposed to the treatment (Sidani, 2015). Post-inclusion dropout refers to consenting

participants who withdraw from the study after exposure to either some or all intervention levels or missing some or all post-intervention outcome measures (Sidani, 2015). Attrition can be detrimental to a study in many ways and lead to missing data issues. Importantly, attrition can be attributed to reasons for dropout related to the intervention, which can profoundly compromise the validity of a study and the generated inferences.

The effects of attrition are multifaceted and often require researchers to spend extra time and resources, including money, to account for the total number of participants who drop out of the study by recruiting additional participants. In quantitative research, statistical analyses can account for missing data; however, depending on the severity of attrition, statistical analyses are not always appropriate for higher attrition levels. Attrition can be influenced by a variety of factors, including participant characteristics (e.g., perception of benefits from an intervention study, age, psychological health, employment status [Moser et al., 2000]), study characteristics (e.g., burdensome procedures, frequency, and timing of data collection, continuous administration of outcome measures), and treatment and outcomes characteristics (e.g., the complexity of treatment, difficult to carry out) (Sidani, 2015). Attrition is typically non-random, meaning there is usually a reason(s) for participant dropout. This can affect the ability to make valid inferences about a treatment intervention based on the treatment and comparison groups.

Although the effects of missing data might not be prevalent in qualitative research, retention issues can still impact the time and cost of a qualitative study, consequently affecting the conduct of mixed methods research studies. Specifically,

mixed methods intervention studies have been documented to be particularly costly and time intensive given the intentional integration of quantitative and qualitative research methods (Fetters & Molina-Azorin, 2020). Moreover, in mixed methods intervention studies, there is a potential of having two identical samples that will be followed for a certain period of time. As a result, it is crucial to identify the most effective strategies to retain participants across mixed methods research designs early on. Retention strategies are pivotal in the health sciences to examine the effects of treatment, its implementation, and how the treatment can be altered if it is unsuccessful. A lack of engaged participants throughout the duration of a study can prevent a successful intervention from occurring and can further hinder the research-to-practice pipeline.

Retention Methods

Given the time and monetary costs invested in mixed methods research studies, it is surprising that no studies were identified that examined the most effective retention strategies in mixed methods studies, specifically across intervention, implementation, and hybrid designs. Few researchers have examined retention strategies in longitudinal cohort studies, which most closely reflect the increased investment of time and cost compared to mixed methods intervention studies. Teague et al. (2018) were one of the first to conduct a meta-analysis of retention strategies in longitudinal cohort studies to maximize participant involvement to inform researchers and funders. Findings demonstrated that more up-to-date retention strategies, such as a combination of social media and websites for keeping participants informed, improved retention rates (Teague et al., 2018). Researchers also found that barrier-reductions strategies were the strongest predictor of improved retention. Barrier-reduction strategies included offering participants alternative

data collection methods, such as collecting survey responses via phone rather than in person (Teague et al., 2018). These findings provide several effective strategies in longitudinal cohort designs, although how these would translate to mixed methods research designs is still unknown.

Abshire and colleagues (2017) noted that the most used retention strategies in longitudinal studies include sending study reminders, tailoring retention strategies to the sample composition (e.g., providing snacks to participants who were required to fast prior to clinic visits), highlighting the importance and benefits of the study, and implementing various contact/scheduling strategies that are most convenient for participants. Abshire et al. (2017) further emphasized the importance of the research team in tailoring retention strategies to the sample's social, cultural, and environmental factors and norms. While these studies shed light on effective retention strategies in longitudinal designs, effective retention strategies in mixed methods designs remain to be investigated. Sidani (2015) suggests researchers consider retention strategies from a multidimensional perspective, including strategies on study design and how it is conducted, strategies for interacting with participants, treatment strategies, management strategies within the research team, and the cultural and social characteristics of the sample.

Issues of Validity

Ineffective retention strategies are heavily intertwined with issues of validity. Effects of attrition have been shown to affect statistical conclusion, internal, and external validity (Sidani, 2015). There are two ways attrition can affect the statistical conclusion validity of a study. For example, when the number of complete data between participants in the treatment and comparison groups is unequal, the within-group variance among the

group of participants with the most complete data could be lower, thus violating the assumption of equal variance that underlies the F-test (Sidani, 2015). If a researcher does not account for these effects of attrition, the statistical conclusions based on the causal inferences could be faulty, and a researcher can conclude there was no significant treatment effect when there was a true effect.

Effects of attrition are also related to the internal validity of a study.

Differential attrition is the proportion of attrition from treatment and comparison groups. In other words, if participants who share similar characteristics in the treatment group withdraw from the study and these characteristics differ from the participants who withdraw from the comparison group, the characteristics of both groups would not be comparable at baseline and thus affect the internal validity of a study (Sidani, 2015). As a result, if a researcher concluded there was a positive effect on the outcome variable(s), caution must be taken when interpreting this effect as this cannot be directly or solely attributed to the intervention due to the differences at baseline between both groups (Sidani, 2015). This differential attrition between groups results in between-group differences at baseline, which can confound the treatment effects.

Effects of attrition on the external validity of a study are present in several ways.

First, participant characteristics (e.g., health, clinical profile) with complete data can differ from dropouts, thus casting doubts on the representation of the target population (Sidani, 2015). Secondly, participant characteristics can also affect how participants respond or adhere to treatment (Sidani, 2015). In both cases, results may not be reproducible and thus affect the ability to generalize to other people, settings, and treatments. Therefore, issues of validity are persistent throughout the entire study if not

attending to issues of retention, which will ultimately affect the inferences and meta-inferences stemming from a study's sample(s) and study design. Moreover, if attrition elongates the time frame of data collection over an extended period, this can also result in a historical effect in quantitative and qualitative studies. For example, participant's opinions on a historical event such as COVID-19 could be very different from pre- and post-vaccine availability.

Although the methodological implications of sampling attrition might be less documented in qualitative research, there are certain qualitative research designs when it is most prevalent. For instance, in qualitative longitudinal research, one major challenge is maintaining researcher/participant relationships over time (Thomson et al., 2003). The inability to maintain relationships with participants in an ethical manner can influence attrition in qualitative research and affect the outcome of the study. The loss of participants in qualitative research studies can also further elongate the time and costs involved in the research process. Hence, retention issues are heavily documented in quantitative research and can gravely impact the validity of a study. In qualitative research, it may severely impact recruitment from other participants from being involved in the study. When integrating these two research approaches in a mixed methods research study, issues of retention and how it is affected by the sample composition and design have yet to be investigated.

Summary

The utility of mixed methods research in the health sciences is evidenced by an increase in article publications, especially in the field of nursing (Timans et al., 2019) and grant proposal submissions to U.S. federal funding agencies (Wisdom & Creswell, 2013;

Coyle et al., 2018; Guetterman et al., 2019; Plano Clark, 2010). Funded health sciences mixed methods research studies increased by 89% from 2009 to 2014 (Coyle et al., 2018). These findings are represented by 36 federal funding agencies and demonstrate the increased use of mixed methods across various subfields in the health sciences (Coyle et al., 2018).

Given the time and monetary investment of mixed methods research studies, particularly in the health sciences, it is paramount that we investigate issues of sampling inherent to mixed methods intervention studies, specifically psychological intervention studies. Although some mixed methods intervention procedural frameworks have identified the role of the qualitative strand when embedded at different stages in an RCT, limited research has investigated the sampling components across psychological intervention research studies. Moreover, effective participant recruitment and retention strategies have yet to be examined across mixed methods research designs, yet this has explicit implications on the sampling and validity of a study.

A list of practical recommendations for mixed methods sampling in psychological intervention research can help to provide guidance on sampling and related methodological components. This list of practical recommendations is grounded in evidence synthesis and empirical research to support its utility across researchers, methodologists, grant funders, and journal reviewers. Until a list of practical recommendations for mixed methods sampling in psychological intervention research is advanced, we may continue imposing monomethod sampling approaches across mixed methods research designs without taking into full consideration the effects of integrating distinct sampling approaches, the temporal placement of data collection and analysis on

sampling, and limiting our ability to implement effective recruitment and retention strategies. Therefore, this study developed a list of practical recommendations for mixed methods sampling in psychological intervention research to enhance further and increase the rigor of mixed methods studies.

CHAPTER III: METHODS

This study employed an exploratory sequential mixed methods case study design to investigate sampling in mixed methods psychological intervention research.

Qualitative data, using multiple data sources, and quantitative data were collected and integrated to develop a list of practical recommendations for sampling in mixed methods psychological intervention research and test a component of content validity. This chapter presents the methods and procedures that were carried out in the study by first introducing the design used to examine the research questions, a mixed methods case study design, and the rationale for selecting a mixed methods design, specifically a mixed methods case study design. Then, the chapter includes details on the first phase of the study, the qualitative case study, including the rationale, data sources, sampling procedures, data collection, data analyses, validity and reliability, and building integration for the development of a preliminary list of recommendations. This is followed by the quantitative strand, consisting of a modified e-Delphi technique, the sampling approaches, procedures, data analyses, and validity and reliability. Then, a discussion on the integration phase, mixed methods research sampling design, and legitimation types are addressed. To conclude, this chapter explains ethical considerations and strategies implemented to increase participant retention.

Mixed Methods Case Study Design

A mixed methods case study (MM-CS) design was used to develop and refine a list of practical considerations on mixed methods research sampling in psychological intervention research. An MM-CS design is a type of complex design that employs a qualitative case study for the qualitative strand of a core mixed methods design (i.e.,

convergent, explanatory sequential, exploratory sequential) (Guetterman & Fetters, 2018; Creswell & Plano Clark, 2018). The core mixed methods design used for this study was an exploratory sequential design.

In an exploratory sequential design, a researcher first engages in qualitative data collection and analysis followed by quantitative data collection and analysis to either develop an instrument or an intervention, identify variables, or develop a new conceptual or theoretical framework (Creswell & Plano Clark, 2018). The first phase of this study was a qualitative case study consisting of two data sources, mixed methods research-systematic methodological review (MMR-SMR) and semi-structured interviews. Through building integration, these two data sources aided in developing a preliminary list of practical considerations on mixed methods research sampling in psychological intervention research that would be further tested. Specifically, the subsequent quantitative phase consisted of a modified e-Delphi method to refine and test the content validity of generated recommendations. Priority was given to the qualitative phase as the qualitative phase contributed to the development of a preliminary list of practical recommendations for mixed methods research sampling psychological interventions, grounded in evidence synthesis and empirical research, that was subsequently refined and tested for evidence of content validity.

Mixed Methods Research Rationale

The purpose of using a mixed methods research approach was for three primary reasons: complementarity, development, and the utility or improving the usefulness of findings. *Complementarity* refers to enhancing and further elaborating results from one strand of a study with the results from the other strand (Greene et al., 1989).

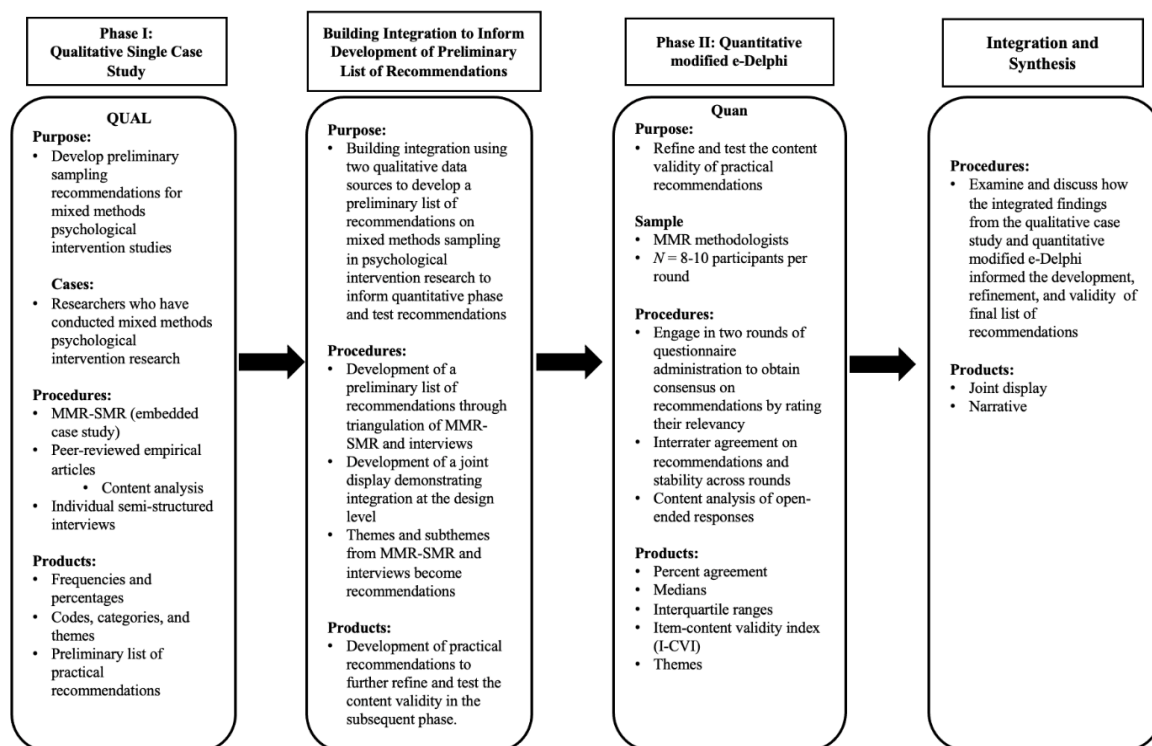
Complementarity was evidenced by the contributions of the quantitative phase in refining the list of practical recommendations for mixed methods research sampling in psychological intervention research. *Development* refers to using the results from one strand to inform the sampling, measurement, or implementation of the subsequent strand (Greene et al., 1989). In this study, the findings from the qualitative case study informed the development of a preliminary list of practical recommendations for mixed methods research sampling model in psychological intervention research.

Utility or improving the usefulness of findings refers to generating results that benefit consumers, practitioners, and others (Bryman, 2006). The resultant list of practical recommendations for mixed methods research sampling will inform researchers in psychology and psychiatry, methodologists, and grant and journal reviewers on best practices for sampling and related methodological components in mixed methods psychological intervention research. In addition, the list of practical recommendations will also serve as guidance for practitioners to determine if the sampling methods used in a study align with the population of interest they might be treating, as well as implementing effective recruitment and retention strategies in mixed methods psychological intervention research, and additional methodological components (e.g., data collection, integration) that can influence sampling and the overall conduct of a mixed methods study. Thus, through the intentional integration of the qualitative case study and the quantitative phase, a list of practical recommendations for mixed methods research sampling in psychological intervention research was developed and refined to encourage its use across social and behavioral sciences. Figure 3.1 presents the

procedural diagram of this mixed methods study. The figure highlights the procedures and products for the qualitative and quantitative strands and the points of integration.

Figure 3.1

Procedural Diagram of Mixed Methods Case Study Design for the Development and Refinement of Sampling Recommendations in Mixed Methods Psychological Intervention Research



Note. MMR = mixed methods research

Although this mixed methods research study consisted of two phases (i.e., qualitative case study and quantitative modified e-Delphi study), the following methodological procedures are presented and organized by the three different data sources that were used in this study within their respective phase: (a) mixed methods

research-systematic methodological review, (b) qualitative semi-structured interviews, and (c) quantitative strand (i.e., modified e-Delphi method).

Mixed Methods Sampling Approach

Several sampling strategies were used across the different phases of the MM-CS design and, more specifically, the various data sources of this mixed methods research study. The sampling approach for the qualitative phase included criterion sampling for the MMR-SMR and maximum variation for the semi-structured interviews. The quantitative phase employed two distinct sampling approaches: critical case and snowball sampling. Although these sampling approaches are distinct and serve their own purposes, they all types of purposeful sampling. From a mixed methods perspective and following Onwuegbuzie and Collins' (2007) two-dimensional mixed methods research sampling model, time orientation and the relationship between the quantitative and qualitative samples must be considered. Therefore, using this model to guide this study's mixed methods research sampling approach, a sequential multilevel sampling design was used.

A sequential multilevel design implies that data collection and analysis occurred in a sequence (e.g., qualitative data collection and analysis preceding quantitative data collection and analysis) and multilevel in that two sets of samples are used at different levels of the study (Onwuegbuzie & Collins, 2007). The population of the qualitative phase involved researchers who have conducted a mixed methods psychological intervention empirical research study, and the quantitative phase involved mixed methods research methodologists, who primarily focus on investigating, advancing, and improving mixed methods research methodology. Thus, it is implied that substantive researchers may learn from mixed methods research methodologists, either through articles,

textbooks, webinars, workshops, and/or trainings. Given this hierarchical structure, a multilevel sampling approach most clearly defined this study.

Samples were selected to maximally answer the research questions and contribute to the integration of both strands. To account for potential multilevel sampling bias (Onwuegbuzie & Corrigan, 2021), demographic questionnaires were administered to all participants to probe their level of mixed methods research expertise. To provide evidence of the hierarchical structure on the level of mixed methods expertise, for the qualitative phase, 40% of participants reported that the methodology they have the most experience with is mixed methods research. In contrast, 100% of participants from the quantitative phase reported having the most experience with mixed methods research.

Qualitative Phase

The first phase of this study employed a qualitative case study design comprised of two data sources, an MMR-SMR and qualitative semi-structured interviews. The purpose of the qualitative phase was multifaceted: (1) identify and systematically code empirical mixed methods research studies in psychological intervention research, (2) conduct follow-up individual semi-structured interviews with researchers who have conducted mixed methods psychological intervention research, and (3) engage in building integration by incorporating findings from the case study data sources to develop a preliminary list of practical recommendations for mixed methods research sampling across psychological intervention research that was tested in the quantitative phase. The following provides a rationale for why a qualitative case study was most appropriate for this study.

Rationale for a Case Study Design

Yin (2018) defined a case study as an empirical research method that aims to investigate a present-day phenomenon, known as the “case,” in greater detail and within real-world settings. Case study research reinforces the idea that the context and the phenomenon are intertwined. In some cases, the demarcations between the context and phenomenon are not apparent, thus emphasizing the cases’ attributes (Yin, 2014). Stake (2005), on the other hand, defined a case study based on the choice of what is studied, known as the bounded system, bounded by time and place. Merriam and Tisdell (2016) noted that a case study should be adequately defined by clearly delineating its intent and the unit of analysis based on the purposes of the study.

Case studies can include an individual, community, decision process, event, or specific project (Creswell & Poth, 2018). One assertion that remains is that regardless of whether a researcher bounds the case to a time and place (Stake, 2005) or to the case’s primary focus and unit of analysis (Merriam & Tisdell, 2016), the overarching purpose of case study research is to gain a better understanding of the research phenomenon through a real-life and current case, bounded by specific defining features. When bounding a case, Yin (2014) recommends that researchers provide specific descriptions of the case, time boundaries that define the case, ensure the bounded case aligns with the research questions and propositions, and is a real-world phenomenon with an explicit manifestation.

Stake (2006) described three purposes of case study research: intrinsic, instrumental, and multiple case. The intrinsic case study focuses on the case itself and its uniqueness. The instrumental case study focuses on the phenomenon of the case and goes

beyond the case (Stake, 2006). A multiple case study focuses on the ‘quintain,’ known as the collection of single cases that collectively belong to and are comprised of multiple cases (Stake, 2006). These individual cases all share characteristics.

This study used an instrumental single case study approach where the case was bounded by researchers who have conducted an empirical mixed methods study in psychological intervention research. Specifically, rather than focusing on the case itself, I examined the methodological aspects of mixed methods psychological intervention research studies to understand issues of sampling, recruitment, and retention while also focusing more specifically on a subset of psychological intervention research targeting a common mental health disorder across the lifespan (i.e., anxiety and depression disorders and their variants) through the MMR-SMR. The focus on empirical mixed methods research studies was to include empirical articles assessing intervention outcomes, rather than methodological mixed methods studies focusing on the application and assessment of the methods.

The unit of analysis in a case study design can take either a holistic or embedded approach. A subunit is defined as the second level of analysis (Yin, 2018). For example, in a single case design, a hospital can be considered the main unit of analysis, while the subunits could include data from various hospital staff members (Yin, 2018). The holistic analysis is defined as a “global-level unit of analysis” with no predetermined subunits (Guetterman & Fetters, 2018, p. 904). An embedded analysis is defined as several subunits or varying levels that comprise the case. Within a single-case design, attention is focused on the case and subunits that are part of the case. This study employed an embedded single-case study approach where a subunit of this case study consisted of an

MMR-SMR specifically focusing on a subset of mixed methods psychological intervention research targeting common mental health disorders across the lifespan within the larger scope of mixed methods psychological intervention research studies.

A strength of the case study design is its focus on using multiple sources of evidence (Yin, 2018). Doing so allows researchers to increase the breadth of the case study under investigation, develop convergent evidence, and contribute to the study's construct validity by using multiple sources of evidence to explore an overarching phenomenon (Yin, 2018). As a result, this study included two primary sources of data, an MMR-SMR and semi-structured interviews. The use of multiple data sources in this case study contributed to the preliminary development of a rigorous, empirically based list of practical recommendations for mixed methods research sampling within psychological intervention research. The following sections detail the rationales for selected data sources, sampling procedures, data collection, data analyses, and validity and reliability.

Rationale for Mixed Methods Research Systematic Methodological Review

An MMR-SMR allows researchers to investigate and explain trends on applying mixed methods research within a particular field or across fields through articles using systematic inclusion and exclusion criteria (Howell Smith & Bazis, 2021). Inclusion and exclusion criteria typically include using specific keywords, databases, date ranges, language, and types of documents (e.g., peer-reviewed articles, book chapters, and conference proceedings). As such, the articles in an MMR-SMR are the unit of analysis. The purpose of carrying out an MMR-SMR for the first phase of this study was to summarize prevalent mixed methods research features, particularly as it pertains to sampling, recruitment, and retention of each strand and the full mixed methods study

across psychological interventions targeting a common mental health disorder across the lifespan. By systematically gathering articles that fit the prespecified inclusion criteria, specific methodological features were coded and analyzed to summarize trends within the case. The findings from the MMR-SMR provided initial evidence for developing a list of practical recommendations for mixed methods research sampling in psychological intervention research.

Sampling. The sampling approach for the MMR-SMR was guided by the case study's bounded system— researchers who have carried out an empirical mixed methods psychological intervention study. More specifically, since the MMR-SMR specifically focused on a subunit of the case, the sampling approach focused on researchers who have published a mixed methods article targeting a common mental health disorder intervention across the lifespan. McManus et al. (2009) classified common mental health disorders as depression, including major depression, dysthymia, minor or mild depression, and anxiety disorders. Furthermore, when investigating common mental health disorders across the lifespan (e.g., children/adolescents, adults, and older adults), the most prevalent across all three age groups are anxiety and depression (e.g., Murphy & Fonagy (2012); Reeves et al. (2011); McCombe et al., 2018, respectively). For the purposes of this study, it was essential to focus on a common mental health disorder across the lifespan as a common metric when analyzing studies identified through the MMR-SMR. This sampling approach is known as criterion sampling and is a purposeful sampling technique where a researcher selects participants, sites, or groups based on one or more specified criteria (Onwuegbuzie & Collins, 2007). Given the importance of

inclusion and exclusion criteria in systematic reviews, additional inclusion and exclusion criteria provided further details on the sample of included articles.

This study included peer-reviewed empirical mixed methods articles involving a psychological intervention targeting common mental health disorders and its variants across the lifespan (e.g., children/adolescents, adults, and older adults). Specific variants of anxiety and depression disorders are based on the Diagnostic Statistical Manual-IV (DMS-IV) and DSM-V. The purpose for including variants of anxiety and depression disorders from both DSM-IV and DSM-V was to capture a comprehensive and overarching umbrella of anxiety and depression disorders prior to recent changes in DSM-V. For example, obsessive-compulsive disorder was considered an anxiety disorder in the DSM-IV; however, it is now its own category in the DSM-V. Therefore, obsessive-compulsive disorder was included under the anxiety disorder category. Anxiety disorders and their variants included: anxiety disorder, generalized anxiety disorder, panic disorder, social anxiety disorder, separation anxiety disorder, selective mutism, specific phobia, panic attack, agoraphobia, post-traumatic stress disorder, obsessive compulsive disorder, and acute stress disorder. Depression disorders and their variants included: disruptive mood dysregulation disorder, major depressive disorder, persistent depressive disorder, dysthymia, and premenstrual dysphoric disorder. Psychological interventions in this study included RCT and non-RCT studies that focused on intervention outcomes such as feasibility, efficacy, and acceptability, where the primary/secondary outcomes were related to assessing a common mental health disorder. Hybrid mixed methods psychological studies were also included if they reported on a common mental health

disorder intervention, where the primary/secondary outcomes were related to assessing a common mental health disorder, as hybrid designs include an intervention component.

The identified articles needed to either explicitly state the use of mixed methods research or incorporate quantitative and qualitative methods with the intent of gaining a richer understanding of the research objectives. Mixed methods research was defined as a research methodology that aims to obtain a more comprehensive understanding of the research phenomenon by combining quantitative and qualitative data collection and analysis to integrate findings (Creswell & Plano Clark, 2018). Table 3.1 summarizes all inclusion and exclusion criteria used for article selection.

Table 3.1

Inclusion and Exclusion Criteria for Articles in MMR-SMR

| Inclusion Criteria | Exclusion Criteria |
|--|--|
| <ul style="list-style-type: none"> • Study involving an intervention (can also include hybrid designs) targeting a CMHD across the lifespan (e.g., children/adolescents, adults, older adults) • CMHDs include anxiety disorders and depressive disorders and their variants • Studies must focus on intervention outcomes (e.g., feasibility, effectiveness, efficacy, acceptability), where the primary/secondary outcomes are related to assessing a CMHD • Interventions delivered via online and/or web applications • At least one sample from the mixed methods study must include individuals diagnosed or screened with a CMHD either using the DSM-4, DSM-5, ICD-10, or inclusion of a self-reported measure intended to assess CMHD prior to the intervention taking | <ul style="list-style-type: none"> • Interventions not targeting at least one CMHD • Single case designs, case reports, or case series • Comparison of multiple interventions to assess perspectives without measuring outcomes related to CMHDs • Dissertation/theses • Book chapters • Protocols (unless quantitative and qualitative preliminary results are included) • Language other than English • Conference proceedings • Methodological articles • Systematic reviews or meta-analysis • Commentaries • Editorials |

place with a specified cutoff score as stated by author(s) demonstrating evidence of at least one type of CMHD

- Quasi-experimental studies including between-subjects designs (e.g., cohort designs, regression-discontinuity, observational designs) and within-subjects studies
- Study must either explicitly state the use of MMR or its conceptualization (i.e., implicit)
- Peer-reviewed and published in English with no predetermined date ranges

Note. CMHD refers to common mental health disorder
DSM-4/DSM5 refers to the Diagnostic Statistical Manual
ICD-10 refers to the International Classification of Diseases

Databases, Date Range, and Keywords. Articles were identified using three databases: Medline (via PubMed), APA PsycINFO and PsycARTICLES, and Scopus (via Elsevier). Medline (via PubMed) is considered a comprehensive health sciences database in which, via PubMed, it includes everything in Medline as well as articles not fully indexed in Medline (Finfgeld-Connett & Johnson, 2018). The APA PsycINFO and PsycARTICLES databases were also used to search for articles more specific to the social and behavioral sciences. One advantage of APA PsycINFO and PsycARTICLES is its inclusion of various filters to limit searches, resulting in a more defined article pool (Finfgeld-Connett & Johnson, 2018). Scopus (via Elsevier) was chosen for its comprehensiveness across fields and to capture any additional relevant articles not identified through Medline (via PubMed) or APA PsycINFO and PsycARTICLES. Overall, these three databases were chosen due to their comprehensive focus on the social and behavioral sciences and because they each include articles not indexed in all

databases, thus increasing the likelihood of obtaining relevant articles. Moreover, Medline (via PubMed), APA PsycINFO and PsycARTICLES, and Scopus are accessible through the University of Nebraska-Lincoln's online library system.

To conduct the searches, various keywords and Boolean operators (e.g., AND, OR, NOT) across all databases were used (see Appendix A). The search began in August 2022 and ended in October 2022. This included revising and further refining the search strategies and keywords and familiarizing oneself with the different filters and limitations across databases. No date ranges were used to limit the searches to obtain a comprehensive sample of articles using mixed methods approaches across psychological interventions targeting a common mental health disorder. However, articles from 2022 and 2023 were not included in the search to account for complete years.

Codebook Development. A codebook was used to guide the coding process. A total of 52 coding categories were used to extract relevant information (see Appendix B). The codebook categories and subcategories were developed using inductive and deductive approaches using concepts derived from content analysis (Schreier, 2012). The deductive approach, also known as concept-driven, is guided by prior research, researcher knowledge, and logic, and primarily employs quantitative content analysis (Schreier, 2012). These codes were generated based on literature in mixed methods and psychological intervention research. On the other hand, the inductive approach, also known as data-driven, places emphasis on detailed descriptions from the articles that were analyzed, specifically open-ended categories (e.g., reasons for collecting qual data before, during, or after intervention, lag time between qual and quan data collection, quan and qual sample size rationale, quan and qual recruitment methods, retention methods,

reason(s) for participant dropout, advice on recruitment and retention, and quan, qual, and mixed methods sampling limitations) (Schreier, 2013).

The codebook also includes definitions for each category and subcategory, instructions/comments/examples for each category/subcategory, and any relevant decision rule(s) (see Appendix B). Including definitions and examples for categories and subcategories was crucial for the reliability and validity of the coding process (Schreier, 2012). Examples are only provided for categories and subcategories where a definition alone would not suffice.

Screening. An online and mobile application specific for the conduct of systematic reviews, Rayyan (Ouzzani et al., 2016), was used to screen articles generated from database searches. This tool works by allowing researchers to upload citations, article meta-data from databases, and full-text articles to expedite the title and abstract screening process and filter searches using keywords (Ouzzani et al., 2016). The initial step included removing irrelevant records, particularly duplicates, for each concept (i.e., intervention and hybrid designs). Once duplicates were removed for each of the three databases for each concept, I then proceeded to remove any articles across all searches involving the two concepts (i.e., intervention and hybrid design). The first deduplication process was done to remove duplicates within intervention and hybrid design articles, respectively, across all three database searches, while the second deduplication process was done to remove any remaining duplicates across all intervention and hybrid design articles and databases. The next step, the screening process, involved screening titles and abstracts of all articles to determine relevancy using the prespecified inclusion and exclusion criteria (as described in Table 3.1). To further enhance this process, I added

specific keywords and their variants based on the searches (see Appendix A) to Rayyan under the inclusion category. Rayyan identified and highlighted these keywords to ensure that they would not be missed during the screening process. If articles met the initial screening stage, then the full-text articles were thoroughly read. Publication metadata (e.g., reference journal, year, country region) was extracted from each article meeting inclusion criteria and transferred to an Excel sheet, with each article assigned an article ID number.

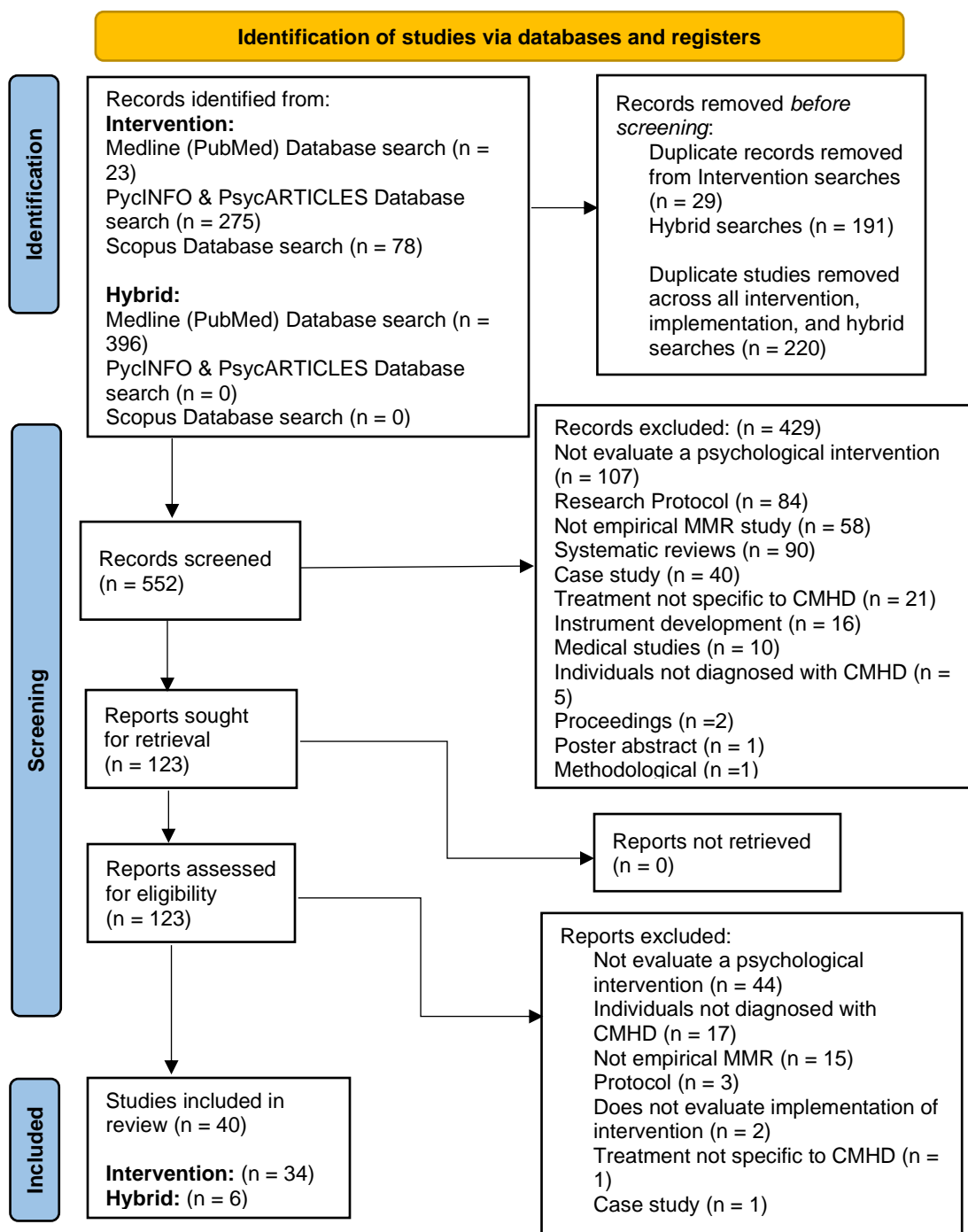
Throughout the screening and data extraction process, reasons for exclusion were documented, as suggested by Higgins et al. (2022), using Rayyan. This information is presented as an aggregate across all intervention studies (including hybrid designs) and include the total number of articles included and excluded at the identification, screening, eligibility, and final inclusion stages using the Preferred Items for Systematic Review and Meta-Analyses (PRISMA) (Moher et al., 2009). The *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins et al., 2022) describes that although it is beneficial to include more than two coders for the initial screening process, it is not necessary. Thus, I was the only person involved in the screening process; however, a second rater, KA (pseudonym), an advanced doctoral student, was involved in coding a subset of the full-text articles. One of the steps of the systematic review process includes evaluating the quality of articles to determine whether they should be included in the overall article pool (Bash et al., 2021). However, because the primary focus of the MMR-SMR was to understand how the methods were implemented across varying mixed methods psychological intervention studies, no quality assessment was conducted to comprehensively explore the diverse range of reported information.

Data Extraction. Full-text articles were thoroughly read and coded using the established codebook. A Microsoft Excel sheet was used to organize all coded data. Two separate coding sheets were developed on Microsoft Excel, (a) a coding sheet with drop-down response options (i.e., subcategories) and text options for all open-ended responses, and (b) a separate coding sheet that included the codebook with descriptions, definitions, and examples of all categories and subcategories. A portion of the data extraction process was carried out with a second rater, KA, following the National Institutes of Health guidelines for systematic reviews (Uman, 2011). Figure 3.2 demonstrates the updated 2020 version of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Page et al., 2021) to document and report the process for the MMR-SMR.

Figure 3.2

PRISMA Diagram of Systematic Methodological Review of Mixed Methods

Psychological Intervention Studies Targeting a Common Mental Health Disorder



Note. MMR = Mixed methods research
 CMHD = Common mental health disorder

Analysis. To answer the research questions pertinent to the MMR-SMR, content analysis was used. Krippendorff (2018) described content analysis as both a quantitative and qualitative method. Data were synthesized using frequencies and percentages, as well as identifying patterns to generate themes (Schreier, 2012; Huxley, 2020).

Validity and Reliability. Several steps were taken to enhance the validity and reliability of the MMR-SMR. I engaged in the article coding process with a second coder, KA. KA is a current doctoral candidate conducting a meta-SEM and has previously worked on meta-analytic projects and other types of systematic reviews, including an MMR-SMR. They have also taken multiple quantitative, qualitative, and mixed methods research courses and are familiar with the methods involved in each. They also work on various projects in different capacities, employing their methodological expertise. Thus, they were well-qualified to aid in the coding process of this study to ensure its validity and reliability.

