Mixed Methods Research in Psychology: Rationales and Research Designs

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Author Note

The paper builds upon a workshop first given by Moin Syed at the 2011 meeting of the Society for the Study of Emerging Adulthood, Providence, Rhode Island. It has been given many times subsequently, most notably since 2012 as a part of a course at the University of Gothenburg, Sweden. The foundational lectures, which track closely with the content of this paper, are freely available for use in teaching and workshops at https://osf.io/cs4h9/. Many people have contributed feedback on the ideas presented here over the past 13 years, including Maria Wängqvist, Ann Frisén, Johanna Carlsson, Philip Hwang, Linda Juang, Kate McLean, and Ursula Moffitt. Special thanks to Kate McLean for helpful comments on an earlier version of this paper. All errors and perspectives remain our responsibility alone. Dulce Wilkinson Westberg is now at the University of California, Davis. Direct correspondence to moin@umn.edu or dwwestberg@ucdavis.edu.

Abstract

Psychological science has long maintained a preference for quantitative methods over qualitative methods. The allegiance to one methodological family and the rejection of another means that, at least in part, our methods are constraining the universe of research questions we are willing to ask. This article provides an overview of mixed methods research, which involves the use and integration of both qualitative and quantitative methods, and why psychology should do more of it. The paper consists of three general sections: 1) a brief discussion of philosophical issues underlying the application of mixed methods research in psychology, 2) a deeper examination of what constitutes "quantitative" and "qualitative" research, and 3) a description of four major mixed methods research designs that hold promise for psychology research. The paper provides researchers with broad conceptual foundations and concrete tools for how research questions in psychology can be mapped to different mixed methods designs, helping correct for researchers' lack of exposure and/or negative preconceptions that have inhibited uptake in the field.

Keywords: *Mixed methods, research design, qualitative, quantitative, philosophy of science, meta-science*

Mixed Methods Research in Psychology: Rationales and Research Designs

Psychological science has long maintained a preference for quantitative methods over qualitative methods. This preference has been explicit, with some journals expressly indicating that qualitative methods are not welcome (Gergen et al., 2015; Levesque, 2021; Yoshikawa et al., 2008). This preference has also been implicit, revealed through graduate training programs that routinely require courses in quantitative methods, yet rarely provide any opportunities at all for training in qualitative methods (Rubin et al., 2018).

There are many problems with this dynamic. Most centrally, the allegiance to one methodological family and the rejection of another means that, at least in part, our methods are constraining the universe of research questions we are willing to ask, and therefore the research that is represented within our journals (Power et al., 2018). That is, rather than starting the research process with a clearly articulated research question, and then using the optimal method to address it, our research questions must be tailored to fit the dominant quantitative methodological approach. In turn, research is assessed relative to quantitative benchmarks, rather than the extent to which the research question has been optimally addressed. These features of our scientific ecosystem perpetuate the dominance of quantitative methods and marginalization of qualitative methods.

It does not have to be this way. Mixed methods research, which involves the use and integration of both qualitative and quantitative methods, has been promoted as a pragmatic, "question-driven" approach to conducting research (Gorard, 2010). Mixed methods research holds great promise for psychology, but because of lack of exposure, training, asymmetrical publishing norms, and/or negative preconceptions, many researchers are unfamiliar with what mixed methods research is, why it is valuable, or how to do it.

The purpose of the current article is to provide an overview of mixed methods research in psychology. The structure of the paper consists of three major sections: 1) a brief discussion of philosophical issues underlying the application of mixed methods research in psychology, 2) a deeper examination of what constitutes "quantitative" and "qualitative" research, and 3) a description of four major mixed methods research designs that hold promise for psychology research.

We aim to build upon past treatments on mixed methods in psychology that have, in our view, provided a somewhat muddled philosophical and conceptual basis for mixed methods, and have grounded their discussion of designs in motivations to achieve particular goals in specific research contexts, such as social psychology (Power et al., 2018), developmental psychology (Yoshikawa, 2008), environmental psychology (Lewis et al., 2020), cross-cultural psychology (Schrauf, 2017), close relationships (Braithwaite et al., 2014), and health psychology (Bishop, 2015). In contrast, we seek to provide researchers with broad conceptual foundations and concrete tools for how research questions in psychology can be mapped to different mixed methods designs. In doing so, we bring our perspective as researchers who do not prioritize one method over the other and have experience with various forms of quantitative, qualitative, and mixed methods research. Our goal here is to provide a general treatment that is grounded specifically in psychology and that uses the language of the mainstream, quantitative psychologists, with the hope that we can begin to move the needle towards methodological diversity in the field.

Philosophical Issues Underlying Mixed Method Research

Engaging seriously with mixed methods research requires confronting the philosophies of science that underpin our understanding of different methodologies. The very notion of "mixed methods" as a named methodological orientation came to prominence via the so-called "paradigm wars" of the 1970s and 1980s, in which there were heated debates about the relative merits of quantitative and qualitative methods across various disciplines in the social sciences (Alise & Teddlie, 2010; Bryman, 2008; Oakley, 1999).

