SMARTPHONES WITHIN PSYCHOLOGICAL SCIENCE

Psychologists can now quantify behaviours beyond the laboratory using a mass-adopted, unified system that is primed for data capture a.k.a. smartphones. This is the first book to bring together related areas of smartphone research and point towards how psychology can benefit and engage with these developments in the future. It critically considers how smartphones and related digital devices help answer and generate new research questions for psychological science. The book then guides readers through how smartphones are being used within psychology and social science more broadly. Drawing from examples of both good and bad practice within current research, a new perspective is brought to major themes and debates across behavioural science. In the digital age, smartphones and associated devices will be able to accomplish much more in the near future. Psychology has a key role to play when it comes to balancing this monumental potential with carefully considered research.

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To Mum, Dad and Brittany

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Preface

It often feels like the rate of technological change is accelerating, but advances in computing and communications have been transforming society since the advent of the printing press. Today, the smartphone has democratised computational power to billions of people across the world by bringing together many technologies that existed separately. Providing a means of communication first, smartphones have replaced the need to carry a separate camera, video recorder, radio, MP3 player, television and laptop computer. Human–computer interaction has become a cornerstone of life as people rely on ubiquitous technology to meet everyday obligations. These realities, coupled with the fact that the smartphone remains in close proximity, provide new opportunities for psychological science.

Such developments come at an interesting time for the social sciences as they face a number of methodological and conceptual challenges, including issues of replicability, transparency and measurement. Many researchers also continue to have reservations about the applicability of laboratory-based research. For example, Tajfel once described the typical laboratory experiment as 'a temporary collection of late adolescent strangers given a puzzle to solve under bizarre conditions in a limited time during their first meeting while being peered at from behind a mirror' (Tajfel, Fraser and Jaspars, 1984, p. 474). While this is a slightly dated view of modern experimental psychology, there remains a tension between ecological validity and experimental control. New technologies, however, can help reduce if not eliminate that tension, and opportunities afforded by advances in electronic sensors, reduction in battery sizes and developments in computational data analysis are ideally suited to understanding the complexity of psychological processes as they unfold in everyday contexts. Mobile and wearable devices, specifically, can record multiple measurements every few seconds, including a person's location, activity levels and patterns of communication. These technologies

provide a prima facie case for a more applicable psychology because understanding what happens outside the lab allows one to ask detailed questions and provide answers that cannot be gleaned from other methods.

Despite this promise, this book grew from equal measures of academic curiosity and frustration. While a large body of research has focused on developing new methods to help answer specific questions, psychologists have spent far more resources investigating how smartphones and other digital technologies (e.g., video games, social media) might cause harm. There is considerable uncertainty in both camps. Therefore, this book is the first to document how developments in mobile technology feed into research avenues traditionally associated with psychology and behavioural science. It also aims to provide guidance on how psychological research might capitalise on the capabilities of smartphones and mobile computing in the future. In this respect it is often a tale of two halves.

Throughout, I provide explicit advice, opinions and suggestions on the quality of research and how it might be improved. I do not claim that every point of view is correct or universally accepted – but it should provoke discussion. This book is certainly not an explicit 'how to' guide when it comes to conducting research with smartphones. Other people have already curated excellent books that cover related topics (e.g., Mehl and Conner, 2012). Nor is this a book that considers which theory can be applied to a specific question. However, one overarching theme concerns how psychology might position itself going forward as part of a larger interdisciplinary effort. Disciplinary isolation has done us few favours, and the content reflects psychology's natural ability to transcend across multiple specialities. As a result, the material is accessible by those who sit outside the discipline.

Smartphones perhaps illustrate the problems and struggles faced when scientific progress appears to be moving faster on paper but slower in practice. In line with the United Kingdom Research and Innovation's (UKRI) current priorities, new ideas and technologies are critical to addressing the complex challenges facing society. However, at many levels we do not yet fully know how to leverage technology in order to support positive social and economic changes. The technical and analytical challenges faced, particularly when working with government and industry partners, have probably had a considerable influence on my views about research. That said, contributions from social science are

essential if new technologies are to have a positive impact on people and society.

The digital age has opened a Pandora's box of opportunities and challenges. Provided psychology can avoid past mistakes, and break free from unproductive cycles of research, the discipline is well placed to make some impressive contributions.

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Piwek, L. & Joinson, A. (2017). Automatic tracking of behavior with smartphones: Potential for behavior change interventions. In

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(Figure 1.2 reproduced with permission.)
Ellis, D. A. (2019). Are smartphones really that bad? Improving the psychological measurement of technology-related behaviors. *Computers in Human Behavior*, *97*, 60–66.
Ellis, D. A., Davidson, B. I., Shaw, H., & Geyer, K. (2019). Do smartphone usage scales predict behavior? *International Journal of Human-Computer Studies*, *130*, 86–92.
Wall, H. J., Taylor, P. J., Dixon, J., Conchie, S. M., & Ellis, D. A. (2013). Rich contexts do not always enrich the accuracy of personality judgments. *Journal of Experimental Social Psychology*, *49* (6), 1190–1195.

Sage Publications (Chapter 2)
Ellis, D. A. & Piwek, L. (2018). Failing to encourage physical activity with wearable technology: What next? *Journal of the Royal Society of Medicine*, *111*(9), 310–313.

Mary Ann Liebert (Chapters 4 and Conclusion)
Shaw, H., Ellis, D. A., Kendrick, L. R., Ziegler, F., & Wiseman, R. (2016). Predicting smartphone operating system from personality and individual differences. *Cyberpsychology, Behavior, and Social Networking*, *19*(12), 727–732.
Ellis, D. A., Davidson, B. I., & Kaye, L. K. (2019). Should smartphones be banned for children or does cyberpsychology have a bigger problem? *Cyberpsychology, Behavior, and Social Networking*, *22*(7), 508–509.

American Association for the Advancement of Science (Chapter 6)
Jenkins, R., & Burton, A. M. (2008). 100% accuracy in automatic face recognition. *Science, 319*(5862), 435–435.
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BMJ Publishing Group (Conclusion)
Davidson, B. I. & Ellis, D. A. (2019). Social media addiction: Technological déjà vu. *BMJ*, *365*, l4277.