To begin the training stage for the MMR-SMR, KA and I met twice to specifically review and refine the codebook. These meetings lasted between 60 to 120 minutes. The purposes of these meetings were to familiarize KA with the objectives of the study, provide a general overview of the study, review each category and subcategory in the codebook, including all relevant examples and definitions, and provide logistical information about where articles would be located on a shared OneDrive folder. Based on these meetings and feedback from KA, I refined the codebook and provided additional examples and clarifications where necessary across categories and subcategories. After codebook refinement, I randomly selected one article to code with KA together. We met and coded each category and subcategory of the article. During this meeting, we also

discussed any questions or doubts related to coding based on the codebook. This stage also served as a pilot test of the codebook.

The next practice coding stage consisted of independently coding two randomly selected articles from the overall article pool that met inclusion criteria. For article 1P (i.e., 1Practice), we had an overall percent agreement of 100%; for article 2P (i.e., 2Practice), we had an overall percent agreement of 66%. Therefore, given these discrepancies, we met and reviewed each article together before proceeding to the next stage.

During these meetings, we focused on how each category was coded for a particular article but did not discuss our individual responses to these categories. In other words, we discussed what the category meant within the context of each article but did not explicitly discuss how we responded. The reason for this was to ensure that there was consistency in our understanding of the codebook, including all categories and subcategories, especially given the potential methodological variability across articles. As a result, we both recoded article 2P and had an overall percent agreement of 98%. This clearly indicated that we could proceed to code additional articles from the article pool independently.

A total of 11 articles were randomly selected based on a random name generator using Microsoft Excel. Each rater had their own independent coding Excel sheet and codebook, which was only visible to each rater. To reduce bias during the coding process and avoid any potential discussion about articles a priori, all randomly selected articles were imported to a shared UNL OneDrive folder. A total of 13 articles (32.5%) were double-coded with KA to assess coding reliability, including the two articles from the

training phase. To assess coding reliability, percent agreement was used. Percent agreement was calculated for the overall article sample, each article, and each coded category. Huxley (2020) recommends that researchers report reliability estimates for each category as well as an overall score to avoid overall low reliability scores that could be masked by specific variables. Moreover, this also helped to determine where additional clarifications were needed and facilitate discussions on disagreements/discrepancies throughout the coding process. One limitation of using percent agreement is that it can result in artificially high values for items that share similar characteristics across studies (Copper et al., 2019). Therefore, interrater reliability of 90% agreement was selected as the criterion percent for the reliability of the overall article pool to be double-coded.

Once KA coded all articles, I reviewed their codes against mine and highlighted the cells on Microsoft Excel where there were discrepancies. We met once this information had been reviewed to discuss the next steps. The following steps involved each of us independently reviewing the codes where we had a discrepancy (i.e., highlighted cells), independently writing notes on reasons to either support our codes or whether our original response should change, and in cases where it should change, we made corresponding changes based on these decisions. Once we each reviewed our codes for each phase, we met to discuss the codes that had changed or remained the same and our rationales. We engaged in this iterative process four times, with the last stage as a final way to discuss codes that remained discrepant and required additional conversations about our choices. Percent agreement was calculated for each coding phase, across each article, and for each category. Table 3.2 documents the overall percent agreement across each coding phase, with four coding phases.

Table 3.2*Overall Percent Agreement Across Coding Phases*

| Coding Phase | Overall Percent Agreement |
|---------------------|----------------------------------|
| 1 | 64.4% |
| 2 | 77.5% |
| 3 | 91.5% |
| 4 | 100% |

Rationale for Semi-structured Interviews

The purpose of the semi-structured interviews was to expand on the MMR-SMR findings by better understanding researchers' methodological rationales, including components related to sampling, recruitment, and retention, in mixed methods psychological intervention studies. Although systematic reviews, in general, have shown to be beneficial in helping researchers better understand an area of research through the systematic inclusion of articles, they also have limitations. Researchers conducting systematic reviews tend to be limited to the information in the articles and, consequently, restricted by journals' word limits. Authors must be selective about the information they include, which sometimes means excluding certain information in articles at the expense of having other information. Thus, semi-structured interviews can aim to combat these issues by delving deeper into the content beyond what is reported in articles, such as rationales for certain methodological decision-making, matters related to recruitment and retention, and additional components related to the study.

Interviews are a critical characteristic of case study research that has been classified as "one of the most important sources of case study evidence" (Yin, 2018, p.

118). The semi-structured interview protocol included predetermined questions that were asked to all participants but also allowed for deviations in the case that participants discussed additional relevant topics. Through the semi-structured interviews, I obtained a more comprehensive understanding of the methodological rationales and decision-making from researchers' perspectives who engaged in or had conducted a mixed methods psychological intervention research study.

Sampling. The sampling approach used for the qualitative interviews was maximum variation sampling. Maximum variation sampling is a purposeful sampling approach where the researcher selects participants to maximize a range of perspectives (Charmaz, 2014; Glaser & Strauss, 1967). Maximum variation sampling provided diverse perspectives on methodological components related to sampling, recruitment, and retention across mixed methods psychological intervention studies. By recruiting participants using maximum variation sampling, the resultant list of practical recommendations provided more comprehensive and encompassing perspectives across psychological interventions targeting a variety of psychological disorders.

To recruit participants in the study, multiple steps were taken. First, potential participants were recruited from the MMR-SMR, such that the lead author of each identified article meeting inclusion criteria was contacted to participate in the study. In addition, I also engaged in a snowball sampling approach using multiple strategies. For example, at the end of each interview, participants were asked if they knew of a colleague who engaged in similar work (i.e., conducted a mixed methods psychological intervention study) and would be interested in participating. Another strategy was conducting Google Scholar searches based on identified articles from the MMR-SMR of

co-authors from identified studies. To determine whether co-authors had conducted a mixed methods psychological intervention study as first authors, I searched for their work through Google Scholar author profiles and read their biographies on university websites. Finally, another strategy that was used to identify potential participants was using keyword phrases on Google Scholar (e.g., ("psychological") AND ("intervention*") AND (("mixed method" OR "mixed methods"))) to identify potential articles. If an article appeared to meet inclusion criteria (e.g., used mixed methods research in psychological intervention research), I proceeded to read the lead author's biography on either a university website or through their Google Scholar profile to determine whether their work aligned with the inclusion criteria for this sample.

Across the different search strategies that were used to recruit participants, a total of 125 participants were invited into the study. If participants did not respond to the initial email, a follow-up email was sent about 9-11 days from the initial email invitation. A total of 12 participants agreed to participate in the study and completed informed consent, but two did not respond to subsequent emails to schedule an interview date. One participant expressed that they could not meet virtually or over the phone due to pressing time commitments. As a result, the interview protocol was sent to them, and they answered the questions and returned them via email. Therefore, a total of ten participants took part in the qualitative interviews.

Sample size determinations were guided by Guest and colleagues' (2006) guidelines for determining data saturation in interviews and a recent systematic review of saturation in qualitative research (Hennink & Kaiser, 2022). Guest et al. (2006) found that data saturation of qualitative interviews occurred at twelve interviews, while

indications of meta-themes were identified at six interviews. Moreover, Hennink and Kaiser (2022) found that saturation of individual interviews is between 9 to 17, regardless of the homogeneity or heterogeneity of the sample. As saturation per se could not be used due to the nature of participant selection, I used the guiding principle of 9-12 participants to determine adequate sample size.

Procedures. Eligible participants were contacted via email through the email address provided on each article/dissertation or their university website. Potential participants were asked if they would be interested in participating in the study (see Appendix C), and those who expressed interest were sent additional information about the study, including the informed consent approved by the University of Nebraska-Lincoln's Institutional Review Board (IRB) through a unique Qualtrics link (see Appendix E). The electronic consent form required participants to click whether they agreed or disagreed to participate in the study.

After consenting to the study, participants were prompted to complete a brief demographics questionnaire (see Appendix G). The types of questions in the demographics questionnaire included gender, current work position, length of time in position, primary substantive area of focus, the methodology they have the most experience with, and their level of expertise in mixed methods research. Once participants submitted this information, they were prompted to click on a link that directed them to a Calendly website to choose the most convenient date and time for our meeting. Once they chose a date and time, they received a confirmation email and a calendar invite with my Zoom link. This process provided a seamless transition and avoided any additional emails to participants. If participants did not respond to the initial

invitation, a follow-up email was sent about two weeks after initial contact (see Appendix D).

Participants engaged in an individual semi-structured interview lasting from a minimum of 35 to a maximum of 80 minutes, with a mean duration of 49 minutes. Interviews occurred via Zoom Video Communications, Inc. (2022). All interviews were audio and video recorded with the participant's consent, although only the audio recording was used for analyses. Audio recordings were transcribed using Rev, a professional transcription service, or VidGrid provided through the University. The interview protocol consisted of a short introduction at the beginning of the interview protocol, and each set of questions included prompts summarizing the topics we discussed. Questions were based on an established interview protocol; however, the interview format was semi-structured, taking an open-ended and conversational approach to allow for flexibility (Yin, 2018).

The interview protocol included a variety of interview questions such as basic descriptive questions (e.g., Please describe your research interests and populations you tend to work with), follow-up/clarifying questions (e.g., What considerations do you take when deciding whether to use identical samples between the quantitative and qualitative strands or different samples between the quantitative and qualitative strands?), comparison/contrast questions (e.g., From your experiences, how is sampling different in intervention studies in comparison to other designs such as implementation and hybrid trial designs in mixed methods research?), and closing questions (e.g., What recommendations or considerations related to sampling, recruitment, and retention

methods would you give researchers for mixed methods psychology intervention research?) (Janesick et al., 2016) (see Appendix F for complete interview protocol).

Once all participant interview data were coded and analyzed, I sent participants an email that included a bulleted list of overarching themes based on the collective group and their individual quotes that would be used in the final report as a member-checking validation strategy (see Appendix H). Participants were asked to verify the accuracy of the information and make any changes/additions as necessary. Nine participants (all participants who were interviewed) reviewed the documents for member-checking purposes. Participants who engaged in the semi-structured interview were compensated for their time with a \$20 Amazon e-gift card.

Data Analysis. To begin the coding and analysis process, I first read and reviewed each transcript for errors/clarifications, and in cases where the transcript read inaudible, I revisited the original audio recording to clarify this information in transcripts. I also de-identified participants' personal information on transcripts, such as their names, institution, and relevant information. Depending on the context, I either replaced this information with the participant's ID number when their name was stated or more generic information such as 'institution' instead of listing the institution's name. I also read each transcript before engaging in data analysis to become familiar with the data. I made memo notes across interviews, particularly aspects of the transcript that warranted further exploration. Then I began the process of data analysis to analyze all transcripts.

To analyze the data, I engaged in a two-stage coding system using MAXQDA software (Verbi Software, 2022). The first stage involved using initial (including in-vivo) and structural coding. Initial coding is used to turn a large amount of qualitative data into

discrete elements to more easily compare and contrast (Saldaña, 2021). In-vivo coding is a type of initial coding that is used to present codes based on the participant's own words. Structural coding is known as “question-based coding” that allows researchers to label and index a large corpus of data (Saldaña, 2021, p. 130). At this beginning stage, preliminary codes were added to a codebook that focused on the topics of inquiry from the interview protocol (e.g., populations they tend to work with, recruitment and retention strategies, recruitment and retention challenges, sampling across mixed methods research designs, sample compositions, challenges when integrating samples, data collection lag time, sampling in intervention, implementation, and hybrid designs, temporal placement of qualitative strand to intervention, recommendations and considerations). Additional codes were added through an iterative process. Coded segments were further refined across each topic of inquiry.

For the second-stage coding process, I engaged in pattern coding. I compared participant responses across the different topics of inquiry and emergent codes to identify similarities and differences within and across topics (i.e., interview protocol questions). Similar emergent codes were grouped into categories, which informed the overarching themes. Saldaña (2021) compares pattern coding to factor analysis, where the researcher condenses the data to arrive at meaningful representations and descriptions of the construct. The purpose of the first coding stage was to summarize all data based on the interview protocol questions, while the second stage helped to group summaries into meta-codes and, ultimately, themes based on the different topics of inquiry followed in the interview protocol (Saldaña, 2021).

Validation Strategies. Creswell and Miller (2000) presented various validation strategies divided into three distinct categories: researcher's lens, the participant's lens, and the reader's or reviewer's lens. Creswell and Miller (2000) and Creswell and Poth (2018) suggested that researchers engage in at least two validation strategies in a research study. Several validation strategies were addressed across different lenses. Two validation strategies were addressed for the researcher lens: (a) developing corroborating evidence through multiple data sources and (b) addressing researcher bias and reflexivity. This study involved multiple data sources for the qualitative strand that combined to determine the degree of corroboration and lead to a more robust list of practical considerations. In addition, these data sources were also part of the larger mixed methods study that further contributed to the robustness of the final list of practical recommendations. My researcher bias and reflexivity have also been addressed at the conceptualization stage of this study. This has allowed me to share how my experiences and methodological training as a student have influenced how I perceive and conduct research.

From the participant's lens, member checks were carried out. Member checks are "the most critical technique for establishing credibility" (Lincoln & Guba, 1985, p. 314). After analyzing all interview data, I created a bulleted list with the overarching themes and included individual participant quotes. Participants were asked to ensure the accuracy of these findings and allowed them to add/make changes if necessary, and all participants who were interviewed provided positive feedback on the member-checking documents.

From the reader's or reviewer's lens, a variation of an external audit was carried out. Specifically, the MMR-SMR involved a second coder to ensure the coded data's

validity and reliability. The second coder, KA, and I met several times for training sessions and throughout the completion of the MMR-SMR to mitigate issues of coder drift. Since the qualitative phase was the first phase of this study, sound validity and reliability steps needed to be carried out to reduce any potential carry-over effects into the subsequent quantitative phase. Engaging in these validation steps ensured that the first step of this study was adequately carried out to the highest level of validity and reliability.

Building Integration for the Development of a Preliminary List of Recommendations

The findings from the MMR-SMR and the semi-structured interviews were integrated to develop a preliminary list of practical recommendations for mixed methods sampling in psychological intervention research. A combination of evidence synthesis and semi-structured interviews were used to enhance the validity of the current study, as the strengths of one data source helped offset the weaknesses of the other (Patton, 2015). The MMR-SMR and semi-structured interviews also validated and cross-checked the findings to strengthen the conclusions of each source (Patton, 2015).

To accomplish building integration for the development of the list of recommendations, I gathered all overarching themes from the MMR-SMR analysis and the qualitative semi-structured interviews. Using pattern coding, I combined similar themes between the MMR-SMR and the semi-structured interviews based on overarching topics of inquiry from both data sources (e.g., recruitment, retention, sampling, data collection, integration, and temporal placement of qualitative strand). These topics of inquiry were chosen to demonstrate concurrence between the MMR-SMR research questions and semi-structured interview research questions to obtain a more thorough

understanding of sampling and the multiple factors that influence sampling in mixed methods psychological intervention research. These topics of inquiry organized the list of recommendations. Examples were provided across recommendations to illustrate its application in real-world settings.

A joint display was created to visually represent building integration and demonstrate the preliminary list of recommendations (see Table 4.10). This joint display demonstrates integration of findings at the design level from the MMR-SMR themes with the semi-structured interview themes. This preliminary list of recommendations was used to inform the follow-up quantitative modified e-Delphi phase and test a component of its content validity.

Quantitative Phase

The second phase of this MM-CS design was the quantitative phase, which consisted of a modified e-Delphi study. The purpose of this quantitative phase was to refine and assess a component of content validity of the list of practical considerations on mixed methods research sampling in psychological intervention research across rounds. The following sections provide a rationale on why a modified e-Delphi method was used, followed by sampling, data source, procedures, analysis, and strategies for assessing the validity and reliability.

Rationale for a Modified e-Delphi Study

The quantitative strand of this study consisted of a modified e-Delphi technique to refine the preliminary list of practical considerations on mixed methods research sampling in psychological intervention research across rounds and assess a component of its content validity. Delphi studies are commonly used in medical, nursing, and health

services research to seek consensus from a group of experts on a particular topic through iterative questionnaires (Hasson et al., 2000). The Delphi technique involves a group of experts answering a series of questions related to either the relevancy, importance, or level of agreement of items in an iterative manner until consensus is reached through various rounds (Trevelyan & Robinson, 2015). At each round, participants receive a summary of how the group rated the items, their ratings, and aggregated responses to open-ended questions. Participants are also asked to re-rate responses on the most recent questionnaire. One of the advantages of the Delphi technique is its aim to improve a group's interpretations and perspectives on a specific topic without allowing one person's opinions to dominate group perspectives, which can affect the validity of the questionnaire, guidelines, or model (Belton et al., 2019).

The Delphi technique comprises four main features: anonymity, iterations, controlled feedback delivered to all participants, and statistical aggregation of participants' responses (Belton et al., 2019). Anonymity allows participants to provide their truthful responses and reduce bias from others' opinions involved in the study (Keeney et al., 2011). Iterations allow for multiple rounds of feedback to improve and reach consensus among members in the group. Controlled feedback serves as a type of communication among participants without being in contact with each other (Trevelyan & Robinson, 2015). Statistical aggregation of participant responses includes analyzing and interpreting the data using appropriate statistical methods to the Delphi technique.

Keeney (2009) identified approximately ten types of Delphi designs, including the classical, modified, decision, policy, real time/consensus conference, e-Delphi, technological, online, argument, and disaggregative policy. Each Delphi design contains

key features that differ based on purpose and procedures (Hasson & Keeney, 2011). The classical Delphi involves multiple open-ended questions that allow experts to provide comments to generate a list of questions for Round 1 (Hasson & Keeney, 2011). The subsequent rounds are aimed at reducing the number of items using a structured questionnaire and typically employ two to three rounds (Shelton et al., 2018; Belton et al., 2019).

The modified Delphi technique differs from a classical Delphi technique in that data for Round 1 typically consists of structured statements derived from interviews, focus groups, or results from a systematic review (Hasson & Keeney, 2011). Moreover, the e-Delphi method involves administering questionnaires via email and online surveys and involves fewer than three rounds (Hasson et al., 2000; Hansson & Keeney, 2011). Thus, the modified e-Delphi method was most appropriate for this study as the development of the preliminary list of practical considerations on mixed methods research sampling in psychological intervention research was generated from the qualitative phase involving the MMR-SMR and semi-structured interviews, and all questionnaires were administered electronically via Qualtrics.

Sampling

A critical sampling approach was used in this phase of the study. Critical case sampling refers to choosing participants or sites because it is an “exceptional case” that will lead to a better understanding of the research phenomenon (Creswell & Guetterman, 2019, p. 208). Participants, known as *experts* in Delphi studies, consisted of national and international researchers who have: (a) conducted mixed methods methodological research, (b) have written about mixed methods research sampling either

through peer-reviewed published articles or book chapters, (c) have served or currently serve on editorial board(s) across mixed methods journal(s) (e.g., *Journal of Mixed Methods Research*, *International Journal of Multiple Research Approaches*, and *Caribbean Journal of Mixed Methods Research*), and/or (d) served as a methodologist on a mixed methods intervention research study in the social and behavioral sciences.

Searches were conducted across all journal web pages to identify editorial board members. In addition, researchers were also identified through Google Scholar searches. No agreed-upon sample size criteria exist for modified e-Delphi studies (Keeney et al., 2011; Sampaio et al., 2017). Nonetheless, the more homogenous the sample, the smaller the sample size requirement, with about 8-12 participants yielding sufficient results (Polit et al., 2007). Thirty-three participants were invited to participate in this study. A total of ten participants consented to participate in the study.

Procedures

Participants were contacted via email with the study's description and asked if they were interested in the study (see Appendix I). If so, an online informed consent form via Qualtrics (see Appendix K) was sent to participants, followed by a short demographic questionnaire (see Appendix G). Participants were also emailed a link to Round 1 of the modified e-Delphi study (see Appendix L). Keeney and colleagues (2011) recommend giving participants 7-10 days to complete each questionnaire across rounds. Given the brevity of the questionnaire, each participant was given seven days to complete questionnaires via Qualtrics. Each questionnaire took participants between 4 to 36 minutes to complete for Round 1 and about 5 to 34 minutes for Round 2. A two-day time window after each modified e-Delphi round was used to generate group statistics,

individual summary results, and generate a new survey. If participants did not respond to the initial invitation, a follow-up email was sent about one week after initial contact (see Appendix J).

There has yet to be an established agreement on the total number of rounds required in a Delphi study; however, the majority of research indicates that most studies incorporate two to three rounds (Shelton et al., 2018). Since this study generated a list of practical recommendations based on empirical research and literature on mixed methods research sampling, the focus of the modified e-Delphi was narrower, with each round serving a specific purpose. This modified e-Delphi study consisted of two rounds. In Round 1, participants were presented with a list of practical considerations on mixed methods research sampling in psychological intervention research (see Appendix M). This was developed from the qualitative case study phase by integrating findings from the MMR-SMR and semi-structured interviews. The purpose of this round was to assess each recommendation's relevancy level, determine whether recommendations needed modifications, or if additional recommendations should be added to the original list. The purpose of Round 2 was to further examine the level of consensus of all recommendations, including any new recommendations and suggested changes, as well as recommendations that did not initially meet consensus.

Questionnaires across rounds asked participants to rate the level of relevancy of generated recommendations on sampling and related components in mixed methods psychological intervention research using a 5-point Likert scale (e.g., *1 = not at all relevant, 2 = slightly relevant, 3 = moderately relevant, 4 = very relevant, 5 = extremely relevant*). In addition, an open-ended response was presented after each set of Likert-type

questions across the different topics of inquiry (e.g., recruitment, retention, sampling across mixed methods research designs, data collection, integrating mixed methods samples, temporal placement of qualitative strand) to allow for additional comments from participants (see Appendix M). A reminder email was sent to participants halfway through the one-week mark (Appendix Q).

For Round 2, participants were sent an email and asked to re-rate all recommendations, including those that met inclusion criteria, to ensure the stability of ratings across rounds, and obtain consensus (Trevelyan & Robinson, 2015) (see Appendix O). In Round 2, participants were presented with a summary of group results from Round 1 that included the group percentage across all response options (e.g., not at all relevant, slightly relevant, moderately relevant, very relevant, extremely relevant), their frequency, and comments (see Appendix R). In addition to the group summary table, participants were presented with their previous individual responses to each question from Round 1 (Keeney et al., 2011). Recommendations not meeting inclusion criteria after Round 2 were eliminated from the final list of practical considerations on mixed methods research sampling in psychological intervention research.

Analysis

Both quantitative and qualitative analyses of the modified e-Delphi study were carried out. Traditionally, Delphi studies incorporate percentages of response rates, percentages for each level of agreement for each statement, median and ranges, means and standard deviations associated with group rankings, and weighted Kappa values to assess consensus (Holey et al., 2007). Weighted kappa values can be calculated across rounds; however, some researchers have argued that it is not appropriate since kappa is a

measure for nominal scale agreement and assumes that there is no inherent ordering to the scale (Trevelyan & Robinson, 2015). Trevelyan and Robinson (2015) have suggested that the most appropriate and rigorous methods for assessing consensus in Delphi studies are medians and interquartile ranges (IQRs). As a result, medians and item-level content validity index (I-CVI) values were used to determine whether consensus across recommendations had been met.

The I-CVI values were used to assess a component of content validity of the generated list of practical recommendations. The content validity index (Lynn, 1989) is the most used method to evaluate the content validity of an instrument in nursing research. The I-CVI values range from 0 to 1, with higher values representing stronger validity across items. In general, no universal agreement consensus percentage has been established for Delphi studies to calculate the level of agreement (Hasson et al., 2000); however, recommendations meeting an 80% consensus rate were included in the final list of practical recommendations.

To calculate I-CVI, the level of agreement was based on participants who rated a recommendation as either *very relevant* or *extremely relevant* (rating 4 or 5) divided by the total number of experts. Therefore, consensus was defined by recommendations reaching a median ≥ 4 and ≥ 0.80 of responses ranging a score between 4 and 5, established through the I-CVI at Round 2. Recommendations that did not meet these criteria were excluded from the final list. These inclusion criteria are adapted from Sampaio et al. (2017). Interquartile ranges IQRs are also reported. Table 3.3 provides a summary of consensus values and definitions.

Table 3.3*Consensus Values (Adapted from Sampaio et al. 2017)*

| Consensus | Definition |
|------------------|---|
| Inclusion | Median ≥ 4 80% or more of responses ranging a score between 4 and 5 (established through I-CVI) |

To assess the open-ended qualitative responses, content analysis was used to determine the similarity of responses across recommendations to make suggested revisions (Keeney et al., 2011).

Validation Strategies of Modified e-Delphi

To ensure the validity of the modified e-Delphi study, an audit trail of all decisions was used throughout all rounds. The audit trail documented all theoretical, methodological, and analytical decisions made across rounds (Skulmoski et al., 2007). For example, overall results, the percentage of participants who did not respond, changes to questions, and the percentage of open-ended comments provided across rounds were documented using a Microsoft Excel sheet. These steps helped increase the methodological rigor of the modified e-Delphi study (Skulmoski et al., 2007).

The reporting standard and guidance for Delphi studies known as the Conducting and REporting of the DELphi Studies (CREDES; Jünger et al., 2017) was used for the conceptualization of this study and throughout the study to ensure transparent reporting and conduct of the modified e-Delphi study. This reporting tool was designed for Delphi studies in palliative care and provides recommendations for best practices when reporting Delphi studies. Recommendations include: (a) providing a sound rationale for selecting

the Delphi technique, (b) planning and designing the Delphi study, including the process and how consensus is defined, and (c) the study conduct, which includes how the feedback is presented to participants and how to reduce bias (Jünger et al., 2017). These recommendations were followed and incorporated throughout the modified e-Delphi study to increase the methodological rigor and soundness of the study.

Mixed Methods Integration

Integration in an exploratory sequential design involves using the qualitative findings to *build* onto the quantitative phase of the mixed methods research study (Creswell & Plano Clark, 2018). The integrated findings based on the analysis and conclusions of the qualitative and quantitative phases were presented using joint displays and narratives. The purpose of joint displays is to visually represent integration of quantitative and qualitative research and serves as “a framework for thinking about integration and organizing data, methods, or results” (Guetterman et al., 2021, p. 1). In other words, “joint displays provide a means to both integrate and represent mixed methods results to generate new inferences” (Guetterman et al., 2015, p. 555). Therefore, a joint display was used to present how the recommendations generated from the qualitative themes of the MMR-SMR and semi-structured interviews were refined and tested in the final with their respective I-CVI values. This provided an in-depth view of how the recommendations evolved across rounds and phases.

Narrative is another integration technique that “describes the quantitative and qualitative results thematically” (Fetters et al., 2013, p. 2150). Specifically, weaving is a type of narrative integration that involves thematically connecting results from the quantitative and qualitative strands, moving from one strand to the other, and

documenting similar themes and concepts throughout the process (Fetters et al., 2013). Weaving occurred by explaining how the qualitative findings, such as developing a preliminary list of mixed methods sampling recommendations, helped build the quantitative phase, which was further refined and tested a component of content validity for the final list.

Legitimation Strategies of Mixed Methods Study

Several legitimation strategies were addressed to attend to the validity and quality of the full mixed methods research study. Based on the most recent iteration of the legitimation typology (e.g., Johnson & Christensen, 2020; Perez et al., 2023), the following legitimation types were addressed: sample integration legitimation, multiple validities, integration legitimation, pragmatic legitimation, and divergent findings legitimation. Sample integration legitimation refers to the degree to which a researcher has assessed whether the conclusions from the quantitative and qualitative samples are appropriately addressed and integrated to develop high-quality meta-inferences (Johnson & Christensen, 2020). Therefore, the sampling approach for each sample of the qualitative and quantitative phases and the full mixed methods study were reported. A sequential multilevel sampling approach was used for the full mixed methods study. Thoughtful evaluation of the mixed methods research sampling approach for each phase allowed for appropriate conclusions for each phase relevant to each sample and the integration of findings by understanding the relationships between the samples and the timing to generate high-quality meta-inferences.

Multiple validities legitimation was addressed by assessing the validity of the quantitative strand, the trustworthiness of the qualitative strand, and the legitimation of

the mixed methods study to develop high-quality meta-inferences (Johnson & Christensen, 2020). As discussed, several validation strategies were used for the qualitative strand and across data sources, using established reporting guidelines of the modified e-Delphi study to increase the validity of the quantitative strand and apply pertinent legitimization types to the full mixed methods study. Integration legitimization is the extent to which a researcher appropriately integrates data, analysis, and conclusions of the quantitative and qualitative strands. Integration occurred at the design level through building integration and at the findings/interpretation level. Two joint displays were created to demonstrate: (a) how qualitative findings were combined to generate the preliminary list of recommendations through building integration, and (b) how findings from the qualitative and quantitative phases were integrated to inform the refinement of the final list of recommendations.

Pragmatic legitimization refers to the degree to which a researcher's study has answered the 'so what?' question (Johnson & Christensen, 2020). Throughout all stages of the analyses across phases, I continually referred to the research questions to ensure they were appropriately and adequately answered. On a macro-scale, I also kept an audit trail documenting how the research questions, collectively, aim to provide "actionable results" to the research problem (Johnson & Christensen, 2017, p. 308). Divergent findings legitimization is the extent to which a researcher has addressed divergent findings in a mixed methods study. It reinforces thoughtful consideration on whether divergent findings can be attributed to the value of mixed methods research or whether divergent findings are due to a validity threat (Perez et al., 2023). Several recommendations were divergent from the preliminary list of recommendations to the final list. After thoughtful

consideration of these divergences, it was concluded that these contradictions gave rise to the complexity of the research phenomenon and were refined by experts in mixed methods research.

Ethical Considerations

Several procedures were taken into consideration to safeguard participants and their data. This study went through the UNLs IRB for approval to ensure the safety of all participants. This research study involved minimal to no potential risks to participants and minimal risks were reduced by taking several steps (e.g., storing data in an adequate location, using a unique ID number in some cases). The following provides detailed information on the ethical procedures of this study to ensure it was carried out by the principles established by the Belmont report and by the Institution's IRB.

Qualitative Phase

The qualitative phase of this study, which included the MMR-SMR and the semi-structured interviews, involved several steps to safeguard participants and their data. The MMR-SMR did not involve participant interaction. For the qualitative interviews, data were collected via Zoom Online Communications, Inc. (2022). With agreement from all participants in the study, all interviews were video and audio recorded. These recordings were uploaded and stored to the Zoom Cloud provided through UNL's Zoom subscription server as suggested by IRB. Participants who take part in the interviews were assigned a participant ID number, and this was used within this dissertation and will also be reported as such when presenting study results at conferences and in manuscripts. Participant data (e.g., consent forms, demographic questionnaire, interviews, and

transcripts) was stored using UNL's OneDrive using a password protected system only known to the primary investigator.

Quantitative Phase

All participants in the modified e-Delphi study were given a participant ID number to de-identify their names from the data collected. This was assigned to participants after they completed Round 1 of the modified e-Delphi study. A Microsoft Excel master sheet was used to store this information on the UNL OneDrive under password protection, documenting participant's name and ID number should there be a need to refer to this information. All information stored on UNL's OneDrive is also secured using a password that will not be shared with anyone and only known to the primary investigator. To ensure participant anonymity across Delphi rounds, a critical tenet of Delphi studies, participants were not be given any information on who was involved in the study and feedback given to participants was aggregated.

Strategies to Enhance Participant Retention

Participant retention is a critical component of all research studies and particularly of essence in mixed methods research. Several steps were taken to increase retention across the qualitative and quantitative phases of this mixed methods research study. The MMR-SMR used systematic methods to identify articles that met inclusion criteria and did not involve participants; thus, retention is not a critical component of the MMR-SMR. Nevertheless, methods to increase retention rates for participants involved in the qualitative semi-structured interviews and modified e-Delphi study were critical. For the qualitative semi-structured interviews, Zoom Video Communications, Inc. (2022) was used for the conduct of semi-structured interviews and has proven to be effective. The

use of Zoom has been rated positively among participants, with many generally preferring Zoom over face-to-face interviewing, telephone, and other videoconferencing services, platforms, and products (Archibald et al., 2019). Zoom has also been considered a sound tool for qualitative data collection due to “its ease of use, cost-effectiveness, data management features, and security options” (Archibald et al., 2019, p. 1).

The modified e-Delphi study was done through Qualtrics, an online platform, to collect participant responses via questionnaires. Online data collection of the modified e-Delphi has shown to be an advantage of this method due to its convenience and ability to capture a wide array of expertise from a geographically diverse group (Toronto, 2017). Furthermore, it also allowed participants to participate online when it was most convenient for them, particularly across a national and international sample. To avoid any technological glitches that could interfere with the appropriate delivery of mail services, I ensured that all emails were sent from my university account to prevent incoming emails from being delivered to a participant’s junk mail folder.

Participants who took part in the qualitative semi-structured interviews and the modified e-Delphi study were compensated with a \$20 Amazon e-gift card for their time. In addition, I used a variety of systematic methods to follow up with participants in cases of non-response. I sent reminder emails to participants after the two-week follow-up for the semi-structured interviews and a one-week from initial contact for the modified e-Delphi study (see Appendix D and I). I also limited the amount of contact and participant procedures involved in the study to reduce participant burden from the study. One advantage to e-Delphi studies is that attrition rates are usually lower than Delphi studies, around 5%-28%, due to its online modality (Toronto, 2017). Participants in both the

qualitative and quantitative phases were selected using strict inclusion criteria, who may have a strong interest in discussing either their research or the topic of mixed methods research sampling more broadly, given their expertise (Toronto, 2017). The culmination of these steps aimed to reduce issues of retention and enhance the methodological rigor of the study across all phases and its integration.

Summary

This study employed an exploratory sequential mixed methods case study design with the overarching purpose of developing a preliminary list of practical recommendations for mixed methods sampling in psychological intervention research. To accomplish this, the qualitative phase consisted of a case study using multiple data sources, including an MMR-SMR and semi-structured interviews. Through building integration, these two data sources informed the development of a preliminary list of practical recommendations for mixed methods sampling in psychological intervention research. The subsequent quantitative phase consisted of a modified e-Delphi method that was used to refine and test a component of the content validity of the generated list. Data collection methods and analyses across all phases and data sources have been described. Several strategies to ensure reliability and validity across all procedures and findings have been discussed and were implemented across the qualitative and quantitative phases, and the full mixed methods study. In addition, ethical considerations were addressed across all phases of the study as well as strategies to increase retention among participants across the semi-structured interviews and modified e-Delphi study. Collectively, addressing these components was critical in ensuring the study was conducted to a high level of rigor and that issues of validity were mitigated.

CHAPTER IV: FINDINGS AND RESULTS

This chapter is divided into four main sections: the qualitative phase, building integration that informed the preliminary list of recommendations, the quantitative phase, and the mixed methods integrative results. The first section presents the findings (themes and subthemes) from the MMR-SMR and semi-structured interviews. The second section provides a narrative and joint display to describe building integration of the MMR-SMR and semi-structured interviews that informed the preliminary list of recommendations. The next section, the quantitative phase, presents the medians and I-CVI values for each recommendation across rounds to test a component of its content validity and further refine the list. The final section integrates the qualitative case study findings with the quantitative modified e-Delphi results to present the final list of recommendations through a narrative and joint display.

Qualitative Findings

The findings from the qualitative phase are presented in three main sections. In the first section, findings from the MMR-SMR are presented to summarize the methodological features of mixed methods psychological intervention studies targeting a common mental health disorder, specifically, features related to sampling, recruitment, and retention strategies. The second section expands on the MMR-SMR findings by presenting findings from the semi-structured interviews with researchers who have conducted mixed methods psychological intervention studies. This section provides a more holistic understanding of the methodological rationales and decision-making in mixed methods psychological intervention research studies from participant perspectives. The third section details the building integration process using the MMR-SMR and

interview findings to develop the preliminary list of practical recommendations for mixed methods sampling in psychological intervention research.

Mixed Methods Research Systematic Methodological Review Findings

A total of 40 studies from the MMR-SMR met inclusion criteria. Of these, 34 studies were solely intervention studies (85%), and six (15%) used a hybrid design. The studies were published between 2007 to 2021 (although three studies had a publication date of 2022 though the preprint of the studies was 2021). Most studies originated from the United States ($n = 21$, 52.5%), followed by European countries ($n = 12$, 30%), Canada ($n = 3$, 7.5%), Australia ($n = 2$, 5%), the Middle East ($n = 1$, 2.5%), and Africa ($n = 1$, 2.5%). Most interventions specifically addressed posttraumatic stress disorder ($n = 16$, 40%), followed by more than one disorder (including both anxiety and depression disorders) ($n = 13$, 32.5%), a type of depression disorder (mainly major depressive disorder) ($n = 6$, 15%), and a type of anxiety disorder ($n = 5$, 12.5%). Most of the studies employed a convergent mixed methods design ($n = 32$, 80%) as the core mixed methods design, followed by an equal amount of explanatory sequential design ($n = 4$, 10%) and exploratory sequential design ($n = 4$, 10%). From these, 31 (77.5%) used merging (combining) as the integration strategy, followed by connecting ($n = 4$, 10%) and building ($n = 4$, 10%), and one study (2.5%) used embedding.