This debate was not merely about methodology, rather it was fundamentally an argument about the philosophical paradigms viewed to underpin the methods, namely post-positivism and constructivism (Alise & Teddlie, 2010; Ponterotto, 2010). In brief, post-positivism is a philosophical approach that views truth and reality as relatively stable and singular, and that as researchers we have the ability, albeit limited, to access this truth via methods of observation and experimentation. In contrast, constructivism holds that there is no singular truth in the world, and that reality is co-constructed through human activity and grounded within social and cultural contexts and practices. Mixed methods was proposed as a solution to the debate about the relative merits of these two paradigms, rejecting the apparent need to align with post-positivism/quantitative or constructivism/qualitative in favor of adopting *pragmatism* as the guiding paradigm. That said, pragmatism is not invoked consistently among those who advocate for mixed methods (Johnson et al., 2007; Johnson & Gray, 2010), sometimes being discussed as a coherent philosophical paradigm rooted in the ideas of Peirce, James, and Dewey, and other times as a way to simply argue that researchers should adopt a "do what works" perspective (see Bishop, 2015, Ghiara, 2020, and Hathcoat & Meixner, 2017 for discussions).

Unfortunately, because foundations in philosophy of science is not part of standard psychology graduate training, nor seen as especially relevant to the daily work of research psychologists, there are damagingly incoherent views that underlie our understanding of mixed methods. This tends to be the case for both the advocates and the skeptics.

In particular, a major barrier to recognizing the value of mixed methods research is the conflation of what constitutes paradigm and what constitutes method (Gorard, 2010; Madill, 2015; Syed & McLean, 2022). A paradigm represents the overarching framework of beliefs and assumptions that guide research, such as post-positivism, constructivism, and criticalism. These paradigms consist of specific assumptions about ontology, epistemology, axiology, and methodology, all of which guide researchers' practice (Ponterotto, 2005). Although the paradigms include beliefs about the optimal methods for achieving research goals, the methods themselves–quantitative, qualitative, and mixed methods–are *not* paradigms. Moreover–and critical to the point of this article–all methods can be used in a way that is consistent with each paradigm (Westerman & Yanchar, 2011). Although quantitative methods are more prevalent, and often more suitable, within the post-positivistic paradigm, qualitative and mixed methods can also be used (Bishop, 2015). Similarly, although qualitative and mixed methods may be more suitable for constructivist and criticalist paradigms, quantitative methods can also be used (e.g., QuantCrit; Garcia et al., 2018). We contend that the conflation of the two is one reason for the slow uptake of qualitative and mixed methods in psychology (for details, see Rogers et al., 2024).

We see the unfortunate conflation of paradigm and method in both the methodological literature on mixed methods (e.g., Creswell & Plano Clark, 2017) and among those in psychology

advocating for qualitative and mixed methods (e.g., Power et al., 2018; Landrum & Garza, 2015; Masaryk & Rogers, 2024). Even Bishop (2015), who recognizes the distinction between paradigm and method, largely endorses the alignment as appropriate. Moreover, in an otherwise excellent article on mixed methods research in developmental psychology, Yoshikawa et al. (2008) scantly discuss philosophical or paradigmatic issues at all.

This conflation has rather substantial implications for research practice in psychology. The dominance of the post-positivistic paradigm in the field leads to a skepticism about the value of constructive and critical approaches, treating them as though they do not constitute "good science" (Lyons, 2009; Rogers et al., 2024). The alignment of constructivism/criticalism with qualitative methods means that qualitative methods can be dismissed on philosophical grounds–that they are outside the realm of acceptable inquiry–rather than evaluated on their methodological merits. Qualitative methods, when seen as a paradigm, are too subjective and antithetical to folk notions of what science ought to be (Lyons, 2009), despite the fact that the dominant quantitative research involves a mountain of unrecognized subjectivities (Jamieson et al., 2023). Moreover, the alignment reifies existing methodological hierarchies in the field. Experiments are the coin of the realm for psychologists, but there is nothing inherently *quantitative* about an experiment and nothing that necessitates the use of quantitative assessments to evaluate their outcomes (Power et al., 2018). Nevertheless, the two methodological approaches, which themselves are broad categories that subsume various methods, are seen as being from different paradigms and having different goals. This is not right.

These are heady issues that can be discussed, at length, on their own (see Gorard, 2010; Madill, 2015; Rogers et al., 2024; and Syed & McLean, 2022 for further treatments). Our rationale for covering this philosophical ground is to raise awareness of how the conflation of paradigm and method closes psychologists off from exploring all available methods. This has been one of the major limitations of the past treatment of mixed methods research in psychology (e.g., Bishop, 2015; Hanson et al., 2005; Power et al., 2018; Yoshikawa et al., 2008). We invite readers to reject this inappropriate conflation and open their mind to how mixed methods might be applicable to their own research domains. For the time being, let us all agree that we are working from a post-positivistic paradigm, and then explore what mixed methods research might look like in that context.

Thinking Differently about What Constitutes "Quantitative" and "Qualitative"

The Fuzziness of Definitions

An observant reader will note that we have not provided a clear definition of what constitutes quantitative, qualitative, and mixed methods. This is because doing so is no clear matter and requires detailed discussion (see Johnson et al., 2007). Indeed, the simple definitions of terms are that quantitative pertains to numbers, qualitative to text, and mixed methods to the integration of both, but such definitions belie the complexity that is necessary to truly understand the concepts (Allwood, 2012). In many ways, we view this section of the paper as the most important and useful for researchers, teachers, and consumers of psychology, as it helps bring clarity to the methodological landscape that we inhabit.

