Book Review

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Music is a cultural universal that fascinates us with its ability to relax and energize, provoke complex emotions, and connect people. Accordingly, music research brings together researchers from many domains, who strive to address questions as varied as: Why do people like music? How did human musicality develop? Why does some music make us want to move? How does musical virtuosity develop?

Answering such questions demands an interdisciplinary approach. Today's music research community includes performers, educators, philosophers, musicologists, sociologists, therapists, psychologists, neuroscientists, medical professionals, computer scientists, physicists, and engineers, among others. Many researchers have mixed backgrounds in two or more of these disciplines; many also work in interdisciplinary teams where diverse areas of expertise are represented.

Since the introduction of the first audio recording devices in the late 19th century, technological advances have been rapidly changing how we experience music as well as the methods that we can use for studying it. Current-day researchers have a wide variety of tools available to them for studying performed music as well as music performance and perception processes. Many of these tools allow for a merging of artistic and scientific priorities in research approaches. Particularly notable developments include online platforms that enable data capture from large numbers of people remotely (Høffding et al., in preparation; Louven et al., 2022), wearable and portable technologies for capture of body motion and physiological data that allow performers and/or listeners to immerse themselves in ecologically-valid musical settings (Bishop et al., 2021a; Høffding et al., in preparation; Jakubowski et al., 2017); and computational modelling techniques that enable studies of large digital corpora (Cancino-Chacón et al., 2018; Chen et al., 2018; Schedl, 2017). In a recent discussion of future directions in music research, Huron (2021) emphasized the value of integrating methods to address questions comprehensively (that is, adopting an integrated bio-psycho-socio-cultural approach).

As forthcoming members of interdisciplinary research teams, students who are poised to enter the world of music research should be familiar with the broad range of methodological approaches that are used in the field. They should be outfitted with the skills necessary to choose methods that are appropriate to address their research questions, critically evaluate research that is uses methods that are different from their own, and communicate with researchers from different backgrounds. They should also be prepared to engage in conversations about the shortcomings of the field and push the research community in new directions.

The book, *Performing music research: Methods in music education, psychology, and performance science*, by Aaron Williamon, Jane Ginsborg, Rosie Perkins, and George Waddell, aims to provide a grounding in research methods for early-career music researchers. The authors specify their target audience as 'aspiring researchers', and state that the book is 'a resource for those who seek to understand musical performance'. No particular domain-specific knowledge is needed to follow the text, making it accessible to readers from diverse academic backgrounds.

One might ask, given the plethora of resources on research methods that already exist, why students of music research would need their own book. First, as discussed above, music research is highly interdisciplinary, so students require a particularly thorough understanding of the diverse approaches that are commonly used. Second, studies of postgraduate learning suggest that students commonly struggle to understand some aspects of research methods, such as how to link theoretical discussions to concrete examples and how to justify using one method over another (Daniel et al., 2018). Situating the study of research methods in the context of music-related studies, and pairing explanations of theory with specific examples, could facilitate their understanding of these points. Third, a well-written book on research methods that is specialized for music-related topics has the potential to offer students an understanding of the type and breadth of research questions that can be addressed. Indeed, addressing this latter point, each chapter of the book includes structured abstracts summarizing recent research by the authors, on topics ranging from musicians' conceptualizations of

virtuosity to the effects of audition stress on performers' cardiovascular activity.

The book is organized into four parts. Part one focuses on planning research, and starts with a chapter on how to formulate good research questions. The authors stress some key points: effective research questions should be backed by literature and address a clearly-defined gap; they should be simple, well-defined, and answerable; and they should define the methodological approach. This is followed by a chapter on methodological approaches, which the authors subdivide into sections on qualitative, quantitative, and multistrategy approaches. Onwuegbuzie and Leech (2005) have discussed the division between qualitative and quantitative approaches and raised the criticism that they are often taught separately at the postgraduate level. They have suggested eliminating the artificial divide between these approaches, and instead teaching them together in a unified format that subdivides research into not qualitative and quantitative, but exploratory and confirmatory approaches. Despite making the traditional qualitative/quantitative distinction, Williamon et al. take a detached and systematic approach to describing the implementation, strengths, and weaknesses of these general approaches. Ultimately, the reader understands that the validity of a chosen approach depends not on the nature of the approach itself but on whether it can be used effectively to answer the research question.

The final chapter of Part one discusses research ethics. This is a critical chapter, since, as the authors say, music research raises few glaringly obvious but many subtly important ethical concerns. They address some issues that are particularly pervasive in music research, including how to handle study designs that require deception and how to reimburse participants—an issue that remains unresolved in many fields (Head, 2009; Permuth-Wey & Borenstein, 2009), but is especially important to consider in cases where the participants represent a vulnerable group or have a unique skillset (for example, professional musicians). Some key ethical concerns are notably absent from this chapter, but appear in subset text boxes elsewhere in the book. These include discussions of data management (how to handle data like audio and video in which participants are personally identifiable is of particular relevance), diversity and representation in participant samples, and how to make research more replicable and accessible (that is, open science).