Most of the studies identified through the MMR-SMR used concurrent identical sampling ($n = 21$, 52.5%), followed by concurrent multilevel sampling ($n = 6$, 15%), concurrent nested sampling ($n = 3$, 7.75%), sequential nested sampling ($n = 3$, 7.75%), sequential identical sampling ($n = 2$, 5%), sequential parallel sampling ($n = 2$, 5%), sequential multilevel sampling ($n = 2$, 5%), and concurrent parallel ($n = 1$, 2.5%).

Most studies used a non-RCT design ($n = 26$, 65%), and 14 (35%) used an RCT design. In general, the intervention outcomes widely varied across all studies. A total of 18 studies (45%) reported only one intervention outcome, and 22 (55%) reported more than one intervention outcome. Out of the studies that only reported on one intervention outcome, seven (17.5%) assessed the effectiveness of the intervention, six (15%) on the feasibility of the intervention, two (5%) on the acceptability of the intervention, and two (5%) on the efficacy of the intervention.

Reasons for Temporal Placement of Qualitative Strand. Out of the 40 studies, most placed the qualitative strand *after* the intervention ($n = 27$, 67.5%). Two (5%) studies noted placing the qualitative strand *during* the intervention, and one (2.5%) placed the qualitative strand *before* the intervention. Ten studies (25%) placed the qualitative strand at several time points throughout the mixed methods intervention. For instance, four (10%) of the studies placed the qualitative strand both *before* and *after* the intervention, three (7.5%) placed the qualitative strand *during* and *after* the intervention, while three (7.5%) placed the qualitative strand *before*, *during*, and *after* the intervention.

To better understand how the temporal placement (i.e., *before*, *during*, or *after*) of qualitative data collection and analysis influenced the reason(s) for conducting a mixed methods design, explicit reasons for carrying out a qualitative phase were coded across all studies. Two overarching themes were identified for conducting the qualitative phase in mixed methods psychological intervention studies: (a) *exploring intervention components* and (b) *participants' responses to outcome measures*. *Exploring intervention components* details reasons to further investigate different facets of the intervention, including investigating the components that motivated/demotivated participants,

receptivity to personnel delivery methods, and identifying culturally responsive components of the intervention. *Participant responses to outcome measures* details the reasons for exploring the range of outcome measures examined through the intervention, such as documenting participants' feelings related to the outcome measure(s). Based on this feedback, researchers often used this to modify the intervention as it relates to the outcome measure(s). Under each theme, several subthemes were identified to provide additional details. Table 4.1 includes the two main themes as well as their corresponding subthemes, a brief description, and an example from the identified studies.

Table 4.1

Reasons for Conducting Qualitative Phase in Mixed Methods Psychological Intervention

Studies in Relation to The Temporal Placement of Intervention

| Theme | Subtheme | Description | Example | Placement |
|---|--|--|---|------------------|
| <i>Exploring intervention components</i> | Motivations (or demotivations) for participation | Explaining the motivating and demotivating factors influencing participation in intervention | Kinser et al. (2013) conducted interviews with eligible women who declined participation or dropped out of the study. | Before |
| | Receptivity to personnel delivery methods | Participants' receptivity to different forms of treatment delivery by personnel | Smith et al. (2020) conducted interviews asking participants about their preference for delivery of the intervention either by peer specialists or professionals. | Before |

| | | | |
|--|---|--|---------------|
| Develop prototype of intervention | Used to help inform intervention components | Lewis et al. (2013) used focus groups with stakeholders to develop a prototype of intervention. | Before |
| Identifying culturally responsive components | Used to inform and tailor cultural components of intervention | Kelly & Pitch (2014) conducted interviews to explore participant's views on the need for culturally-tailored interventions and components. | Before, After |
| Adaptations to intervention | Exploring elements to adapt in intervention | Dindo et al. (2020) obtained feedback during intervention workshop to make adaptations for RCT trial of intervention. | During |
| Perceived barriers of intervention | Exploring barriers of the intervention | Herrera-Mercadal et al. (2015) gave participants the opportunity to consult with a therapist about any challenges related to the intervention. | During |

| | | | |
|---|---|---|-------|
| Perceived benefits/facilitators and barriers | Exploring both benefits/facilitators and barriers of intervention | Huddleton et al. (2018) conducted phone interviews to explore the barriers and facilitators of skills taught within the intervention. | After |
| Overall experiences and feelings about the intervention | In general, overall experiences from participating in intervention | Reeve et al. (2020) used open-ended survey responses to explore how treatment helped participants overall. | After |
| Elicit participant feedback on the intervention | Explicitly asking participants for feedback and suggestions on intervention | Serfaty et al. (2016) asked participants for feedback and recommendations for improvement of intervention. | After |
| Perceived acceptability of intervention | Identifying acceptability of intervention | Karatzias et al. (2019) conducted interviews used to assess the acceptability of eye movement and desensitization intervention. | After |
| Perceived feasibility and | Identifying both the feasibility and | Lawn et al. (2019) conducted | After |

| | | | | |
|---|--|--|--|-----------------------|
| | acceptability of intervention | acceptability of intervention | interviews with participants and stakeholders to assess feasibility and acceptability of treatment program. | |
| | Perceived acceptability and efficacy of intervention | Identifying the acceptability of intervention and exploring its efficacy | Lang et al. (2020) conducted interviews to explore the acceptability and efficacy of compassionate mediation in veterans with PTSD. | After |
| | Perceived tolerability of intervention | Exploring the perceived tolerability of the intervention | Mott et al. (2013) examined participants' perspectives on tolerability of a 12-week course of group-based exposure therapy for PTSD. | After |
| <i>Participants' responses to outcome measures</i> | Exploring range of outcome measure(s) | Describes how participants responded to intervention based on measured outcome variable(s) | Blaauwendraat et al. (2017) used semi-structured interviews to explore the following outcome measures: stability, movement coordination, | Before, During, After |

| | | | |
|-----------------------------|--|--|-----------------------|
| | | breathing, and awareness. | |
| Exploring coping mechanisms | Explains how participants coped with their symptom(s) either before, during, or after intervention | Manter et al. (2022) collected detailed clinical progress and nursing support field notes documenting participants' methods for coping with anxiety, depression, and PTSD before, during, and after labor. | Before, During, After |

Several reasons were reported for placing the qualitative strand *before* the intervention. This includes studies that did so only at one or multiple time points. Although nine (22.5%) studies incorporated the qualitative strand *before* the intervention, some of these studies provided more than one reason. Therefore, the percentages reported are based on the total number of reasons across the different temporal placements of qualitative data collection and analysis (i.e., *before*, *during*, and *after*). A total of 10 reasons were reported for incorporating the qualitative strand *before* the intervention. These reasons are further explained as subthemes under the overarching theme *exploring intervention components* and *participants' responses to outcome measures*. Under the theme *exploring intervention components*, the following reasons (i.e., subthemes) were reported: motivations (or demotivations) for participation ($n = 2$, 20%), receptivity to personnel delivery methods ($n = 2$, 20%), developing a prototype of intervention ($n = 1$, 10%), and identifying culturally-responsive components ($n = 1$, 10%). Under the theme

participants' responses to outcome measures, the following reasons (i.e., subthemes) were reported: exploring the range of outcome measure(s) ($n = 2$, 20%), and exploring coping mechanisms before intervention ($n = 1$, 10%). One (10%) article (e.g., Wollett et al., 2020) did not provide a specific reason, although they stated that interviews were conducted before the intervention.

Eight (20%) studies incorporated the qualitative strand *during* the intervention, including studies that did so only at one or multiple time points, with some studies providing more than one reason for doing so. A total of nine reasons were reported across this group. Under the theme *exploring intervention components*, the following reasons (i.e., subthemes) were reported: adaptations to intervention ($n = 3$, 33.3%) and perceived barriers of intervention ($n = 1$, 11.1%). Under the theme *participants' responses to outcome measures*, the following reasons (i.e., subthemes) were reported: exploring the range of outcome measure(s) ($n = 4$, 44.4%) and exploring coping mechanisms during the intervention ($n = 1$, 11.1%).

Thirty-eight (95%) studies placed the qualitative strand *after* the intervention, including studies that did so only at one or multiple time points, with 47 reasons for doing so, as some studies reported more than one reason. Under the theme *exploring intervention components*, the following reasons (i.e., subthemes) were reported: perceived benefits/facilitators and barriers ($n = 7$, 14.9%), overall experiences and feelings about the intervention ($n = 15$, 31.9%), elicit participant feedback on the intervention ($n = 4$, 8.5%), perceived acceptability of intervention ($n = 3$, 6.4%), perceived feasibility and acceptability of intervention ($n = 3$, 6.4%), perceived barriers of intervention ($n = 2$, 4.3%), perceived acceptability and efficacy ($n = 1$, 2.1%), perceived

tolerability ($n = 1, 2.1\%$), and identifying culturally responsive components ($n = 1, 2.1\%$). Under the theme *participants' responses to outcome measures*, the following reasons (i.e., subthemes) were reported: exploring the range of outcome measure(s) ($n = 9, 19.1\%$) and exploring coping mechanisms after intervention ($n = 1, 2.1\%$).

To examine how the mixed methods research sampling approach differs across various temporal placements of the qualitative strand in mixed methods psychological intervention research studies, table 4.2 presents the following information. The mixed methods research sampling approach is based on Onwuegbuzie and Collins' (2007) sampling typology.

Table 4.2

Mixed Methods Research Sampling Typology Across Varying Temporal Placements of Qualitative Strand

| Qualitative Temporal Placement | Mixed Methods Research Sampling Design | Frequency (n) |
|---------------------------------------|---|-----------------------------------|
| <i>Before intervention</i> | | |
| | Concurrent identical | 3 |
| | Concurrent multilevel | 2 |
| | Sequential multilevel | 2 |
| | Concurrent parallel | 1 |
| | Sequential parallel | 1 |
| <i>During intervention</i> | | |
| | Concurrent identical | 4 |
| | Concurrent nested | 1 |
| | Concurrent parallel | 1 |
| | Sequential multilevel | 1 |
| | Sequential parallel | 1 |
| <i>After intervention</i> | | |
| | Concurrent identical | 20 |
| | Concurrent multilevel | 6 |
| | Concurrent nested | 3 |
| | Sequential nested | 3 |
| | Sequential identical | 2 |
| | Sequential multilevel | 2 |
| | Concurrent parallel | 1 |
| | Sequential parallel | 1 |

The most prevalent mixed methods research sampling design was concurrent identical across all varying temporal placements of the qualitative strand (i.e., *before*, *during*, and *after*) ($n = 3, 4, 20$, respectively). It is important to note that since some studies placed the qualitative strand at several time points (e.g., during and after), these were reported across each temporal placement. Sample sizes for studies that placed the qualitative strand *before* the intervention ranged between 11 to 20 participants, 8 to 40 participants for studies that placed the qualitative strand *during* the intervention, and 4 to 460 participants for studies that placed the qualitative strand *after* the intervention. Notably, the study that reported a sample size of 460 for the qualitative strand placed *after* the intervention consisted of document analysis, including supervision notes. Therefore, considering the participant as the unit of analysis, sample sizes for the qualitative strand *after* the intervention ranged between 4 to 46 participants.

Recruitment Strategies. The sample demographics across all studies was primarily comprised of adults or older adults aged 18 to 75 ($n = 37, 95.5\%$). Only three studies (e.g., Auslander et al., 2017; Frey et al., 2020; Woollett et al., 2020) included a primary sample of either adolescents ages 12-18 or children ages 6-14 and their mothers. All studies comprised at least one primary sample of individuals diagnosed with a common mental health disorder. There were several prevalent recruitment strategies that were identified across the quantitative and qualitative strands. Overall, the most common recruitment strategy with a primary sample of individuals with a common mental health disorder for the quantitative strand was referrals ($n = 13, 29.5\%$), followed by recruiting through care facilities such as agencies, clinics, and hospitals ($n = 9, 20.5\%$). Referrals

were generally from the participant's general practitioner,/provider, or through service providers in mental health clinics. Participants who were recruited through care facilities involved research personnel visiting target mental health agencies, psychiatric clinics, or congregated care facilities. In these cases, no information on referral services was described in the studies. Instead, researchers noted directly visiting care facilities. For example, Brooks et al. (2020) recruited participants for the quantitative strand through one community-based aging center and one community-based mental health site in the New England region. Out of the total number of recruitment strategies used for the quantitative strand, most researchers employed passive recruitment strategies ($n = 10$, 83.3%), and only two recruitment strategies were labeled as active (16.7%). Out of the 40 studies, two (5%) did not report recruitment strategies for the quantitative strand. Table 4.3 reports the various recruitment strategies and their frequency for the quantitative strand of mixed methods studies and whether the recruitment strategy is labeled as active or passive. It is important to note that some studies reported more than one recruitment strategy; therefore, the total number of recruitment strategies exceeds the total number of studies in the MMR-SMR.

Table 4.3

Recruitment Strategies of Quantitative Strand in Mixed Methods Psychological

Intervention Studies

| Quantitative Recruitment Strategies | Frequency (n) | Active or Passive |
|--|-----------------------------------|--------------------------|
| Referral | 13 | Passive |
| Recruited through care facilities (e.g., agencies, clinics, hospitals) | 9 | Active |
| Flyers/distribution of study materials | 7 | Passive |
| Attending community events and community-based outpatient clinics | 3 | Active |
| Waitlist | 3 | Passive |

| | | |
|---|---|---------|
| Self-referral | 2 | Passive |
| Offered complimentary therapy/program session | 2 | Passive |
| Announcements at recruitment location | 1 | Passive |
| Snowball sampling | 1 | Passive |
| Extracted from secondary data sources | 1 | Passive |
| Newspaper/radio reports | 1 | Passive |
| Social media advertisements | 1 | Passive |

To explore variations across recruitment strategies for the quantitative and qualitative strands, recruitment strategies for the qualitative strands were also reported. Overall, the most common recruitment strategy for the qualitative strand was recruiting through care facilities ($n = 9$, 22%), followed by referrals ($n = 8$, 19.5%), and flyers/distribution of study materials ($n = 7$, 17.1%). Out of the 40 studies, four (10%) did not report recruitment strategies for the qualitative strand. Four studies (10%) that used a nested sample did not report whether recruitment methods were the same or if any changes were made to the recruitment process. Most researchers used passive recruitment strategies for the qualitative strand ($n = 10$, 83.3%), and only two recruitment strategies were labeled as active (16.7%). Table 4.4 provides the various recruitment strategies and their frequency across the quantitative strand of mixed methods studies and whether the recruitment strategy is labeled as active or passive. Similar to the quantitative recruitment strategies, some studies noted multiple recruitment strategies. Thus, the sum of qualitative recruitment strategies exceeds the total number of studies.

Table 4.4

Recruitment Strategies of Qualitative Strand in Mixed Methods Psychological

Intervention Studies

| Qualitative Recruitment Strategies | Frequency (n) | Active or Passive |
|--|-----------------------------------|--------------------------|
| Recruited through care facilities (e.g., agencies, clinics, hospitals) | 9 | Active |

| | | |
|---|---|---------|
| Referral | 8 | Passive |
| Flyers/distribution of study materials | 7 | Passive |
| Nested sample from quan. strand (no specific information on qual recruitment for subsample) | 4 | Passive |
| Attending community events and community-based outpatient clinics | 3 | Active |
| Waitlist | 3 | Passive |
| Offered complimentary therapy/program session | 2 | Passive |
| Self-referral | 1 | Passive |
| Snowball sampling | 1 | Passive |
| Extracted from secondary data sources | 1 | Passive |
| Newspaper/radio reports | 1 | Passive |
| Document review | 1 | Passive |

Retention Strategies. A total of 12 (30%) studies reported one or more retention strategies to keep participants engaged throughout the duration of the mixed methods psychological intervention study. These retention strategies are organized into four major themes: *enhancing participant autonomy*, *incorporating various follow-up methods*, *alleviating potential barriers*, and *other*. Table 4.5 lists all reported retention strategies and their frequency across studies. It is important to note that in some studies, more than one retention strategy was incorporated.

Table 4.5

Retention Strategies in Mixed Methods Psychological Intervention Studies

| Retention Strategies | Frequency (n) |
|--|----------------------|
| <i>Enhancing participant autonomy</i> | |
| Offering option to choose supportive adult throughout duration of intervention | 1 |
| Opportunity to make up session if any are missed throughout | 1 |
| Offer option to participate in long-term follow-up study | 1 |
| <i>Incorporating various follow-up methods</i> | |
| On-going reminder calls | 3 |
| Mailing hand-written cards from study personnel | 1 |
| Scheduling flexibility | 1 |
| <i>Alleviating potential barriers</i> | |
| Financial incentives (e.g., money, gift cards) | 5 |
| Providing transportation/travel reimbursement | 3 |

| | |
|--------------------------------|---|
| Service-connected compensation | 1 |
| Providing childcare | 1 |
| <hr/> | |
| <i>Other</i> | |
| Stress ball | 1 |
| <hr/> | |

Several retention strategies were reported across all studies with four overarching themes. Retention strategies labeled *enhancing participant autonomy* include strategies offered to participants that cater to their needs and increase their autonomy and choice to enhance their involvement in the intervention or seek continued care. For example, in one of the studies involving a sample of adolescents (e.g., Auslander et al., 2017), researchers gave adolescent participants the option to select an adult who provided support throughout multiple sessions in the program, including during the duration of data collection and caregiver sessions. Participants were also offered an individual makeup session with a facilitator following the week they missed. Kinser and colleagues (2014) allowed participants to engage in a long-term follow-up study after completing the current 8-week study.

Across all studies, some retention strategies were noted to be used throughout the study, particularly when following up at different time points in the mixed methods psychological intervention study. These are classified under the theme of *incorporating various follow-up methods*. Ongoing reminder calls were the most frequent follow-up method (e.g., Auslander et al., 2017; Kinser et al., 2013; Gallegos et al., 2015). Auslander et al. (2017) also sent participants mailings of hand-written cards from facilitators/study personnel and follow-up data collection at various time points. Andrews et al. (2022) mentioned giving participants flexibility with meeting schedules and times to enhance continued treatment access.

The theme of *alleviating potential barriers* relates to potential issues that can make it challenging for participants to engage and continue with the intervention and ways researchers can mitigate these challenges. One of the most prevalent retention methods under this theme was providing monetary incentives such as money or gift cards. The timing of financial incentives varied across the studies. For example, Carr et al. (2012) paid participants a single fee toward the end of the study, with varying amounts across the treatment (£20) and waiting (£30) groups. The waiting group comprised participants on the waiting list to seek treatment, but both groups received treatment. Woollett and colleagues (2020) reimbursed participants \$15 for their time for each interview. Three studies (e.g., Gallegos et al., 2015; Smith et al., 2020; Bauer et al., 2021) incorporated incentives at multiple time points throughout the mixed methods study. For instance, Gallegos et al. (2015) gave participants \$50 at baseline assessment and \$25 for each follow-up call. Participants received a total of \$125 for participating in the four study sessions. Smith et al. (2020) also provided incentives at multiple time points in the mixed methods study (e.g., baseline and posttreatment study visits) but not for therapy sessions. Bauer et al. (2021) compensated participants for completing assessments with a \$30 gift card at baseline, a \$20 gift card at mid-treatment, and a \$50 gift card at post-treatment and 3-month follow-up.

Additional retention strategies for *alleviating potential barriers* included providing transportation/travel reimbursement to reduce barriers to seeking treatment or completing study assessments (e.g., Andrews et al., 2022; Kelly & Pich, 2014; Cole et al., 2015). Mott et al. (2013) reported that most participants received service-compensated compensation at the beginning of treatment. Kelly and Pich (2014) reported providing

childcare during data collection and intervention sessions. Under the *other* theme, one study (e.g., Woolett et al. 2020) provided children who participated in the intervention with their mothers a stress ball.

Reasons For Dropout. Across the 40 studies, 19 (47.5%) explicitly reported reasons for participant dropout in the mixed methods intervention study. Table 4.6 documents the various reasons for dropout and their frequency. It is important to note that some studies provided multiple reasons for participant dropout.

Table 4.6

Reasons For Dropout in Mixed Methods Psychological Intervention Studies

| Reason(s) for Dropout | Frequency (<i>n</i>) |
|---|-----------------------------|
| Personal reasons | 12 |
| No response | 4 |
| Loss of interest in study | 3 |
| Difficulty understanding study material | 1 |
| Reduced symptom severity | 1 |
| Inability to contact participants | 1 |

The majority of the studies reported the primary reason for participant dropout due to personal reasons, including participants who moved, untenable commute, family emergency, financial barriers, housing issues, scheduling conflicts and time commitment barriers, deciding to receive care/services elsewhere, comorbidity with other psychiatric and physical diagnoses at the time of treatment, legal issues, and experiencing acute illness that interfered with the intervention ($n = 12$, 63.2%). Four studies (21.1%) (e.g., Cole et al., 2015; Fletcher et al., 2020; Lawn et al. (2019); Ebenfeld et al., 2020) reported no response from participants, and therefore, there are no specific reasons why participants dropped out of the study.

Three studies (15.8%) attributed participant dropout to disinterest in the study (e.g., Auslander et al., 2017; Blaauwendraat et al., 2017; Herrera-Mercadal et al., 2015). Andrews et al. (2022) stated that based on a checklist of barriers completed by participants in the study, researchers found that participants who did not complete treatment indicated having difficulties understanding the explanation of PTSD in the study intervention. Blaauwendraat et al. (2017) reported that one participant in the study decided to drop out because they no longer expressed symptoms consistent with the targeted intervention. Regarding the inability to contact participants, Auslander et al. (2017) noted that they experienced difficulties in contacting the participants in the sample, particularly given the vulnerability of the sample, such as girls who had run away from home.

Recommendations on Recruitment and Retention. Several studies reported explicit recommendations related to recruitment and retention in mixed methods psychological intervention research studies. Ten of the 40 studies (25%) reported explicit recommendations on recruitment and retention. These recommendations are organized into three overarching themes: *recommendations on the delivery of treatment*, *recommendations on recruitment*, and *recommendations on retention*. Table 4.7 highlights the different recommendations provided by researchers across studies for the various categories.

Table 4.7

Recommendations on Recruitment and Retention in Mixed Methods Psychological Intervention Studies

| Recommendation(s) | Frequency (n) |
|--|----------------------|
| <i>Delivery of treatment</i> | |
| Participants desire for face-to-face interaction | 3 |

| | |
|--|---|
| Decreasing potential distress | 2 |
| Increased contact and engagement with therapist(s) | 1 |
| Careful training of intervention delivery | 1 |
| Fostering group cohesion | 1 |
| <i>Recruitment</i> | |
| Clinician referrals | 2 |
| Using broad eligibility requirements | 1 |
| Word-of-mouth recruitment at health provider offices | 1 |
| Offer brochures at health provider offices | 1 |
| <i>Retention</i> | |
| Appointment reminders | 1 |
| Offering continuous care to participants | 1 |
| Consistent check-ins with participants | 1 |

Several recommendations were offered by researchers related to the *delivery of treatment*. For example, in three studies (30%) (e.g., Johansen et al., 2020; Hovland et al., 2015; Fletcher et al., 2022), researchers noted that face-to-face interactions with therapists supported and encouraged participants to engage in the intervention/program. In a study by Fletcher et al. (2022), researchers found that participants (i.e., veterans) strongly favored the presence of a coach, particularly during the enrollment process and/or initial phase of the treatment intervention. Moreover, although noted in only one study, Johansen et al. (2020) added that increased contact and engagement through multiple strategies, such as messaging, also served as crucial motivating factors for participants and, ultimately, helped reduce potential barriers to implementing the treatment.

Another explicit recommendation was decreasing potential distress related to the delivery of the intervention. Karatzias et al. (2019) noted the importance of allowing a family member or supporter to be present during therapy with the participant's consent to minimize any distress linked with receiving therapy. Similarly, Auslander et al. (2017) used different strategies in the study to alleviate potential distress, including providing

the option to skip questions, extensive training of interviewers allowing them to recognize signs of distress quickly and effectively expressed by participants, and providing referrals for professional help should participants express this desire.

Andrews et al. (2022) reinforced the importance of careful training when delivering psychoeducational components of an intervention and providing additional education and clarity should it be needed within the intervention. In a study by Mott and colleagues (2013), researchers stated that fostering group cohesion among group members within the intervention helped reduce dropout. This was especially important as the intervention focused on group-based exposure therapy among veterans, where group cohesion is central within the military culture (Mott et al., 2013).

Several examples from studies reported *recruitment* recommendations. Lang et al. (2020) reinforced the importance of referrals as a recruitment and retention strategy. Specifically, Lang et al. (2020) concluded that clinician referrals and broad eligibility requirements for recruiting participants led to high retention rates. Moreover, Kinser et al. (2013) stated that besides referrals from psychotherapists and psychiatrists, the most effective recruitment strategies were word-of-mouth and distributing brochures at healthcare provider offices.

Related to recommendations on *retention* strategies across mixed methods psychological intervention studies, Cole et al. (2015) noted that retention rates were high in their study because participants received continuous health care at the facility where the intervention took place. Therefore, had the intervention been in another setting unfamiliar to the participants, the authors noted that retention rates likely might have been lower. In addition, the authors also reinforced the importance of appointment

reminders. Further, Karatzias et al. (2019) recommended maintaining consistent check-ins with participants in intervention studies to maximize retention at follow-up.

Semi-structured Interview Findings

A brief demographics questionnaire (see Appendix G) was administered to all participants in the study. Ten participants participated in the qualitative interviews. Most participants were female ($n = 9$, 90%), and held current positions as either a post-doctoral research fellow ($n = 4$, 40%) or professors ($n = 6$, 60%). One participant described their current position as non-tenure track because they work in a medical school that does not follow the tenure process. Almost all the participants have been at their current position between 1-5 years ($n = 9$, 90%), with one (10%) participant reporting 5-10 years.

Most of the participants' main area of focus was psychology/psychiatry ($n = 5$, 50%), or a variant (e.g., human development or special education) ($n = 1$, 10%, respectively), two participants noted their focus on nursing ($n = 2$, 20%), and one participant stated medical education ($n = 1$, 10%). In general, although the fields varied, all participants discussed their work conducting mixed methods psychological intervention studies. Half of the participants expressed mixed methods research as the methodology they have the most experience with ($n = 5$, 50%), and feeling competent in this area ($n = 6$, 60%), with four (40%) who reported being proficient. Table 4.8 displays overall demographic information about the 10 interviewees in the sample.

Table 4.8

Participant Demographics for Qualitative Interviews (N = 10)

| Characteristics | <i>n</i> (%) |
|------------------------|---------------------|
| <i>Gender</i> | |
| Female | 9 (90%) |
| Male | 1 (10%) |

| | |
|---|---------|
| Prefer not to respond | 0 |
| <i>Current work position</i> | |
| Post-doctoral researcher | 4 (40%) |
| Professor | 6 (60%) |
| <i>Length of time in current position</i> | |
| Less than 1 year | 0 |
| 1-5 years | 9 (90%) |
| 5-10 years | 1 (10%) |
| 10-15 years | 0 |
| More than 15 years | 0 |
| <i>Main substantive area of focus</i> | |
| Psychology/Psychiatry | 5 (50%) |
| Nursing | 2 (20%) |
| Human development and family studies | 1 (10%) |
| Medical education | 1 (10%) |
| Special education | 1 (10%) |
| <i>Methodology of most experience</i> | |
| Quantitative | 2 (20%) |
| Qualitative | 3 (30%) |
| Mixed Methods | 5 (50%) |
| <i>Level of experience with mixed methods research</i> | |
| Novice | 0 |
| Competent | 6 (60%) |
| Proficient | 4 (40%) |
| Expert | 0 |

Overarching Themes from Qualitative Semi-structured Interviews

Several themes were identified in response to the qualitative semi-structured research questions. The themes are divided into overarching categories relevant to the research questions. The categories are recruitment, retention, sampling, data collection, integration, and temporal placement of the qualitative strand. Table 4.9 demonstrates the overarching themes identified across each category. Following the table, each theme is explained in greater detail and presented for each category.

Table 4.9

Overarching Themes from Semi-structured Interviews Across Each Category

| Categories | Theme | Sub-theme |
|-------------------|--------------|------------------|
|-------------------|--------------|------------------|

| | | |
|---|---|---|
| <i>Recruitment</i> | | |
| Strategies | <ul style="list-style-type: none"> • Cultivating Community Partnerships | |
| Challenges | <ul style="list-style-type: none"> • Challenges with Community Partnerships • Acknowledging Challenges Inherent to Sample Demographics | |
| <hr/> | | |
| <i>Retention</i> | | |
| Strategies | <ul style="list-style-type: none"> • Role of Incentives • Data Collection Considerations • Continuous Contact Throughout Duration of Study | |
| Challenges | <ul style="list-style-type: none"> • Influence of External Factors on Attrition | Completion of Study vs. Completion of the Program |
| <hr/> | | |
| <i>Sampling</i> | | |
| | <ul style="list-style-type: none"> • Sampling Considerations Across Mixed Methods Core Designs • Deciding Between Recruiting Identical Samples or Different Samples • Challenges Integrating Findings from Mixed Methods Samples | |
| <hr/> | | |
| <i>Temporal Placement of Qualitative Strand</i> | | |
| | <ul style="list-style-type: none"> • Special Considerations on the Temporal Placement of Qualitative Strand | |
| <hr/> | | |

Recruitment Strategies. Overall, participants discussed effective recruitment strategies centered around building and fostering community partnerships. One theme was identified related to recruitment strategies, *cultivating community partnerships*.

Cultivating Community Partnerships. Participants discussed several recruitment strategies they found effective in mixed methods psychological intervention studies. An essential aspect of the research process that can influence recruitment is identifying the

appropriate entity or source. This can include university departments, schools, churches, community housing networks, clinics/health services, hospitals, and in-patient/outpatient facilities. Building partnerships becomes a critical component of the recruitment process and can involve snowball sampling once the setting has been identified. For example, Melissa discussed that participants in the intervention informed others through word-of-mouth about their experiences with the research staff, which motivated potential participants to participate in the intervention study. This was also true for participants working with university samples by “tapping into existing social networks” (Robert).

Once the entity or source for recruitment was selected, participants in the study emphasized different ways of building trust with community partners throughout the research process. Robert discussed the importance of building relationships through partnerships “...and that researchers aren’t just popping in to collect data and making sure that the communities that they work with know where the data is being used.” Robert also encouraged researchers to engage in work that will contribute to the community, such as giving presentations or workshops. Melissa noted that one aspect of building a partnership is expressing the value of the intervention to partners and participants, and being clear about the goals of the intervention and how it aims to help participants. Robert and Barbara also reinforced the importance of describing the role(s) of the researcher(s) to partners and participants. Specifically, Robert stressed the importance of clarifying what the researcher does, their background, and the goals of the research study. He added, “So just really making sure that communities and folks not only know what the study is about but actually know the team. And I think that helps build trust and engagement with projects.” Barbara echoed similar sentiments and shared:

So they [community partners] get more confidence in me and to understand me as a person because I think it helps them. If they have confidence in me and think that I can take care of the patient and won't harm the patient, then I think they would tend to ask patients more.

Sara discussed that she has cultivated relationships with community partners by attending community events to learn more from them. Elizabeth shared similar sentiments about the importance of being present when recruiting participants.

Another critical aspect of fostering community partnerships is conveying the importance of the research. Ingrid noted the importance of communicating the purpose of the intervention and study and "...making sure that people feel like it's relevant to them, that it's something they want to be involved in," and part of this process is also recognizing whether this will be a participatory process including them [educators or teachers] and whether they will be co-developers or if they will be doing an evaluation and receiving information instead. Ingrid further emphasized the importance of clarifying the role of partners, how they will be involved, what they are interested in, and the study's overall purpose. Barbara also added that building a relationship with nurses increased the participant recruit success rate, and some of the contributing factors included nurses knowing the intervention, knowing that the study would not involve harm to participants, and that the intervention had been carried out in other populations or settings, but was now being adapted into a group format.

Recruitment Challenges. Participants expressed several challenges related to recruitment in mixed methods psychological intervention research. Two themes were

identified as overarching recruitment challenges, *challenges with community partnerships*, and *acknowledging challenges inherent to sample demographics*.

Challenges with Community Partnerships. Participants capitalized on the importance of building partnerships, especially in mixed methods research studies, throughout the research process but also discussed some potential challenges in doing so. One of the challenges includes securing buy-in from all stakeholders and community partners. Sara noted that this is particularly apparent in mixed methods research studies and explained:

It is very hard to recruit for mixed methods with the population I work with in general [children and families from marginalized communities], and I think because, well, because I use community partnerships to do my work...I highly rely on recruitment through community partners, so leaders in the communities, and that's because they already have relationships with the communities that we're working with.

Moreover, Melissa further reinforced the importance of establishing buy-in at every step of the study, including "at the research stage, at the treatment administration phase, at the participant phase, you have to have it at all three levels." Not only is buy-in critical to consider across various stages of the research process, but also who buy-in will be needed from. For example, Ingrid described that the school district may have approved the study at the school level, but the school or individual educators may not be interested. Therefore, the challenge is not only in recruiting participants but securing buy-in from community partners and gatekeepers. Sara also discussed that once she has identified what centers would be most appropriate to recruit participants, the challenge was often

meeting with individuals who work at the center(s) and explaining the purpose of the study and the study logistics before beginning the study.

Participants discussed specific barriers to using a tiered approach for recruitment. A tiered approach to recruitment can be described as a nested or multilevel approach, where recruitment starts at the macro-level and ultimately comes down to the micro-level. For example, when recruiting students for a psychoeducational intervention, researchers may first need to contact school districts, schools, administrators, teachers, and parents, to recruit students. Doing so can help researchers more easily connect with the target population and increase recruitment success. Samantha explained that she recruits participants through hospitals and outpatient centers, and therefore, nurses are involved in the recruitment process of the study. One of the challenges this presents is that nurses may often forget to inform potential participants about the study due to busy schedules in the clinical setting. Therefore, Samantha shared that the researcher/research personnel needed to be also present in these settings where recruitment happens. Although their country does not allow researchers to personally recruit participants in hospital settings (i.e., Denmark), researcher presence was critical in this case to serve as a reminder to nurses involved in the recruitment about the current study and push the recruitment process forward. Samantha stated: “But that was the challenge, how to always be in the forefront, and that I learned was to be there physically.”

Elizabeth also discussed that the greatest challenge with recruitment is engaging with healthcare staff, who are often busy with their schedules to fully engage in the recruitment process. Barbara noted that healthcare professionals are often the only individuals who can ethically approach and recruit study participants, thus making it

challenging for researchers to engage in the recruitment process. Another challenge in working with gatekeepers in clinical settings is that sometimes inclusion criteria may be altered in settings unknowingly to the researcher, and gatekeepers may invite participants into the study that would typically not meet inclusion criteria. One of the ways Barbara and their team have mitigated these challenges is by teaching healthcare professionals to encourage participant autonomy and allow the patients to make their own decisions on participation and avoid making decisions or swaying participants to respond a certain way.

Acknowledging Challenges Inherent to Sample Demographics. Participants discussed the importance of acknowledging the challenges specific to the sample demographics. Sara shared that often when working with vulnerable populations, participants may be interested in participating but might be exposed to barriers that prevent them from participating. These barriers may include a lack of financial resources, transportation, or participants going through custody battles, making it challenging to participate in intervention studies. Victoria also shared that when working with parents experiencing depression, “They [participants] don’t have much time, or energy, or resources to do anything, and then, the motivation to participate in research study, there has to be some clear motivation for them themselves.” Nevertheless, recruiting these individuals in research is particularly important to serve these communities better.

Further, Victoria discussed the challenges when recruiting a diverse sample and its implications for the research findings. One challenge is ensuring that those participating in the study are genuinely interested in the research and that families who participate come from various sociodemographic factors. Failure to do so may lead to a

misrepresentation of the research phenomenon and limit the perspectives of a diverse group. Lauren further expanded on this, explicitly stating that if a researcher is recruiting a smaller sample size first (i.e., exploratory sequential designs), one factor to be mindful of is ensuring the researcher does not engage in selection bias “where one type of person is trying to get their friends to come do it, and then you’re not getting enough heterogeneity.”

Retention Strategies. Participants discussed many retention strategies they use to mitigate issues of retention in mixed methods psychological intervention studies. Three themes were identified related to retention strategies, the *role of incentives*, *data collection considerations*, and *continuous contact throughout duration of study*.

Role of Incentives. Several retention strategies were noted across all participants. All participants in this study discussed the importance of offering incentives to participants in the research study and paying them an appropriate amount for their time. Lauren shared that although there is no ‘formula’ when determining a reasonable incentive amount, she shared several strategies. One strategy is ensuring the compensation is appealing to the group in the study. When working with youth, Lauren has found that youth tend to be more excited about receiving cash, and therefore if the research team can, they will offer the youth cash and offer the parents gift cards to places participants will be interested in. Lauren discussed the importance of budgeting incentives from the inception of the study. She stated:

But also I would put a lot of my budget into this. I wouldn't be afraid to pay \$100 to someone for spending an hour with us or something because then it feels like, "Okay, this isn't just worth how much I get paid at my job, but all the other things

I gave up to be here. The fact that I had to drive here or whatever. I feel fairly compensated for this." So I think that goes a long way.