The first key point is that, like nearly everything we treat as binary, the distinction between quantitative and qualitative is not one of discrete kinds but rather one of degree. A simple example illustrates this point. Let's say we gather a group of participants in a room and present to them an

ostensibly funny photo, such as that presented in Figure 1. We, as researchers, believe that this photo has some humor value, but are interested in assessing how humorous the participants find it to be. We have a variety of approaches we could use to conduct this assessment, ranging along a continuum of quantitative to qualitative.

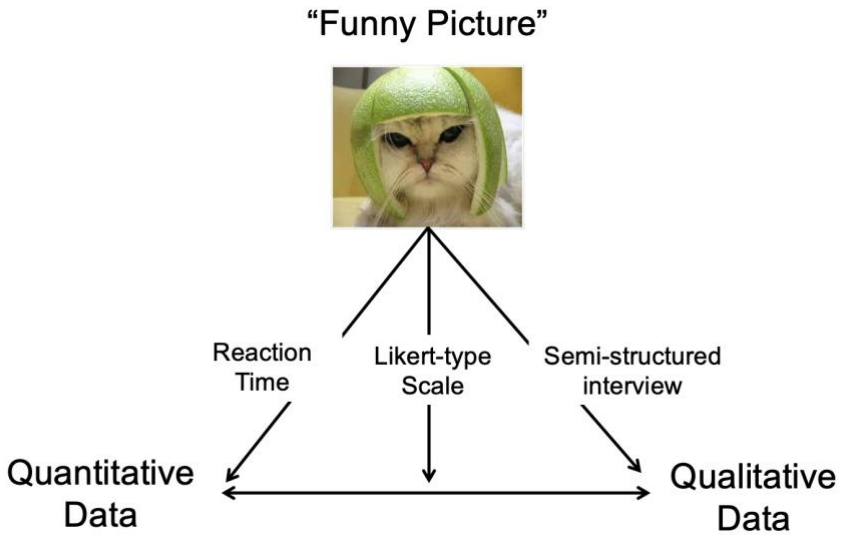

Figure 1. Illustration of how assessments of how funny a picture is can be purely quantitative (e.g., reaction time), purely qualitative (e.g., semi-structured interview), or something in between (e.g., Likert-type scale). The image is of limecat, which has no known source.

At the most extreme quantitative end, we could assess something like how quickly the participants laughed at the photo. A quick reaction time could indicate that the participants genuinely found the picture to be funny, whereas a delayed one could indicate that they felt a social obligation to laugh due to the context, even if they did not think it was particularly funny. Alternatively, we could measure the decibel level of the laughter. Both of these examples are on the extreme quantitative end because they can be measured as numerical representation of underlying numerical quantities–time and volume.

At the most extreme qualitative end, we could conduct semi-structured interviews or focus groups with the participants, asking them whether they found the picture to be funny, why it is funny, why it might not be funny, and so on. Doing this would generate text data that would pertain to their subjective impressions of the quality of the photo, with no inherently quantitative properties.

There is, however, space between these two extremes, space that is occupied by the approach taken by very many psychologists, particularly those interested in individual differences: questions that rely on Likert-type response options. We could have an item such as, "How funny is this picture," with response options ranging from 1 = not funny in the slightest to 6 = the funniest thing I have ever seen. We could have several similar questions that we ask, and then create a "humor scale" that is the average score on the items, finding that the picture has a humor score of $M = 3.46$, $SD = 0.85$. We treat this approach as "quantitative," but really it is a blend of quantitative and qualitative (Axinn & Pearce, 2006; Landrum & Garza, 2015). We are prompting participants for their subjective response to the picture, fixing their possible qualitative responses to the prompt, and then assigning numbers to those responses. The numbers we assign are arbitrary, and do not

correspond to any meaningful quantity (Kazdin, 2006), and thus there is nothing inherently quantitative about this approach. We assigned values to the responses and then analyzed them statistically, so treat them as quantitative, but the method is essentially a structured interview with fixed response options. Indeed, once upon a time such an approach was considered to be a qualitative method (Brower, 1949; Michell, 2011).

Through this example, we see that the distinctions made between quantitative and qualitative methods are not as clear-cut as many psychologists may be inclined to think. Rather, there is a need to distinguish between the types of data that we work with and the methods that we use to analyze them, an issue that we will explore in further detail in the next section. This distinction is all the more necessary in light of the strong divisions and value claims that researchers often ascribe to methods when treating them as paradigms.

The Independence of Data and Analysis

In both casual discussions and methodological treatments, references to "quantitative methods" and "qualitative methods" abound. Such references obscure critical distinctions between quantitative and qualitative *data* and quantitative and qualitative *analysis* (Axinn & Pearce, 2006; Levitt et al., 2018; Yoshikawa et al., 2008). Here, we make the case for the distinction between data and analysis, and why the distinction matters. Among other reasons, recognizing the distinction helps us see how many researchers are already engaging in some forms of mixed methods research, perhaps without realizing it.

If we treat the nature of the data and the nature of the analysis as independent of one another, we can create a visual field that produces four quadrants (Figure 2). For simplicity's sake, we will betray the previous section and treat quantitative and qualitative as discrete kinds, but the arguments advanced here easily accommodate our continuous conceptualizations.

Two of these quadrants will be easy for psychological researchers to understand and recognize. When we have quantitative data and conduct quantitative analysis on those data, this is generally what we refer to and think of as "quantitative research." When we have qualitative data and conduct qualitative analysis on the data, this is generally what we refer to and think of as "qualitative research." All very simple and straight-forward. But what about the other two quadrants, where the data and analysis methods are discordant?