Part two of the book focuses on conducting research, and includes chapters on observation, documentation, interviews, surveys, and experiments. The theoretical complexity of research methods becomes apparent to the reader as the authors explain that these techniques do not fit neatly into the framework of methodologies presented in the previous chapters (that is, qualitative and quantitative approaches). Rather, most of these techniques can be applied as part of qualitative, quantitative, or multistrategy approaches.

These chapters take the format of a handbook: they present vocabulary and concepts, then suggest how to go about designing a study that uses each method. The authors include tips learned through their own experience as researchers. For example, the chapter on interviews includes a table listing challenges that can arise during interviews and how to handle them, and the chapter on experiments includes a list of points to consider when organizing a pilot test. All of the chapters in Part two conclude with a subsection on how to document the selected method in a research report or thesis.

Part three focuses on data analysis. One chapter is given to qualitative analysis. This chapter discusses the role of the researcher in interpreting data, presents software options for data storage and processing, and explains how to choose between analysis techniques. The following four chapters cover descriptive and inferential statistics, including measures of central tendency and variability, regression, significance tests, and effect sizes. This part of the book provides a gentle introduction to qualitative and quantitative techniques at a level that is geared towards students, but might also serve as useful introductory material for more experienced researchers who are trying to implement an unfamiliar approach.

The chapters on statistics take a different approach than many standard statistics textbooks, where the language tends to be more formalized and greater mathematical knowledge is assumed. The authors offer intuitive and example-based explanations, also emphasizing the importance of building statistical evidence to support a conclusion through a combination of carefully-chosen and interpreted comparisons, significance tests, and effect sizes. Their coverage of different statistical topics is broad, including brief explanations of factor analysis, Bayesian statistics, and structural equation modelling, in addition to regression, t-tests, ANOVA, and MANOVA. Perhaps the only notable omission is some discussion of time series data, which is commonly dealt with in studies of performance science (for example, Dean & Bailes, 2015; D'Amario et al., submitted; Scheurich et al., 2018). While advanced approaches to time series analysis would be beyond the scope of the book, readers might benefit from some description of typical analysis techniques (for example, autoregression models, Fourier transform, recurrence quantification analysis), given at a conceptual rather than mathematical level, especially since such explanations are not readily found elsewhere in the literature.

Part four concludes the book with a focus on communicating and disseminating research. The authors distinguish between communication with academic peers (that is, through research reports, theses, and conference presentations) and dissemination to the broader public. The authors draw on their expertise in research and teaching, and anticipate many of the problems that students encounter when reporting on their research for the first time, including how to structure their text, which writing style to adopt, and

what to expect as part of the peer-review process. The authors remind the reader that others are not privy to knowledge about how the ideas for the study developed or the logic behind the design, so it is important to take a detached perspective and explain these points clearly.

To conclude, it is useful to reflect on current trends and shortcomings in the field of music research, and consider how successfully the book, as a tool for research training to be used alongside other resources, helps to prepare students to contribute. A recurrent theme in this review has been the increasingly interdisciplinary nature of music research. At present, interdisciplinary approaches are being used to investigate themes such as the nature of individual and shared musical experiences—especially in ecologically-valid settings (Bishop et al., 2021b; Smetana et al., 2022); commonalities and differences in musical constructs and practices across cultures (Clayton et al., 2019); how new technologies can be used to facilitate music education and accessibility (Aufegger et al., 2017); and how to promote the benefits of music participation for well-being across the lifespan (Sheppard & Broughton, 2020). General shortcomings of the field include a focus on average trends at the expense of understanding individuals and outlying cases; bias towards Western musical traditions and overrepresentation of WEIRD participants from Western, Educated, Industrialized, Rich, and Democratic countries (Henrich et al., 2010); despite rising interdisciplinarity, an enduring lack of integration between some disciplines; and low replicability of published research—a widespread problem across disciplines.

In their introductory chapter, the authors describe the book as a 'comprehensive, yet easily accessible, guide to performing music research'. Indeed, they manage a good balance between comprehensiveness and readability: the book gives adequate attention to nearly the full range of commonly-used methods while outlining the research process, and engages the reader's interest through examples and practical tips. Their discussions of multistrategy approaches, in particular, communicate how successful interdisciplinary research might look. Some shortcomings of the field are addressed directly (for example, the overrepresentation of WEIRD samples and the replication crisis and push for open science). If I were to suggest any addition, it would be a chapter or subsection dedicated to interdisciplinarity, discussing what constitutes interdisciplinary research, what the benefits and risks are, how to go about collaborating with people from other disciplines, and what challenges might arise. Overall, this is a valuable book that should be standard reading for all aspiring music researchers.

Action Editor

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