Providing incentives in many ways served as both a recruitment and retention strategy. Ingrid discussed providing incentives to the teacher liaison, who served as a gatekeeper in the study. Ingrid also discussed giving participants options in terms of incentives. Specifically, she gave the students involved in the study the choice of where they would like to receive a gift card and similarly stated that most of their budget goes towards incentives. Barbara noted that in their country (i.e., Denmark), they can send money to participants through a direct bank transfer and offer gift cards to Amazon or local shops. In addition, the research team also covers any transportation costs.

Some participants also discussed offering incentives at various points in the study, such as every time they completed a survey or interview throughout the study. Lauren noted that she used separate incentives for each phase of the study, which helped to incentivize participants to return at follow-up. She added, "And then also if you do have a participant that you really want, but you're not confident that they're going to be consistent, at least you get partial data from them, by incentivizing every piece along the way." This was a common strategy across several participants in ensuring all participants were incentivized after completing a study-related task (e.g., survey/questionnaire and interviews). Sara noted that providing childcare services is one strategy she has started using with the population she works with (i.e., children and families from marginalized communities).

It is also important to note that although all participants discussed the role of incentives in mixed methods psychological studies, Barbara indicated that she could not

provide incentives in their residing country (i.e., Denmark) to individuals diagnosed with a mental illness. The regional ethics committee has set these rules because the expectation is that the motivation should come from participants who voluntarily decide to take part in the study. However, if participants are in the control group or considered healthy individuals, they can be incentivized. Nonetheless, all participants can be reimbursed for travel.

Data Collection Considerations. Participants discussed several retention strategies closely related to data collection procedures. These include maintaining transparency with participants about the data collection process, acknowledging participants' feelings and motivations to engage in data collection/intervention, being aware of the language used with participants and included in data sources, and offering participants various data collection options. Barbara noted the importance of carefully considering the data collection methods and procedures, such as how long each data collection session will take, whether participants have concentration or cognitive deficits that can impede the selected data sources or methods, how many instruments will be used, and the total number of questionnaires, among other choices related to data collection. Elizabeth stated:

When working with vulnerable target groups, it's important to explain this in a way that fits their cognitive skills/level to make sure they understand. Same goes for the research methods. Questions/text shouldn't be too difficult, and data collection shouldn't take too long.

Many participants in this study discussed allowing participants to complete data collection at a location most convenient to them to reduce potential barriers. These may

include visiting the participants' homes and hospitals or offering the option for participants to visit the researcher's office. However, when visiting participants' homes for data collection, one of the challenges, acknowledged by Samantha, is ensuring this is a feasible option due to the participant sample size and the number of research personnel involved in data collection. Overall, Lauren encouraged researchers to:

...be willing to go wherever you need to go in order to conduct the research and collecting lots of contact information from them [participants] that if they change where they're going to be, their phone number, location, you're able to find them again.

This is especially true for longitudinal mixed methods designs.

In addition to being flexible with data collection methods conducive to participants, another vital aspect is honoring participants' feelings, especially if participants are not motivated to participate in the study or intervention on the scheduled date, being transparent about the purposes of the study, but most importantly, informing participants on what the research team will do with their data and the potential benefits from engaging in the research study and data collection process with researchers. Moreover, participants noted the importance in using appropriate language with participants. Robert described that he refers to the participants in the study as 'partners' or 'experts,' not participants, and treat them as partners and experts with their own lived experience. Moreover, the language used in data sources can also be a factor that influences retention. Specifically, Elizabeth mentioned that if interviews contain abstract questions or questionnaires include too much text, this can alter participants' motivations to engage in the study.

Continuous Contact Throughout Duration of Study. Participants in this study discussed the need to use multiple approaches to maintain contact with participants throughout a study to increase retention rates. In some studies, individuals who delivered the treatment or program met monthly, and researchers set up a liaison for each school involved in the study to check in with individuals delivering the program. In other cases, participants engaged in face-to-face interactions with participants and gatekeepers throughout the study. Melissa mentioned that the more she visited the residential treatment facility, the more open participants were, and it helped participants become more familiar with the research personnel. Melissa shared, “You’re not a phone number, you’re not an email, you’re a person.”

Another participant mentioned that from the onset of the study, they had already developed set dates when the research personnel would be reaching out for visits in advance, which helped retain participants. Victoria described staying in touch with participants by sending children birthday cards and writing Christmas cards for families. One of the most discussed strategies was sending participant reminders. This includes check-in emails to ensure participants received online survey links via emails, reminding participants to complete and return questionnaires to the research personnel, and informing participants when they should be expecting another survey from the research team. Participants discussed doing this via phone and email; however, Melissa described that email is more legitimate and less invasive than a phone call when scheduling reminders.

Retention Challenges. Participants discussed several challenges related to retention in mixed methods psychological intervention studies. One theme was identified

for retention challenges, the *influence of external factors on attrition*, and the subtheme, *completion of study vs. completion of the program*.

Influence of External Factors on Attrition. Participants discussed several challenges related to external factors often not controlled by the researcher but essential to consider, which can ultimately affect attrition. One of the most discussed external factors uncontrollable to the researcher is life circumstances and events that may affect a participant's ability to continue engaging in the study. For example, these can include moving, not being receptive to the intervention components, financial obstacles, transportation, having to stop intervention due to more pressing mental or physical health concerns, and inability to contact participants once the intervention ends. Melissa expressed that since participants in their study lived in a care facility, once they were done with the intervention, it became difficult to contact these participants because the participants themselves did not know where they would be living or have limited or no access to phone or internet. Melissa added:

You don't want to search a participant down after a withdrawal. Not because it wouldn't be worth it, but because the voluntary nature of participation means they can walk away at any time without the pressure of giving a reason. So for example, let's say a participant is moving out of state. If they provide contact information and an explicit interest to continue the study, then the door to continue participating is still open. If not, then that's the end.

Other participants discussed losing access to a gatekeeper, particularly in cases where the access point is the setting. Lauren suggested that one way to overcome this issue is by stating in the IRB that contact information will be asked of individuals outside

of the setting where access was initially obtained and requesting permission to contact participants to continue following up. Additional reasons for attrition include disinterest in the study, topic sensitivity, and cancellations. In cases where a participant might cancel their session, Samantha suggested contacting the participant soon after to schedule another date/time, and if they consecutively missed sessions, probing for reasons to ensure these are not study related (i.e., missing not at random). Another challenge that can result from participants dropping out of the study or rescheduling is losing the sample's representativeness over time. This is especially true in longitudinal mixed methods designs.

Completion of the Program vs. Completion of Study. Several participants in the study noted differences between participants who completed the program/intervention and those who completed the study and ways this can differentially influence data collection. Sara described that participants who completed the program might have completed all sessions, but often research personnel could not get data across all time points and phases due to participant external factors. Alternatively, participants who completed the study may not have completed the program/intervention but continued engaging in the data collection process throughout the full mixed methods study. Melissa also mentioned that participants who finish the program can be classified as ‘graduates’ from the program and are considered ‘dropouts’ from the study. Often these participants are not contacted after the completion of the program due to sensitive topics that need respect. Therefore, Melissa mentioned that having participants graduate from the program is “a good challenge,” but also noted:

Particularly in my research, ‘graduation’ means progress towards feeling better. I want to see that for participants, even at the expense of data collection. In mixed methods research, you need twice the effort, energy, and time from participants, so withdrawals – even for positive reasons – are going to be an issue.

Sampling in Mixed Methods Intervention Research. The following section provides detailed information on three identified themes related to sampling decisions and their influence in mixed methods research. The themes are, *sampling considerations across mixed methods core designs, deciding between recruiting identical samples or different samples, and challenges integrating findings from mixed methods samples.*

Sampling Considerations Across Mixed Methods Core Designs. One of the overarching considerations on sampling in sequential designs was recruiting representative samples that adequately define the qualitative sample's true parameters, particularly for the qualitative strand. For example, if the purpose is to develop a measure for an intervention, participants discussed the importance of thinking through the sample demographics and who the target sample is as it will influence the development of the measure for the intervention (e.g., different geographic regions). Lauren stated that some researchers might often be tempted to recruit a convenience sample over the most balanced one. She noted, “I think anytime you are limited by a setting, there is a ceiling on the number of people even available to you.” Participants recommend being intentional with the sampling strategy ahead of time and trying to keep the sample as balanced and representative as possible.

Melissa stated that when conducting an exploratory sequential design, it is often not feasible to recruit hundreds of participants for the qualitative strand; therefore,

essential considerations related to sampling in exploratory sequential designs might include thinking about an adequate number that is reasonable for the research personnel but will also be sufficient to meet saturation and incorporate all potential perspectives. Melissa added, “For sequential designs, sampling might be a bit trickier because you can’t predict when you’re going to hit that saturation. You may need to adjust your data collection plan.” Although some guidelines for determining saturation in qualitative research have been established, Melissa explained that one of the challenges in following those guidelines is that a researcher may think they had achieved saturation at participant 15 based on guidelines. Yet, after conducting interview 15, they find a diverse perspective that other participants have not previously mentioned. Thus, it is vital to intentionally sample participants that meet the study's parameters while considering the required sample size across strands.

When it comes to convergent designs, there were different sampling considerations expressed by participants. For example, Robert described that in convergent designs, the samples for the quantitative and qualitative strands tend to be smaller because he tends to follow participants for a more extended period, and it is more challenging to conduct interviews with more than 100 people. He also added that he is more likely to use quality indicators in convergent designs rather than sequential designs. Specifically, Robert stated that in convergent designs, he is more likely to have multiple measures related to similar constructs to have a better sense of the sample. Whereas, in sequential designs, one important consideration is how long surveys will take because the samples may differ in sequential designs, and researchers may have less time with participants. Elizabeth also noted that when employing a convergent design in

intervention research, she tends to collect quantitative questionnaires and qualitative open-ended questions. Although collecting questionnaires as a quantitative and qualitative method in convergent designs might increase participant recruitment and retention, Elizabeth stated, “the answers to the open-ended questions provide less depth/insights than interviews/in-person methods.”

Deciding Between Recruiting Identical or Different Samples. Participants discussed at varying lengths their decision-making process for using identical samples versus different samples across mixed methods psychological intervention studies. The majority of the participants in this study reported using identical samples across both quantitative and qualitative phases. One of the challenges of using an identical sample across both strands is having small sample sizes for the quantitative strand, which can limit the ability to find significant treatment effects. Robert, however, explained that even though a researcher might find the samples identical, different factors, such as specific sample demographic characteristics, may vary and can influence how alike everyone in the sample truly is, particularly when analyzing qualitative data. There are ways to control for demographic factors in the quantitative strand, but the same might not be true for the qualitative strand. For instance, Robert described that if he is interested in exploring the experiences and psychological effects of racism and racial discrimination qualitatively from participants in the South, those participants’ experiences might be very different from participants in the North or Midwest, even though the samples may be relatively identical. Therefore, Robert advises assessing the sample demographics and what identical samples mean within the context of the mixed methods study and the research phenomenon.

Participants also noted that even when recruiting a subsample for the follow-up strand, they typically recruit participants from the same overarching intended sample. Sara stated, “I never thought about ever using a different sample. As an interventionist who does research, it doesn’t make sense for me because I want the same participants to understand them quantitatively but also descriptively through qualitative approaches.” In general, participants in this study recruited identical samples, and when recruiting subsamples, they ensured to recruit participants from the original sample.

Challenges Integrating Findings from Mixed Methods Samples. Participants expressed multiple challenges when selecting different samples for the quantitative and qualitative phases in mixed methods intervention studies. The biggest challenge reported by participants is making sense of the results when integrating findings between different samples. To overcome these challenges, participants provided several considerations and recommendations. Ingrid explained that if the samples between the quantitative and qualitative strands are different and the results between both samples do not directly connect, it is critical to provide information on the process a researcher engaged in and provide transparency throughout each step. Lauren provided thoughtful reflections to consider when integrating findings from two different samples. One is to consider whether the findings from both samples corroborate and lead to similar conclusions. If so, she discussed that this might serve as a member check in mixed methods research. If the samples are different and, through integration, there is divergence, it is important to consider whether the groups are contextually different and have “validly different answers to some of your questions based on their context.”

When combining data and results from different samples, one challenge researchers might encounter is making sense of divergent findings. If divergent findings arise in a mixed methods intervention study, Melissa suggests researchers find commonalities between the samples. In other words, once the quantitative and qualitative data and analysis have been completed, the next step is determining where the two stories can integrate. Melissa stated, “For me, in my experience, it's usually been when we have both pieces of the story, and then it's, ‘Where does it naturally feel like it integrates? Where does it naturally feel like, yeah, that's a connection that can be made?’” Melissa added that even after finding commonality between strands, as a researcher, it is important to continue exploring potential possibilities of commonality to ensure the researcher is not introducing bias or to assess whether there is more than one connection point or commonality. Melissa further added:

From my perspective, it's fine if it isn't a completely beautiful, all knots are tied and all Ts are crossed story, because the human experience is not always that seamless. It's not that you have to answer every question, it's about telling a story as best you can. In my research, we saw that quantitative depression scores decreased, and then looking at the qualitative responses, we can say, ‘Well, yeah, the scores probably decreased because participants are getting practice with having to advocate for themselves, which can be difficult. It can reduce stress and anxiety and depression to just get out of your own surroundings, and in some cases, maybe even getting out of your own head.’

Other participants noted that while they may collect data from different samples in a mixed methods study, not all samples are incorporated in the analysis. For example,

data can be collected from adolescents, parents, and nurses; however, only the adolescent data may be used when evaluating the intervention and clinical outcomes of the mixed methods intervention study. Regardless of these challenges, participants elucidated the benefit of including different samples in a mixed methods intervention study as it helps to obtain a broader view of the processes between both groups. For example, Ingrid explained that a study she conducted allowed her to explore the processes teachers were going through qualitatively and examine student outcomes quantitatively. She mentioned that if she had only included results from only one sample, she would have missed the complete picture. Therefore, even though it may not be a perfect one-to-one fit or correlation, “you’re still getting a more in-depth story of what’s going on in the intervention together in the same paper” (Ingrid).

Temporal Placement of Qualitative Strand. To better understand the reasons for collecting qualitative data across different time points throughout the mixed methods study, this was further explored with participants. One overarching theme was identified, *special considerations on the temporal placement of qualitative strand*, that illuminates the decision-making process of including a qualitative strand *before, during, or after* in mixed methods psychological intervention research. The following provides detailed information on this theme.

Special Considerations on Temporal Placement of Qualitative Strand.

Participants discussed the value of qualitative research in mixed methods intervention research studies. Participants discussed that one of the driving forces when deciding to place the qualitative strand either *before*, *during*, or *after* an intervention largely depends on the research questions. Lauren mentioned that the qualitative strand could help to uncover whether participants improved from the intervention, especially a few years after the completion of the intervention. If participants in the intervention expressed that they did not get better, Lauren noted that it would make little sense to invest in a four-year follow-up that could cost \$1 million. Sara mentioned, “If I could, I would include qualitative through all the strands of every part of my intervention just because it helps me understand the significant impact without depending on the quantitative data.”

Several reasons for collecting and analyzing the qualitative data *before* the intervention were shared by participants in the study. Sara explained that conducting the qualitative strand *before* the intervention can help ensure a high effectiveness rate before starting the intervention on a larger scale. Specifically, Sara referred to interviewing community leaders and facilitators to understand the needs of a program and probing whether a program is already in place for researchers to bolster the strengths of existing interventions. Sara noted that qualitative research in mixed methods intervention studies helps the program's sustainability by addressing potential barriers and capitalizing on the strengths grounded on community perspectives. Other reasons for conducting the qualitative strand *before* the intervention included asking if participants (i.e., clients) and therapists had prior experiences with the intervention, exploring what factors may

influence the intervention, identifying variables to target during the intervention, and developing the intervention.

Several reasons for conducting the qualitative strand *during* the intervention were reported by participants, including asking how participants (i.e., clients) feel during the intervention and how participants are implementing the intervention while it is happening. Regarding reasons for conducting the qualitative strand *after* the intervention, this study's participants reported the most reasons across the different temporal placements. These include identifying strategies participants (i.e., clients) used to manage their emotions after the intervention, ways the intervention helped participants, evaluating participants' direct experiences with the intervention, assessing barriers and facilitators to the intervention, assessing the effectiveness of the treatment, overall outcomes of the intervention, and conducting evaluations of the intervention to determine needed adaptations to the intervention. Samantha discussed the need to carry out the qualitative strand *after* the quantitative data collection because if it had been collected during, this would compromise the quantitative data. Barbara advised researchers to acknowledge the lag time between quantitative and qualitative data collection and analysis. She described that the time lag could influence the amount of information shared by participants; specifically, this could be affected by participant recall or strategies the research personnel use to collect data and/or build rapport.

Building Integration

A joint display was developed to illustrate areas of convergence and *silence* across the MMR-SMR and semi-structured interview findings along with the resultant preliminary list of recommendations. To demonstrate corroboration between data

sources, relevant themes from the MMR-SMR and semi-structured interviews were matched with each other. In cases where no direct corroboration between the MMR-SMR and semi-structured interviews was present, *silence* was used to refer to when one set of results was ‘silent’ in comparison to the other set of results (Farmer et al., 2006). *Silence* is often reported frequently for the MMR-SMR since the semi-structured interviews were conducted to expand on the findings from the MMR-SMR. In other cases (e.g., integrating mixed methods samples), *silence* is reported for the MMR-SMR, but seminal literature from the field of mixed methods research was referenced to provide additional details on the development of recommendations and further corroborate with the interview findings.

Table 4.10 displays the integrated joint display between the MMR-SMR and semi-structured interviews, along with the resultant recommendations across the primary topics of inquiry (e.g., recruitment, retention, sampling across MMR designs, data collection, integrating mixed methods samples, and temporal placement of qualitative strand). These recommendations served as the preliminary list of recommendations for the subsequent quantitative phase.

Table 4.10
Joint Display Between MMR-SMR and Interview Findings Demonstrating Development of Resultant Recommendations Through Building Integration

| Sources of Integration | | | |
|-------------------------------|------------------------|---|---|
| Topic(s) of Inquiry | MMR-SMR Findings | Interview Findings | Supporting Source |
| Recruitment | Recruitment strategies | Acknowledging challenges inherent to sample demographics | <i>Silence</i> |
| | <i>Silence</i> | Cultivating community partnerships and challenges with community partnerships | <i>Silence</i> |
| | | | <ol style="list-style-type: none"> 1) Identify the most effective strategies to recruit participants based on the sample demographics and accessibility. These may include, but are not limited to, referrals, recruiting through care facilities, flyers, attending community events, etc. 2) Develop strategies to ensure buy-in from community partners/gatekeepers involved in the recruitment process. 3) Ensure transparency of sample inclusion criteria to gatekeepers/community partners. 4) Consider strategies to develop trust with community partners. This may include but is not limited to, describing the role(s) of the researcher, the goals of the study, describing value of intervention, and having conversations with partners on their role(s) and how they plan to be involved. 5) Consider how selection bias was mitigated when recruiting participants between the quantitative and |

qualitative strands of the mixed methods psychological intervention study.

Retention

| | | | |
|--|--|-----------------------|---|
| <p>Incorporating various follow-up methods</p> | <p>Continuous contact throughout duration of study</p> | <p><i>Silence</i></p> | <p>6) Identify effective strategies or a combination of strategies for maintaining continuous contact with participants and gatekeepers. These strategies may include but are not limited to face-to-face interactions, phone, email, and sending participant reminders.</p> |
| <p>Alleviating potential barriers</p> | <p>Roles of incentives</p> | <p><i>Silence</i></p> | <p>7) Enhance barrier-reduction strategies between the quantitative and qualitative strands, and full mixed methods study. These strategies may include but are not limited to scheduling flexibility, offering participants the option to choose the desired location for data collection (e.g., home, clinic/hospital, school), opportunity to make up missed session, providing transportation/travel reimbursement, and childcare).</p> |
| | | | <p>8) Identify appropriate incentive(s) most appealing to the target population. This may include but is not limited to determining whether to offer gift cards or cash (if possible) and offering participants their choice of gift card (e.g., goods, restaurants).</p> |
| | | | <p>9) If possible, consider providing an incentive after each data collection point between the quantitative and qualitative strands.</p> |
| | | | <p>10) Particularly, in cases of participant dropout, assess the representativeness of sample(s) over time between the</p> |

quantitative and qualitative strands.

11) Identify reasons for attrition to determine whether participant dropout was at random or not at random (e.g., inherent to study characteristics/design).

| Sampling Across MMR Designs | |
|---|---|
| <i>Silence</i> | <p>12) Researchers are encouraged to report sample size(s) between the quantitative and qualitative strands of the mixed methods psychological intervention study.</p> <p>13) If using a subsample (i.e., nested sample), researchers are encouraged to provide details on subsample demographics.</p> <p>14) Provide explicit statement(s) on the reasons for the chosen sampling approach between the quantitative and qualitative strands of the mixed methods psychological intervention study.</p> <p>15) Provide rationale on decision(s) for choosing identical samples or different samples between the quantitative and qualitative strands and how it relates to the chosen mixed methods core design.</p> <p>16) Consider the characteristics of identical samples and its representativeness over time.</p> |
| Sampling considerations across mixed methods core designs | Onwuegbuzie and Collins (2007) |
| <i>Silence</i> | <p>Deciding between recruiting identical or different samples</p> <p>Onwuegbuzie and Collins (2007)</p> <p>17) Carefully consider the types of data sources that are used between the quantitative and qualitative strands and whether they are conducive to the sample(s) (e.g., language,</p> |
| Data Collection | <p>Data collection considerations</p> <p>Song et al. (2010)</p> |
| <i>Silence</i> | |

reading levels, cognitive abilities, concentration levels).

18) Provide participants with transparency on the data collection procedures (e.g., how will data be used, potential benefits from participating in study).

Integrating Mixed Methods Samples

Silence

Challenges
integrating mixed
methods samples

Onwuegbuzie
and Collins
(2007)

19) Researchers are encouraged to report the mixed methods research sampling design used in the mixed methods psychological intervention study (see Onwuegbuzie and Collins, 2007).

20) When integrating findings between samples, consider whether findings corroborate, or whether samples are contextually different leading to validly different results.

21) Identify the point(s) of commonality between samples when integrating findings and provide statement describing this process.

Temporal Placement of Qualitative Strand

Exploring
intervention
components and
participants'
responses to
outcome
measures

Special
considerations on
temporal
placement of
qualitative strand

Silence

22) Consider the time lag between data collection and analysis between the quantitative and qualitative strands and its impact on the priming effects and validity of the data.

23) Provide explicit reason(s) for the temporal placement of the qualitative strand in relation to the intervention. Examples include but are not limited to:

Before

Motivations or demotivations for participation
Receptivity to personnel delivery methods
Develop prototype of intervention

Identifying culturally responsive components
Gauging participants' and therapists' prior experiences with intervention
Exploring factors that may influence intervention
Identifying variables to target in intervention
Developing intervention

During

Adaptations to intervention
Perceived intervention barriers
Exploring range of outcome measure(s) (i.e., explore multiple psychological constructs being measured qualitatively)
Exploring coping mechanisms
Exploring how participants feel during time of intervention
Explore how participants are implementing intervention as intervention is occurring

After

Adaptations to intervention
Overall experiences and feelings about intervention
Elicit participant feedback on intervention
Perceived acceptability of intervention
Perceived feasibility and acceptability of intervention
Perceived acceptability and efficacy of intervention
Perceived tolerability of intervention
Identifying effective strategies used by participants to manage emotions after intervention
Explore how intervention helped participants
Evaluate participants' direct experiences with the intervention

Assess barriers and facilitators of intervention
Assess effectiveness of treatment
Explore overall outcomes of intervention

□

Quantitative Results

A total of ten participants participated in Round 1 of the modified e-Delphi study. After agreeing to participate in the study, a brief demographics questionnaire was administered to participants through informed consent (see Appendix G). Five participants identified as female (50%), four as male (40%), and one preferred not to respond. Most participants reported currently working as a tenure track professor ($n = 6$, 60%), followed by two non-tenure track professors (20%), one postdoctoral research fellow (10%), and one participant who is currently retired (10%). However, before retirement, they were a professor. The majority of participants have been in their current position between 1-5 years ($n = 5$, 50%), two reported 6-10 years (20%), and three reported more than 15 years (30%).

The participants' main substantive area of focus ranged between education ($n = 4$, 40%), health sciences ($n = 3$, 30%), psychology ($n = 2$, 20%), health sciences and education ($n = 1$, 10%), and business management ($n = 1$, 10%). It is important to note that some participants reported more than one substantive area of focus, which is why the total amount exceeds the sample size of ten. All participants ($n = 10$, 100%) reported that the methodology they have the most experience with is mixed methods research, with four (40%) reporting feeling proficient in this area and six (60%) reporting as experts. Table 4.11 displays overall demographic information of the ten participants in the modified e-Delphi study.

Table 4.11

Participant Demographics for Quantitative Modified e-Delphi Round 1 (N = 10)

| Characteristics | <i>n</i> (%) |
|------------------------|---------------------|
| <i>Gender</i> | |
| Female | 5 (50%) |

| | |
|---|-----------|
| Male | 4 (40%) |
| Prefer not to respond | 1 (10%) |
| <hr/> | |
| <i>Current work position</i> | |
| Tenure-Track professor | 6 (60%) |
| Non-Tenure track professor | 2 (20%) |
| Post-doctoral research | 1 (10%) |
| Retired | 1 (10%) |
| <hr/> | |
| <i>Length of time in current position</i> | |
| Less than 1 year | 0 (0%) |
| 1-5 years | 5 (50%) |
| 6-10 years | 2 (20%) |
| 11-15 years | 0 (0%) |
| More than 15 years | 3 (30%) |
| <hr/> | |
| <i>Main substantive area of focus</i> | |
| Education | 4 (50%) |
| Health sciences | 3 (20%) |
| Psychology | 2 (20%) |
| Health sciences & education | 1 (10%) |
| Business Management | 1 (10%) |
| <hr/> | |
| <i>Methodology of most experience</i> | |
| Quantitative | 0 (0%) |
| Qualitative | 0 (0%) |
| Mixed Methods | 10 (100%) |
| <hr/> | |
| <i>Level of experience with mixed methods research</i> | |
| Novice | 0 (0%) |
| Competent | 0 (0%) |
| Proficient | 4 (40%) |
| Expert | 6 (60%) |

Round 1

Ten participants agreed to participate in the study and completed the Round 1 questionnaire. A total of 23 methodological statements were included in Round 1. Eighteen out of the 23 methodological statements met consensus agreement, with medians ranging between 4.5 to 5 and I-CVI values ranging between 0.80 to 1. Five recommendations did not meet agreement (8, 9, 19, 20, and 22), with median values at 4 and I-CVI values between 0.60 to 0.70. These recommendations warranted further inspection for Round 2. Not all participants reported a response to all the recommendations. Specifically, these included two recommendations that did not meet

consensus agreement in Round 1 (numbers 19 and 20). Table 4.12 displays the medians, I-CVI values, and IQR for each recommendation in Round 1.

Table 4.12

Round 1 Modified e-Delphi Results

| Recommendation | Median | I-CVI x 100 (%) | IQR |
|--|---------------|----------------------------|------------|
| 1. Identify the most effective strategies to recruit participants based on the sample demographics and accessibility. These may include, but are not limited to, referrals, recruiting through care facilities, flyers, attending community events, etc. | 5 | 90% | 1 |
| 2. Develop strategies to ensure buy-in from community partners/gatekeepers involved in the recruitment process. | 5 | 100% | 1 |
| 3. Ensure transparency of sample inclusion criteria to gatekeepers/community partners. | 4.5 | 90% | 1 |
| 4. Consider strategies to develop trust with community partners. This may include but is not limited to, describing the role(s) of the researcher, the goals of the study, describing value of intervention, and having conversations with partners on their role(s) and how they plan to be involved. | 5 | 100% | 0 |
| 5. Consider how selection bias was mitigated when recruiting participants between the quantitative and qualitative strands of the mixed methods psychological intervention study. | 5 | 80% | 1.25 |
| 6. Identify effective strategies or a combination of strategies for maintaining continuous contact with participants and gatekeepers. These strategies may include but are not limited to face-to-face interactions, phone, email, and sending participant reminders. | 4.5 | 90% | 0 |
| 7. Enhance barrier-reduction strategies between the quantitative and qualitative strands, and full mixed methods study. These strategies may include but are not limited to scheduling flexibility, offering participants the option to choose the desired location | 5 | 100% | 0 |

| | | | |
|---|-----|------|------|
| for data collection (e.g., home, clinic/hospital, school), opportunity to make up missed session, providing transportation/travel reimbursement, and childcare. | | | |
| 8. Identify appropriate incentive(s) most appealing to the target population. This may include but is not limited to determining whether to offer gift cards or cash (if possible) and offering participants their choice of gift card (e.g., goods, restaurants).* | 4 | 60% | 1.25 |
| 9. If possible, consider providing an incentive after each data collection point between the quantitative and qualitative strands.* | 4 | 70% | 1 |
| 10. Particularly in cases of participant dropout, assess the representativeness of sample(s) over time between the quantitative and qualitative strands. | 5 | 90% | 1 |
| 11. Identify reasons for attrition to determine whether participant dropout was at random or not at random (e.g., inherent to study characteristics/design). | 5 | 90% | 1 |
| 12. Researchers are encouraged to report sample size(s) between the quantitative and qualitative strands of the mixed methods psychological intervention study. | 5 | 90% | 0.25 |
| 13. If using a subsample (i.e., nested sample), researchers are encouraged to provide details on subsample demographics. | 5 | 90% | 0 |
| 14. Provide explicit statement(s) on the reasons for the chosen sampling approach between the quantitative and qualitative strands of the mixed methods psychological intervention study. | 5 | 100% | 0.25 |
| 15. Provide rationale on decision(s) for choosing identical samples or different samples between the quantitative and qualitative strands and how it relates to the chosen mixed methods core design. | 5 | 90% | 1 |
| 16. Consider the characteristics of identical samples and its representativeness over time. | 4.5 | 80% | 1.25 |
| 17. Carefully consider the types of data sources that are used between the quantitative and qualitative strands and whether they are conducive to the | 5 | 90% | 1 |

| | | | |
|--|-----|------|------|
| sample(s) (e.g., language, reading levels, cognitive abilities, concentration levels). | | | |
| 18. Provide participants with transparency on the data collection procedures (e.g., how will data be used, potential benefits from participating in study). | 5 | 90% | 1 |
| 19. Researchers are encouraged to report the mixed methods research sampling design used in the mixed methods psychological intervention study (see Onwuegbuzie and Collins, 2007).* | 5 | 70% | 1.5 |
| 20. When integrating findings between samples, consider whether findings corroborate, or whether samples are contextually different leading to validly different results.* | 5 | 70% | 1.5 |
| 21. Identify the point(s) of commonality between samples when integrating findings and provide a statement describing this process. | 4.5 | 90% | 1 |
| 22. Consider the time lag between data collection and analysis between the quantitative and qualitative strands and its impact on the priming effects and validity of the data.* | 4 | 70% | 2.25 |
| 23. Provide explicit reason(s) for the temporal placement of the qualitative strand in relation to the intervention. | 4 | 100% | 1 |

Note. * Denotes recommendations not meeting consensus in Round 1

Several open-ended responses suggested changes and additions to recommendations by participants in Round 1. Using content analysis (Schreier, 2012), these responses were grouped by overarching themes to inform modifications or additions. Two recommendations were added to the list for Round 2. Recommendation 24 was specifically related to participant burnout: Identify strategies to reduce participant burnout related to the mixed methods design. This can include but is not limited to considering how long data collection will take for the quantitative and qualitative strands, how long the intervention will last, if qualitative data will be collected at multiple points

in the mixed methods study, and, if so, providing explicit reason(s) for collecting data at multiple points. Recommendation 25 was specifically referring to the integration of samples: Provide an explicit rationale(s) on how the quantitative and qualitative samples were integrated in the full mixed methods intervention study (see Appendix P for summary responses sent to participants and open-ended responses contributing to the addition of these recommendations). Three recommendations were modified, and an additional response option of ‘I cannot tell’ was added to Round 2 as requested by participants. Table 4.13 displays the Round 1 original recommendation and its modification for Round 2 based on the three modified recommendations. Italicized words represent changes/additions between Rounds 1 and 2.

Table 4.13

Round 1 Recommendations and Modifications for Round 2

| Round 1 Recommendation | Revision for Round 2 |
|--|--|
| 11. Identify reasons for attrition to determine whether participant dropout was at random or not at random (e.g., inherent to study characteristics/design). | 11. <i>Given the sensitivity of the research topic, if feasible</i> , identify reasons for attrition to determine whether participant dropout was at random or not at random (e.g., inherent to study characteristics/design). |
| 16. Consider the characteristics of identical samples and its representativeness over time. | 16. Consider the characteristics of identical samples and <i>whether these characteristics remain representative of the sample</i> over time. |
| 19. Researchers are encouraged to report the mixed methods research sampling design used in the mixed methods psychological intervention study (<i>see Onwuegbuzie and Collins, 2007</i>). | 19. Researchers are encouraged to report the mixed methods research sampling design used in the mixed methods psychological intervention study. |

Round 2

Nine participants completed the Round 2 questionnaire with a 10% attrition rate. Although not all participants from Round 1 participated in Round 2, their data was still included as attrition is expected, especially with increased rounds in Delphi studies (Keeney et al., 2011). Nineteen of 25 recommendations met agreement consensus (76%) in Round 2, with medians ranging between 4 to 5 and I-CVI values ranging between 0.89 to 1. Six recommendations (24%) did not meet consensus (1, 6, 8, 20, 22, 25), with medians ranging from 3 to 5 and I-CVI values from 0.44 to 0.78. Although some of these recommendations had a median between 4 and 5, the I-CVI value was under the inclusion threshold for meeting consensus (0.80) and, therefore, these recommendations were removed from the final list.

Some of the recommendations that did not meet agreement consensus in Round 1 met consensus in Round 2. These recommendations are 9 and 19. Recommendation 9 had a median value of 7 and an I-CVI of 0.70 in Round 1 and a median value of 4 and an I-CVI of 0.89 in Round 2. Recommendation 19 had a median of 5 and an I-CVI of 0.70 in Round 1 and a median of 5 and an I-CVI of 1 in Round 2. Three recommendations did not meet agreement consensus in either Rounds 1 or 2 (8, 20, and 22) (see Appendix R for group summary results across all recommendations for Round 2). Recommendations that did not meet consensus in Round 2 were eliminated from the final list. Participants who responded “I cannot tell” to any of the recommendations were not incorporated into the calculations for consensus. Table 4.14 displays the medians, I-CVI values, and IQR.