Let's take the easy one first, when we have qualitative data but we analyze it quantitatively, which is an approach that is widely used throughout the field (Fakis et al., 2014). Researchers commonly gather qualitative data, be it text, video, web content, or something else. Then, they code those data for some features of interest, an approach that "quantitizes" the qualitative data (Sandelowski et al., 2009), and subsequently enter those quantitized data into statistical models. Examples of this approach are easy to conjure quickly. In developmental psychology, central constructs such as attachment and identity have relied on interview-based assessments that were used to generate data that could be coded and analyzed statistically (Kroger & Marcia, 2011; Main & Goldwyn, 1984). In personality psychology, the vast majority of research on narrative identity gathers stories from individuals, codes them for a variety of features, and then analyzes them statistically (Adler et al., 2017). Quantizing qualitative data is a common and acceptable approach throughout the field, highlighting how qualitative *data* are not seen as a problem, as long as they are analyzed quantitatively.

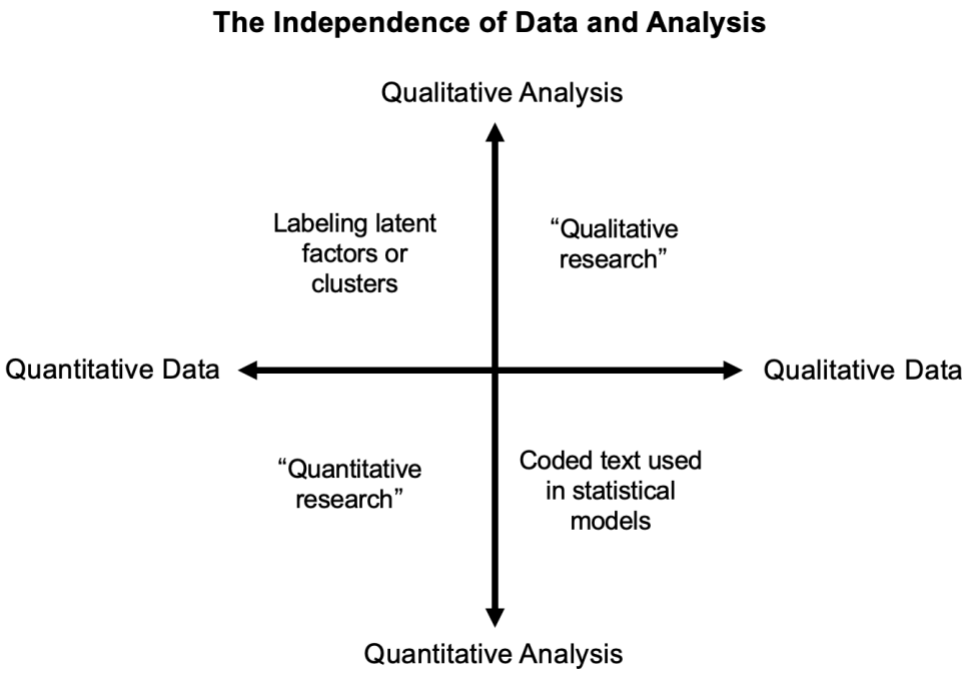

Figure 2. A schematic showing data and analysis as independent dimensions, each varying in its quantitative and qualitative properties, and creating four quadrants of combinations of types of data with types of analysis.

Now the fourth quadrant looms, likely creating some degree of confusion or uncertainty. This quadrant pertains to quantitative data that are analyzed qualitatively. To some, this might seem absurd, or even impossible. Yet, it too, is quite common in the field, but seldom recognized. Qualitative analysis involves interpretation, and that interpretation can be applied to any kind of data. In other words, any time you take a set of data and make some kind of meaning of it, you are conducting qualitative analysis. A widespread application of this approach is in the context of factor analysis, particularly exploratory factor analysis where the factors are not predetermined. Once the analyst is reasonably confident in the number of factors and the items that load on each, the next step is to interpret the factors and label them. This is, in fact, qualitative analysis of quantitative data; it involves taking a set of observations and then synthesizing and interpreting them. In other words, it involves identifying the underlying *theme* that cover the observations, much like one might do when performing a thematic analysis (Braun & Clarke, 2006). Many readers of this paper have conducted such an analysis, and so we pose the question: *what formal procedure have you used to interpret and label the factors?*

The answer for everyone will be the same: they used none. Rather, the standard procedure is to squint at the items, wave one's hands, and generate a label based on their preconceived notions and/or personal desires for what the factors ought to be. This is qualitative analysis, and it is qualitative analysis done poorly. The implications of this practice are substantial, as once a factor receives a label, we tend to focus more on that label vs. the underlying items that define it, and the label thus serves to reify the construct and make it "real' (Hathcoat & Meixner, 2017; see Fried, 2017, for a related discussion). The same general issue arises with groups created via cluster analysis, latent class analysis, structural topic modeling, and the like, all of which involve major interpretations as the analyst moves from solution to labeling, and represent a form of "qualitizing" quantitative data (Landrum & Garza, 2015). As an entirely different example, what is the Discussion section of

empirical journal articles other than qualitative analysis of quantitative data? Discussion sections involve synthesizing and making meaning of patterns of data; they are our interpretations of what we believe we found, what it means, and possibly how it could be used in policy and practice. This is a form of everyday qualitative analysis hiding in plain sight.

