INVITED EDITORIAL: The Benefits of a Bigger Toolbox: Mixed Methods in Psychological Research

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Recently, researchers have paid increased attention to integrating qualitative and quantitative methods (Bryman, 2006; Johnson, Onwuegbuzie, & Turner, 2007; Tashakkori & Teddlie, 2003). However, in many psychology programs, students are trained in either quantitative methods or qualitative methods, and it is still relatively rare for students to be trained in both methods as well as mixed-method designs (Yardley & Bishop, 2015). Consequently, if students want to later utilize such methods, they are not adequately prepared. As Hesse-Biber and Johnson (2013) put forth, it is time to "expand the conversation" and discuss how quantitative and qualitative methodologies are not mutually exclusive but rather cohesive and beneficial. As the field of mixed methods keeps expanding and more people are engaging in projects that are integrative, collaborative, and complex, it is possible that researchers could rethink the traditional models with ones that have a greater effect on the population of interest. These models will likely integrate qualitative and quantitative methods for maximum impact.

Individually, both methods serve an important purpose in the landscape of psychological research, and used together, these methods can do great things. In this editorial, I offer a brief background regarding mixed methods, some general benefits to implementing a mixed-methods project, and some of the issues that researchers need to consider before integrating qualitative and quantitative methods. Additionally, I offer a brief overview of different design strategies that can be used to decide how to implement a mixed-methods project. Finally, I offer my thoughts on the future of mixed methodology. My goal is to enlighten future and current researchers on the benefits and challenges of engaging in mixed-methods research and how, if done properly, these types of designs can result in enriched data and outcomes. I also provide additional resources on mixed-methods papers and books, as well as a table summarizing qualitative and quantitative methods (see Table 1).

What Are Mixed Methods?

Having a great research question is only part of the battle when embarking on a new project. Another obstacle is the development of a methodological and design approach that can ensure that the question can be answered appropriately. Although there are advantages in both qualitative and quantitative methods, there are times when integrating the two can result in more accurate and superior results (Bryman, 2006; Morgan, 2013). Mixed methods, otherwise known as multimethod research or multistrategy research, allows researchers to integrate methodologies in such a way that the depth and breadth of the research can far surpass what could be obtained using a single methodology.

Interestingly, this approach is relatively uncommon, although the use of multiple methods has been around for decades. More specifically, Campbell and Fiske's (1959) research is often regarded as the seminal work that formalized the importance of implementing multiple research methods. Although they were primarily focused on the issues of validation, their idea of triangulation, which they referred to as "multiple operationalism" (e.g., between- or across-methods), resonated with many (Denzin, 1978; Webb, Campbell, Schwartz, & Sechrest, 1966). Bouchard (1976) went further to argue that, by integrating multiple methods, researchers are able to increase the likelihood that their observations are valid and not just "artifacts" of the methodology used.

Echoing the same sentiment, Denzin (1978) suggested the need for "the combination of methodologies in the study of the same phenomenon" (p. 302). Further, it can be argued that the rigor of multiple methodologies can negate most of the preconceptions and biases that are inherent within most participants, researchers, and types of methodologies. In other words, using multiple methods allows for a union between different types of information, and through that integration, the accurate information can be found (Denzin, 1978; Johnson et al., 2007).

Benefits of Mixed Methodology

Reduction in biases. Building on Denzin's (1978) work, it has been argued that researchers walk into a project with biases or preexisting assumptions; these are a real and harmful part of research. Consequently, diligent researchers spend a great deal of time considering and attempting to address these issues before a study starts. Some have argued that the likelihood of biases in a mixed-methods approach is reduced compared to that of a single design study (Creswell, 2013; Jick, 1979; Morgan, 2013). By having the added benefit of using different methods, one part of a study can inform, guide, or explain other parts (Creswell, 2013; Greene, Caracelli, & Graham, 1989; Morgan, 2013), thereby reducing biases.

Interpretation. An additional strength of mixed-methods design is that the use of narratives, pictures, and conversations from a qualitative approach can help with the interpretation of what the quantitative data actually mean. Numbers alone require interpretation from the researcher rather than participants. However, depending on the design of the mixed-methods project, the researchers can use participants' commentary to assist in the interpretation process. Accordingly, the results are less biased and more accurate.

Moreover, it is not uncommon for researchers to tailor their research questions to fit the methodology that they are most comfortable using. Consequently, this can result in subpar research. In other words, only part of the larger question is being studied because the researchers may not have the tools to more fully examine their interests. By integrating the correct methodology, adequate research questions can become important and the results can be more accurately understood.