Table 4.14*Round 2 Modified e-Delphi Results*

| Recommendation | Median | I-CVI x 100 (%) | IQR |
|--|---------------|----------------------------|------------|
| 1. Identify the most effective strategies to recruit participants based on the sample demographics and accessibility. These may include, but are not limited to, referrals, recruiting through care facilities, flyers, attending community events, etc.* | 5 | 77.8% | 1.5 |
| 2. Develop strategies to ensure buy-in from community partners/gatekeepers involved in the recruitment process. | 5 | 100% | 1 |
| 3. Ensure transparency of sample inclusion criteria to gatekeepers/community partners. | 4 | 100% | 1 |
| 4. Consider strategies to develop trust with community partners. This may include but is not limited to, describing the role(s) of the researcher, the goals of the study, describing value of intervention, and having conversations with partners on their role(s) and how they plan to be involved. | 5 | 100% | 0.50 |
| 5. Consider how selection bias was mitigated when recruiting participants between the quantitative and qualitative strands of the mixed methods psychological intervention study. | 5 | 88.9% | 1 |
| 6. Identify effective strategies or a combination of strategies for maintaining continuous contact with participants and gatekeepers. These strategies may include but are not limited to face-to-face interactions, phone, email, and sending participant reminders.* | 5 | 66.7% | 2 |
| 7. Enhance barrier-reduction strategies between the quantitative and qualitative strands, and full mixed methods study. These strategies may include but are not limited to scheduling flexibility, offering participants the option to choose the desired location for data collection (e.g., home, clinic/hospital, school), | 5 | 85.7% | 0.75 |

| | | | |
|---|---|-------|------|
| opportunity to make up missed session, providing transportation/travel reimbursement, and childcare. | | | |
| 8. Identify appropriate incentive(s) most appealing to the target population. This may include but is not limited to determining whether to offer gift cards or cash (if possible) and offering participants their choice of gift card (e.g., goods, restaurants).* | 3 | 44.4% | 2 |
| 9. If possible, consider providing an incentive after each data collection point between the quantitative and qualitative strands. | 4 | 88.9% | 0.50 |
| 10. Particularly in cases of participant dropout, assess the representativeness of sample(s) over time between the quantitative and qualitative strands. | 5 | 100% | 0 |
| 11. Given the sensitivity of the research topic, if feasible, identify reasons for attrition to determine whether participant dropout was at random or not at random (e.g., inherent to study characteristics/design). | 4 | 100% | 1 |
| 12. Researchers are encouraged to report sample size(s) between the quantitative and qualitative strands of the mixed methods psychological intervention study | 5 | 100% | 0 |
| 13. If using a subsample (i.e., nested sample), researchers are encouraged to provide details on subsample demographics. | 5 | 100% | 0 |
| 14. Provide explicit statement(s) on the reasons for the chosen sampling approach between the quantitative and qualitative strands of the mixed methods psychological intervention study. | 5 | 88.9% | 0.50 |
| 15. Provide rationale on decision(s) for choosing identical samples or different samples between the quantitative and qualitative strands and how it relates to the chosen mixed methods core design. | 5 | 100% | 0.50 |
| 16. Consider the characteristics of identical samples and whether these characteristics remain representative of the sample over time. | 5 | 88.9% | 1 |

| | | | |
|---|---|-------|------|
| 17. Carefully consider the types of data sources that are used between the quantitative and qualitative strands and whether they are conducive to the sample(s) (e.g., language, reading levels, cognitive abilities, concentration levels). | 5 | 88.9% | 1 |
| 18. Provide participants with transparency on the data collection procedures (e.g., how will data be used, potential benefits from participating in study). | 5 | 88.9% | 1 |
| 19. Researchers are encouraged to report the mixed methods research sampling design used in the mixed methods psychological intervention study. | 5 | 100% | 1 |
| 20. When integrating findings between samples, consider whether findings corroborate, or whether samples are contextually different leading to validly different results.* | 4 | 75% | 1.75 |
| 21. Identify the point(s) of commonality between samples when integrating findings and provide a statement describing this process. | 4 | 88.9% | 1 |
| 22. Consider the time lag between data collection and analysis between the quantitative and qualitative strands and its impact on the priming effects and validity of the data.* | 4 | 77.8% | 2 |
| 23. Provide explicit reason(s) for the temporal placement of the qualitative strand in relation to the intervention. | 4 | 88.9% | 1 |
| 24. Identify strategies to reduce participant burnout related to the mixed methods design. This can include but is not limited to considering how long data collection will take for the quantitative and qualitative strands, how long the intervention will last, if qualitative data will be collected at multiple points in the mixed methods study, and, if so, providing explicit reason(s) for collecting data at multiple points. | 5 | 88.9% | 1 |
| 25. Provide an explicit rationale(s) on how the quantitative and qualitative samples were integrated in the full mixed methods intervention study.* | 5 | 77.8% | 1.50 |

Note. * Denotes recommendations not meeting consensus in Round 2

Open-ended responses for each recommendation were collected and analyzed using content analysis to make any required modifications. Most of the open-ended comments related to the integration of samples. Specifically, participants mentioned that findings from the quantitative and qualitative samples do not always corroborate in mixed methods research. Instead, findings may be divergent, corroborate, or further elaborate from the initial phase of the mixed methods study. Thus, one additional recommendation was added to appropriately address how the integration of findings from the sample(s) relates to the purpose(s) of mixing. The following recommendation was added: When integrating findings between samples, consider the degree that the findings support the purpose for mixing within the study (i.e., do findings corroborate, diverge, or expand). Four recommendations were slightly modified on the final list due to minor word changes. Table 4.15 displays the Round 2 recommendations and their modifications. Italicized words represent changes/additions between Round 2 and the final list.

Table 4.15

Round 2 Recommendations and Final Modifications

| Round 2 Recommendation | Revision for Final List |
|---|--|
| 3. Ensure transparency of sample inclusion criteria to gatekeepers/community partners. | 3. <i>Provide clear</i> sample inclusion criteria to gatekeepers/community partners. |
| 7. Enhance barrier-reduction strategies between the quantitative and qualitative strands, and full mixed methods study. These strategies may include but are not limited to scheduling flexibility, offering participants the option to choose the desired location for data collection (e.g., home, clinic/hospital, school), opportunity to make up missed session, providing transportation/travel reimbursement, and childcare. | 7. <i>Incorporate</i> barrier-reduction strategies between the quantitative and qualitative strands, and full mixed methods study. These strategies may include but are not limited to scheduling flexibility, offering participants the option to choose the desired location for data collection (e.g., home, clinic/hospital, school), opportunity to make up missed session, providing transportation/travel reimbursement, and childcare. |

| | |
|---|--|
| 10. Particularly in cases of participant dropout, assess the representativeness of sample(s) over time between the quantitative and qualitative strands. | 10. Particularly in cases of participant dropout, assess the representativeness of sample(s) (<i>i.e., characteristics of the sample</i>) over time between the quantitative and qualitative strands. |
| 12. Researchers are encouraged to report sample size(s) between the quantitative and qualitative strands of the mixed methods psychological intervention study. | 12. Researchers are encouraged to report sample size(s) <i>and the strategy to solicit the sample(s)</i> between the quantitative and qualitative strands of the mixed methods psychological intervention study. |

Table 4.16 displays the evolution of changes in the list of practical recommendations for sampling in mixed methods psychological intervention research across rounds, beginning with the preliminary list developed from the qualitative phase used in Round 1, to the final list generated from Round 2.

Table 4.16*Evolution of Changes of Practical Recommendations for Sampling in Mixed Method**Psychological Intervention Research*

| Category | Round 1 Recommendations | Round 2 Recommendations | Final List of Recommendations |
|--------------------|--|--|--|
| Recruitment | | | |
| | 1. Identify the most effective strategies to recruit participants based on the sample demographics and accessibility. These may include, but are not limited to, referrals, recruiting through care facilities, flyers, attending community events, etc. | No change | Removed |
| | 2. Develop strategies to ensure buy-in from community partners/gatekeepers involved in the recruitment process. | No change | No change |
| | 3. Ensure transparency of sample inclusion criteria to gatekeepers/community partners. | No change (comment suggested on wording) | Provide clear sample inclusion criteria to gatekeepers/community partners. |
| | 4. Consider strategies to develop trust with community partners. This may include but is not limited to, describing the role(s) of the researcher, the goals of the study, describing value of intervention, and having conversations | No change | No change |

| | | |
|---|-----------|-----------|
| with partners on their role(s) and how they plan to be involved. | | |
| 5. Consider how selection bias was mitigated when recruiting participants between the quantitative and qualitative strands of the mixed methods psychological intervention study. | No change | No change |

Retention

| | | |
|---|--|---|
| 6. Identify effective strategies or a combination of strategies for maintaining continuous contact with participants and gatekeepers. These strategies may include but are not limited to face-to-face interactions, phone, email, and sending participant reminders. | No change | Removed |
| 7. Identify effective strategies or a combination of strategies for maintaining continuous contact with participants and gatekeepers. These strategies may include but are not limited to face-to-face interactions, phone, email, and sending participant reminders. | No change (comment suggested on wording) | Incorporate barrier-reduction strategies between the quantitative and qualitative strands, and full mixed methods study. These strategies may include but are not limited to scheduling flexibility, offering participants the option to choose the desired location for data collection (e.g., home, |

| | | |
|--|---|--|
| | | clinic/hospital, school), opportunity to make up missed session, providing transportation/travel reimbursement, and childcare. |
| 8. Identify appropriate incentive(s) most appealing to the target population. This may include but is not limited to determining whether to offer gift cards or cash (if possible) and offering participants their choice of gift card (e.g., goods, restaurants). | No change | Removed |
| 9. If possible, consider providing an incentive after each data collection point between the quantitative and qualitative strands. | No change | No change |
| 10. Particularly in cases of participant dropout, assess the representativeness of sample(s) over time between the quantitative and qualitative strands. | No change (comment suggested on wording) | Particularly in cases of participant dropout, assess the representativeness of sample(s) (i.e., characteristics of the sample) over time between the quantitative and qualitative strands. |
| 11. Identify reasons for attrition to determine whether participant dropout was at random or not at random (e.g., | Given the sensitivity of the research topic, if feasible, identify reasons for attrition to determine whether | No change |

| | |
|--|--|
| inherent to study characteristics/design). | participant dropout was at random or not at random (e.g., inherent to study characteristics/design). |
|--|--|

Sampling across MM Core Designs

| | | |
|---|--|---|
| 12. Researchers are encouraged to report sample size(s) between the quantitative and qualitative strands of the mixed methods psychological intervention study. | No change (comment suggested on wording) | Researchers are encouraged to report sample size(s) and the strategy to solicit the sample(s) between the quantitative and qualitative strands of the mixed methods psychological intervention study. |
| 13. If using a subsample (i.e., nested sample), researchers are encouraged to provide details on subsample demographics. | No change | No change |
| 14. Provide explicit statement(s) on the reasons for the chosen sampling approach between the quantitative and qualitative strands of the mixed methods psychological intervention study. | No change | No change |
| 15. Provide rationale on decision(s) for choosing identical samples or different samples between the quantitative and qualitative strands and how it relates to the | No change | No change |

chosen mixed methods
core design.

16. Consider the characteristics of identical samples and its representativeness over time.

Consider the characteristics of identical samples and whether these characteristics remain representative of the sample over time.

No change

Data Collection

17. Carefully consider the types of data sources that are used between the quantitative and qualitative strands and whether they are conducive to the sample(s) (e.g., language, reading levels, cognitive abilities, concentration levels).

No change

No change

18. Provide participants with transparency on the data collection procedures (e.g., how will data be used, potential benefits from participating in study).

No change

No change

Integration

19. Researchers are encouraged to report the mixed methods research sampling design used in the mixed methods psychological intervention study (see

Researchers are encouraged to report the mixed methods research sampling design used in the mixed methods psychological intervention study.

No change

Onwuegbuzie and Collins, 2007).

20. When integrating findings between samples, consider whether findings corroborate, or whether samples are contextually different leading to validly different results.

No change

Removed

21. Identify the point(s) of commonality between samples when integrating findings and provide a statement describing this process.

No change

No change

Temporal Placement of Qualitative Strand

22. Consider the time lag between data collection and analysis between the quantitative and qualitative strands and its impact on the priming effects and validity of the data.

No change

Removed

23. Provide explicit reason(s) for the temporal placement of the qualitative strand in relation to the intervention.

No change

No change

Added After Round 1

24. Identify strategies to reduce participant burnout related to the mixed methods design. This can

No change

| | | |
|--|---|-----------|
| | include but is not limited to considering how long data collection will take for the quantitative and qualitative strands, how long the intervention will last, if qualitative data will be collected at multiple points in the mixed methods study, and, if so, providing explicit reason(s) for collecting data at multiple points. | |
| | 25. Provide an explicit rationale(s) on how the quantitative and qualitative samples were integrated in the full mixed methods intervention study. | Removed |
| | 26. When integrating findings between samples, consider the degree that the findings support the purpose for mixing within the study (i.e., do findings corroborate, diverge, or expand). | No change |

Note. MM = Mixed methods

Table 4.17 presents the final list of recommendations and explanations/examples. It is important to note that not every recommendation has an explanation/example.

Table 4.17*Final List of Recommendations on Sampling in Mixed Methods Psychological**Intervention Research*

| Category | Recommendation | Explanations/Examples |
|--------------------|---|--|
| Recruitment | 1. Develop strategies to ensure buy-in from community partners/gatekeepers involved in the recruitment process. | |
| | 2. Provide clear sample inclusion criteria to gatekeepers/community partners. | |
| | 3. Consider strategies to develop trust with community partners. | This can include but is not limited to: describing the role(s) of the researcher, the goals of the study, describing value of intervention, and having conversations with partners on their role(s) and how they plan to be involved. |
| | 4. Consider how selection bias was mitigated when recruiting participants between the quantitative and qualitative strands of the mixed methods psychological intervention study. | |
| Retention | 5. Incorporate barrier-reduction strategies between the quantitative and qualitative strands, and full mixed methods study. | These strategies may include but are not limited to: scheduling flexibility, offering participants the option to choose the desired location for data collection (e.g., home, clinic/hospital, school), opportunity to make up missed session, providing transportation/travel reimbursement, and childcare. |
| | 6. If possible, consider providing an incentive after each data collection point between the quantitative and qualitative strands. | |

7. Particularly in cases of participant dropout, assess the representativeness of sample(s) (i.e., characteristics of the sample) over time between the quantitative and qualitative strands.

8. Given the sensitivity of the research topic, if feasible, identify reasons for attrition to determine whether participant dropout was at random or not at random (e.g., inherent to study characteristics/design).

9. Identify strategies to reduce participant burnout related to the mixed methods design.

This can include but is not limited to considering how long data collection will take for the quantitative and qualitative strands, how long the intervention will last, if qualitative data will be collected at multiple points in the mixed methods study, and, if so, providing explicit reason(s) for collecting data at multiple points.

Sampling across MM Core Designs

10. Researchers are encouraged to report sample size(s) and the strategy to solicit the sample(s) between the quantitative and qualitative strands of the mixed methods psychological intervention study.

11. If using a subsample (i.e., nested sample), researchers are encouraged to provide details on subsample demographics.

12. Provide explicit statement(s) on the reasons for the chosen sampling approach between the quantitative and qualitative

strands of the mixed methods
psychological intervention study.

13. Provide rationale on
decision(s) for choosing identical
samples or different samples
between the quantitative and
qualitative strands and how it
relates to the chosen mixed
methods core design.

14. Consider the characteristics
of identical samples and whether
these characteristics remain
representative of the sample over
time.

Data Collection

15. Carefully consider the types
of data sources that are used
between the quantitative and
qualitative strands and whether
they are conducive to the
sample(s) (e.g., language,
reading levels, cognitive abilities,
concentration levels).

16. Provide participants with
transparency on the data
collection procedures (e.g., how
will data be used, potential
benefits from participating in
study).

Integration

17. Researchers are encouraged
to report the mixed methods
research sampling design used in
the mixed methods psychological
intervention study.

18. Identify the point(s) of
commonality between samples
when integrating findings and
provide a statement describing
this process.

19. When integrating findings between samples, consider the degree that the findings support the purpose for mixing within the study (i.e., do findings corroborate, diverge, or expand).

Temporal Placement of Qualitative Strand

20. Provide explicit reason(s) for the temporal placement of the qualitative strand in relation to the intervention.

Examples include but are not limited to:

Before: Motivations or demotivations for participation, receptivity to personnel delivery methods, develop prototype of intervention, identifying culturally responsive components, gauging participants' and therapists' prior experiences with intervention, exploring factors that may influence intervention, identifying variables to target in intervention, developing intervention.

During: Adaptations to intervention, perceived intervention barriers, exploring range of outcome measure(s) (i.e., explore multiple psychological constructs being measured qualitatively), exploring coping mechanisms, exploring how participants feel during time of intervention, explore how participants are implementing intervention as intervention is occurring.

After: Adaptations to intervention, overall experiences and feelings about intervention, elicit participant feedback on intervention, perceived acceptability of intervention, perceived feasibility and acceptability of intervention, perceived acceptability and efficacy of intervention, perceived tolerability of intervention, identifying effective strategies used by participants

to manage emotions after intervention, explore how intervention helped participants, evaluate participants' direct experiences with the intervention, assess barriers and facilitators of intervention, assess effectiveness of treatment, explore overall outcomes of intervention

Note. MM = Mixed methods

Mixed Methods Integrative Results

Integration was present at multiple stages of this study, including the design level, interpretation, and reporting, to develop meta-inferences of the exploratory sequential MM-CS. Integration was achieved through a joint display and a narrative summary. Doing so allowed for a more comprehensive and robust list of practical recommendations for sampling in mixed methods psychological intervention research. The list of practical recommendations intends to be used by various audiences, including researchers, mixed methods research methodologists, and grant and journal reviewers. A joint display is first presented highlighting the findings for each phase and the resultant list of recommendations and fit of integration (i.e., convergence, expansion, or discordance) and a narrative summary follows, describing the integration process.

Joint Display of Major Findings

A joint display in mixed methods research provides a visual depiction of the integration of the quantitative and qualitative strands. Joint displays can include the integration of results, methods, or data in any combination (Guetterman et al., 2021). Two joint displays were developed to demonstrate integration at multiple stages of this exploratory sequential MM-CS study. The first joint display presents the building integration from the MMR-SMR and semi-structured interviews to the resultant

preliminary list of recommendations. The overarching themes from the MMR-SMR and semi-structured interviews, relevant methodological references, and the resultant recommendations are presented (see Table 4.10). These recommendations served as the preliminary list for Round 1 of the modified e-Delphi study for the quantitative phase and highlight integration at the design level.

The second joint display was used at the interpretation and reporting stage of this study. To provide a holistic understanding of the development of a list of practical recommendations for sampling in mixed methods psychological intervention research, findings from the qualitative phase (i.e., preliminary recommendations) and results from the quantitative phase (e.g., medians, I-CVI values) were integrated to generate a final list of recommendations grounded in evidence synthesis and empirical research. Table 4.18 displays the joint display of major findings, which includes the initial recommendations generated from the qualitative phase, the medians and I-CVI values for each recommendation assessed through the quantitative phase for Rounds 1 and 2, and the final list of recommendations with meta-inferences. Since this joint display includes all the original recommendations from the qualitative phase, including those removed from the final list, the total number of recommendations presented here is more than the final list.

Table 4.18*Joint Display of Major Qualitative and Quantitative Findings and their Integration*

| Recommendations Based on Qualitative Case Study | Quantitative e-Delphi Results | | Final Recommendations |
|--|-------------------------------|----------------------------|--|
| | Round 1 (median I-CVI) | Round 2 (median I-CVI) | |
| Recruitment | | | |
| 1. Identify the most effective strategies to recruit participants based on the sample demographics and accessibility. These may include, but are not limited to, referrals, recruiting through care facilities, flyers, attending community events, etc. | Median = 5 I-CVI = 0.90 | Median = 5 I-CVI = 0.78 | Removed |
| 2. Develop strategies to ensure buy-in from community partners/gatekeepers involved in the recruitment process. | Median = 5 I-CVI = 1 | Median = 5 I-CVI = 1 | No change |
| 3. Ensure transparency of sample inclusion criteria to gatekeepers/community partners. | Median = 4.5 I-CVI = 1 | Median = 4 I-CVI = 1 | Provide clear sample inclusion criteria to gatekeepers/community partners. |
| 4. Consider strategies to develop trust with community partners. This may include but is not limited to, describing the role(s) of the researcher, the goals of the study, describing value of intervention, and having conversations with partners on their role(s) and how they plan to be involved. | Median = 5 I-CVI = 1 | Median = 5 I-CVI = 1 | No change |

| | | | |
|---|--------------------------------------|------------------------------------|-----------|
| 5. Consider how selection bias was mitigated when recruiting participants between the quantitative and qualitative strands of the mixed methods psychological intervention study. | Median = 5 I-CVI = 0.80 | Median = 5 I-CVI = 0.889 | No change |
|---|--------------------------------------|------------------------------------|-----------|

Meta-Inferences: Recommendations regarding recruitment capitalized the importance of first engaging with community partners and developing strategies to foster the relationship and inform them about the details of the study.

Retention

| | | | |
|---|--|------------------------------------|---------|
| 6. Identify effective strategies or a combination of strategies for maintaining continuous contact with participants and gatekeepers. These strategies may include but are not limited to face-to-face interactions, phone, email, and sending participant reminders. | Median = 4.5 I-CVI = 0.90 | Median = 5 I-CVI = 0.667 | Removed |
|---|--|------------------------------------|---------|

| | | | |
|---|--------------------------------|------------------------------------|-----------|
| 7. Enhance barrier-reduction strategies between the quantitative and qualitative strands, and full mixed methods study. These strategies may include but are not limited to scheduling flexibility, offering participants the option to choose the desired location for data collection (e.g., home, clinic/hospital, school), opportunity to make up missed session, providing transportation/travel reimbursement, and childcare. | Median = 5 I-CVI = 1 | Median = 5 I-CVI = 0.875 | No change |
|---|--------------------------------|------------------------------------|-----------|

| | | | |
|--|----------------------------|-----------------------------|--|
| 8. Identify appropriate incentive(s) most appealing to the target population. This may include but is not limited to determining whether to offer gift cards or cash (if possible) and offering participants their choice of gift card (e.g., goods, restaurants). | Median = 4 I-CVI = 0.60 | Median = 3 I-CVI = 0.444 | Removed |
| 9. If possible, consider providing an incentive after each data collection point between the quantitative and qualitative strands. | Median = 4 I-CVI = 0.70 | Median = 4 I-CVI = 0.889 | No change |
| 10. Particularly in cases of participant dropout, assess the representativeness of sample(s) over time between the quantitative and qualitative strands. | Median = 5 I-CVI = 0.90 | Median = 5 I-CVI = 1 | No change |
| 11. Identify reasons for attrition to determine whether participant dropout was at random or not at random (e.g., inherent to study characteristics/design). | Median = 5 I-CVI = 0.90 | Median = 4 I-CVI = 1 | Given the sensitivity of the research topic, if feasible, identify reasons for attrition to determine whether participant dropout was at random or not at random (e.g., inherent to study characteristics/design). |

Meta-Inferences: Recommendations regarding retention mainly centered around developing strategies that will reduce participant burnout due to the study design, and in cases of attrition, implementing strategies to ensure the validity of the sample.

Sampling across MM Core Designs

| | | | |
|---|----------------------------|-------------------------|---|
| 12. Researchers are encouraged to report sample size(s) between the quantitative and qualitative strands of the mixed methods psychological intervention study. | Median = 5 I-CVI = 0.90 | Median = 5 I-CVI = 1 | Researchers are encouraged to report sample size(s) and the strategy to solicit the sample(s) between the quantitative and qualitative strands of the mixed methods psychological intervention study. |
|---|----------------------------|-------------------------|---|

| | | | |
|---|------------------------------|-----------------------------|--|
| 13. If using a subsample (i.e., nested sample), researchers are encouraged to provide details on subsample demographics. | Median = 5 I-CVI = 0.90 | Median = 5 I-CVI = 1 | No change |
| 14. Provide explicit statement(s) on the reasons for the chosen sampling approach between the quantitative and qualitative strands of the mixed methods psychological intervention study. | Median = 5 I-CVI = 1 | Median = 5 I-CVI = 0.889 | No change |
| 15. Provide rationale on decision(s) for choosing identical samples or different samples between the quantitative and qualitative strands and how it relates to the chosen mixed methods core design. | Median = 5 I-CVI = 0.90 | Median = 5 I-CVI = 1 | No change |
| 16. Consider the characteristics of identical samples and its representativeness over time. | Median = 4.5 I-CVI = 0.80 | Median = 5 I-CVI = 0.889 | Consider the characteristics of identical samples and whether these characteristics remain representative of the sample over time. |

Meta-Inferences: Recommendations regarding sampling across mixed methods core designs reinforced important reporting features of studies in articles such as the sample size(s) across strands, the sampling approach(es), and explicit statements on the relationship between samples (i.e., identical, different, nested).

Data Collection

| | | | |
|--|----------------------------|-----------------------------|-----------|
| 17. Carefully consider the types of data sources that are used between the quantitative and qualitative strands and whether they are conducive to the sample(s) (e.g., language, reading levels, cognitive abilities, concentration levels). | Median = 5 I-CVI = 0.90 | Median = 5 I-CVI = 0.889 | No change |
|--|----------------------------|-----------------------------|-----------|

| | | | |
|---|----------------------------|-----------------------------|-----------|
| 18. Provide participants with transparency on the data collection procedures (e.g., how will data be used, potential benefits from participating in study). | Median = 5 I-CVI = 0.90 | Median = 5 I-CVI = 0.889 | No change |
|---|----------------------------|-----------------------------|-----------|

Meta-Inferences: Recommendations regarding data collection focused on ensuring data sources are carefully thought through for the sample(s) and ensuring transparency on procedures.

Integration

| | | | |
|---|----------------------------|-------------------------|---|
| 19. Researchers are encouraged to report the mixed methods research sampling design used in the mixed methods psychological intervention study (see Onwuegbuzie and Collins, 2007). | Median = 5 I-CVI = 0.70 | Median = 5 I-CVI = 1 | Researchers are encouraged to report the mixed methods research sampling design used in the mixed methods psychological intervention study. |
|---|----------------------------|-------------------------|---|

| | | | |
|---|----------------------------|----------------------------|---------|
| 20. When integrating findings between samples, consider whether findings corroborate, or whether samples are contextually different leading to validly different results. | Median = 5 I-CVI = 0.70 | Median = 4 I-CVI = 0.75 | Removed |
|---|----------------------------|----------------------------|---------|

| | | | |
|---|------------------------------|-----------------------------|-----------|
| 21. Identify the point(s) of commonality between samples when integrating findings and provide a statement describing this process. | Median = 4.5 I-CVI = 0.90 | Median = 4 I-CVI = 0.889 | No change |
|---|------------------------------|-----------------------------|-----------|

Meta-Inferences: Recommendations regarding integration encouraged the use of mixed methods sampling designs in articles and finding a point of commonality when integrating findings between samples. Since findings will not always corroborate in mixed methods research, this recommendation was removed based on expert feedback.

Temporal Placement of Qualitative Strand

| | | | |
|---|-----------------------------|---|-----------|
| 22. Consider the time lag between data collection and analysis between the quantitative and qualitative strands and its impact on the priming effects and validity of the data. | Median = 4 I-CVI = 0.70 | Median = 4 I-CVI = 0.778 | Removed |
| 23. Provide explicit reason(s) for the temporal placement of the qualitative strand in relation to the intervention. | Median = 4 I-CVI = 1 | Median = 4 I-CVI = 0.889 | No change |
| Meta-Inferences: Recommendations on the temporal placement mainly reinforced the need to provide an explicit statement in articles on the reason(s) for the placement of the qualitative strand (i.e., before, during, or after intervention). | | | |
| Added After Round 1 | | | |
| -- | Median = 5 I-CVI = 0.889 | 24. Identify strategies to reduce participant burnout related to the mixed methods design. This can include but is not limited to considering how long data collection will take for the quantitative and qualitative strands, how long the intervention will last, if qualitative data will be collected at multiple points in the mixed methods study, and, if so, providing explicit reason(s) for collecting data at multiple points. | |
| | Median = 5 I-CVI = 0.778 | 25. Provide an explicit rationale(s) on how the quantitative and qualitative samples were integrated in the full mixed methods intervention study. [Removed] | |

--

--

26. When integrating findings between samples, consider the degree that the findings support the purpose for mixing within the study (i.e., do findings corroborate, diverge, or expand).

Meta-Inferences: Additional recommendations that were added to the final list focused on the need to identify participant burnout as it relates to participant retention in a study and identifying the purpose for mixing when integrating findings between samples. As described by experts, since samples between strands are not usually integrated, instead, the findings are integrated, this recommendation was removed.

Note. Recommendation 26 was added in Round 2 based on qualitative content analysis of open-ended responses.

Overall, 13 recommendations (2, 4, 5, 7, 9, 10, 13, 14, 15, 17, 18, 21, 23) remained the same (i.e., no changes) between the preliminary list from the qualitative case study to the final list of recommendations in the quantitative phase. For these 13 recommendations, integration of results were *confirmed*. For confirmation of data integration, recommendations from the qualitative phase to Round 2 of the modified e-Delphi quantitative phase remained the same and met inclusion consensus values using medians and I-CVI (e.g., median ≥ 4 and I-CVI values ≥ 0.80). Seven recommendations (3, 11, 12, 16, 19, 24, 26) were *expanded*, where recommendations were either added or modified from the qualitative case study to the final list of recommendations in the quantitative phase. For *expansion*, recommendations from Round 2 of the modified e-Delphi demonstrated values within the inclusion consensus threshold (e.g., median ≥ 4 and I-CVI values ≥ 0.80) but required additions or changes from the initial qualitative case study per experts' feedback through the modified e-Delphi study.

Six recommendations (1, 6, 8, 20, 22, 25) were identified as *discordant* between the qualitative case study and the final Round 2 modified e-Delphi study, and thus

removed from the final list. These recommendations did not meet the established threshold based on median and I-CVI values (e.g., median ≤ 3 and I-CVI values ≥ 0.79). Recommendation 26 was added after Round 2 based on open-ended responses from experts. Importantly, this recommendation is meant to replace recommendation 20 (i.e., When integrating findings between samples, consider whether findings corroborate or whether samples are contextually different, leading to validly different results) as all comments provided by experts related to the idea that findings between samples will not always corroborate. This side-by-side joint display offers an in-depth overview of the evolution of the list of recommendations generated from the initial qualitative case study to the refined list of recommendations for Round 2 that were quantitatively assessed based on median and I-CVI values to determine the recommendations that met agreement consensus and accepted content validity values.

Narrative Summary

Integration of this exploratory sequential MM-CS design occurred through *building* integration by developing a list of practical recommendations from the qualitative case study phase and refining the list through the quantitative modified e-Delphi phase. The preliminary list of recommendations was generated through multiple data sources, including an MMR-SMR of psychological intervention research studies targeting a common mental health disorder and further expanding on these results through semi-structured interviews with researchers who have conducted a mixed methods psychological intervention study. Pattern matching was used to group similar categories and develop themes across the MMR-SMR and semi-structured interview findings. Recommendations were expanded based on examples from the MMR-SMR and

semi-structured interviews. These overarching themes from the qualitative phase informed the development of the final list of recommendations. By integrating a qualitative case study design with a modified e-Delphi study, a list of practical recommendations for sampling in mixed methods research was further refined, grounded in evidence synthesis and empirical research. Specifically, the qualitative case study was grounded in participants' perspectives and experiences in conducting mixed methods research within psychological intervention research, while the modified e-Delphi served the purpose of refining the recommendations from the perspectives of experts in the field of mixed methods research methodology.

CHAPTER V: DISCUSSION

The purpose of this chapter is to summarize the findings of the qualitative phase, quantitative phase, and mixed methods integration. The implications of the qualitative and quantitative results and the implications for the full mixed methods study are presented. These implications are described within the field of psychological intervention research and methodological implications for mixed methods research. This chapter concludes with the current study's limitations and potential areas for future research.

Qualitative Summary

This study used evidence synthesis and empirical research to generate a robust list of practical recommendations for sampling in mixed methods psychological intervention research studies to not only guide researchers but also provide guidance to methodologists as well as journal and grant reviewers when evaluating sampling components in mixed methods psychological intervention research studies. In this exploratory sequential MM-CS design, the purpose of the qualitative phase was to generate a preliminary list of practical recommendations for sampling in mixed methods psychological intervention research using a case study approach of multiple data sources. The data sources included an MMR-SMR and semi-structured interviews.

The case study was bounded by researchers who have conducted empirical mixed methods psychological intervention research. The MMR-SMR focused on a subunit of the case study by focusing on interventions targeting a common mental health disorder. A total of 40 studies were identified meeting inclusion criteria and were coded based on an established codebook. Following the MMR-SMR, semi-structured interviews were conducted with ten participants who have conducted mixed methods psychological

intervention studies. Through building integration, themes from the MMR-SMR and semi-structured interviews were combined to generate a list of preliminary practical recommendations for sampling in mixed methods psychological intervention research that were tested. As such, the major findings for each research question relevant to each data source are presented, and their implications.

Mixed Methods Research-Systematic Methodological Review

RQ1: How does the temporal placement of qualitative data collection and analysis (i.e., before, during, or after an intervention) influence the reasons for conducting a mixed methods psychological intervention study? The qualitative findings indicated that researchers placed the qualitative phase of a mixed methods psychological intervention study at different time points and for different reasons. These reasons were categorized into two overarching themes (a) *exploring intervention components* and (b) *participants' responses to outcome measures*, each representing several subthemes. As it relates to *exploring intervention components*, the reasons for conducting the qualitative strand *before* the intervention included: motivations (or demotivations) for participation, receptivity to personnel delivery methods, developing a prototype of intervention, and identifying culturally responsive components. Moreover, the reasons for conducting the qualitative strand *during* the intervention included: making adaptations to the intervention and exploring the perceived barriers. Reasons for conducting the qualitative strand *after* the intervention included: identifying culturally responsive components, exploring perceived benefits/facilitators and barriers, overall experiences and feelings about the intervention, eliciting participant feedback on the intervention, perceived acceptability of the intervention, perceived feasibility and

acceptability of the intervention, perceived acceptability and efficacy of the intervention, and perceived tolerability of the intervention.

Several studies conducted the qualitative phase to qualitatively *participants' responses to outcome measures*, including exploring the range of outcome measure(s) and participants' coping mechanisms. Studies that focused on exploring participants' responses to outcome measures incorporated the qualitative phase at various and multiple timepoints, including *before, during, and after* the intervention. Based on these findings, we can conclude that the temporal placement of the qualitative phase in mixed methods psychological intervention studies heavily depends on the overall purpose for conducting the intervention. In other words, conducting the qualitative phase *before* an intervention is typically to improve intervention uptake from participants through various facets related to the intervention.

In contrast, the reasons for conducting the qualitative phase *during* an intervention are typically to monitor and assess feedback during the intervention, and reasons for conducting the qualitative phase *after* the intervention is to obtain feedback on the overall feasibility, acceptability, efficacy, tolerability of the intervention as well as obtaining feedback from participants on their experiences with the intervention and ways it can change for future iterations. As evident from this sample of studies, when conducting the qualitative phase to explore *participants' responses to outcome measures*, this was generally carried out *before, during, and after* intervention as the purpose was to qualitatively explore the range of outcome measure(s) that the intervention was targeting and how participants cope with these symptoms.

These results build on O’Cathain et al.’s (2015) findings that identified five categories with 22 subcategories focusing on conducting qualitative research in RCTs. Specifically, these findings contribute to increased specificity across the various subcategories including motivations (or demotivations) for participation, identifying culturally responsive components, experiences, and feedback on the intervention, and exploring coping mechanisms. Although the current study focused on examining the temporal placement of the qualitative phase in mixed methods psychological interventions, rather than the health sciences more broadly like O’Cathain et al. (2015), these findings may also be applicable in other health sciences fields. Exploring how the temporal placement of the qualitative phase influenced the reasons for conducting a mixed methods design in psychological intervention research was important to understand the values of qualitative research in psychological intervention research and expand on how the sampling approach differed across varying temporal placements of the qualitative strand.

Based on studies identified through the MMR-SMR, the most common mixed methods sampling design was concurrent identical. This indicates that most studies use identical samples for the quantitative and qualitative strands. Nevertheless, although less frequently, some studies used nested, parallel, and multilevel samples across convergent and sequential designs.

RQ2: What recruitment strategies do researchers implement across mixed methods psychological interventions targeting a common mental health disorder?

Several prevalent recruitment strategies were reported for the quantitative and qualitative strands of mixed methods psychological intervention research studies. Collectively,

between the quantitative and qualitative strands, these findings indicate that researchers and research teams engage more often in passive recruitment strategies, irrespective of the methodology. For the quantitative strand, the most common recruitment strategy was recruiting through referrals, a passive strategy. In contrast, the most common recruitment strategy for the qualitative strand was recruiting participants through care facilities such as agencies, clinics, and hospitals, known as an active strategy. Referrals were usually made by the participant's general practitioner/provider, whereas researchers who recruited participants through care facilities were familiar with mental health agencies and visited these sites to encourage participation. Additional recruitment strategies were reported across the quantitative and qualitative strands of the mixed methods psychological intervention studies, including flyers/distribution of materials, attending community events to recruit and engage with potential participants, recruiting from existing waitlists from care facilities, self-referrals, and snowball sampling. Some studies used a nested sample for the qualitative strand, providing no specific information on whether participants from the nested sample were asked to participate in the follow-up qualitative strand using different recruitment methods than when they were originally recruited into the overall study. Overall, qualitatively, there does not appear to be substantial differences in recruitment strategies between the quantitative and qualitative strands.

RQ3: What retention strategies do researchers implement across mixed methods psychological interventions targeting a common mental health disorder?

Multiple retention strategies were identified across mixed methods psychological intervention studies. These strategies were categorized under four overarching themes: *enhancing participant autonomy, incorporating various follow-up methods, alleviating*

potential barriers, and *other*. Studies reported several ways to *enhance participants' autonomy* in mixed methods psychological intervention studies, primarily based on giving participants options to choose what is best for them throughout the duration of the intervention study, such as offering them the option to make up a missed session, allowing a supportive member to join them during the intervention, and allowing them to participate in a long-term study related to the intervention. Other studies also discussed the importance of *incorporating multiple follow-up methods* to increase retention throughout the full mixed methods study, including on-going reminder calls, maintaining contact through written cards from the research team, and having increased scheduling flexibility with participants, as doing so can decrease the chances for participant dropout. Several studies also mentioned various ways to *alleviate potential barriers*, such as providing financial incentives, transportation/travel reimbursement, service-connected compensation, and childcare.

Based on these findings, some of these strategies may be beneficial to incorporate across various stages of the mixed methods psychological intervention studies to mitigate potential issues and increase participant retention. Most of these findings are consistent with Teague et al.'s (2018) meta-analysis of retention strategies in longitudinal cohort studies. Researchers found barrier-reduction strategies, such as offering alternative data collection methods, strongly associated with improved retention rates, and added specific strategies pertinent to the mixed methods design. Regardless of the retention strategies used in the full mixed methods study, it is also important to note why participants may drop out of mixed methods psychological intervention studies. The studies that reported reasons for dropout stated that the main reason could be attributed to personal reasons

(e.g., family emergency, untenable commute, housing/legal issues, and several others). Although only one study reported reasons for dropout related to difficulty in understanding study material, reduced symptom severity, and inability to contact participants, respectively, it is important to note that these factors can be present across mixed methods psychological intervention studies. In some cases, it may be effective to incorporate a combination of strategies can be used to mitigate some of these challenges.