Our purpose in explicating the four quadrants describing intersections of data and analysis is manifold. First, the two are frequently conflated in published work and everyday discussions on methods, yet it is clearly important to separate them. Second, thinking in this way helps reveal how psychologists, perhaps unwittingly, are already conducting some kinds of "mixed methods" research (see also Maxwell, 2015). Finally, it helps expose the specific types of research considered unacceptable or less appropriate for the goals of the field, namely qualitative data analyzed qualitatively. A question to reflect on, though, is if three of the quadrants are acceptable, is there any good reason for why the fourth should not be? In the next section, we describe specific ways that such approaches can be fruitful for the goals of mainstream psychological research, particularly in the context of mixed methods designs.

Mixed Methods Research Designs

The central argument for mixed methods research is that, regardless of one's paradigmatic commitments, study design should follow from the research question of interest. In mixed methods, however, there is also the consideration of the intended role of the quantitative and qualitative components with respect to one another (Creswell, 2022). There are several different rationales for why researchers might pursue mixed methods as an optimal approach to address their questions, including a perceived need to enhance the study, to first explore qualitatively, to explain quantitative findings, or to generalize their findings. Each of these motivations is associated with specific mixed methods research designs, and thus it is critical that researchers align their research question, motivations, and study designs.

Most readers are well aware that "quantitative methods" are not a singular entity but rather subsume a broad array of specific methods that generally involve applying some statistical procedure to numerical data. The same is true for what we refer to as qualitative methods, which consist of both methods of data collection, including interviews, focus groups, and observation, as well as methods of data analysis, including narrative, phenomenological, and thematic analysis. Each of these methods has its own norms, assumptions, procedures, and conceptualizations of rigor and how to achieve it (Creswell et al., 2007).

The variety of quantitative methods available paired with the variety of qualitative methods available necessitates that there will be a large number of mixed methods approaches when combining the two. Nevertheless, our focus here is not on those types of combinations, but rather the methodological structure of the mixed methods research designs as they align with specific types of research questions. It is also important to be aware that there is no single taxonomy of mixed methods designs (Bishop, 2015). Moreover, just as our understanding of quantitative analyses evolves with subsequent work, the labels and descriptions of mixed methods designs change over time, even among the same authors (e.g., Creswell & Plano-Clark, 2017). Here, we elaborate on the four types of core mixed methods designs described in detail by Creswell and Plano-Clark (2007): triangulation, embedded, explanatory, and exploratory (Figure 3). We find that these four designs have the broadest applicability to psychology researchers and awareness of them can help motivate their own mixed methods studies.

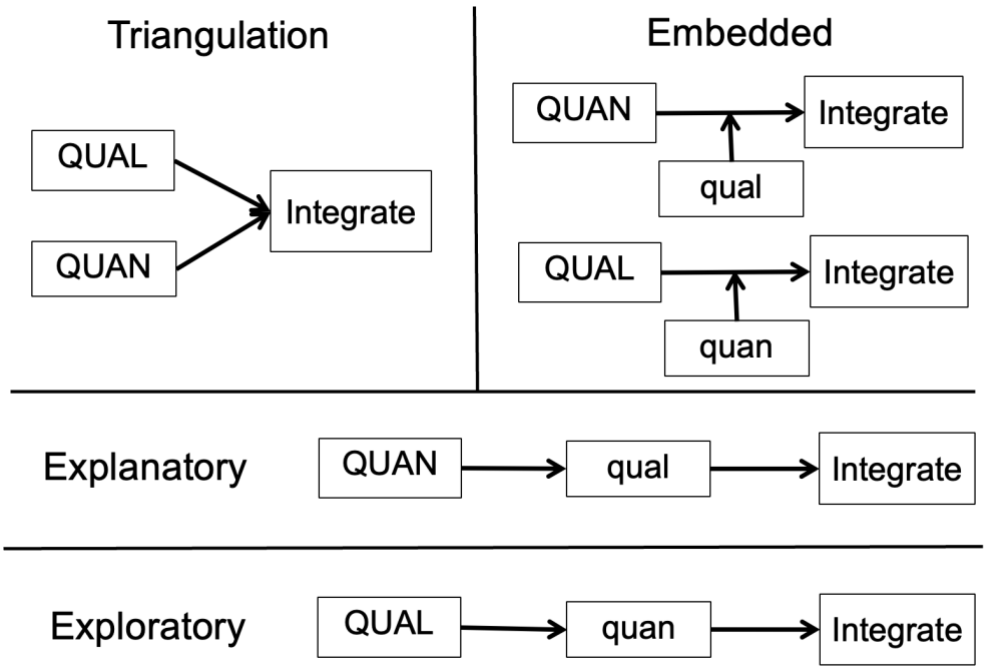

Figure 3. Graphical descriptions of the four major mixed methods designs, indicating the sequencing and weighting of the quantitative and qualitative components relative to one another. Adapted from Creswell and Plano-Clark (2007).

A few considerations are in order before beginning the review of the four designs. First, because these are all mixed methods designs, they do require some sort of *mixing* or integration of the quantitative and qualitative components (Fàbregues et al., 2024). The mixing can occur in the sampling (e.g., quantitative and qualitative data are collected from the same participants), the analysis (e.g., directly connecting the quantitative and qualitative data), and/or the interpretation (e.g., the meaning of the results relies on the integration of the quantitative and qualitative findings). Studies that rely on quantitative and qualitative methods but that do not mix are sometimes referred to as *multiple methods* rather than mixed methods (e.g., using qualitative and quantitative methods in distinct phases of the study to address separate aims; Creswell & Plano Clark, 2017).