Validation. For those who are looking to develop and validate measures, mixed methods are often an appropriate approach. For example, at times, researchers may only have a measure available that was developed and validated using a college sample to probe a construct they are interested in measuring in a noncollege sample. In these times, a sequential design (see below for design strategies) would be beneficial because the researchers could gather initial information from focus groups made up of people from the population of interest, then use the information obtained to quantify their measure. Lastly, they could send out surveys to validate their measures. This process may be time consuming, but it can reduce biases and help to create a more accurate measure for the specific population under consideration

Outcome research. Many research projects are outcome based, meaning that they examine the effects of interventions, medical care, mental health care, and policies on mental and physical health outcomes. These projects often evaluate protocols, determine quality and efficiency of care, and demonstrate effectiveness of interventions. This field is heavily entrenched in quantitative methods. Curry, Nembhard, and Bradley (2009) suggested that, by adding qualitative methods, researchers can obtain enriched data by using one method to further explain the results from the other methods. It is important to note that outcome research is very difficult and fluid, so the ability to capture data that is theoretically accurate could change the way individuals deal with addiction, mental illness, physical illness, and so on.

Curry and colleagues (2009) further argued that outcome researchers who engage mixed methods must present their research with these three things in mind: (a) *credibility*, the degree to which the results are reasonable and congruent with other similar research; (b) *dependability*, the

TABLE 1

Brief Overview of Qualitative Methods and Quantitative Methods

Qualitative Methods	Quantitative Methods
Primarily inductive methods are used to develop a model, theory, and/or hypothesis	Probability and nonprobability sampling
Exploratory—more subjective	Conclusive—more objective
Small sample sizes	Large sample sizes
Data being obtained is more in-depth (generally verbal); consequently fewer cases are used	Much more structured (counting and classifying); focus on measurement
Hypothesis is broad	Hypothesis is narrow
Statistics are not generally employed	Statistical analyses used
Can assist with validation	Less in-depth, but more breadth of information is obtained
Time intensive	
Specific Methods Include	**Specific Methods Include**
Unstructured interviews	Online surveys
Structured interviewing	Paper surveys
Direct observation	Telephone interviews and/or surveys
Case studies	Systematic observations
Participant observations	Mobile interviews
Focus groups	Face-to-face interviews (no open-ended questions)
Structured interviewing	Online polls

level in which the research accounts for and communicates about the details of the project; and (c) *transferability*, the generalizability to other situations and contexts. Arguably, if understanding outcomes is part of the main focus of a research project, then integrating qualitative and quantitative methods is a preferable path to take.

Underresearched populations. There are some groups that researchers would consider underresearched, meaning that there is little empirical work on that particular group. Researchers must be cautious about making assumptions about these groups because those assumptions can easily lead to biases in the research. To avoid this pitfall, adding a qualitative piece to a quantitative study can be particularly beneficial. I personally have worked on three studies (Brannan & Bleistein, 2012; Brannan & Murphy, 2015; Brannan, Biswas-Diener, Mohr, Mortazavi, & Stein, 2013) where it was difficult to find any research on the samples we were examining. In two of the studies, we employed a mixed-methods design so that we could be sure that the right questions were being asked in a way that participants could understand. Additionally, we wanted to be sure that we were interpreting the data accurately. For example, one group was comprised of novice English as a Second Other Language (ESOL) teachers. Although there was plenty of research on K–12 teachers, there were limited studies on ESOL teachers and even fewer that focused on brand-new ESOL teachers. By integrating qualitative and quantitative methods, we were confident that our research was accurately reflecting the teachers' views.

Researchers must be cautious when embarking on these types of studies because, without proper training and understanding of how to integrate and implement mixed-methods, the results can be problematic. For the sake of accuracy, credibility, completeness, and explanation, it is critical to have people on the research team with expertise in both qualitative and quantitative methods as well as having a person who can create a strong justification as to how the methods were combined and why (Bryman, 2006; Morgan, 2013).

Challenges in Mixed Methods

A mixed-methods approach is attractive to many because, if implemented correctly, it can make a research study much more interesting and important. I would be remiss if I did not acknowledge some of the issues that are associated with mixed methodology.