RQ4. What prevalent recommendations on sampling, recruitment, and retention do researchers report in mixed methods psychological interventions targeting a common mental health disorder? Although only a limited number of studies from the MMR-SMR reported recommendations on recruitment and retention in mixed methods psychological intervention studies, several recommendations were noted across these studies. These recommendations were categorized into three overarching themes: *recommendations on the delivery of treatment*, *recommendations on recruitment*, and *recommendations on retention*. Regarding the delivery of treatment, some recommendations include having face-to-face interactions with participants, decreasing distress, increasing contact with therapists involved in delivering the intervention, providing careful training on the delivery of the intervention, and fostering group cohesions when engaging in group therapy. In general, studies noted the importance of face-to-face interactions with both participants and therapists providing the intervention.

Regarding recommendations on recruitment, the importance of recruiting participants through clinical referrals was a suggested method by researchers, as well as using broad eligibility criteria, word-of-mouth recruitment at care facilities, and offering flyers or brochures to participants through healthcare providers' offices and facilities.

Recommendations on retention were noted less than other categories, however, in general, researchers in studies reported the importance of sending appointment reminders for data collection and intervention sessions, offering participants with continuous care and follow-up even after the study had ended, and checking in with participants at multiple points throughout the intervention study.

Semi-structured Interviews

RQ1: What are effective *recruitment* strategies and challenges researchers encounter when conducting mixed methods psychological intervention research?

Building and fostering strong community partnerships was discussed as a critical recruitment strategy and explained as a process. For example, one of the initial steps involves identifying the appropriate source for recruitment. Once the source of recruitment is identified, whether it is a clinic, provider, school, or other location, participants discussed the next steps, which involve describing the intervention's goals and purpose(s) and the ways the intervention aims to help participants. Moreover, these discussions with community partners are an ongoing process and reinforce the opportunity for community partners to learn about the roles of the researcher(s) and their background to build trust and confidence over time.

One of the ways to continue cultivating these relationships with community partners is by engaging in community events and discussing with community partners or other participants who may be involved in the intervention such as educators, the participatory components of the study and ask how they would like to engage in the research process. Overall, participants discussed key takeaways beginning from the study's inception and, throughout the study, on critical steps researchers and research

teams can implement when fostering partnerships with community partners to increase recruitment efforts in mixed methods psychological intervention studies.

Although participants in this study provided sufficient details on the importance and process of cultivating relationships with community partners, they also acknowledged some challenges when engaging with community partners. Specifically, one of these challenges is securing buy-in from community partners at all stages of the research study. Therefore, although participants elaborated on strategies to foster relationships and trust with community members, as it is central to mixed methods psychological intervention research, securing buy-in from all members, including those carrying out the intervention, can be challenging. The inability to secure buy-in from community partners and individuals delivering the intervention study poses challenges when recruiting individuals.

Furthermore, using a tiered approach to recruitment (e.g., hospitals, psychologists, nurses, or school districts, principals, educators) in mixed methods psychological interventions has been effective; however, two major challenges were identified. First, when using a tiered approach to recruitment, it is critical that all members involved in the recruitment process understand the purposes of the study and the inclusion criteria. Specifically, it is imperative that individuals involved in recruitment efforts do not stray away from the established inclusion criteria, as this can affect the representativeness of the sample and the overall meta-inferences that are developed. Similarly, it is also good practice to remind individuals involved in recruitment efforts about the study and the importance of recruiting participants into the study.

To mitigate these challenges, participants in the study reinforced the importance of having the presence of a researcher at recruitment sites, even though community members may be engaged in the recruitment process. These findings suggest a pseudo-active recruitment strategy where the researcher is present at sites but mostly engages with community members who are implementing active recruitment strategies themselves. This reinforces a potential first step in the recruitment process for mixed methods psychological intervention studies by fostering relationships between research personnel and community partners.

Another recruitment challenge expressed by participants in this study was acknowledging that the sample demographics often pose recruitment challenges in mixed methods psychological intervention studies. For instance, participants noted that when working with vulnerable populations in intervention research, participants may experience specific barriers such as lack of financial resources, transportation, and/or legal challenges that may pose difficulties to engaging in research, even though they may express interest. Conversely, as stated by participants, recruiting individuals who are interested in the study and may come from various sociodemographic backgrounds is essential to mitigate selection bias. Therefore, certain sample demographic factors can contribute to a participant's willingness and ability to participate in the study. As a researcher, one of the goals is to be mindful of these elements before the study begins and reduce potential issues of selection bias.

RQ2: What are effective *retention* strategies and challenges researchers encounter when conducting mixed methods psychological intervention research?

Many retention strategies were shared by participants, specifically the importance of financial incentives. In general, participants in the study stressed the importance of providing a financial incentive that aligned with the time participants spent on the study and identifying the financial incentive(s) most appealing to participants (e.g., parents, children/adolescents, educators). Financial incentives were often discussed as both a recruitment and retention method that helps to invite participants into the study and keep them engaged throughout the study. By providing incentives, it demonstrates to participants that their time and experiences are valued in research. Particularly in mixed methods intervention studies, participants noted the benefits of offering incentives at multiple stages of the study after each data collection point, if possible (e.g., survey, interview). Nevertheless, given that this was an international sample, it is important to note that some participants in this study reside in Denmark, where they are only allowed to incentivize control of healthy individuals. Thus, incentives appear to be an effective recruitment and retention strategy in mixed methods psychological intervention studies; however, the use of incentives may depend on a country's ethical guidelines of research conduct and can be heavily dependent on the population's desires; thus, warranting alternative methods.

Another critical element that can increase participant retention efforts is carefully choosing and designing data collection methods and procedures that are conducive to the sample. For example, being cognizant of the language used in surveys, what is being asked of participants, and giving them the option of choosing a location to collect data from them (e.g., their home, researcher office, or clinic). Specifically in longitudinal mixed methods intervention designs. Maintaining contact with participants throughout

the study was another fundamental component of increasing participant retention in mixed methods psychological intervention studies. This can include seeing participants in person, sending email/phone reminders about the study, check-in emails, and sending Christmas cards. These findings are supported by a study from Abshire and colleagues (2017) that found using a combination of retention strategies is particularly beneficial in longitudinal clinical research studies. In addition to financial incentives, researchers found that attending and facilitating visits, reinforcing the potential benefits of participating in the study, and being contacted by skilled staff are effective methods. Liu et al. (2018) also found that accessibility of information and consent materials was particularly important when recruiting and retaining participants in mental health trials.

One of the most prominent challenges with participant retention in mixed methods psychological intervention studies is the influence of external factors that directly affect attrition. These may include life circumstances preventing participants from further engaging in the study, such as relocating, not responding to intervention, and needing to stop intervention due to comorbid health concerns. As such, these external factors may prevent participants from participating at the initial onset of the study (i.e., recruitment) but also prevent them from completing the full study (i.e., retention). Another barrier is losing access to gatekeepers or community partners who were heavily involved in directly contacting participants and retaining them in studies. Participants in this study also discussed that some participants in intervention studies might complete the program/intervention and dropout of the study, resulting in a loss of data. In contrast, others might complete the study and all data sources but dropout of the intervention. Each

scenario poses difficulties and reinforces researchers to think about missing data with the sample.

Although strategies were provided to overcome these challenges, these findings indicate the importance of the researcher and research team in familiarizing themselves with a study's sample demographics. Doing so will aid researchers in identifying specific strategies to reduce potential barriers and enhance retention. Further, these findings suggest the importance of adapting retention protocols for mixed methods psychological intervention studies based on sample demographics. Abshire et al. (2017) found that research teams that adapted and refined retention protocols in longitudinal clinical research studies had high participant retention rates. Given that the study design and sample demographics influence retention strategies, this study provides a basis for effective retention strategies in mixed methods psychological intervention research studies. Researchers can build on these retention recommendations based on the study sample demographic.

RQ3: How do sampling decisions differ across mixed methods core designs?

Several sampling considerations were discussed across sequential and convergent mixed methods designs. A prevalent sampling consideration in sequential mixed methods designs was (a) ensuring the sample is representative, particularly for the qualitative strand, especially in cases where the setting limits researchers, and (b) determining an adequate sample size for the qualitative strand given the feasibility and characteristics of qualitative research. Participants believed these specific considerations were crucial because the inferences based on the sample generated for the qualitative strand would ultimately impact the subsequent quantitative strand in exploratory sequential designs.

Collectively, participants noted that in convergent designs, collecting more data from participants around the same time can be advantageous, mainly if the samples are the same; however, if participants drop out from a convergent mixed methods design, researchers may have more incomplete data for both strands in comparison to sequential designs. Thus, sample size issues remain at the root of core mixed methods designs across the quantitative and qualitative strands.

Participants also discussed that using identical or different samples between the quantitative and qualitative strands of the mixed methods intervention study can influence the overall sample size. Specifically, using identical samples for the quantitative and qualitative strands could lead to smaller sample sizes. These findings also suggest that even when an identical sample is recruited for both strands, researchers may often question whether intra-sample characteristics are truly similar—in other words, ensuring the samples are truly identical based on their demographic features. In general, participants reported using subsamples in mixed methods psychological intervention research but infrequently using different samples across both strands.

One of the main reasons participants did not recruit different samples between the quantitative and qualitative strands was due to the challenges of integrating the findings from different samples. Therefore, when researchers engage in this process, participants in this study recommended providing transparency on the process of integrating the findings and determining whether findings corroborate or diverge. Nevertheless, although these challenges were vocalized by a majority of participants in the sample, many still emphasized the value of including different samples in a mixed methods intervention study to obtain a more holistic understanding from multiple perspectives. These findings

further highlight the value of mixed methods research, especially as it relates to aspects of sampling.

RQ4: What additional information can we learn about the temporal placement of the qualitative strand in mixed methods psychological intervention studies? Consistent with previous research on the role of qualitative research in RCT trials (e.g., Creswell et al., 2009; O’Cathain et al., 2015; Drabble et al., 2014), participants expressed the importance of the qualitative strand in relation to the intervention, noting integrating a qualitative phase allows them to better understand the barriers and facilitators of the intervention and make adequate modifications to the intervention. Overall, participants reported several reasons for carrying out the qualitative phase *before* an intervention, mostly related to the development of the intervention. Additionally, participants mentioned several reasons for conducting the qualitative phase *during* the intervention, primarily centered around gauging participants’ experiences with the intervention throughout their participation. The reasons for conducting the qualitative after the intervention were mostly to assess the intervention's barriers and facilitators and assess the intervention's effectiveness based on primary outcome variables. These findings suggest that generally, the reasons for conducting a qualitative phase either before, during, or after an intervention may depend on the development and progression of the intervention.

Implications of Qualitative Findings

The qualitative case study findings shed light on various topics of inquiry related to sampling in mixed methods psychological intervention research. Using a combination of an MMR-SMR and semi-structured interviews, we begin to understand researchers’

rationale and decision-making on methodological components of mixed methods psychological intervention studies that are influenced by sampling. Through the MMR-SMR I explored *what* methodological components researchers address in mixed methods empirical studies, and through the semi-structured interviews, I obtained a deeper understanding of *how* these decisions were made. With the qualitative findings, we gained a more complete understanding of (a) the recruitment strategies and challenges in mixed methods psychological intervention studies, (b) retention strategies and challenges, (c) sampling decisions across mixed methods core designs, and (d) how the temporal placement of the qualitative phase influences the reasons for conducting a mixed methods psychological intervention study.

Quantitative Summary

The quantitative phase comprised a modified e-Delphi study consisting of two rounds. The purpose of this phase was to assess the level of relevancy of each generated recommendation from the qualitative case study across rounds, make necessary changes to the list as suggested by experts, and report a final list of recommendations meeting inclusion criteria based on medians and I-CVI values. As such, the aim of the quantitative phase was also to test a component of the content validity of each recommendation using I-CVI values. The purpose of Round 1 was to assess the initial relevancy of recommendations from the qualitative case study. Round 2 was used to refine further the recommendations that would be retained in the list and assess the recommendations included in the final list. Conducting two rounds of the modified e-Delphi study was important in documenting the evolution of changes across rounds and evaluating a component of content validity across all recommendations.

A total of ten participants participated in Round 1 and nine participants in Round 2. The original preliminary list included a total of 23 recommendations. After Round 1, 18 recommendations met consensus, five failed to meet consensus, two recommendations were added to Round 2, and three were modified based on open-ended responses from experts. For Round 2, experts were asked to re-rate all recommendations to determine which would be retained in the final list. A total of 19 recommendations met consensus in Round 2, six recommendations did not meet consensus and were eliminated, and one recommendation was added to modify a previous recommendation based on experts' feedback. The final list of recommendations includes 20 recommendations. To examine the content validity of the generated recommendations, this study was guided by two research questions.

RQ1: What evidence of content validity is supported by the final list of practical recommendations?

Twenty recommendations met inclusion criteria in Round 2 based on median and I-CVI values. To reach an agreement, all recommendations met a median ≥ 4 , and 80% or more of the responses ranged between a score of 4 or 5 (*very relevant* or *extremely relevant*). The list of recommendations is divided into six categories or topics of inquiry (recruitment, retention, sampling across mixed methods core designs, data collection, integration, and temporal placement of qualitative strand). A total of five recommendations were proposed for the category of recruitment, and one was removed. Seven recommendations for the retention category were proposed, with one recommendation added per expert feedback. From these, two recommendations were removed from this category. Five recommendations were proposed for the sampling

across mixed methods core designs, and all were retained for the final list. The next category, data collection, comprised two recommendations that were retained. Five recommendations were provided for category integration, two new recommendations were suggested for addition by experts, and four were retained. Two recommendations were suggested for the final category, temporal placement of the qualitative strand, and one was retained in the final list.

Across all recommendations in Round 2, fourteen had a median value of 5 and I-CVI values ranging between 0.89 and 1, and five had a median value of 4 and I-CVI values ranging between 0.89 and 1. The final recommendation (20) was added to the list after Round 2 through qualitative content analysis, and therefore, no median or I-CVI values are provided. Overall, the final recommendations have strong evidence for content validity and demonstrates that these recommendations are relevant to sampling in mixed methods psychological intervention research through I-CVI values.

RQ2: How does the content validity on the list of practical recommendations change across rounds of the modified e-Delphi?

To further establish the content validity of the list of recommendations, the I-CVI values across Rounds 1 and 2 were compared, along with medians. In general, I-CVI values increased from Round 1 to Round 2 after suggested changes provided by experts. Out of 23 original recommendations presented in Round 1, a total of 18 recommendations met consensus in Round 1, with medians ranging between 4.5 and 5, and I-CVI values ranging between 0.80 and 1. In Round 2, 19 recommendations met consensus out of 25, with medians ranging between 4 to 5 and I-CVI values between 0.89 to 1.

In Round 1, five recommendations did not meet consensus, with the lowest median value of 4 and I-CVI values ranging between 0.60 and 0.70. Since consensus was measured using medians and I-CVI values, each recommendation needed to meet the inclusion criteria threshold to be retained in the final list of recommendations. From the five recommendations that did not meet consensus in Round 2, two (9 and 19) did meet consensus in Round 2 with medians in Round 1 at 4 and 5, respectively, and I-CVI values at 0.70, and medians of 4 and 5, respectively, in Round 2 and I-CVI values between 0.89 and 1. It is important to note that recommendation 19 was modified based on expert feedback. Three recommendations did not meet consensus in Round 2 (recommendations 8, 20, and 22).

After suggested improvements and modifications from experts after Round 2, I-CVI values remained the same between Rounds 1 and 2 for three recommendations and improved for 11 recommendations. Thus, these findings indicate that the content validity of the list of practical recommendations for sampling in mixed methods research improved across rounds and demonstrated overall sufficient evidence of content validity.

Implications of the Quantitative Results

The quantitative results demonstrate that the recommendations improved from the preliminary list proposed for Round 1 to the final list of recommendations developed from Round 2. Consistency across recommendations was evidenced by the recommendations that were retained in the final list of recommendations. After Round 2, recommendations that did not meet the established median and I-CVI values were eliminated from the list. The final list of recommendations consists of recommendations with high I-CVI values to ensure each recommendation is relevant and has evidence of

content validity. Importantly, experts in mixed methods research took part in the modified e-Delphi study to ensure the recommendations were methodologically sound and provided open-ended responses to further refine the recommendations.

Mixed Methods Summary

The integration of quantitative and qualitative findings was achieved at multiple stages of the mixed methods design. First, integration occurred at the design level. A preliminary list of recommendations was developed through building integration of the qualitative case study involving an MMR-SMR and semi-structured interviews to inform the quantitative phase. This was achieved through a joint display that included the overarching themes from the MMR-SMR and semi-structured interviews, relevant methodological references, and the resultant recommendations (see Table 4.10). This preliminary list served as Round 1 of the modified e-Delphi study for the quantitative phase.

Integration was also present at the interpretation and reporting stages of this study. At the interpretation and reporting stage, a final list of recommendations was developed based on iterative rounds and feedback from experts in the modified e-Delphi study. The recommendations that were included in the final list met agreement consensus based on median values, and established evidence of content validity by measuring a component of it using I-CVI values. Comparisons were made between the recommendations proposed in the preliminary list and the final list examining the degree of integration (e.g., convergence, discordance, or expansion). The integration of a qualitative case study and a modified e-Delphi allowed for a complete understanding of sampling and related methodological components in mixed methods psychological

intervention research and generated a robust list of recommendations to guide researchers.

RQ1: How does the integration of a case study design and a modified e-Delphi technique inform the development and refinement of a list of practical recommendations for mixed methods sampling?

The integration of a qualitative case study and a modified e-Delphi study contributed to the robustness of the final list of practical recommendations for sampling in mixed methods psychological intervention research. The qualitative case study, consisting of an MMR-SMR and semi-structured interviews, contributed to developing a preliminary list of recommendations. Importantly, this list is grounded in evidence synthesis and empirical research, such that recommendations and examples are generated based on what researchers reported in mixed methods psychological research study articles and what they shared from their experiences conducting these studies, and the challenges they have encountered, respectively.

Empirical evidence is also presented through the modified e-Delphi study by further refining the recommendations based on expert knowledge and experiences. Therefore, integrating a case study design and a modified e-Delphi technique reinforced the robustness of the final list of recommendations. Notably, the resulting list of recommendations is grounded in applied and methodological research. In other words, the qualitative strand is grounded in researchers' perspectives who conduct psychological intervention research with specific populations. The quantitative strand is grounded in mixed methods research methodologists' perspectives, which advance the methods. Thus, the preliminary list from the qualitative phase was grounded on substantive research in

the field of psychological intervention research, whereas the subsequent quantitative phase complemented previous findings by focusing on the methodological relevancy of recommendations from experts in the field of mixed methods research.

This study further reinforced the thoughtful integration of a qualitative case study and modified e-Delphi study by assessing the evolution of recommendations in relation to the fit of data integration. Fetters and colleagues (2013) described the “fit” of data integration as the “coherence of the quantitative and qualitative findings” in mixed methods research (p. 2143). To assess the fit of integration, they described three potential outcomes: confirmation, discordance, and expansion. The fit of integration was used to determine how the recommendations from the preliminary list generated from the qualitative phase evolved into the resultant list developed from the quantitative phase. Specifically, recommendations that remained the same were labeled as *convergence*, those that were modified were labeled as *expansion*, and those that were eliminated from the final list were labeled as *discordance*. In doing so, this illuminated on the integration of a qualitative case study and modified e-Delphi study across generated recommendations between phases.

Implications

This study has several implications, including substantive within the field of psychological intervention research and methodological. From a substantive perspective, these findings, and the resulting list of recommendations on sampling in mixed methods research, may be adapted for use across other areas in the health sciences. From a methodological perspective, this study sheds light on a mixed methods research topic that has received limited attention in the past decades and warrants exploration. The following

will present a discussion on the substantive and methodological implications of the current study.

Substantive Implications

The resultant list of practical recommendations for mixed methods sampling in psychological intervention research holds critical implications for the field of psychology. Although literature exists on effective recruitment and retention strategies in clinical and mental health trial research, research on sampling in mixed methods psychological intervention studies, to my knowledge, has not yet been addressed. By developing a list of practical recommendations for psychology intervention research, researchers will be able to apply it to their studies to increase recruitment and retention efforts while enhancing the rigor of the mixed methods study. Moreover, given that the list of recommendations is organized by various topics of inquiry influenced by sampling, researchers conducting psychological intervention research will also be able to evaluate other aspects of their studies that are influenced by sampling using this list.

It is also the aim that the resultant list of recommendations will continue to further promote the use of mixed methods research across various subdisciplines of psychology. Mixed methods research remains in its infancy in certain areas of psychology, such as educational psychology, when compared to mono-methods, such as quantitative and qualitative research (McCrudden et al., 2019). However, the reasons for this are unknown, even though mixed methods research is not new to psychology, and many researchers acknowledge its value (Creamer & Reeping, 2020). Thus, by providing recommendations on sampling and related methodological components specific to

psychological intervention research, it is assumed that this will increase the visibility and rigorous applicability of mixed methods research in the social and behavioral sciences.

Methodological Implications

This study offers several methodological implications and contributions to the field of mixed methods research. First, to my knowledge, this is the first empirical study that examines sampling within psychological intervention research to develop a list of practical recommendations for the field. This study used evidence synthesis and empirical research to generate and further refine a list of practical recommendations. Although several mixed methods sampling typologies have been developed for their broad use across disciplines, there has yet to be one widely accepted typology (Tashakkori et al., 2021). Thus, with the development of this list of practical recommendations, the hope is that this further promotes discussions and advancements on sampling in mixed methods research.

Secondly, the resultant list of recommendations can be used by several audiences, including researchers, methodologists, and journal and grant reviewers. Specifically, when evaluating a grant proposal or manuscript, reviewers can use this list as a guiding framework to determine whether sampling and related methodological components were addressed in a study. Finally, this study expands on a novel mixed methods design incorporating evidence synthesis (e.g., MMR-SMR) and semi-structured interviews for the qualitative phase to build a preliminary list of recommendations that was further refined using a quantitative modified e-Delphi technique. The integration of a case study using evidence synthesis provided foundational evidence on sampling and related methodological components of mixed methods psychological intervention studies. The

semi-structured interviews expanded these findings and provided a more complete understanding of the research phenomenon.

Furthermore, this study demonstrates the applications of a modified e-Delphi technique within the quantitative phase of an exploratory sequential design. Although Delphi studies involve both quantitative and qualitative assessments, this study capitalized on assessing a component of content validity through I-CVI values to establish recommendations that were relevant and demonstrated evidence of content validity in the final list. Combining evidence synthesis, semi-structured interviews, and modified e-Delphi methods can elucidate the use of complex designs and their applications within mixed methods research and inform nuanced approaches to integration using these methods.

Limitations

There are several limitations of the current study that are important to address. First, while this study advances a list of practical recommendations for mixed methods sampling in psychological intervention research, this list is not all-encompassing. This list includes recommendations across various topics of inquiry, including recruitment, retention, sampling across mixed methods core designs, data collection, integration, and the temporal placement of the qualitative strand. However, some of these recommendations, particularly related to recruitment and retention, may require some adaptations based on specific sample demographic characteristics. Abshire et al. (2017) noted that updating retention protocols may be beneficial for maintaining high participant retention rates across the study. Nevertheless, these recommendations should guide researchers conducting mixed methods psychological intervention research from the

conceptualization, designing, and conducting stages of a study. Specifically, these recommendations are tailored to the conduct of mixed methods within psychological intervention research. I encourage researchers conducting psychological intervention research and mixed methods research methodologists to use this list and share feedback on ways to adapt or add recommendations to the current list.

Second, there are no agreed upon sample size criteria for Delphi studies or the number of experts required for content validation. Although this study was guided by Polit and colleagues' (2007) suggested sample size of eight to ten participants for assessing content validity, it is unknown how some recommendations closer to an I-CVI value of 0.80 would result if the sample size were to increase. Three recommendations had an I-CVI value of 0.78; therefore, it is unknown how these recommendations would change if the sample size increased. Nevertheless, sample sizes across rounds for the modified e-Delphi were consistent and aligned with guiding principles in the literature. Third, the MMR-SMR focused on interventions targeting a common mental health disorder. As a result, interventions targeting other types of disorders, such as attention-deficit hyperactivity disorder, were not captured through the MMR-SMR. Nevertheless, the purpose of the MMR-SMR was to examine a subunit of psychological interventions, and the semi-structured interviews obtained holistic perspectives across various psychological interventions, and, therefore, captured additional psychological interventions not included in the MMR-SMR.

Future Research

Future research can expand on this study by exploring additional dimensions of the phenomenon. First, as this list of recommendations is applied in psychological

intervention research, future research can examine how researchers address the existing recommendations and shed light on whether recommendations require further modifications or additions. Moreover, future research should replicate this study across various fields in the health sciences, such as interventions targeting diseases, to determine whether this list of practical recommendations can also be applied in other contexts. We may find that the recommendations can be applied to various substantive fields but provide specificity to mixed methods research. I encourage researchers across various fields in the health sciences, including psychological intervention research, to share insights, challenges, and experiences when applying this list of recommendations, as well as grant and journal reviewers.

From a methodological standpoint, future research can further examine the applications of evidence synthesis across various mixed methods research designs. This study applied evidence synthesis within the qualitative case study phase; however, future research can examine how evidence synthesis can be used within the quantitative phase and what the implications are for the mixed methods core designs. Integrating evidence synthesis in mixed methods research may help us better highlight its potential within the context of mixed methods research designs.

Conclusion

To date, limited empirical research has been conducted to explore researchers' rationales and decision-making on sampling issues and related components in mixed methods psychological intervention research. Using an exploratory sequential MM-CS design, consisting of an MMR-SMR and semi-structured interviews for the qualitative phase and a modified e-Delphi study for the quantitative phase, a list of practical

recommendations for sampling in mixed methods psychological intervention research studies was developed and refined across phases. A list of 20 recommendations met agreement consensus and each recommendation demonstrated strong evidence of content validity.

As we continue to advance and promote discussions on sampling in mixed methods research, the aim is that the findings from this study can help guide these discussions. We should challenge ourselves to shift from mostly focusing on sampling from a mono-method perspective, to considering sampling and its findings in an integrated way. At the forefront of these mixed methods sampling discussions, we should bring forth the central tenet to mixed methods research: integration. Although findings between samples will not always corroborate nor is it the expectation, thinking about sampling from an integrated perspective may reinforce the use of established mixed methods research sampling typologies and ways we can continue to build on this scholarship.

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APPENDICES

Appendix A

Keyword Searches

Concept 1: Intervention

TI(intervent* OR “randomized control trial*” OR “randomized clinical trial*” OR “randomized controlled trial*” OR RCT OR “effectiveness trial” OR “efficacy trial”) OR AB(intervent* OR “randomized control trial*” OR “randomized clinical trial*” OR “randomized controlled trial*” OR RCT OR “effectiveness trial” OR “efficacy trial”)

Concept 2: Anxiety disorders

TI OR AB(“anxiety disorder” OR “generalized anxiety disorder” OR “generalised anxiety disorder” OR “panic disorder” OR “social anxiety disorder” OR “social phobia” OR “separation anxiety disorder” OR “selective mutism” OR “specific phobia” OR “panic attack” OR “agoraphobia” “post-traumatic stress disorder” OR “posttraumatic stress disorder” OR PTSD OR “obsessive-compulsive disorder” OR “obsessive compulsive disorder” OR “acute stress disorder”)

Concept 3: Depressive Disorders

TI OR AB(“disruptive mood dysregulation disorder” OR “major depressive disorder” OR “persistent depressive disorder” OR “dysthymi*” OR “premenstrual dysphoric disorder”)

Concept 4: Psychotherapy

TI(“psychotherap*” OR counsel* OR program* OR therapy OR therapies OR therapist* OR treatment* OR behavior*) OR AB(“psychotherap*” OR counsel* OR program* OR therapy OR therapies OR therapist* OR treatment* OR behavior*)

Concept 5: MMR

TI (“mixed method*” OR “multimethod*” OR "multi method*" OR "multiple method*" OR (qualitative* AND quantitative*)) OR AB (“mixed method*” OR multimethod* OR "multi method*" OR "multiple method*" OR (qualitative* AND quantitative*))

Concept 1: Hybrid

TI("hybrid design*" OR "hybrid design type 1" OR "type 1 hybrid design" OR "type 1 hybrid trial*" OR "hybrid type 1" OR "hybrid design type 2" OR "type 2 hybrid design" OR "type 2 hybrid trial*" OR "hybrid type 2" OR "hybrid design type 3" OR "type 3 hybrid design" OR "type 3 hybrid trial*" OR "hybrid type 1" OR "effectiveness-implementation trial*") OR AB(("hybrid design*" OR "hybrid design type 1" OR "type 1 hybrid design" OR "type 1 hybrid trial*" OR "hybrid type 1" OR "hybrid design type 2" OR "type 2 hybrid design" OR "type 2 hybrid trial*" OR "hybrid type 2" OR "hybrid design type 3" OR "type 3 hybrid design" OR "type 3 hybrid trial*" OR "hybrid type 1" OR "effectiveness-implementation trial*"))

Concept 2: Anxiety disorders

TI OR AB("anxiety disorder" OR "generalized anxiety disorder" OR "generalised anxiety disorder" OR "panic disorder" OR "social anxiety disorder" OR "social phobia" OR "separation anxiety disorder" OR "selective mutism" OR "specific phobia" OR "panic attack" OR "agoraphobia" "post-traumatic stress disorder" OR "posttraumatic stress disorder" OR PTSD OR "obsessive-compulsive disorder" OR "obsessive compulsive disorder" OR "acute stress disorder")

Concept 3: Depressive Disorders

TI OR AB("disruptive mood dysregulation disorder" OR "major depressive disorder" OR "persistent depressive disorder" OR "dysthymia" OR "premenstrual dysphoric disorder")

Concept 4: Psychotherapy

TI("psychotherap*" OR counsel* OR program* OR therapy OR therapies OR therapist* OR treatment* OR behavior*) OR AB("psychotherap*" OR counsel* OR program* OR therapy OR therapies OR therapist* OR treatment* OR behavior*)

Concept 5: MMR

TI ("mixed method*" OR "multimethod*" OR "multi method*" OR "multiple method*" OR (qualitative* AND quantitative*)) OR AB ("mixed method*" OR multimethod* OR "multi method*" OR "multiple method*" OR (qualitative* AND quantitative*))

Appendix B

Mixed Methods Research- Systematic Methodological Review Codebook

Instructions: This codebook should be used throughout the coding process. It provides examples and clarifications for each variable that will be coded for. The section titled ‘Data/Code’ includes several coding options such as dropdown options, open-ended text, and numeric responses. The data/codes will vary depending on the variable. The section titled ‘instructions/comments/examples’ provides additional information pertinent to each variable code as well as examples for some codes. Please include sentence(s) directly from the article to provide support for the code that was chosen if stated under the ‘instructions/comments/examples’ section.

| Variable | Data/Code | Instructions/Comments/Examples |
|--------------------------------------|--|---|
| <i>Publication Metadata</i> | | |
| Article ID | | Will be provided a priori |
| Reference | | Will be provided a prior |
| Journal | | List name of journal |
| Region/Country | USA Canada Japan Germany Switzerland Australia United Kingdom Other, please specify | Based on principal author’s region/country listed on article. If not included in dropdown list, please specify the country using text. |
| Intervention name | Open-ended response | List the name of the intervention. If there is no specific name, but instead uses a more generic approach (e.g., CBT), then include this. |
| Disorder(s) targeted by intervention | Open-ended response | List which common mental health disorder is targeted by the intervention (e.g., anxiety, depression, specific type) |
| <i>Intervention Designs</i> | | |
| Intervention name | Open-ended response | List the name of the intervention. If there is no specific name, but instead uses a more generic approach (e.g., CBT), then include this. |
| Intervention outcome(s) | Open-ended response | Intervention: An intervention study involves the researcher “actively interferes with nature—by performing an intervention in some |

| | | |
|--|--|--|
| | | <p>or all study participants—to determine the effect of exposure to the intervention on the natural course of events.” (Aggarwal & Ranganathan, 2019)</p> <p>List the purpose of the intervention. In other words, are authors assessing the effectiveness, efficacy, feasibility, acceptability, appropriateness, adoption, etc. of the intervention. If more than one aspect of the intervention study is being assessed, choose 'other' and list them all out in the next cell titled 'Specify 'Other' or all intervention types.')</p> |
| Specify 'other' or all intervention outcome(s) | Open-ended response | List all intervention types assessed using this cell. |
| Type of hybrid design | <p>Hybrid Type 1</p> <p>Hybrid Type 2</p> <p>Hybrid Type 3</p> | <p>Hybrid design: Involves assessing the clinical effectiveness of an intervention and its implementation. Divided into three types: Type I: Focuses on testing the clinical intervention while also gathering implementation data; Type II: focuses on both testing the intervention and assess its implementation by balancing the importance of both; Type III: focuses on testing the implementation strategy while gathering information on the clinical intervention. (Curan et al., 2012)</p> <p>If the study is a hybrid design, please choose most appropriate option by choosing one of the options from the dropdown menu.</p> <p>Hybrid Type I: Test the clinical intervention and secondarily gather data to inform subsequent implementation research trials. AKA: Primary aim is to determine</p> |

| | | |
|---|-------------------------------|---|
| | | <p>the effectiveness of intervention and secondary aim is to better understand the context for implementation.</p> <p>Hybrid Type II: Simultaneously tests the clinical intervention, while rigorously testing the implementation strategy. AKA: Determine the effectiveness of an intervention AND determine the feasibility and/or (potential) impact of an implementation strategy.</p> <p>Hybrid Type III: Primarily test the implementation strategy via measures of adoption of and fidelity to clinical interventions. The secondary aim measures patient-level effects of the clinical intervention. AKA: Primary aim is to determine the impact of an implementation strategy and the secondary aim is to assess clinical outcomes associated with implementation.</p> |
| Specify all intervention and implementation types | Open-ended response | Specify all intervention and implementation outcomes that were assessed in study. If not applicable, use 'N/A.' |
| Pilot study | Yes No | State whether this study was a pilot study or not. |
| <i>Quantitative Approach</i> | | |
| Quantitative design | RCT Non-RCT Descriptive | <p>RCT: Uses a randomized controlled trial to carry out study. Include an intervention, control group, and randomization of participants into groups.</p> <p>Non-RCT: Includes between-subjects designs (e.g., observational studies [such as cohort studies, case-control], regression-discontinuity, observational designs) and within-subjects studies. Quasi-experimental</p> |

| | | |
|--|---|---|
| | | designs, for example, include an intervention, but no randomization. Descriptive: Do not have an intervention or treatment and are considered nonexperimental. They usually aim to provide information about relevant variables but do not test hypotheses. |
| <i>Qualitative Approach</i> | | |
| Qualitative approach | Phenomenology Grounded Theory Case Study Narrative Ethnography Other, please specify | Phenomenology: Focus is on describing the ‘essence’ of a phenomenon for several individuals (Creswell & Poth, 2018). Grounded Theory: Develop or extend a theory that is grounded in participant’s perspectives. Case Study: Develop an in-depth understanding of a case or multiple cases that are bounded by time or place. Narrative: Documenting the experiences and life of an individual through narratives or stories (Creswell & Poth, 2018). Ethnography: Describe the perspectives and shared patterns of a culture sharing group (Creswell & Poth, 2018). |
| Other qualitative approach | Open-ended response | If ‘Other’ option is chosen, specify using text. Include supporting sentence(s) from article. |
| <i>Placement of Qual Strand</i> | | |
| | Qual BEFORE RCT Qual DURING RCT Qual AFTER RCT | Please mention if the qualitative strand was conducted before, during, or after the intervention or implementation. |
| <i>Reasons for Collecting Qual Data</i> | | |
| Reason(s) for collecting qual. BEFORE RCT | Open-ended response | If ‘Qual BEFORE RCT’ is selected, choose which option(s) applies based on the dropdown list. If ‘Other’ option is chosen, specify |

| | | |
|--|---------------------|---|
| | | <p>using text. Please include supporting sentence(s) from article. Examples include but are not limited to:</p> <ul style="list-style-type: none"> Develop an instrument for RCT Develop good recruiting/consenting practices for participants in RCT Understand participants, context, and environment to ensure RCT will work Document a need for RCT Gather comprehensive assessment of baseline information Other, please specify |
| Reason(s) for collecting Qual DURING RCT | Open-ended response | <p>If ‘Qual DURING RCT’ is selected, choose which option(s) applies based on the dropdown list. If ‘Other’ option is chosen, specify using text. Please include supporting sentence(s) from article. Examples include but are not limited to:</p> <ul style="list-style-type: none"> Validate quantitative outcomes with qual. data from participant perspectives Understand impact of RCT on participants (e.g., barriers/facilitators) Understand unanticipated participant experiences during RCT Identify constructs that could impact outcomes of RCT (e.g., sociocultural environment) Identify resources that facilitate conduct of RCT Understand and depict processes experienced by experimental group(s) Check fidelity of implementation of procedures Identify potential mediating and moderating factors Other, please specify |