Second, mixed methods research designs differ in the *timing* of the quantitative and qualitative methods (Creswell & Plano Clark, 2017). Generally, the timing can be concurrent, in which the two methods are conducted at the same time, or sequential, in which the methods are not only conducted in sequence but the design features of the second are dependent on the outcome of the first.

Finally, mixed methods design vary with respect to the *weighting* of each component, with some designs placing either the quantitative or qualitative component as dominant, whereas others place the two on equal footing (Gorard, 2011). We highlight these three considerations–mixing, timing, and weighting–through our discussion of the four designs. The discussion here focuses primarily on the specifics of design aspects, with empirical examples of each design provided in Table 1.

Table 1

Example Empirical Studies for each Mixed Methods Design

Design	Description	Example	Research Question	Use of Mixed Methods
Triangulation	The quantitative and qualitative components are compared for inferential congruence	Kim et al. (2013)	How do children adopted from Korea and their White American adoptive parents discuss issues of race, ethnicity, and culture?	Both parents and adolescents rated the frequency of discussions of race, ethnicity, and culture, with parents reporting higher rates. The qualitative data from a family interaction task indicated that the adolescents were the more reliable reporter, and that the parents' reports were inflated because of having a low threshold for what counted as socializing behavior.
Embedded (QUAN-quan)	The qualitative component augments, supplements, and fleshes out the primary quantitative component	Sorkkila et al. (2020)	What is the nature of school and sports burnout among elite adolescent athletes?	Burnout profiles were identified using latent growth mixture modeling. A subset of participants were interviewed to gather more fine-grain details on their experiences of burnout.
Embedded (QUAL-qual)	The quantitative component provides a broader context for understanding the primary qualitative findings.	Syed (2010)	How do U.S. college student integrate their ethnic and academic identities over time?	Quantitative data showed general patterns of identity development for the sample to provide the context for understanding the individual case studies of identity integration.
Explanatory	The qualitative component is used to help explain or better understand the findings of the quantitative component	Carlsson et al. (2015)	What are the patterns of stability and change of identity statuses in adulthood?	Quantitative data showed indicated a high prevalence of stability of identity. Qualitative data provided insights on how stability was maintained as well as how there are elements of change within the stability not picked up by the quantitative data.

Exploratory	The qualitative is used to explore the construct or phenomenon of interest that is subsequently examined using quantitative methods.	Shiyanbola et al. (2021)	Can a scale developed for assessing illness and medication beliefs about diabetes using predominantly White samples be culturally adapted for Black Americans?	Interviews were first conducted and analyzed to generate themes, which were then converted to potential items and subject to cognitive interviewing for revision. The revised scale with the new items was then completed by a larger sample of Black Americans to assess the scale performance.

Triangulation Design

The general principle of the triangulation design will be familiar to most psychology researchers: do data from multiple sources converge towards the same interpretation? Triangulation via the multitrait-multimethod matrix has long been seen as a gold standard approach to assessing construct validity (Campbell & Fiske, 1959). Whereas the multitrait-multimethod matrix consists of patterns of correlations, and thus relies on data that are represented quantitatively, the triangulation mixed methods design pertains to the use and integration of quantitative and qualitative methods and analysis to draw inferences about the research question.

In a triangulation design, the quantitative and qualitative data could be collected either concurrently or sequentially, depending on the researchers' goals and how they intend to mix the data sources. Indeed, mixing could be accomplished in the sampling, data analysis, and/or interpretation phases. That is, the same participants could be administered a rating-scale instrument and complete semi-structured interviews that cover similar ground, and thus the quantitative and qualitative samples are the same and are intermixed systematically to address the same research question (e.g., Kim et al., 2013). Alternatively, interviews could be conducted with a subset of those who completed the surveys, or different participants altogether. The two sources of data could be integrated via quantitizing the qualitative data and conducting statistics (if coming from the same participants) or by maintaining the qualitative data and using a joint display (Guetterman et al., 2021) or some other method to support metainferences (Creswell, 2022). Regardless of which of the preceding approaches are used, the integration of the qualitative and quantitative components are central to the interpretation of a triangulation design, and the whole purpose of the design is to examine the degree to which disparate sources of data are congruent. For this reason, the two sources of data are typically weighted equally.

Embedded Design

The embedded design shares some similarities with the triangulation design, in that a central goal of both designs is to use different sources of data to support convergent interpretations. Indeed, in more recent versions of their textbook, Creswell and Plano Clark (2017) place triangulation and embedded designs under the broader header of *convergent* design, minimizing the substantive difference between the two. We break from that change in organizational structure and maintain the distinction for a few reasons. First, as we will explore, there are some key differences in the designs that warrant keeping them separate. Second, and more importantly for thinking about mixed methods in psychology, one variant of the embedded design is the most commonly observed mixed methods design used in the field, and is the one that researchers seem to default to when they do not have strong backgrounds in mixed methods design. For this reason, it is instructive to treat the embedded design separately from triangulation to better communicate with our intended audience.