Expertise. It is important to point out that mixed-methods studies are challenging in that they require researchers to be proficient in both quantitative and qualitative methodologies. This does not mean that they have an "idea" about how a person could integrate the two methods, but rather that researchers fully understand the overall goals of the study. Additionally, they need to have a strong data collection strategy, which will be discussed shortly. Many have argued that researchers need to be proficient enough in both methods to understand how one type of methodology might support the other in a logical sound way (Morgan, 2013). This is why some believe that graduate programs should have formal mixed-methods training. A well-trained generation for whom mixed methodology is part of their repertoire will only advance research and strengthen science.

Time and resource intensive. In addition, mixed methods are often costly and take a great deal more work than single-design studies. First, researchers must determine what design is most appropriate for their study, which often requires including multiple meetings with other experts. Also, it is important to thoroughly work through the details of the study, which often results in more meetings. Other issues can be coordinating time with participants; focus groups and face-to-face interviews can be time consuming because researchers have to meet participants. If research assistants are involved, then time also has to be dedicated to extensive training.

Undergraduates are not likely to implement their own mixed-methods project mainly because having a clear understanding of advanced methodology is necessary and the resources required to employ such a project are often not available to undergraduates (e.g., statistical programs, qualitative data programs, funding). That is not to say that they should not assist in a mixed-methods project. As for graduate students, it is completely feasible for them to engage in a mixed-methods project as long as there is justification for the project, adequate resources, time, and expertise available to the graduate student.

No consensus on how to integrate methods. Unfortunately, there are no clear guidelines as to how to integrate qualitative and quantitative methods. Before researchers embark on a mixed-methods study, it is recommended that they spend time talking to people who have already conducted such a study to receive as much guidance as possible. In addition, reading and e-mailing other experts for advice works well (Creswell, 2013;

Morgan, 2013).

Should you? Lastly, although embarking on a mixed-methods project may sound fun or reasonable, it is important to remember that, just because you can, it does not mean you should. As Creswell (2003) pointed out, researchers must be able to consider what this type of project would add to the field of research, will people be interested, and faculty researchers must consider what this will add to their scholarship and career. Researchers should think long and hard as to whether this is worth the time, effort, and resources. If the answer is yes, then proceed but with necessary caution.

Data Collection Strategies

In mixed-methods designs, data can be collected concurrently or sequentially depending on what the goal of the overall project is, and it takes a clear data collection strategy. More specifically, to obtain the most comprehensive, rich, specific information possible from participants, researchers must decide what is best. They must consider whether quantitative methods should be employed before qualitative methods, the opposite of that, or whether they should collect both at the same time. When picking a data collection strategy, there are a number of approaches that are offered by various experts. For the scope of this article, I offer commonly used and general guidelines. For more information, see the Appendix with additional resources at the end of this article. With that said, there are generally two data collection strategies: sequential and concurrent (Creswell, 2003).

Sequential designs. These can be *exploratory* or *explanatory* in nature. Exploratory sequenced design is when researchers start with the qualitative component of a study and then analyze the information gained by looking for themes. The qualitative component guides the next quantitative phase of the research (Creswell, 2013). Exploratory sequential designs are often used to study underresearched groups. As I previously mentioned, in my own work, we worked with novice ESOL teachers, but more specifically, we wanted to know who offered these new ESOL teachers social support. We were unsure what they might say or what direction to go in because there was very little research on this particular group. Moreover, these people were new to their jobs and many lived all over the world, so we thought culture and distance from family and friends were possible issues. We started with the qualitative piece, and through their answers, we saw common themes that enabled us to move forward with the quantitative piece (Brannan & Bleistein, 2012). If we would have used a traditional quantitative study, the depth of information that was obtained would have been nearly impossible to manage.

Conversely, in explanatory sequenced designs, researchers generally start out with a quantitative component in which they use surveys and other instruments to gather data and then, in a second phase, engage in interviews, focus groups, and other types of qualitative data collection techniques to fully understand the results (Morgan, 2013). This method is often used in research that involves an intervention. Researchers can acquire quantitative results but then follow up in order to more fully understand the emotions, motivations, and/or thoughts behind the numbers (i.e., results). Some researchers may decide to follow up with qualitative methods in order to obtain clarification or to investigate outliers.

In addition, it can be beneficial to follow up quantitative methods with a qualitative approach when nonsigificant results are found (Morgan, 2013). It is possible that the researchers were not asking the appropriate questions or that participants might have not understood the questions being asked. Unfortunately, the researchers might never know these reasons if there is no follow up with the participants. Consequently, this approach allows researchers to obtain a deeper understanding of the data and accurately present the results.