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| Reason(s) for collecting Qual AFTER RCT | Open-ended response | <p>If ‘Qual AFTER RCT’ is selected, choose which option(s) applies based on the dropdown list. If ‘Other’ option is chosen, specify using text. Please include supporting sentence(s) from article. Examples include but are not limited to:</p> <p>Understand how participants view results of trial Receive participant feedback to revise treatment Help explain quantitative outcomes (e.g., under-represented variations in trial outcomes) Determine long-term, sustained effects of an RCT after a trial Understand in more depth how mechanisms worked in a theoretical model Determine if the processes in conducting trial had treatment fidelity Assess the context when comparisons of outcomes are made with baseline data Other, please specify</p> |
| Qual data collected at multiple time points? | Open-ended response | If qual data was collected at multiple time points, please specify these time points here. (e.g., during and after intervention) |
| Lag time between qual and quan data collection | Open-ended response | Please indicate the lag time between the qualitative data collection from the quantitative data collection phase. If missing, please use "Not reported." |
| <i>Quan Sampling</i> | | |
| Quantitative sampling scheme | Simple Random Sampling Systematic Random Sampling Stratified Random Sampling Cluster Random Sampling Multi-stage Random Sampling | <p>Simple random sampling: Ensures that every individual from the sampling frame has an equal chance to be chosen for the study (Creswell & Guetterman, 2019).</p> <p>Systematic random sampling: Choosing the <i>n</i>th individual or site</p> |

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| | | <p>from a sampling frame until a researcher reaches a predetermined sample size (Creswell & Guetterman, 2019).</p> <p>Stratified random sampling: Requires researchers to divide the sampling frame into subsets based on specific characteristics, and then applies simple random sampling to sample from each subset (i.e., stratum) of the sampling frame (Creswell & Guetterman, 2019).</p> <p>Cluster random sampling: Involves having the researcher select intact groups that represent clusters, instead of randomly selecting individuals (Onwuegbuzie & Collins, 2007).</p> <p>Multi-stage random sampling: Involves choosing a sample in multiple stages (Onwuegbuzie & Collins, 2007).</p> |
| Other quantitative sampling scheme | Open-ended response | If 'Other' option is chosen, specify using text. Please include supporting sentence(s) from article. |
| Total sampling size | Numeric value | Please provide a numeric value reflecting the final total quantitative sample size based on the total number of participants who consented. Can use the total sample size reported by researchers. Can also include total number and total number dropped out in parenthesis. |
| Sample size rationale | Open-ended response | This refers to whether the author(s) provided any explicit information on why the study used a sample size of XX. For example, for quant. studies perhaps they included some information on previous power analyses that led them to including a sample size of this number. Please |

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| | | provide a sentence(s) from article demonstrating sample size rationale. If no rationale is stated, please state 'not reported.' |
| Quantitative sample composition | Open-ended response | This refers to sample characteristics of the quantitative strand such as demographic information, grade, gender, level of education, etc. If information is provided, include 'yes' or 'no' if not provided. If no demographics provided for subsample, use 'Not reported for subsample.' |
| Qual Sampling | | |
| Qualitative sampling scheme | Convenience Sampling Snowball Sampling Maximum Variation | <p>Convenience sampling: Researcher selects participants based on convenience, either due to their relation to the settings, groups, and/or individuals or their desire to participate in the study (Onwuegbuzie & Collins, 2007).</p> <p>Snowball sampling: Involves asking participants in the current study to recruit or inform other individuals to participate in the study.</p> <p>Maximum variation: Aim is to obtain a wide variation of perspectives from either settings, groups, and/or individuals (Onwuegbuzie & Collins, 2007).</p> |
| Other qualitative sampling scheme | Open-ended response | If 'Other' option is chosen, specify type using text. Please include supporting sentence(s) from article. |
| Total sample size | Numeric value | Please provide a numeric value of the total quantitative sample size. Please include sentence(s) to support this assertion. |
| Sample size rationale | Open-ended response | This refers to whether the author(s) provided any explicit information on why the study used a sample size of XX. For example, in qualitative studies perhaps they said they ended with a sample of XX |

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| | | because they reached saturation. Please provide a sentence(s) from article demonstrating sample size rationale. If no rationale is stated, please state 'not reported.' |
| Qualitative sample composition | Open-ended response | This refers to sample characteristics of the quantitative strand such as demographic information, grade, gender, level of education, etc. If information is provided, include 'yes' or 'no' if not provided. If no demographics provided for subsample, use 'Not reported for subsample.' |
| <i>Data Sources</i> | | |
| Quantitative data sources | Questionnaires Physio measures More than 1, please specify Other, please specify | Please include all quantitative data collection sources used for the quantitative strand. |
| Other quantitative data sources | Open-ended responses | If author(s) used more than one data source, choose 'More than 1, please specify' and list all forms of data collected in text in the following column. No specific information of measures' names is needed. For example, if they used questionnaires, secondary data, and physio-measures, you can state this and not include the specifics of each measure. |
| Qualitative data sources | Individual interviews Focus groups Observations Diaries More than 1, please specify Other, please specify | Please include all qualitative data collection sources used for quantitative strand. |
| Other qualitative data sources | Open-ended responses | If author(s) used more than one data source, choose 'More than 1, please specify', and list all forms of data collected in text in the following column. |
| <i>MMR Core Design</i> | | |
| Types of MMR core design | Convergent Explanatory Sequential Exploratory Sequential | Convergent: Also known as concurrent or parallel design, is implemented when a researcher |

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| | | <p>collects and analyzes data from the quantitative and qualitative strands independently and then merges results to obtain a more holistic understanding of the phenomena.</p> <p>Explanatory Sequential: Implemented when a researcher first collects and analyzes quantitative data to either explain or expand on these results by subsequently following with qualitative data collection and analysis (Creswell & Plano Clark, 2018).</p> <p>Exploratory Sequential: Implemented when a researcher first collects and analyzes qualitative data followed by quantitative data collection and analysis, typically to build or adapt an instrument, intervention, or identify variables (Creswell & Plano Clark, 2018).</p> |
| Integration | | |
| | <p>Merging (Combining) Connecting Building Embedding</p> | <p>Merging (Combining): Associated with the convergent design where quantitative and qualitative results are combined to obtain a more complete understanding. Data can be merged by either comparing quantitative and qualitative results or through data transformation (e.g., quantizing or qualitzing data).</p> <p>Connecting: Associated with explanatory sequential designs where the quantitative and qualitative strands are connected with the intent of the qualitative strand to provide a greater understanding for the initial quantitative results. Typically, the results of the initial quantitative</p> |

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| | | <p>analysis are used to purposefully select participants for the qualitative phase.</p> <p>Building: Associated with exploratory sequential designs where building from the qualitative phase can inform the development of a quantitative element that will be tested (Creswell & Plano Clark, 2018, p. 240).</p> <p>Embedding: Mostly associated with mixed methods experimental or intervention designs where a secondary method (i.e., quantitative or qualitative) is nested within a research design that typically is associated with another approach (e.g., case study, program evaluation) (Plano Clark & Ivankova, 2016).</p> |
| MMR Sampling | | |
| Concurrent timing | Concurrent Identical Concurrent Parallel Concurrent Nested Concurrent Multilevel | <p>Concurrent: Data collection and analysis of quantitative and qualitative data is conducted at the same time, thus independent from each other.</p> <p>The following are examples of the relationship between samples, irrespective of the timing of data collection and analysis. First, determine the time orientation (e.g., concurrent or sequential. MMR design will usually guide this decision.). Then, decide on the relationship between the quantitative and qualitative samples using the definitions and examples below:</p> <p>Identical: Same sample was used for both quan and qual strands. Ex. Administering a questionnaire on perceptions of work</p> |

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| | | <p>environment to 6th grade middle school teachers and also conduct interviews using the same sample.</p> <p>Parallel: Different samples for the quan and qual strands. Ex. Administer a questionnaire on perceptions of work environment to 6th grade middle school teachers and conduct interviews with 6th grade middle school teachers from another school.</p> <p>Nested: Select a sample for one strand of study and subsample of those participants for subsequent strand. Ex. Administer a questionnaire on perceptions of work environment to 6th grade middle school teachers and then follow-up with interviews with 6th grade middle school teachers from the same school who reported scores on the extreme ends of the scale.</p> <p>Multilevel: Using two or more types of samples from different populations. Ex. Quantitative phase could involve sampling 6th grade middle school teachers within one middle school, the qualitative phase could involve interviewing/observations with students, parents, and/or principals.</p> |
| Sequential timing | Sequential Identical Sequential Parallel Sequential Nested Sequential Multilevel | <p>Sequential: Data collection and analysis of quantitative and qualitative data are carried out in a sequence, with one occurring before the other, thus dependent of each other (Plano Clark & Ivankova, 2016).</p> <p>The following are examples of the relationship between samples,</p> |

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| | | <p>irrespective of the timing of data collection and analysis. First, determine the time orientation (e.g., concurrent or sequential. MMR design will usually guide this decision.). Then, decide on the relationship between the quantitative and qualitative samples using the definitions and examples below:</p> <p>Identical: Same sample was used for both quan and qual strands. Ex. Administering a questionnaire on perceptions of work environment to 6th grade middle school teachers and also conduct interviews using the same sample.</p> <p>Parallel: Different samples for the quan and qual strands. Ex. Administer a questionnaire on perceptions of work environment to 6th grade middle school teachers and conduct interviews with 6th grade middle school teachers from another school.</p> <p>Nested: Select a sample for one strand of study and subsample of those participants for subsequent strand. Ex. Administer a questionnaire on perceptions of work environment to 6th grade middle school teachers and then follow-up with interviews with 6th grade middle school teachers from the same school who reported scores on the extreme ends of the scale.</p> <p>Multilevel: Using two or more types of samples from different populations. Ex. Quantitative phase could involve sampling 6th grade middle</p> |
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| | | school teachers within one middle school, the qualitative phase could involve interviewing/observations with students, parents, and/or principals. |
| <i>Qual Saturation</i> | | |
| Saturation explicit | Yes No | This variable is only for qualitative strands that employed semi-structured interviews or focus groups. Please state whether the author(s) explicitly mentioned reaching saturation through interviews. This information will typically be found in the analysis section or methods. To confirm, search 'saturation' in article. If they did, please include supporting sentence(s) from article. If 'no,' state "No." |
| Method other than saturation | Open-ended response | This variable is only for qualitative strands that employed semi-structured interviews or focus groups. This refers to whether the author(s) provided an explicit reason on how they determined the total sample size for the qualitative strand when using interviews/focus groups through a method other than saturation. For example, sometimes, researchers will use 'information power' rather than saturation. This should be an explicit phrase stated in the article. If no information is provided, use "N/A." |
| Total number of interviews | Numeric value If not interview were conducted, please include 'N/A.' | Please include the total number of interviews that were conducted. If focus groups were conducted instead of individual interviews, please include how many focus group sessions were carried out. If interviews were not conducted, please include 'N/A.' |
| Average time reported for interviews | Numeric value If no time reported, please include 'None.' | If average time was reported for interviews or focus groups, please include this with supporting |

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| | | sentence(s) from article. If no time reported, please include 'None.' |
| <i>Recruitment Methods</i> | | |
| Quantitative | Open-ended response | Please include all recruitment methods identified in the article for the quantitative strand. In other words, what did author(s) do to invite participants into the study. Some recruitment methods include but are not limited to: visiting a clinic, distributing flyers/advertisements, sending an email or letter invitations, word-of-mouth (snowball sampling), referrals (i.e., third-party assistance), social media platforms, crowdsourced research platforms (e.g., MTurk), direct person-to-person contact with potential participants, existing records, databases, recruitment lists, repositories, SONA (University researchers). Include supporting sentence(s) from article. This will usually be found in the 'Methods' section or in the 'Discussion'/concluding section of the article. If none are reported, please include 'not reported.' If no recruitment information provided for subsample, use 'Not reported for subsample.' If the same sample is used for both strands, then can include same recruitment info. for both quan and qual. |
| Qualitative | Open-ended response | Please include all recruitment methods identified in the article for the qualitative strand. In other words, what did author(s) do to invite participants into the study. Some recruitment methods include but are not limited to: Visiting a clinic, distributing flyers/advertisements, sending an email or letter invitations, word-of-mouth (snowball sampling), |

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| | | referrals (i.e., third-party assistance), social media platforms, crowdsourced research platforms (e.g., MTurk), direct person-to-person contact with potential participants, existing records, databases, recruitment lists, repositories, SONA (University researchers). Include supporting sentence(s) from article. This will usually be found in the 'Methods' section or in the 'Discussion'/concluding section of the article. If none are reported, please include 'not reported.' If no recruitment information provided for subsample, use 'Not reported for subsample.' If the same sample is used for both strands, then can include same recruitment info. for both quan and qual. |
| <i>Retention Methods</i> | | |
| Mixed methods research | Open-ended response | <p>Examples (based on Teague et al. 2018):</p> <ul style="list-style-type: none"> • Sending a postcard or letter reminder to complete follow-up assessments • Offering participants alternative methods of data collection (e.g., conducting interview over the phone rather than face-to-face). • Barrier-reduction strategies: offering childcare services, assistance with parking and transport, and engaging a participant sub-sample to evaluate data collection methods for the next wave • Community-building strategies: creating a recognisable study brand via logos and colour schemes, giving away study merchandise to create a sense of project community |

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| | | <p>(e.g., t-shirts with study logo), and sharing study results, news and events with participants via newsletters, social media, and feedback reports</p> <ul style="list-style-type: none"> • Strategies to improve follow-up rates within each wave: cash or voucher incentives for varying levels of assessment completion, and use of phone calls, SMS, house visits, mail and email reminders to participants to complete assessments • Tracing strategies: Collecting the details of alternative contact persons for each participant at baseline, using public or non-public records to find updated contact information for participants, and collecting detailed participant contact information via a locator document (e.g., full name, address, social security number, phone numbers, email addresses, etc.) • This will usually be found in the 'Methods' section or in the 'Discussion'/concluding section of the article. If none are reported, please include 'not reported.' |
| Reasons for participant dropout | Open-ended response | Please provide a sentence(s) indicating any reasons expressed by the author for participant dropout in the study. |
| Recommendations on recruitment and retention | Open-ended response | Please provide a sentence(s) indicating any recommendations noted by the author(s) on recruitment and retention for this |

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| | | study. This should be something that is explicit by the author(s). |
| <i>Sampling Limitations</i> | | |
| Quantitative | Open-ended response | Please include the sentence(s) from the article discussing any limitations related to the sample(s) or sampling approaches of the quantitative strand. Examples may include but are not to: limited sample size, difficult to access population, high levels of attrition, etc. This will usually be found in the 'Methods' section or in the 'Discussion'/concluding section of the article. If none are reported, please include 'not reported.' |
| Qualitative | Open-ended response | Please include the sentence(s) from the article discussing any related to the sample(s) or sampling approaches of the related to the qualitative strand. Examples may include but are not to: limited sample size, difficult to access population, high levels of attrition, etc. This will usually be found in the 'Methods' section or in the 'Discussion'/concluding section of the article. If none are reported, please include 'not reported.' |
| Mixed methods research | Open-ended response | Please include the sentence(s) from the article discussing any related to the sample(s) or sampling approaches of the full MMR study. Examples may include but are not to: limited sample size, difficult to access population, high levels of attrition, etc. If author(s) do not specifically refer to one specific sample (either quan or qual), but instead refer to the overall sample or if an identical sample was used, this would be classified as a sampling limitation for the MMR study. This information will usually be found in the 'Methods' section or in the 'Discussion'/concluding |

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| | | section of the article. If none are reported, please include 'not reported.' |
| <i>Grant Information</i> | | |
| Received a grant | Yes No | This refers to whether author(s) received a grant to support this study. This is usually found towards the end of an article by the acknowledgements. Please note 'yes' or 'no.' |
| Name of grant funder | Open-ended response | Please include the name of the funding source/organization |

Appendix C

Recruitment Email for Semi-structured Interviews

Subject: Request for Research Participation: Practical Recommendations on Sampling in Mixed Methods Psychological Interventions: A Mixed Methods Case Study

Dear Dr. [Participant's Last Name],

I hope this email finds you well. I am a doctoral candidate in the Quantitative, Qualitative, and Psychometric Methods program at the University of Nebraska-Lincoln. For my dissertation, I am conducting a study examining sampling, as well as the challenges of recruitment and retention in mixed methods psychological intervention research. Specifically, this can include interventions, implementation, and hybrid designs using a mixed methods research approach. This research aims to propose practical recommendations on sampling and inform tailored interventions through the evaluation of effective recruitment and retention strategies.

Given your expertise and research in conducting psychological interventions, we would like to invite you to participate in this study. We would engage in a Zoom interview that will take approximately 45 minutes discussing your research using mixed methods approaches in psychological intervention research. We would greatly appreciate your insights on this important and understudied topic in mixed methods intervention research.

If you are interested, please reply to this email and I will send you the informed consent with additional information.

Thank you so much for your consideration. I look forward to hearing from you!

Best,
Analay

Appendix D

Follow-Up Email for Semi-structured Interviews

Subject: Follow-up: Request for Research Participation: Practical Recommendations on Sampling in Mixed Methods Psychological Interventions: A Mixed Methods Case Study

Dear Dr. [Participant's Last Name],

This message is a follow-up to a previous email to inform you about a study I am currently conducting for my doctoral dissertation. This study examines sampling, as well as the challenges of recruitment and retention in mixed methods psychological intervention research. Given your expertise and research in conducting psychological interventions, we would like to invite you to participate in this study. Your participation in this research study is invaluable for me to understand the use of mixed methods approaches in psychological intervention research.

Please reply to this email to let me know whether you are interested in participating in a Zoom interview. This interview should take approximately 45 minutes and I would be happy to coordinate a date and time most convenient for you.

I am happy to answer any questions you may have now or at any time during the study.

Thank you so much for your consideration. I look forward to hearing from you!

Best,
Analay

Appendix E

Consent Form for Semi-Structured Interviews

Study Title: Practical Recommendations on Sampling in Mixed Methods Psychological Interventions: A Mixed Methods Case Study

Authorized Study Personnel:

Primary Investigator: Analay Perez, aperez@huskers.unl.edu

UNL Faculty Advisor: Wayne A. Babchuk, wbabchuk1@unl.edu

Dear Participant,

You are invited to take part in this research study. The information on this form is meant to help you decide whether or not to participate. Please carefully read the entire document. You can ask any questions you have before deciding if you want to participate.

Why are you being asked to be in this research study?

You are being asked to participate in this study because you have conducted a mixed methods study in psychological intervention research.

What is the purpose of this study?

The purpose of this study is to obtain an in-depth understanding on the methodological components such as sampling, recruitment, and retention of mixed methods psychological interventions. Importantly, this study aims to propose practical recommendations on sampling, recruitment, and retention across mixed methods psychological interventions to better inform tailored interventions through the evaluation of effective recruitment and retention strategies.

What will you be asked to do if you take part in this research study?

You will be asked to complete a brief demographics questionnaire. After, you will participate in an individual, semi-structured interview that will take approximately 45 minutes to complete. You will be asked to share information about methodological components such as sampling, recruitment, and retention strategies in mixed methods psychological intervention studies. You will be contacted once after the interview with preliminary findings from the interview and asked to verify the information as a member-checking validation tool. This should take no more than 15 minutes. The total time for this study is about 60 minutes for the combination of the interview and member-checking. The primary investigator will conduct these interviews via Zoom and all interviews will be video and audio recorded. It is important that you are in a room/area that is quiet to reduce any outside noise.

Are you required to participate in this study?

Taking part in this research study is completely voluntary. If you choose to participate, you have the right to stop at any time. Your decision will not influence current or future relationships with researchers either now or in the future.

What are the possible risks of being in this research study?

There are no significant risks for participants in this study, and your participation is voluntary.

What are the possible benefits of completing the research study?

By taking part in this study, you are allowing us to help inform researchers on ways to conduct a rigorous mixed methods psychological interventions and help us in the development and advancement of practical considerations on sampling across mixed methods intervention designs.

Will you be compensated for being in this research study?

For your participation in the semi-structured interview and member-checking, you will be compensated with a \$20 Amazon e-gift card.

How will information about you be protected?

Privacy and confidentiality will be guaranteed. A pseudonym will be used, which will be linked to direct quotes from the interview. These direct quotes and corresponding pseudonym will be incorporated in scientific journals and presented at scientific meetings. You will be given the option to choose your own pseudonym or allow the researchers to choose a pseudonym. Please be sure to inform the interviewer with your preference. Your data (including informed consent and audio files) will be stored electronically through a secure server. The only people who will have access to your research records are the study personnel, the Institutional Review Board (IRB), and any other person, agency, or sponsor as required by law. Records from this research will be stored for a minimum of three years after the completion and publication of the study.

What are your rights?

You may ask any questions concerning this research and have those questions answered before agreeing to participate in the study or during the study. For study related questions, please contact the Principal Investigator, Analay Perez, by email aperez@huskers.unl.edu. If you have questions about ethical aspects of the research or wish to make a complain about how it is being conducted, you may contact the University of Nebraska-Lincoln's Institutional Review Board at 1(402)472-6965 or irb@unl.edu.

What will happen if you decide not to be in this research study or decide to stop participating once you start?

You can decide not to participate in this research study, or you can stop participating in this research study at any time before, during, or after the research begins for any reason. Deciding not to participate in this research study or deciding to withdraw will not affect

your relationship with the investigators or with the University of Nebraska-Lincoln. You will not lose any benefits to which you are entitled.

Documentation of Informed Consent: You are voluntarily making a decision whether or not to be in this research study. By signing below, this means that (1) you have read and understood this consent form, (2) you have had the consent form explained to you, (3) you have had your questions answered, and (4) you have decided to participate in the research study. If you would like, the research team can provide you with a copy of this consent form.

Name of Participant (print/type)

Participant Signature

Date

Appendix F

Semi-structured Interview Protocol

Interviewer: Before we begin, I want to thank you for taking the time to help me learn about your research and taking part in this study. This interview will take about 45 minutes and I will be recording this session via Zoom.

You will be contacted via email with a 1-page summary from this interview to ensure the accuracy of my interpretations of this interview. A pseudonym will be used to report any direct quotes we may use from this interview, which will be reported in journals and conference presentations. If you have a pseudonym you would like for us to use, please let me know. If not, we will provide one. If, at any point, something arises, please feel free to let me know. Do you have any questions about this study?

MMR and Sampling: *Today we will be discussing your work using mixed methods approaches in psychological intervention research. First, I want to start off by talking about your research interests.*

1) Please briefly describe your research interests and the populations you tend to work with for your research.

Recruitment and Retention: *For the next set of questions, we'll be discussing recruitment and retention in mixed methods research studies. In other words, recruiting such as the strategies you used to invite participants in your mixed methods studies, and retention such as the strategies implemented on keeping participants engaged throughout the duration of the study. We will first start off with the recruitment questions.*

2) What challenges, if any, have you encountered related to *recruiting* participants in mixed methods studies?

3) What *recruitment* strategies have you found to be most effective in your mixed methods studies?

4) What challenges, if any, have you encountered related to *retaining* participants in mixed methods studies?

5) What *retention* strategies have you found to be most effective in your mixed methods psychological studies?

Data Collection and Analysis and Integration: *Next, I want to gain a better understanding of the sampling considerations and how they influence the integration and order we collect data for the quantitative and qualitative strands.*

6) For this question we will be discussing mixed methods research designs. Convergent designs involve simultaneous data collection and analysis, whereas sequential designs

involve data collection and analysis of one strand, followed by the subsequent strand, where one strand depends on the other, one strand informs data collection and analysis of the other.

What aspects related to sampling are important to consider across the different **mixed methods core designs** for intervention research?

7) What influences your decision on the temporal placement of the qualitative strand? In other words, are there different reasons for implementing the qualitative phase before an RCT, during, or after?

8) What considerations do you take when deciding whether to use identical samples between the quantitative and qualitative strands or different samples between the quantitative and qualitative strands? (e.g., identical vs. parallel, nested, and multilevel)

Follow-up: What challenges, if any, are present when integrating findings between the quantitative and qualitative strands if the samples between both strands are different?

9) From your experiences, how is sampling different across solely intervention studies versus other designs such as implementation and hybrid trial designs in mixed methods research?

Final Thoughts: *For the last set of questions, I will be asking about advice or recommendations you would give to other researchers carrying out a mixed methods study in psychological intervention research.*

10) What recommendations or considerations would you give researchers related to sampling, recruitment, and retention methods for mixed methods psychological intervention research?

11) What additional information would you like to add that perhaps we have not yet discussed?

Thank you again so much for sharing your insights on this topic. I appreciate your time. I will be contacting you within a month or two with a member checking summary and also a gift card as compensation for engaging in this study. Before we wrap up, I wanted to ask if you know of any colleagues who might engage in similar work, conducting mixed methods psychological intervention research, who might be interested in this study? If so, I would be happy to get in contact with them via email to ask if they would also like to participate in this study and gain their insights on this topic as well.

Appendix G

Demographics Questionnaire for Semi-structured Interviews and Modified e-Delphi Study Participants

- 1) What is your gender?
 - Male
 - Female
 - Intersex
 - Prefer not to respond
 - Not listed, please specify

- 2) What is your *current* position?
 - Tenure-Track Professor
 - Non-Tenure Track Professor
 - Research Associate
 - Adjunct Faculty
 - Post-Doctoral Researcher
 - Data Scientist
 - Retired
 - Other, please specify (Bank entry field)

- 3) How many years were you in this position?
 - Less than 1 year
 - 1-5 years
 - 6-10 years
 - 11-15 years
 - More than 15 years

- 4) If you are retired, please type the previous academic/industry position you retired from. [Open-ended response]

- 5) Approximately how long have you been in your current position?
[Numerical/open-ended response]

- 6) What is your main substantive area of focus (i.e., discipline or subdiscipline)?
Please check all that apply.
 - Psychology
 - Nursing
 - Public Health
 - More than one
 - Other, please specify (Bank entry field)

- 7) What methodology do you have most experience in?
 - Quantitative

Qualitative
Mixed Methods Research
Other, please specify (Bank entry field)

- 8) How would you rate your level of experience in mixed methods research?
- Novice
 - Competent
 - Proficient
 - Expert

Appendix H

Member-checking for Semi-structured Interviews Email

Subject: Follow-up: Request for Research Participation: Practical Recommendations on Sampling in Mixed Methods Psychological Interventions: A Mixed Methods Case Study

Dear Dr. [Participant's Last Name],

I hope you are doing well. I wanted to send you some updates regarding the study you participated in about the use of mixed methods in psychological intervention research and the challenges to sampling, recruitment, and retention. I am excited to share that I have wrapped up data analysis of the qualitative semi-structured interviews! Your contributions to this study have been invaluable. This study would not have come to fruition without your participation and insights on this important topic.

Attached are the findings based on the collective group. Direct quotes have been included underneath the themes. These will be included in published manuscripts and conference presentations. Please review the attached document to ensure I accurately captured your perspectives. If there are any comments or additions you would like to make, please let me know. If you are able, please let me know your thoughts by Wednesday, May 10th.

I would also like to send you a \$20 Amazon e-gift card for your participation in this study. Please let me know a good email address to send the e-gift card.

I sincerely thank you for sharing your time and expertise with me as we continue advancing the field of mixed methods psychological intervention research.

If you have any questions or concerns, please let me know.

With much appreciation,

Analay

Appendix I

Recruitment Email for Modified e-Delphi Study

Subject: Research Study Participation: Practical Recommendations on Sampling in Mixed Methods Psychological Interventions: A Mixed Methods Case Study

Hello Dr. [Participant's Last Name],

My name is Analay Perez and I am a Ph.D. candidate in the Quantitative, Qualitative, and Psychometric Methods program at the University of Nebraska-Lincoln. I am contacting you to request your participation in a modified e-Delphi study. The purpose of this study is to refine and test the content validity of a mixed methods research sampling model for the health sciences.

If you agree to participate in this study, you will be asked to complete a short demographic questionnaire that will only be administered one time. After, using a modified e-Delphi technique, you will be asked to complete two to three questionnaires (also known as rounds) to achieve consensus. Each questionnaire should take about 15-20 minutes to complete. By taking part in this study, you are allowing us to refine and further develop a mixed methods research sampling model for the health sciences.

If this is something you would be interested in, please reply to this email and I will send you the informed consent that will include more information. I thank you in advance for your time and consideration. If you have any questions, please do not hesitate to contact me.

Again, I sincerely appreciate your consideration and look forward to hearing from you!

Best,
Analay

Appendix J

Follow-Up Email for Modified e-Delphi Study

Note. Email is intended if no responses is received within two weeks from initial recruitment email.

Subject: Follow-up: Research Study Participation: Practical Recommendations on Sampling in Mixed Methods Psychological Interventions: A Mixed Methods Case Study

Hello Dr. [Participant's Last Name],

This email is a follow-up from a previous message sent about two weeks ago inviting you to participate in a modified e-Delphi study with the purpose of refining and testing the content validity of a mixed methods research sampling model for the health sciences.

If you agree to participate in this study, you will be asked to complete a short demographic questionnaire that will only be administered one time. After, using a modified e-Delphi technique, you will be asked to complete two to three questionnaires (also known as rounds) to achieve consensus. Each questionnaire should take about 15-20 minutes to complete. By taking part in this study, you are allowing us to refine and further develop a mixed methods research sampling model for the health sciences.

If this is something you would be interested in, please reply to this email and I will send you the informed consent that will include more information. I thank you in advance for your time and consideration. If you have any questions, please do not hesitate to contact me.

I sincerely thank you for your time and appreciate your consideration. I look forward to hearing from you!

Best,
Analay

Appendix K

Consent Form for Modified e-Delphi Study

Study Title: Practical Recommendations on Sampling in Mixed Methods Psychological Interventions: A Mixed Methods Case Study

Authorized Study Personnel:

Primary Investigator: Analay Perez, aperez@huskers.unl.edu

UNL Faculty Advisor: Wayne A. Babchuk, wbabchuk1@unl.edu

Dear Participant,

You are invited to take part in this research study. The information on this form is meant to help you decide whether or not to participate. Please carefully read the entire document. You can ask any questions you have before deciding if you want to participate.

Why are you being asked to be in this research study?

You are being asked to participate in this study because you have either: (a) conducted mixed methods methodological research, (b) have written about mixed methods research sampling either through peer-reviewed published articles, book chapters, or textbooks, (c) have served or currently serve on editorial board(s) across mixed methods journal(s), and/or (d) have conducted a mixed methods intervention research study in the social and behavioral sciences as a methodologist.

What is the purpose of this study?

The purpose of this study is to refine and test the content validity of a preliminary list of practical recommendations on mixed methods research sampling across psychological intervention research. Importantly, this study aims to propose practical recommendations on sampling, recruitment, and retention across mixed methods psychological interventions to better inform tailored interventions through the evaluation of effective recruitment and retention strategies and provide best practices when making sampling decisions.

What will you be asked to do if you take part in this research study?

You will be asked to complete a brief demographics questionnaire that will only be administered once. After, using a modified e-Delphi technique, you will be asked to complete two to three questionnaires (also known as rounds) to achieve consensus. Each questionnaire should take about 15-20 minutes to complete. At the beginning of each round, results from the previous round will be provided and will include your individual responses as well as aggregated results from the entire sample. After reviewing these results, you will be asked to complete a subsequent questionnaire (or round). You may be contacted to participate in no more than three rounds.

Are you required to participate in this study?

Taking part in this research study is completely voluntary. If you choose to participate, you have the right to stop at any time. Your decision will not influence current or future relationships with researchers either now or in the future.

What are the possible risks of being in this research study?

There are no significant risks for participants in this study, and your participation is voluntary.

What are the possible benefits of completing the research study?

By taking part in this study, you are allowing us to help inform researchers on ways to conduct a rigorous mixed methods research study in the health sciences and help us in the development and refinement of a mixed methods research sampling model for the health sciences.

Will you be compensated for being in this research study?

For your participation in this study, you will be compensated with a \$20 Amazon e-gift card.

How will information about you be protected?

Your data (including informed consent and audio files) will be stored electronically through a secure server. The only people who will have access to your research records are the study personnel, the Institutional Review Board (IRB), and any other person, agency, or sponsor as required by law. Records from this research will be stored for a minimum of three years after the completion and publication of the study. The information from this study may be published in scientific journals and presented at scientific meetings. Pseudonyms will be used to protect participant anonymity.

What are your rights?

You may ask any questions concerning this research and have those questions answered before agreeing to participate in the study or during the study. For study related questions, please contact the Principal Investigator, Analay Perez, by email aperez@huskers.unl.edu. If you have questions about ethical aspects of the research or wish to make a complain about how it is being conducted, you may contact the University of Nebraska-Lincoln's Institutional Review Board at 1(402)472-6965 or irb@unl.edu.

What will happen if you decide not to be in this research study or decide to stop participating once you start?

You can decide not to participate in this research study, or you can stop participating in this research study at any time before, during, or after the research begins for any reason. Deciding not to participate in this research study or deciding to withdraw will not affect your relationship with the investigators or with the University of Nebraska-Lincoln. You will not lose any benefits to which you are entitled.

You are voluntarily making a decision whether or not to participate in this research study, By clicking on the 'I Agree' button below, your consent to participate is implied. You should print or save a copy of this page for your records.

Name of Participant (print/type)

Participant Signature

Date

Appendix L

Consent Form and Qualtrics Links

Subject: Follow-up: Research Study Participation: Practical Recommendations on Sampling in Mixed Methods Psychological Interventions: A Mixed Methods Case Study

Hello Dr. [Participant's Last Name],

Thank you so much for your willingness to participate in this study. I sincerely appreciate your time and expertise as we explore and learn more about sampling in mixed methods intervention research.

Below I have included a link to the online informed consent. Once you have gone through the informed consent and submitted your response, the following page will display a brief demographic questionnaire.

Informed Consent: https://unleducation.az1.qualtrics.com/jfe/form/SV_8vlwqTF9l6t8oXc

Below, I have also included the link to the initial Round 1 e-Delphi questionnaire. There are a total of 23 methodological statements regarding sampling and related components in mixed methods psychological intervention research with open-ended text boxes to allow for additional comments. This questionnaire should take about 15-20 minutes to complete.

Round 1 e-Delphi Questionnaire

Link: https://unleducation.az1.qualtrics.com/jfe/form/SV_6GtHZswVajLvpdA

If you are able, we would greatly appreciate your responses to this questionnaire by Friday, May 12th, 2023.

Please do not hesitate to contact me if you have any questions.

Thank you again so much for your time.

All the best,
Analay

Appendix M

Round 1 Modified e-Delphi Questionnaire

Thank you for participating in this study. We are interested in identifying the most relevant recommendations on sampling in mixed methods research to inform researchers conducting a mixed methods psychological intervention research study.

For the following questions, please rate the level of relevancy for each sampling recommendation in mixed methods psychological intervention research. Below each set of questions, a text box is included if you have any comments you would like to include.

What is your name? (This information will only be used to internally calculate individual responses.)

The following recommendations are specific to **recruitment** strategies in mixed methods psychological intervention research.

- 1) Identify the most effective strategies to recruit participants based on the sample demographics and accessibility. These may include, but are not limited to, referrals, recruiting through care facilities, flyers, attending community events, etc.

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 2) Develop strategies to ensure buy-in from community partners/gatekeepers involved in the recruitment process.

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 3) Ensure transparency of sample inclusion criteria to gatekeepers/community partners.

Extremely relevant
 Very relevant
 Moderately relevant

Slightly relevant
Not at all relevant

- 4) Consider strategies to develop trust with community partners. This may include but is not limited to, describing the role(s) of the researcher, the goals of the study, describing value of intervention, and having conversations with partners on their role(s) and how they plan to be involved.

Extremely relevant
Very relevant
Moderately relevant
Slightly relevant
Not at all relevant

- 5) Consider how selection bias was mitigated when recruiting participants between the quantitative and qualitative strands of the mixed methods psychological intervention study.

Extremely relevant
Very relevant
Moderately relevant
Slightly relevant
Not at all relevant

- 6) If you have any additional comments on the previous questions, please include them below.

The following recommendations are specific to **retention** strategies in mixed methods psychological intervention research.

- 7) Identify effective strategies or a combination of strategies for maintaining continuous contact with participants and gatekeepers. These strategies may include but are not limited to face-to-face interactions, phone, email, and sending participant reminders.

Extremely relevant
Very relevant
Moderately relevant
Slightly relevant
Not at all relevant

- 8) Enhance barrier-reduction strategies between the quantitative and qualitative strands, and full mixed methods study. These strategies may include but are not limited to scheduling flexibility, offering participants the option to choose the desired location for data collection (e.g., home, clinic/hospital, school), opportunity to make up missed session, providing transportation/travel reimbursement, and childcare.