Similar to the triangulation design, with the embedded design there is some flexibility in the timing and mixing of the components. That is, depending on the research questions and goals of the project, data could be collected concurrently or sequentially, and mixing could be accomplished during sampling, analysis, and/or interpretation. What sets the embedded design apart from triangulation is the weighting of the quantitative and the qualitative methods. Whereas the two are set on equal footing in triangulation, with embedded designs one method is primary and the other is

secondary. This fact gives rise to two variants of the embedded design, one in which the quantitative is primary and one in which the qualitative is primary.

The quantitative-primary embedded design will be familiar to many producers and consumers of mixed methods research in psychology. In this design, the research questions are primarily addressed via quantitative analysis, and the associated methods drive many of the choices regarding sampling, analysis, and interpretation. A qualitative component is added as supplementary, as a way to augment what is provided by the central quantitative methods (e.g., in the context of randomized controlled trials; Gaugler et al., 2021; Plano Clark et al., 2013). When researchers include a qualitative component to a primarily quantitative study to "give voice to the participants," "flesh out the results," or seek to "bring their findings to life," they are using the embedded design. Similarly, when journal editors and reviewers comment that the qualitative component "seems tacked on" or "does not clearly add anything to the study," they are typically reacting to a poorly communicated embedded design. Authors must clearly convey the value of the qualitative component and how it contributes to our understanding of the findings.

The qualitative-primary embedded design will be less familiar to most researchers in psychology, as it pertains to a project that is guided and dominated by the qualitative component, with the quantitative playing a secondary, supplementary role. Although this design is seldom observed, it can be used to great effect, and indeed its use could potentially facilitate greater appreciation for and uptake of qualitative methods in psychology. The quantitative component in this design helps to provide a broader context for understanding the primary qualitative findings. This could include some quantitative data from the participants, or the broader pool from which they were drawn, to better understand how the participants in the qualitative analysis fit within the broader distribution of the phenomenon of interest (e.g., Robinson, 2019). Alternatively, institutional, population, or demographic data could be included as an additional source of information to provide context for the qualitative analysis. As quantitative analyses are often prioritized by psychologists, it is particularly important when researchers use this type of design to clearly indicate up front that the role of the quantitative data is to bolster the qualitative research findings, rather than for it to be the central focus as it typically is.

Explanatory Design

The triangulation and embedded designs are both focused on the convergence of the quantitative and qualitative data (Creswell & Plano Clark, 2017), and can be implemented in myriad ways depending on the research question and goals of the researcher. The explanatory design is distinct in purpose and in character. The explanatory design is, by definition, a quantitative-focused design that is conducted sequentially. The quantitative component is completed first, and then the qualitative component is designed and executed based on the results of the initial quantitative study. As the name implies, the purpose of the explanatory design is to use the qualitative component to help explain the findings of the quantitative component.

A classic aphorism in quantitative-focused research is that studies tend to raise more questions than answers. Why did the control group show greater gains than the treatment group on the target outcome? Why are these two seemingly unrelated variables so highly correlated? Why do we see so little change in response to a major stressor? The explanatory design can be deployed to address these types of questions. Moreover, the design can be used effectively to identify potential

mediators (i.e., explanatory mechanisms) and moderators (i.e., contextual modifiers) that could be examined in subsequent quantitative projects (Bishop, 2015).

Use of the explanatory design by quantitatively-minded researchers would certainly help advance their research programs in ways that would not be realized when relying on quantitative data alone (see Turner et al., in press). It is important to note, however, that doing so requires training and intention. Qualitative analysis is not "anything goes," but rather involves specific sets of conceptual and methodological procedures that need to be followed, just as with any quantitative analysis (Creswell et al., 2007; Rennie, 2012).

Exploratory Design

The exploratory design is the reverse of the explanatory design. It is also conducted sequentially, but it is qualitative-focused. The qualitative component is completed first, with the goal being to explore the construct or phenomenon of interest that is subsequently examined using quantitative methods. The exploratory design can be used to address several researcher needs and motivations. First, sometimes there is simply a need to explore qualitatively as an initial step. Conducting an initial qualitative study, whether it is a pilot study or a full stand alone project, can be incredibly informative in its own right and provide a solid direction in which the researcher can proceed with further studies (Bishop, 2015). This general approach will be familiar to many psychology researchers, as it is frequently used in the context of developing new psychological measures, in which researchers engage in interviews or focus groups with members of the target population to improve item generation and refine a set of items (Boateng et al., 2018; Coyle & Williams, 2000).

An entirely different motivation addressed by the exploratory design is the need to generalize. It is often stated that generalizability is not a goal of qualitative research, but this is incorrect, or at least overstated (Smith, 2018). This is true for *some* studies using *some* qualitative methods, but is certainly not the case for the entirety of qualitative research. Whereas some qualitative methods are focused on the generalizability or transferability of theoretical propositions (see Robinson & McAdams, 2015), some do seek to make generalizations about the prevalence of observations, associations, or effects. The key is to examine the claim that the authors are making from their data, rather than believing that methods are, by necessity, tied to specific inferential goals. Conducting a quantitative study following a qualitative study can help address the generalizability of the qualitative observations. Of course, quantitative studies have their own problems with generalizability (Yarkoni, 2022), but through combining qualitative and quantitative methods we can gain more traction for generalizability of research findings (Syed & McLean, 2022).

Finally, the exploratory design is well-suited for situations in which researchers have a need for cultural adaptation of their research materials. It is well-known and widely documented that the vast majority of psychological research is based on samples with limited representation of domestic and global diversity (Roberts et al., 2020; Thalmayer et al., 2021; Yarkoni, 2022). Accordingly, researchers are often confronted with a challenge when seeking to use a previously developed scale or intervention with a new population. In such cases, a preliminary qualitative project would be valuable to assess the suitability of the measure or intervention and to determine the features that must be adapted (see Juang et al., 2023, for a detailed example).

