report

Some highlights of the Synergy Expert Meeting 2015

Mhealth for behaviour change: Opportunities, challenges and future directions

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Mhealth interventions have the potential to significantly improve the effectiveness of public health interventions. At this year Synergy meeting experts discussed the opportunities, challenges and future directions for mhealth behavior change. Professors Lucy Yardley, Susan Michie and Robert West facilitated the meeting and provided guidance on the future of mhealth interventions. Twenty seven experts from 11 different countries contributed synergistically with their insights on mhealth research. Among others, experts covered topics relevant to the methods for developing and testing theory based intervention; testing the engagement of the user with the intervention and the quality of the data; analysis for complex interventions; and data management of mhealth interventions. Some highlights of these topics are described below.

Methodological considerations for developing and testing theory using mhealth interventions

Experts identified the need for appropriate designs to answer key questions during the development and testing of theory based behavior change interventions, using technology. Considering the complexity of such interventions, there is a need for designs to identify the active ingredients of an intervention, as well as the dose of each component that promotes behavior change and maintenance of behavior change. These active components might be relevant to several aspects of the intervention, such as the behavioral change techniques, and the delivery of the intervention.

Today, the gold standard of randomized control trials (RCTs) provides the most rigorous test of the efficacy of behavioral interventions. Although desirable, RCTs provide a test of the intervention as a whole, assuming independence of variance within intervention components. This limits our ability to accurately identify and effectively replicate the most successful intervention components within different conditions and settings.

During the Expert Meeting (EM) the potential of new methods, such as factorial designs, fractional factorial designs and stepped wedge designs were discussed. By using random experimentation, these designs allow researchers to test the individual effects of each component, as well as their effects in combination with other components, against a suitable comparison group. This is particularly important, considering the dynamic effect of technology on behavior change. When this continuous process provides some insight on the optimal dose and combination of such components to produce the

best outcome within the time-adaptive context, it can be tested in larger scale RCTs to promote cost-effective mhealth behavior change.

The utility of Bayesian methods in M-health interventions

During the EM, we discussed the utility of using Bayesian statistical methods when evaluating complex and dynamic interventions such as mhealth based interventions, as a Bayesian approach offers an interesting alternative to classical (aka frequentist) techniques for statistical inference. One of the main differences between frequentist and Bayesian statistics is that while the former is based on testing a null hypothesis that considers there is no relation between the variables of interest, in the Bayesian approach, estimation derives from a combination of evidence based knowledge of the population parameters with the data obtained in the current research.

Although most health psychologists have heard or maybe even read a few things about Bayesian methods, many of us are still clueless about its use, whether we should use it, and how to begin using it. Given the increasing popularity of the Bayesian approach, experts suggested some introductory readings, such as an Editorial on Addiction by Robert West (2015), an introduction to Bayesian Analyses for Health Psychologists published in the European Health Psychologist (Van de Schoot and Depaoli, 2014), and an interesting book that tells the story of Bayes' theorem (McGrayne 2012).

Engagement of mhealth interventions

Successful engagement is a key issue in digital health behavior change interventions, in which non-usage attrition after the first sessions of a program is quite high (e.g. Arden-Close et al., 2015). As a dose-response effect is expected in behaviour change interventions, this can undermine the benefits of interventions.

During the EM meeting, the main discussion points on engagement were on the following topics: 1) How can engagement be more consistently and appropriately defined, i.e. what is engagement within an intervention? Engagement can mean different things for different people, i.e. which components are useful for which participants. 2) How we can evaluate engagement more comprehensively, accurately, and efficiently? Usability, interest, convenience, motivation, enjoyment, quality of the experience, and easy of use, are examples of categories of engagement that can be assessed (e.g. see Arden-Close et al., 2015). 3) How can engagement with digital interventions be best promoted, for example by designing interventions to meet the needs of diverse populations using person-centred approaches (e.g. tailored interventions), and by making use of psychological theories that can provide a better understanding of engagement, such as the utility of habituation and learning theories. The EM discussed the literature on engagement with digital interventions, which is increasingly popular and suggested that models for understanding and promoting engagement are needed (for an example see, Short, Rebar, Plotnikoff, Vandelanotte, 2015)

Open Science Framework

Another topic covered during the EM was how to best store and share your study data with your research team and with other audiences. One of the solutions that was presented and discussed during the EM was a recent initiative called the Open Science Framework (OSF) created by the Centre for Open Science https://cos.io/. The OSF is a free and open source platform that allows you to store and share documents and datasets; it can be particularly relevant for mhealth research projects, which often require vast digital space. You can open your free account on the OST here: https://osf.io/and see how it works here: https://www.youtube.com/watch?v=2TV21gOzfhw.

Some of the OSF advantages discussed during the EM include having one centralised location to store all research files; keeping control over which parts of the project are private and which are public; and integration with other platforms and services such as Dropbox or Google Drive. On the other hand some of the challenges associated with the OSF were also debated, including the controversy around the data protection laws and data sharing. The EM agreed on the need for data transparency, appreciating that platforms such as the OSF are yet to gain the acceptance of research funders.

In Conclusion

This article aimed to describe some of the topics covered during the EM. More action points will follow, including among others a paper on the future challenges of mhealth, monthly online meetings for presentation and discussion of interventions, the formation of a Special Interest Group on mhealth, and a symposium on the next EHPS conference on mhealth methods. Experts at this year Synergy EM promoted discussions on our current challenges, taking into consideration the limitations in our understanding on mhealth behaviour change and the methods to test these; as well as they promoted ideas/guidelines for future research.

References

Arden-Close, E., Smith, E., Bradbury, K., Morrison, L., Dennison, L, Michaelidis, D., & Yardley, L. (2015). A visualisation tool to analyse usage of web-based interventions: The example of Positive Online Weight Reduction (POWeR). Journal of Medical Internet Research Human Factors, 2(1), 1-25.

Collins, L.M, Murphy, S.A., Strecher, V. (2007). The Multiple Optimisation Strategy (MOST) and the Sequential Multiple Assignment Randomised Trial (SMART): new methods for more potent ehealth interventions. American Journalof Preventive Medicine, 32(5), S112-S118.

McGrayne S. (2012). The theory that would not die. New Haven: Yale.

Short, C., Rebar, A. L., Plotnikoff, R. C. & Vandelanotte, C. (2015). Designing engaging online behaviour change interventions: a proposed model of user engagement. The European Health Psychologist, 17(1), 32-38.

Van de Schoot, R., &Depaoli, S. (2014). Bayesian analyses: where to start and what to report. The European Health Psychologist, 16(2), 75-84.

West R. (In press). Using Bayesian analysis for hypothesis testing in addiction science (Editorial). Addiction. doi:10.1111/add.13053

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