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 9) Identify appropriate incentive(s) most appealing to the target population. This may include but is not limited to determining whether to offer gift cards or cash (if possible) and offering participants their choice of gift card (e.g., goods, restaurants).

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 10) If possible, consider providing an incentive after each data collection point between the quantitative and qualitative strands.

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 11) Particularly in cases of participant dropout, assess the representativeness of sample(s) over time between the quantitative and qualitative strands.

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 12) Identify reasons for attrition to determine whether participant dropout was at random or not at random (e.g., inherent to study characteristics/design).

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 13) If you have any additional comments on the previous questions, please include them below.

The following recommendations are specific to **sampling across mixed methods core designs**.

- 14) Researchers are encouraged to report sample size(s) between the quantitative and qualitative strands of the mixed methods psychological intervention study.

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 15) If using a subsample (i.e., nested sample), researchers are encouraged to provide details on subsample demographics.

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 16) Provide explicit statement(s) on the reasons for the chosen sampling approach between the quantitative and qualitative strands of the mixed methods psychological intervention study.

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 17) Provide rationale on decision(s) for choosing identical samples or different samples between the quantitative and qualitative strands and how it relates to the chosen mixed methods core design.

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 18) Consider the characteristics of identical samples and its representativeness over time.

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 19) If you have any additional comments on the previous questions, please include them below.

The following recommendations are specific to **data collection** in mixed methods psychological intervention research.

- 20) Carefully consider the types of data sources that are used between the quantitative and qualitative strands and whether they are conducive to the sample(s) (e.g., language, reading levels, cognitive abilities, concentration levels).

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 21) Provide participants with transparency on the data collection procedures (e.g., how will data be used, potential benefits from participating in study).

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 22) If you have any additional comments on the previous questions, please include them below.

The following recommendations are specific to **integrating** mixed methods samples in psychological intervention research.

- 23) Researchers are encouraged to report the mixed methods research sampling design used in the mixed methods psychological intervention study (see Onwuegbuzie and Collins, 2007).

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 24) When integrating findings between samples, consider whether findings corroborate, or whether samples are contextually different leading to validly different results.

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 25) Identify the point(s) of commonality between samples when integrating findings and provide a statement describing this process.

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 26) If you have any additional comments on the previous questions, please include them below.

The following recommendations are specific to the **temporal placement of the qualitative strand** in mixed methods psychological intervention research.

- 27) Consider the time lag between data collection and analysis between the quantitative and qualitative strands and its impact on the priming effects and validity of the data.

Extremely relevant
 Very relevant
 Moderately relevant
 Slightly relevant
 Not at all relevant

- 28) Provide explicit reason(s) for the temporal placement of the qualitative strand in relation to the intervention. Examples include but are not limited to:

Before: Motivations or demotivations for participation, receptivity to personnel delivery methods, develop prototype of intervention, identifying culturally responsive components, gauging participants' and therapists' prior experiences with intervention, exploring factors that may influence intervention, identifying variables to target in intervention, developing intervention.

During: Adaptations to intervention, perceived intervention barriers, exploring

range of outcome measure(s) (i.e., explore multiple psychological constructs being measured qualitatively), exploring coping mechanisms, exploring how participants feel during time of intervention, explore how participants are implementing intervention as intervention is occurring.

After: Adaptations to intervention, overall experiences and feelings about intervention, elicit participant feedback on intervention, perceived acceptability of intervention, perceived feasibility and acceptability of intervention, perceived acceptability and efficacy of intervention, perceived tolerability of intervention, identifying effective strategies used by participants to manage emotions after intervention, explore how intervention helped participants, evaluate participants' direct experiences with the intervention, assess barriers and facilitators of intervention, assess effectiveness of treatment, explore overall outcomes of intervention

Extremely relevant
Very relevant
Moderately relevant
Slightly relevant
Not at all relevant

- 29) Please include any additional comments regarding the previous question.
- 30) If you have any additional comments that you believe are important on sampling recommendations in mixed methods psychological intervention research studies, please include them below.

Appendix N

Last Reminder Email for Round 1 e-Delphi

I hope you are doing well. I wanted to follow up on the e-Delphi study on sampling in mixed methods research. Your expertise is very important to us as we aim to advance a list of practical recommendations on sampling in mixed methods psychological intervention research.

I wanted to send you an update and let you know the round 1 questionnaire is currently still available. The questionnaire for the first round will remain open till Tuesday, May 16, 2023. This questionnaire should take no more than 15 minutes to complete and consists of 23 short methodological statements.

If you are interested in participating, below I have included the informed consent. Once you have gone through the informed consent and submitted your response, the following page will display a brief demographic questionnaire.

Informed Consent: https://unleducation.az1.qualtrics.com/jfe/form/SV_8vlwqTF9l6t8oXc

To access and complete Round 1 of the modified e-Delphi questionnaire, please click the following link:

Round 1 e-Delphi Questionnaire

Link: https://unleducation.az1.qualtrics.com/jfe/form/SV_6GtHZswVajLvpdA

Please do not hesitate to contact me if you have any questions or if there is anything I can do.

Thank you again so much for your time and consideration.

All the best,
Analay

Appendix O

Email for Round 2 of Modified e-Delphi Study

Thank you very much for participating in the Round 1 e-Delphi study and sharing your expertise on mixed methods research sampling. This study aims to refine a list of practical recommendations on sampling in mixed methods psychological intervention research.

I have reviewed the results for Round 1, and I am excited to share a group summary of the feedback provided by experts. Two recommendations were added (24 and 25), and three were modified (recommendations 11, 16, and 19). An additional response category, 'I cannot tell,' was added as suggested by participants.

Please see attached for the document with the group and your individual responses to Round 1. Specifically, this document includes Round 1 group responses, your response to each recommendation from Round 1, Round 1 expert comments, and suggested changes/additions made moving forward to Round 2. Before rating each recommendation for Round 2, please review this document and refer to it as you complete the Round 2 questionnaire.

Below you will find the Qualtrics link to the Round 2 questionnaire:

Round 2 e-Delphi Questionnaire

Link: https://unleducation.az1.qualtrics.com/jfe/form/SV_8rmjytnOpjFU5i

If you are able, we would greatly appreciate your responses to this questionnaire by Wednesday, May 24th, 2023.

Please do not hesitate to contact me if you have any questions.

Thank you again so much for your time and participation in this study.

All the best,
Analay

Appendix P

Round 1 Summary Response Sent to Participants

Group responses and comments

| 1. Identify the most effective strategies to recruit participants based on the sample demographics and accessibility. These may include, but are not limited to, referrals, recruiting through care facilities, flyers, attending community events, etc. | | | |
|--|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 7 | 70% | |
| Very relevant | 2 | 20% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 1 | 10% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Identify the most effective strategies to recruit participants based on the sample demographics and accessibility. These may include, but are not limited to, referrals, recruiting through care facilities, flyers, attending community events, etc.

[Individual Participant Response]

Group responses and comments

| 2. Develop strategies to ensure buy-in from community partners/gatekeepers involved in the recruitment process. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 7 | 70% | |
| Very relevant | 3 | 30% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Develop strategies to ensure buy-in from community partners/gatekeepers involved in the recruitment process.

[Individual Participant Response]

Group responses and comments

| 3. Ensure transparency of sample inclusion criteria to gatekeepers/community partners. | | | |
|--|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 5 | 50% | |
| Very relevant | 4 | 40% | |
| Moderately relevant | 1 | 10% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Ensure transparency of sample inclusion criteria to gatekeepers/community partners.

[Individual Participant Response]

Group responses and comments

| 4. Consider strategies to develop trust with community partners. This may include but is not limited to, describing the role(s) of the researcher, the goals of the study, describing value of intervention, and having conversations with partners on their role(s) and how they plan to be involved. | | | |
|--|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 9 | 90% | |
| Very relevant | 1 | 10% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Consider strategies to develop trust with community partners. This may include but is not limited to, describing the role(s) of the researcher, the goals of the study, describing value of intervention, and having conversations with partners on their role(s) and how they plan to be involved.

[Individual Participant Response]

Group responses and comments

| 5. Consider how selection bias was mitigated when recruiting participants between the quantitative and qualitative strands of the mixed methods psychological intervention study. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 7 | 70% | |
| Very relevant | 1 | 10% | |
| Moderately relevant | 2 | 20% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Consider how selection bias was mitigated when recruiting participants between the quantitative and qualitative strands of the mixed methods psychological intervention study.

[Individual Participant Response]***Group comments***

If you have any additional comments on the previous questions [**recruitment**], please include them below.

- Purposeful/convenience sampling is used too often. It impacts the diversity in the data collected.

Group responses and comments

| 6. Identify effective strategies or a combination of strategies for maintaining continuous contact with participants and gatekeepers. These strategies may include but are not limited to face-to-face interactions, phone, email, and sending participant reminders. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 5 | 50% | |
| Very relevant | 4 | 40% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 1 | 10% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Identify effective strategies or a combination of strategies for maintaining continuous contact with participants and gatekeepers. These strategies may include but are not limited to face-to-face interactions, phone, email, and sending participant reminders.

[Individual Participant Response]

Group responses and comments

| 7. Enhance barrier-reduction strategies between the quantitative and qualitative strands, and full mixed methods study. These strategies may include but are not limited to scheduling flexibility, offering participants the option to choose the desired location for data collection (e.g., home, clinic/hospital, school), opportunity to make up missed session, providing transportation/travel reimbursement, and childcare. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 9 | 90% | |
| Very relevant | 1 | 10% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Enhance barrier-reduction strategies between the quantitative and qualitative strands, and full mixed methods study. These strategies may include but are not limited to scheduling flexibility, offering participants the option to choose the desired location for data collection (e.g., home, clinic/hospital, school), opportunity to make up missed session, providing transportation/travel reimbursement, and childcare.

[Individual Participant Response]

Group responses and comments

| 8. Identify appropriate incentive(s) most appealing to the target population. This may include but is not limited to determining whether to offer gift cards or cash (if possible) and offering participants their choice of gift card (e.g., goods, restaurants). | | | |
|--|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 2 | 20% | |
| Very relevant | 4 | 40% | |
| Moderately relevant | 4 | 40% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Identify appropriate incentive(s) most appealing to the target population. This may include but is not limited to determining whether to offer gift cards or cash (if possible) and offering participants their choice of gift card (e.g., goods, restaurants).

[Individual Participant Response]

Group responses and comments

| 9. If possible, consider providing an incentive after each data collection point between the quantitative and qualitative strands. | | | |
|--|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 1 | 10% | |
| Very relevant | 6 | 60% | |
| Moderately relevant | 2 | 20% | |
| Slightly relevant | 1 | 10% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: If possible, consider providing an incentive after each data collection point between the quantitative and qualitative strands.

[Individual Participant Response]

Group responses and comments

| 10. Particularly in cases of participant dropout, assess the representativeness of sample(s) over time between the quantitative and qualitative strands. | | | |
|--|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 7 | 70% | |
| Very relevant | 2 | 20% | |
| Moderately relevant | 1 | 10% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Particularly in cases of participant dropout, assess the representativeness of sample(s) over time between the quantitative and qualitative strands.

[Individual Participant Response]

Group responses and comments

| 11. Identify reasons for attrition to determine whether participant dropout was at random or not at random (e.g., inherent to study characteristics/design). | | | |
|--|-------|------------|---|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 6 | 60% | <ul style="list-style-type: none"> Understanding whether attrition is random is very important but may not be practical or feasible. If someone attritted, they may not want follow up to give a reason. |
| Very relevant | 3 | 30% | |
| Moderately relevant | 1 | 10% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Identify reasons for attrition to determine whether participant dropout was at random or not at random (e.g., inherent to study characteristics/design).

[Individual Participant Response]

Suggested change for round 2: Given the sensitivity of the research topic, if feasible, identify reasons for attrition to determine whether participant dropout was at random or not at random (e.g., inherent to study characteristics/design).

Group responses and comments

| 12. Researchers are encouraged to report sample size(s) between the quantitative and qualitative strands of the mixed methods psychological intervention study. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 8 | 80% | |
| Very relevant | 1 | 10% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 1 | 10% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Researchers are encouraged to report sample size(s) between the quantitative and qualitative strands of the mixed methods psychological intervention study.

[Individual Participant Response]

Group responses and comments

| 13. If using a subsample (i.e., nested sample), researchers are encouraged to provide details on subsample demographics. | | | |
|--|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 9 | 90% | |
| Very relevant | 0 | 0% | |
| Moderately relevant | 1 | 10% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: If using a subsample (i.e., nested sample), researchers are encouraged to provide details on subsample demographics.

[Individual Participant Response]

Group responses and comments

| 14. Provide explicit statement(s) on the reasons for the chosen sampling approach between the quantitative and qualitative strands of the mixed methods psychological intervention study. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 8 | 80% | |
| Very relevant | 2 | 20% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Provide explicit statement(s) on the reasons for the chosen sampling approach between the quantitative and qualitative strands of the mixed methods psychological intervention study.

[Individual Participant Response]

Group responses and comments

| 15. Provide rationale on decision(s) for choosing identical samples or different samples between the quantitative and qualitative strands and how it relates to the chosen mixed methods core design. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 6 | 60% | |
| Very relevant | 3 | 30% | |
| Moderately relevant | 1 | 10% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Provide rationale on decision(s) for choosing identical samples or different samples between the quantitative and qualitative strands and how it relates to the chosen mixed methods core design.

[Individual Participant Response]

Group responses and comments

| 16. Consider the characteristics of identical samples and its representativeness over time. | | | |
|---|--------------|-------------------|--|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 5 | 50% | <ul style="list-style-type: none"> • I do not quite understand 16 |
| Very relevant | 3 | 30% | |
| Moderately relevant | 1 | 10% | |
| Slightly relevant | 1 | 10% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Consider the characteristics of identical samples and its representativeness over time.

[Individual Participant Response]

Suggested change for round 2: Consider the characteristics of identical samples and whether these characteristics remain representative of the sample over time.

Group responses and comments

| 17. Carefully consider the types of data sources that are used between the quantitative and qualitative strands and whether they are conducive to the sample(s) (e.g., language, reading levels, cognitive abilities, concentration levels). | | | |
|--|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 7 | 70% | |
| Very relevant | 2 | 20% | |
| Moderately relevant | 1 | 10% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Carefully consider the types of data sources that are used between the quantitative and qualitative strands and whether they are conducive to the sample(s) (e.g., language, reading levels, cognitive abilities, concentration levels).

[Individual Participant Response]

Group responses and comments

| 18. Provide participants with transparency on the data collection procedures (e.g., how will data be used, potential benefits from participating in study). | | | |
|---|--------------|-------------------|---|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 7 | 70% | <ul style="list-style-type: none"> It's ethically important but not sure how much it will improve recruitment or retention |
| Very relevant | 2 | 20% | |
| Moderately relevant | 1 | 10% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Provide participants with transparency on the data collection procedures (e.g., how will data be used, potential benefits from participating in study).

[Individual Participant Response]***Group comments***

If you have any additional comments on the previous questions [**data collection**], please include them below.

- The participant burden for data collection is important to consider as well - how much time will it take them to provide data, and if there is an intervention of some sort, how long for that.

Group responses and comments

| 19. Researchers are encouraged to report the mixed methods research sampling design used in the mixed methods psychological intervention study (see Onwuegbuzie and Collins, 2007). | | | |
|---|--------------|-------------------|---|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 5 | 50% | <ul style="list-style-type: none"> • I recommend taking out the citation listed. This is the only one that has had a citation. |
| Very relevant | 2 | 20% | |
| Moderately relevant | 2 | 20% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| Unanswered | 1 | 10% | |

Your response in round 1: Researchers are encouraged to report the mixed methods research sampling design used in the mixed methods psychological intervention study (see Onwuegbuzie and Collins, 2007).

[Individual Participant Response]

Suggested change for round 2: Researchers are encouraged to report the mixed methods research sampling design used in the mixed methods psychological intervention study.

Group responses and comments

| 20. When integrating findings between samples, consider whether findings corroborate, or whether samples are contextually different leading to validly different results. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 5 | 50% | |
| Very relevant | 2 | 20% | |
| Moderately relevant | 2 | 20% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| Unanswered | 1 | 10% | |

Your response in round 1: When integrating findings between samples, consider whether findings corroborate, or whether samples are contextually different leading to validly different results.

[Individual Participant Response]

Group responses and comments

| 21. Identify the point(s) of commonality between samples when integrating findings and provide a statement describing this process. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 5 | 50% | |
| Very relevant | 4 | 40% | |
| Moderately relevant | 1 | 10% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Identify the point(s) of commonality between samples when integrating findings and provide a statement describing this process.

[Individual Participant Response]

Group comments

If you have any additional comments on the previous questions [**integrating mixed methods sampling**], please include them below.

- These [integrating samples] are often overlooked.
- I do not understand some questions/items. They do not make sense to me. In the next round, can you add a response option such as "I cannot tell" or "other response"? Not having this type of item imposes a cognitive burden on the respondent.
- How to manage discordant findings is in particular need of more guidance

Group responses and comments

| 22. Consider the time lag between data collection and analysis between the quantitative and qualitative strands and its impact on the priming effects and validity of the data. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 3 | 30% | |
| Very relevant | 4 | 40% | |
| Moderately relevant | 1 | 10% | |
| Slightly relevant | 2 | 20% | |
| Not at all relevant | 0 | 0% | |

Your response in round 1: Consider the time lag between data collection and analysis between the quantitative and qualitative strands and its impact on the priming effects and validity of the data.

[Individual Participant Response]

Group responses and comments

23. Provide explicit reason(s) for the temporal placement of the qualitative strand in relation to the intervention. Examples include but are not limited to:

Before: Motivations or demotivations for participation, receptivity to personnel delivery methods, develop prototype of intervention, identifying culturally responsive components, gauging participants' and therapists' prior experiences with intervention, exploring factors that may influence intervention, identifying variables to target in intervention, developing intervention.

During: Adaptations to intervention, perceived intervention barriers, exploring range of outcome measure(s) (i.e., explore multiple psychological constructs being measured qualitatively), exploring coping mechanisms, exploring how participants feel during time of intervention, explore how participants are implementing intervention as intervention is occurring.

After: Adaptations to intervention, overall experiences and feelings about intervention, elicit participant feedback on intervention, perceived acceptability of intervention, perceived feasibility and acceptability of intervention, perceived acceptability and efficacy of intervention, perceived tolerability of intervention, identifying effective strategies used by participants to manage emotions after intervention, explore how intervention helped participants, evaluate participants' direct experiences with the intervention, assess barriers and facilitators of intervention, assess effectiveness of treatment, explore overall outcomes of intervention

| Answer choice | Count | Percentage | Comments |
|----------------------|--------------|-------------------|-----------------|
| Extremely relevant | 4 | 40% | |
| Very relevant | 6 | 60% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |

Your response to round 1: Provide explicit reason(s) for the temporal placement of the qualitative strand in relation to the intervention.

[Individual Participant Response]

If you have any additional comments that you believe are important on sampling recommendations in mixed methods psychological intervention research studies, please include them below.

- There should have been a question about the temporal placement of quantitative research right? Or maybe a temporal placement relative to the relationship between quan and qual strands?
- Were all types of participant-based integration of qualitative and quantitative methods (sampling) addressed?
 - E.g., Construct a sample for the QUAL component of a convergent design MMR using a priori features within the larger sample used in the QUAN component.
 - Identify essential features from phase-one QUAN results of a sequential explanatory design MMR to sample participants for the phase-two QUAL.
 - Identify essential attributes from phase-one QUAL findings of a sequential exploratory design MMR to sample specific participants for the phase-two QUAN.
 - Use an identical sample for the QUAL and QUAN components or phases of a MMR.
Example: A feasibility study in preparation for planning a randomized controlled trial.
 - Build theoretically connected samples, but separate samples for the QUAL and QUAN components, or phases, or levels of a MMR.
Example 1: Build a small sample of information-rich participants of a QUAL component (key informants or stakeholders), which is not included in the large sample of participants of the QUAN component.
Example 2: Build a level-one large sample of patients and caregivers, and a level-two small sample of health care clinicians and managers, for the QUAN and QUAL components of a MMR, respectively.
- Again, I think balancing the participant burden is important - you could do qual pre, during and post intervention, but SHOULD you?

New recommendation added to round 2***Comments provided by participants:***

- The participant burden for data collection is important to consider as well - how much time will it take them to provide data, and if there is an intervention of some sort, how long for that.
- Again, I think balancing the participant burden is important - you could do qual pre, during and post intervention, but SHOULD you?

24. Identify strategies to reduce participant burnout related to the mixed methods design. This can include but is not limited to considering how long data collection will take for the quantitative and qualitative strands, how long the intervention will last, if qualitative data will be collected at multiple points in the mixed methods study, and, if so, providing explicit reason(s) for collecting data at multiple points.

New recommendation added to round 2

Comments provided by participants:

- These [integrating samples] are often overlooked.
- There should have been a question about the temporal placement of quantitative research right? Or maybe a temporal placement relative to the relationship between quan and qual strands?
- Were all types of participant-based integration of qualitative and quantitative methods (sampling) addressed?
 - E.g., Construct a sample for the QUAL component of a convergent design MMR using a priori features within the larger sample used in the QUAN component.
 - Identify essential features from phase-one QUAN results of a sequential explanatory design MMR to sample participants for the phase-two QUAL.
 - Identify essential attributes from phase-one QUAL findings of a sequential exploratory design MMR to sample specific participants for the phase-two QUAN.
 - Use an identical sample for the QUAL and QUAN components or phases of a MMR.
Example: A feasibility study in preparation for planning a randomized controlled trial.
 - Build theoretically connected samples, but separate samples for the QUAL and QUAN components, or phases, or levels of a MMR.
Example 1: Build a small sample of information-rich participants of a QUAL component (key informants or stakeholders), which is not included in the large sample of participants of the QUAN component.
Example 2: Build a level-one large sample of patients and caregivers, and a level-two small sample of health care clinicians and managers, for the QUAN and QUAL components of a MMR, respectively.

25. Provide an explicit rationale(s) on how the quantitative and qualitative samples were integrated in the full mixed methods intervention study.

Examples include but are not limited to: constructing a sample for the qualitative phase of a convergent design using a priori features from a larger quantitative phase, identifying essential features from the quantitative results of an explanatory sequential design to inform the sample selection for the follow-up qualitative phase, identifying essential attributes based on the qualitative findings of a sequential exploratory design to sample specific participants for the follow-up quantitative phase, using an identical sample between the quantitative and qualitative phases (e.g., conducting a feasibility study to plan for a randomized controlled trial), create theoretically connected samples that are different between the quantitative and qualitative phases that are not included in the larger sample of the quantitative phase (e.g., building a small sample of information-rich participants for the qualitative phase comprised of key informants or stakeholders), using a multilevel sample where the qualitative phase is comprised of therapists and case managers, and the larger quantitative sample is comprised of patients and caregivers.

Appendix P

Last Reminder Email for Round 2 e-Delphi

I hope all is well. I am writing to follow up on the modified e-Delphi study on sampling in mixed methods psychological intervention research. We would like to send you a kind reminder and let you know the Round 2 questionnaire is still available. The experts who have completed the questionnaire so far have taken between 10-15 minutes. We would sincerely appreciate if you are able to complete the questionnaire by Wednesday, May 24, 2023.

In light of the results from Round 1, two recommendations were added (24 and 25), and three were modified (recommendations 11, 16, and 19). An additional response category, 'I cannot tell,' was added as suggested by participants.

Please see attached for the document with the group and individual responses to Round 1. Specifically, this document includes Round 1 group responses, your responses to each recommendation from Round 1, Round 1 expert comments, and suggested changes/additions made moving forward to Round 2. Before rating each recommendation for Round 2, please review this document and refer to it as you complete the Round 2 questionnaire.

Below you will find the Qualtrics link to the Round 2 questionnaire:

Round 2 e-Delphi Questionnaire

Link: https://unleducation.az1.qualtrics.com/jfe/form/SV_8rmjytnOpjFUsSi

Please do not hesitate to contact me if you have any questions or if there is anything I can do.

Thank you again so much for your time and consideration.

All the best,
Analay

Appendix Q

Round 2 Modified e-Delphi Summary Responses

Group responses and comments

| 1. Identify the most effective strategies to recruit participants based on the sample demographics and accessibility. These may include, but are not limited to, referrals, recruiting through care facilities, flyers, attending community events, etc. | | | |
|--|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 4 | 50% | |
| Very relevant | 2 | 25% | |
| Moderately relevant | 2 | 25% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Did not meet criteria

Group responses and comments

| 2. Develop strategies to ensure buy-in from community partners/gatekeepers involved in the recruitment process. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 5 | 62.5% | |
| Very relevant | 3 | 37.5% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Group responses and comments

| 3. Ensure transparency of sample inclusion criteria to gatekeepers/community partners. | | | |
|--|--------------|-------------------|--|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 2 | 25% | <ul style="list-style-type: none"> Relevant but be mindful of what is too much information for individuals. |
| Very relevant | 6 | 75% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Suggested change: Provide clear sample inclusion criteria to gatekeepers/community partners.

Group responses and comments

| 4. Consider strategies to develop trust with community partners. This may include but is not limited to, describing the role(s) of the researcher, the goals of the study, describing value of intervention, and having conversations with partners on their role(s) and how they plan to be involved. | | | |
|--|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 6 | 75% | |
| Very relevant | 2 | 25% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Group responses and comments

| 5. Consider how selection bias was mitigated when recruiting participants between the quantitative and qualitative strands of the mixed methods psychological intervention study. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 4 | 50% | |
| Very relevant | 3 | 37.5% | |
| Moderately relevant | 1 | 12.5% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Group responses and comments

| 6. Identify effective strategies or a combination of strategies for maintaining continuous contact with participants and gatekeepers. These strategies may include but are not limited to face-to-face interactions, phone, email, and sending participant reminders. | | | |
|---|--------------|-------------------|--|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 4 | 50% | <ul style="list-style-type: none"> • Continuous contact is pretty high standard. • Not specific to MMR |
| Very relevant | 1 | 12.5% | |
| Moderately relevant | 2 | 25% | |
| Slightly relevant | 1 | 12.5% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Did not meet criteria

Group responses and comments

| 7. Enhance barrier-reduction strategies between the quantitative and qualitative strands, and full mixed methods study. These strategies may include but are not limited to scheduling flexibility, offering participants the option to choose the desired location for data collection (e.g., home, clinic/hospital, school), opportunity to make up missed session, providing transportation/travel reimbursement, and childcare. | | | |
|---|-------|------------|--|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 5 | 71.4% | <ul style="list-style-type: none"> • I might refer to this idea as participant burden in addition to barriers. • This recommendation seems unclear (e.g., clarify the first sentence) and not specific to MMR? |
| Very relevant | 1 | 14.3% | |
| Moderately relevant | 3 | 42.9% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 1 | | |

Suggested change: Incorporate barrier-reduction strategies between the quantitative and qualitative strands, and full mixed methods study. These strategies may include but are not limited to scheduling flexibility, offering participants the option to choose the desired location for data collection (e.g., home, clinic/hospital, school), opportunity to make up missed session, providing transportation/travel reimbursement, and childcare.

Group responses and comments

| 8. Identify appropriate incentive(s) most appealing to the target population. This may include but is not limited to determining whether to offer gift cards or cash (if possible) and offering participants their choice of gift card (e.g., goods, restaurants). | | | |
|--|--------------|-------------------|---|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 1 | 12.5% | <ul style="list-style-type: none"> Some have expressed concerns about the use of "target population", which could be offensive or triggering given some historical injustice in unethical research. not specific to MMR |
| Very relevant | 3 | 37.5% | |
| Moderately relevant | 1 | 12.5% | |
| Slightly relevant | 3 | 37.5% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Did not meet criteria

Group responses and comments

| 9. If possible, consider providing an incentive after each data collection point between the quantitative and qualitative strands. | | | |
|--|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 2 | 25% | |
| Very relevant | 5 | 62.5% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 1 | 12.5% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Group responses and comments

| 10. Particularly in cases of participant dropout, assess the representativeness of sample(s) over time between the quantitative and qualitative strands. | | | |
|--|-------|------------|---|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 8 | 100% | <ul style="list-style-type: none"> This recommendation seems unclear: e.g., clarify the "representativeness of sample(s) over time"? |
| Very relevant | 0 | 0% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 1 | % | |

Suggested change: Particularly in cases of participant dropout, assess the representativeness of sample(s) (i.e., characteristics of the sample) over time between the quantitative and qualitative strands.

Group responses and comments

| 11. Given the sensitivity of the research topic, if feasible, identify reasons for attrition to determine whether participant dropout was at random or not at random (e.g., inherent to study characteristics/design). | | | |
|--|--------------|-------------------|------------------------------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 3 | 37.5% | • Relevant but may not be possible |
| Very relevant | 5 | 62.5% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Group responses and comments

| 12. Researchers are encouraged to report sample size(s) between the quantitative and qualitative strands of the mixed methods psychological intervention study. | | | |
|---|-------|------------|--|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 7 | 87.5% | <ul style="list-style-type: none"> Sample size and the strategy to solicit the sample (i.e., sample design components) are important. |
| Very relevant | 1 | 12.5% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Suggested change: Researchers are encouraged to report sample size(s) and the strategy to solicit the sample(s) between the quantitative and qualitative strands of the mixed methods psychological intervention study.

Group responses and comments

| 13. If using a subsample (i.e., nested sample), researchers are encouraged to provide details on subsample demographics. | | | |
|--|--------------|-------------------|--|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 7 | 87.5% | <ul style="list-style-type: none"> This information could be interpreted as part of the rationale for the selection of the nested sample. |
| Very relevant | 1 | 12.5% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

No changes were made as this refers to a nested sample.

Group responses and comments

| 14. Provide explicit statement(s) on the reasons for the chosen sampling approach between the quantitative and qualitative strands of the mixed methods psychological intervention study. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 6 | 75% | |
| Very relevant | 1 | 0% | |
| Moderately relevant | 1 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Group responses and comments

| 15. Provide rationale on decision(s) for choosing identical samples or different samples between the quantitative and qualitative strands and how it relates to the chosen mixed methods core design. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 6 | 75% | |
| Very relevant | 2 | 25% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Group responses and comments

| 16. Consider the characteristics of identical samples and whether these characteristics remain representative of the sample over time. | | | |
|--|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 5 | 62.5% | |
| Very relevant | 2 | 25% | |
| Moderately relevant | 1 | 12.5% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Group responses and comments

| 17. Carefully consider the types of data sources that are used between the quantitative and qualitative strands and whether they are conducive to the sample(s) (e.g., language, reading levels, cognitive abilities, concentration levels). | | | |
|--|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 4 | 50% | |
| Very relevant | 3 | 37.5% | |
| Moderately relevant | 1 | 12.5% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Group responses and comments

| 18. Provide participants with transparency on the data collection procedures (e.g., how will data be used, potential benefits from participating in study). | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 5 | 62.5% | |
| Very relevant | 2 | 25% | |
| Moderately relevant | 1 | 12.5% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Group responses and comments

| 19. Researchers are encouraged to report the mixed methods research sampling design used in the mixed methods psychological intervention study. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 5 | 62.5% | |
| Very relevant | 3 | 37.5% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Group responses and comments

| 20. When integrating findings between samples, consider whether findings corroborate, or whether samples are contextually different leading to validly different results. | | | |
|---|-------|------------|--|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 2 | 25% | <ul style="list-style-type: none"> • the repetition of "samples" in this sentence makes it somewhat hard to follow • The issue is far more than just corroborate. It is also to see where there results elaborate or contradict. • the recommendation seems incomplete: findings can be convergent, divergent or complementary? • This issue is pertinent to what is the purpose for mixing (i.e., corroborate or divergent findings per sample. When integrating findings between samples consider the degree that the findings support the purpose for mixing within this study. |
| Very relevant | 3 | 37.5% | |
| Moderately relevant | 2 | 25% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 1 | % | |
| | | | |

Did not meet criteria

Group responses and comments

| 21. Identify the point(s) of commonality between samples when integrating findings and provide a statement describing this process. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 3 | 37.5% | |
| Very relevant | 4 | 50% | |
| Moderately relevant | 1 | 12.5% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Group responses and comments

| 22. Consider the time lag between data collection and analysis between the quantitative and qualitative strands and its impact on the priming effects and validity of the data. | | | |
|---|--------------|-------------------|-----------------|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 3 | 37.5% | |
| Very relevant | 3 | 37.5% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 2 | 25% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Did not meet criteria

Group responses and comments

23. Provide explicit reason(s) for the temporal placement of the qualitative strand in relation to the intervention. Examples include but are not limited to:

Before: Motivations or demotivations for participation, receptivity to personnel delivery methods, develop prototype of intervention, identifying culturally responsive components, gauging participants' and therapists' prior experiences with intervention, exploring factors that may influence intervention, identifying variables to target in intervention, developing intervention.

During: Adaptations to intervention, perceived intervention barriers, exploring range of outcome measure(s) (i.e., explore multiple psychological constructs being measured qualitatively), exploring coping mechanisms, exploring how participants feel during time of intervention, explore how participants are implementing intervention as intervention is occurring.

After: Adaptations to intervention, overall experiences and feelings about intervention, elicit participant feedback on intervention, perceived acceptability of intervention, perceived feasibility and acceptability of intervention, perceived acceptability and efficacy of intervention, perceived tolerability of intervention, identifying effective strategies used by participants to manage emotions after intervention, explore how intervention helped participants, evaluate participants' direct experiences with the intervention, assess barriers and facilitators of intervention, assess effectiveness of treatment, explore overall outcomes of intervention

| Answer choice | Count | Percentage | Comments |
|----------------------|--------------|-------------------|---|
| Extremely relevant | 2 | 25% | • this seems to be about MMR designs, not sampling? |
| Very relevant | 5 | 62.5% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 0 | 0% | |
| Not at all relevant | 1 | 12.5% | |
| I cannot tell | 0 | 0% | |

Group responses and comments

| 24. Identify strategies to reduce participant burnout related to the mixed methods design. This can include but is not limited to considering how long data collection will take for the quantitative and qualitative strands, how long the intervention will last, if qualitative data will be collected at multiple points in the mixed methods study, and, if so, providing explicit reason(s) for collecting data at multiple points. | | | |
|---|--------------|-------------------|--|
| Answer choice | Count | Percentage | Comments |
| Extremely relevant | 5 | 62.5% | <ul style="list-style-type: none"> • Relevant, earlier I mentioned participant burden in the item about barriers. That concern is addressed with this addition. • the incentive after every round is critical. |
| Very relevant | 2 | 25% | |
| Moderately relevant | 0 | 0% | |
| Slightly relevant | 1 | 12.5% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Group responses and comments

25. Provide an explicit rationale(s) on how the quantitative and qualitative samples were integrated in the full mixed methods intervention study.

Examples include but are not limited to: constructing a sample for the qualitative phase of a convergent design using a priori features from a larger quantitative phase, identifying essential features from the quantitative results of an explanatory sequential design to inform the sample selection for the follow-up qualitative phase, identifying essential attributes based on the qualitative findings of a sequential exploratory design to sample specific participants for the follow-up quantitative phase, using an identical sample between the quantitative and qualitative phases (e.g., conducting a feasibility study to plan for a randomized controlled trial), create theoretically connected samples that are different between the quantitative and qualitative phases that are not included in the larger sample of the quantitative phase (e.g., building a small sample of information-rich participants for the qualitative phase comprised of key informants or stakeholders), using a multilevel sample where the qualitative phase is comprised of therapists and case managers, and the larger quantitative sample is comprised of patients and caregivers.

| Answer choice | Count | Percentage | Comments |
|----------------------|--------------|-------------------|---|
| Extremely relevant | 4 | 50% | <ul style="list-style-type: none"> • I would reformulate the statement to account for the possibility that the quantitative and qualitative samples do not always need to be integrated. • Not all samples are integrated in MM studies. • Some of these questions are very redundant. |
| Very relevant | 2 | 25% | |
| Moderately relevant | 1 | 12.5% | |
| Slightly relevant | 1 | 12.5% | |
| Not at all relevant | 0 | 0% | |
| I cannot tell | 0 | 0% | |

Did not meet criteria

If you have any additional comments that you believe are important on sampling recommendations in mixed methods psychological intervention research studies, please include them below.

- It will be very important how you frame your results from these questionnaires. I am responding from my philosophical thinking about MM and research in general. My values, beliefs, and common practices impact how I respond. If all the other respondents come from the same philosophical thinking as me, that shows us more about our common thinking than what the field of mmr as a whole agrees to (since many quan-dominant folks do not share my same values, beliefs, and practices).
- A nested sample is critical to integration during analysis.

New recommendation added***Comments provided by participants:***

- The issue is far more than just corroborate. It is also to see where there results elaborate or contradict.
- the recommendation seems incomplete: findings can be convergent, divergent or complementary?
- This issue is pertinent to what is the purpose for mixing (i.e., corroborate or divergent findings per sample. When integrating findings between samples consider the degree that the findings support the purpose for mixing within this study.
- I would reformulate the statement to account for the possibility that the quantitative and qualitative samples do not always need to be integrated.
- Not all samples are integrated in MM studies.

20. When integrating findings between samples, consider the degree that the findings support the purpose for mixing within the study (i.e., do findings corroborate, diverge, or expand).

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