As with the explanatory design, greater uptake of the exploratory design would undoubtedly increase the rigor and quality of our research and interpretations. Indeed, there is a broad need to observe and describe psychological phenomena before testing specific hypotheses designed for prediction (Scheel, 2022; Syed & McLean, 2022).

Mixed Methods Studies vs. Mixed Methods Program of Research

The preceding four mixed methods research designs pertain to single studies or, sometimes, multiple studies that researchers report together all in a single article. However, we wish to highlight the utility of engaging in what has been labeled as a *mixed methods program of research* (Creswell & Plano-Clark, 2017; McKim, 2017). This approach refers to a general orientation that researchers take toward their work on a particular topic, in which some studies may be quantitative only, some qualitative only, and some mixed methods, but each study is deliberately interconnected and mutually influential.

In outlining how mixed methods could be used to advance research in social psychology, Power et al. (2018) argued that a mixed methods program of research is consistent with classical views of the field. They conceptualize a program of research as a recursive process in which different studies using different methods are synthesized and triangulated to continually check and refine findings, interpretations, and assumptions. Syed (2015) provides a description of this approach for the study of racial/ethnic identity, detailing specific examples of how small observations in qualitative studies were followed up and tested in subsequent quantitative studies, and how peculiar findings in quantitative studies led to subsequent qualitative explorations to gain a deeper understanding.

As argued by Syed and McLean (2022) making greater use of qualitative and mixed methods research in our programs of research could help address issues that have arisen through both the replicability and generalizability crises (Open Science Collaboration, 2015; Yarkoni, 2022). In particular, qualitative methods are well-suited for gaining a deeper understanding of psychological constructs, which can then help inform measurement and how to attune to contextual variation (Silan, 2019). Unfortunately, because of the dominance of quantitative methods in the field, reform efforts have largely failed to take perspectives from qualitative and mixed methods research into account (see Steltenpohl et al., 2024 and Reischer & Cowan, 2020, for recent exceptions). In addition to the methodological benefits, drawing from these literatures could help facilitate greater engagement in reflexivity about the choices we make in our research process, which is much needed in quantitative research (Humphreys et al., 2021, Jamieson et al., 2023, Rogers et al., 2024; Tafreshi et al., 2016).

Beyond the substantive value of this approach, we have found through our experiences and observations that using designs that align with the goals of our overall research program–rather than existing within the constraints of a particular design–helps keep us grounded and fresh. The value we have found in actually interacting with our participants directly and hearing their voices and experiences cannot be understated. Doing so reminds us that our data points are actual complex people with actual complex lives, and provides a fullness to the interpretation of our quantitative findings. Conversely, in qualitative methods, because we are hearing from the participants directly about their lives, we are often drawn to the most unique and interesting cases. The reality is, however, that most people are thoroughly average, so outsized attention to such cases can distort our understanding of the psychological phenomenon of interest (Morse, 2010). Moving between the

qualitative and the quantitative can give us a better sense for how our observations fit with a broader distribution, calibrating our interpretations (Yoshikawa et al., 2008). Beyond these scientific rationales, it is worth noting that existing within the liminal space between qualitative and quantitative methods simply keeps us fresh, attentive, and engaged with the work we are doing–we seldom get bored.

Conclusions and an Invitation

Mixed methods research continues to be scarce and underused in psychology. In this article, we have tried to examine the philosophical and methodological misunderstandings that have contributed to this problem, and described four core mixed methods designs that hold great promise for the future of psychological science.

We contend that there is no compelling scientific rationale against using mixed methods research. Rather, it is only assumptions, socialized beliefs, and entrenched practices that are closing us off to a whole world of methodological approaches. Yoshikawa et al. (2008) referred to the problem as "Methodocentrism," and others have described how our beliefs in our methods are so strong that we often do not fully recognize just how much they guide our scientific decision-making process (Greenwald, 2012; Lebel & Peters, 2011). These beliefs have led to a system of dissemination that erects further barriers to publishing mixed methods work, as researchers' increased familiarity with quantitative methods can bias them against mixed methods, which then reinforces a cycle in which people are not trained or rewarded for applying mixed methods.

We invite psychology researchers to take our arguments seriously and consider where their beliefs about appropriate methods come from, and the rationales they rely on to uphold those beliefs. To be clear, we are not advocating that *all* researchers engage in mixed methods *all* the time. Rather, we are advocating that *all* researchers see the *value* of mixed methods research, engage with the philosophical and conceptual foundation of mixed methods, and consider how a mixed methods design might help move their research forward. Ask yourself: what do you have to lose?

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Resources

The following are useful resources for individuals interested in learning more about mixed methods research and how to apply it to their work.

Creswell, J. W. (2021). *A concise introduction to mixed methods research.* Sage Publications.

Creswell, J. W., & Plano Clark, V. L. (2017). *Designing and conducting mixed method research (3rd ed.).* Sage Publications.

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Tashakkori, A., & Teddlie, C. (Eds.). *Sage handbook of mixed methods in social and behavioral research (2nd ed.),* Sage Publications.

Watkins, D. C. (2022). *Secondary data in mixed methods research.* Sage Publications.

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