Concurrent data collection designs. These are also known as convergent parallel mixed methods (Creswell, 2013) and can be a bit trickier because researchers are obtaining information qualitatively and quantitatively at the same time. The information obtained during the study helps with interpretation and to inform and clarify the results. It is not uncommon to have follow-up questions in these studies. In a study that I am currently working on, we collected concurrent data by gathering both qualitative and quantitative data during the participants' initial assessment. The participants then went on to participate in a 21-day diary study. Thus, the qualitative data will help us to understand the quantitative data in a more comprehensive manner. Due to the fact that daily diary studies are laborious and our sample consisted of nontraditional students (i.e., worked at least part-time, went to school at least part-time, lived with an intimate partner), we wanted to capture as much data as possible in the easiest way possible. Therefore, concurrent data collection was necessary. Following

these participants up with further questions would likely be putting undue burden on them. It is also important to note that the qualitative data and theory will assist us in creating and conducting the most appropriate statistical models.

Concurrent collections can be useful for those who do not have time to conduct sequential data collections. Again, it depends on the expertise of the researchers and the overall goal of the study.

The Future in Mixed Methods

Integrating qualitative and quantitative methods is a large undertaking. At this point, the history, as well as the strengths, weaknesses, and design options, have been presented in this editorial, but this is just a very limited review. With this in mind, I offer a few suggestions when thinking about the future of mixed-methods research.

More Communication in the Field

Hesse-Biber and Johnson (2013) argued that there is a real need to have researchers reach out to other experts and discuss projects. Collaboration is ideal for this type of work, and researchers should be "open to dialogue across our paradigmatic and methods comfort zones" (Hesse-Biber & Johnson, 2013, p. 104). This could lead to more collaborative, team-based research projects, which could be ideal. It is important to point out that, although it is vital for some researchers to venture outside of their own field (e.g., psychology, gerontology, medical, neuroscience), for many, it is just as important to stay within the same field but reach out to others with different expertise; that is when the bounds of science are limitless. The key is to have a great research question and then go find the training and/or people who can help get it done.

Change in Graduate Programs

In the future, graduate programs may have no choice but to integrate a mixed-methods component into their curriculum. If there is a demand by students for this type of training, graduate programs will likely listen. Many students want to be cross-disciplinary, and training in multiple methods would be much more advantageous.

In addition, because research is becoming more intricate, complicated, and cross-disciplinary in nature, students are going to need a larger set of skills to go out into the workforce and be successful. Mixed methods could be just the training vehicle needed for these students to be exemplary researchers in the future.

Raise Awareness With Funding Agencies

Researchers do what funding agencies ask, and if the source of funding is asking for more collaborative integrated methodology, it will happen. It is likely that, as funding agencies see more high-level funding applications come across their desks, agencies can and will be able to see the value of mixed-methods work. With that said, funding agencies generally like a set of standards by which they can justify the significance of a project. However, no set of standards exist in mixed methods. Consequently, it is going to be key for mixed-methods researchers to explain that no one set of rules or standards govern mixed methods (Hesse-Biber & Johnson, 2013).

Conclusion

Because of the global scrutiny of scientific work, it is not enough to have an interesting research question but rather it is essential to have an important research question. It is the researcher's job to make their questions important, and a key to doing that is to have a vast set of "methodological tools" to draw from. For some, this notion might seem a bit overwhelming and disconcerting but be assured that many researchers engaging in mixed-methodology felt the same way at some point. Even established researchers can be hesitant to make this shift in their work, but the benefits far outweigh the consequences of not broadening a skill-set.

For up and coming researchers, I will give this advice: Remember that undergraduate and graduate schools are like a tool belt, and the more tools you can put in that belt the better off you will be later down the road. It is not a time just to "get through" classes because you are required to, but rather a time to absorb as much information and knowledge as possible. You never know when that knowledge will come in handy. For established researchers, it is never too late to start using mixed methods. There are a number of forums, blogs, and websites dedicated to researchers (in every field) being able to communicate and share information with others. These, along with conferences and networking, are the perfect places to search out those who have the expertise to help in your current research.

In sum, this is an exciting time to be a researcher because scientists are just scratching the surface as to what can be done by integrating multiple methods. Just remember that, whether you see yourself engaging in mixed-methodology in the future or not, the research question determines the

research methodology that you will use (Morgan, 2013), so be prepared and learn as much as possible about integrating methods.

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APPENDIX

Additional Resources

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