

Danielle Arigo: communication is what allows science to advance!

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Editor's note

Smartphone applications have arisen to be an important asset in today's healthcare industry. Many consider them to be effective tools to intervene behavior change by real-time delivery and personalized settings and preferences. Many of these apps also connect users, which may exert social influence on users by social comparison, social support and accountability. However, the efficacy of health behavior change apps is limited by the fact that they seldom engage social processes systematically to fit the needs and preferences of individual users (1). Optimization of these apps is thus imminent.

For years, Dr. Danielle Arigo from Rowan University (NJ) has been studying the social influences on health and health behavior (such as eating and exercise behavior), chronic illness self-management, women's health, and body image/eating disorders. She has been seeking to optimize eHealth and mHealth programs by incorporating beneficial social processes via online networking. With a great honor, *mHealth* is pleased to have this opportunity to interview Dr. Arigo, who will share with us the merits and limitations of the use of health behavior change apps, the current and future development of mobile technology in health psychology and behavioral medicine, the research she is currently working on and the challenges encountered in these research projects.

Expert introduction

Danielle Arigo, PhD, currently serves as the Assistant Professor of Psychology, Rowan University, Glassboro, NJ (*Figure 1*). She is a licensed clinical psychologist specializing in health psychology and behavioral medicine. She received her B.S. in Psychology from Drexel University and her M.S. and Ph.D. in Clinical Psychology from Syracuse University. She completed a health-focused training during her clinical internship at the Syracuse VA Medical Center



Figure 1 Dr. Danielle Arigo.

and Postdoctoral Research Fellowship at Drexel University (Eating and Weight Disorders Research Program; WELL Center and Lowe Labs).

Dr. Arigo's research is focused on the interplay between physical and emotional health, with particular emphasis on two areas: the examination of social influences on health and health behavior, and the improvement of intervention design and delivery. She directs the Clinical Health And Social Experiences (CHASE) research team at Rowan University, and is an Adjunct Assistant Professor of Family Medicine at Rowan School of Osteopathic Medicine. She also serves on the advisory board for the Women's and Gender Studies Program at Rowan University and serves as the co-chair for the Behavioral Informatics and Technology Special Interest Group of the Society of Behavioral Medicine. Dr. Arigo received several recognitions in the field, including being a Scholar for the 2015–2016 PRIDE-Cardiovascular Disease Summer Institute sponsored by the National Heart, Lung, and Blood Institute (NHLBI), and being awarded an NHLBI Career Development Award to study physical activity promotion for midlife women.

Interview

mHealth: You have recently shared your viewpoints on the efficacy of smartphone apps that provide social comparison for health behavior change. What are the major merits and limitations of these apps?

Dr. Arigo: On the positive side, many of these apps are easy and enjoyable to use; they incorporate evidence-based behavior change techniques, and they connect users to each other in order to harness the benefits of social processes such as comparison. But many of them are limited by the assumption that everyone needs and responds positively to the same intervention (app) content, or that they know how to navigate an app to maximize its benefit. We know from research that these don't hold true, particularly with respect to social comparison effects—sometimes, comparing yourself to another user results in discouragement and a decrease in motivation for changing a health behavior. You could address differences in response by giving users a choice of which other users they might rely on as comparison targets. But as we discuss in our Viewpoint piece, what a user prefers and what might actually motivate them could be different. So, we need to assess both what people want and what works, and try to balance between these if they're not the same. With respect to knowing how to navigate an app, a lot of apps don't have a single sequence that leads users through intervention content. Although this allows a lot of flexibility, which some users like, others feel frustrated by the variety of options, and stop using apps because they don't see them as beneficial.

mHealth: What are some critical questions that researchers and developers have to answer as they refine app-based health behavior change interventions?

Dr. Arigo: Two critical questions have to do with outcomes and optimal tailoring. Important outcomes to assess with an app are (I) do people use it; (II) does use lead to health behavior change; and (III) which intervention content or mechanisms lead to optimal change? The latter is uniquely complex, as different content or mechanisms may work best for different people, at different stages of the change process. This gets back to tailoring—what do we need to know and assess in order to optimally tailor an app's content (or the order in which the content is presented) to produce the most benefit? I think there is great potential to address the tailoring question regarding social comparison, though there

are many other processes that deserve this kind of attention.

mHealth: How do you see the future development of mobile technology in the field of health psychology/behavioral medicine?

Dr. Arigo: There is increasing interest in digital health tools in health psychology/behavioral medicine, as these tools could increase access to effective intervention content and lead to new advances in the science of health behavior change. But researchers and clinicians in health psychology/behavioral medicine don't typically receive training in the technical skills needed to create, improve, or commercialize these tools (such as computer programming). Likewise, we don't typically receive training in how best to collaborate with people who do have these skills—we speak different languages and have different outcomes in mind. Fortunately, there is a lot of interest in providing such training and facilitating academic-industry collaborations, and some professional societies in health psychology/behavioral medicine are leading the way in this domain (e.g., Society of Behavioral Medicine).

mHealth: We realize you are currently directing the CHASE research team at Rowan University. What role do you play in it? And what kind of research are you working on at the moment?

Dr. Arigo: I'm the principal investigator and faculty director of the CHASE team. In this role, I direct research projects that are related to advancing the science of social influences on health and health behavior. My specialization is in social comparison; right now, we have two ongoing studies that examine the influence of social comparison processes on health behaviors such as physical activity and eating. One is an experimental study, the other is an ecological momentary assessment (i.e., intensive observational) study. We also have two systematic review projects underway that are related to social comparison and health. I generate new research ideas and design new studies and/or write research grants to fund new work, as well as analyze data from ongoing studies and disseminate findings via manuscripts and conference presentations. I also supervise and mentor trainees (clinical psychology Ph.D. students, research coordinators, and undergraduate psychology students) to contribute to ongoing research and develop independent research ideas.

mHealth: Your research has also been supported by NHLBI. Would you introduce us to a recent one that you are involved in?

Dr. Arigo: I'm incredibly fortunate to have a Career Development Award (K23) from NHLBI. This award protects the majority of the investigator's time for training and research activities; in my case, the work is focused on developing more effective physical activity promotion tools for midlife women with elevated cardiovascular disease risk. Women are more sedentary than men, particularly during midlife (age 40–60), which is when their cardiovascular risk also increases due to age and menopause. Women in this age group face unique social barriers to engaging in physical activity (which would buffer against the effects of age and menopause), such as lack of social support or role models for prioritizing activity. Women in this age range also tend to prioritize others' health needs over their own. There is a huge area of opportunity to better understand these barriers, and to use this understanding to design better activity promotion programs and digital health tools for these women. The research goals of my K23 are (I) to understand dynamic social predictors of midlife women's physical activity (particularly social comparison); and (II) to design an mHealth tool that addresses these predictors in daily life. I'm still in the first year of the five-year award. The first year was devoted to intensive training in advanced research design and statistics, physical activity assessment, and tailoring interventions for women. We're nearly done collecting preliminary data to refine the procedures for goal #1, and we'll start full-scale data collection in early 2019.

mHealth: What are the major challenges in your area of research? And what have been driving you to move forward and make progress in it?

Dr. Arigo: One overarching challenge/area of opportunity is that investigations of physical activity typically happen at the between-person level—in other words, it's about creating an “average” amount of physical activity for a given person, and comparing that person to other people (with respect to physical activity and various predictors or outcomes). That tells us a lot about how people differ, and potentially, about the skills that people could build in order to increase their activity levels. But that hasn't been optimally successful for promoting physical activity at the population level. One reason may be that people rarely

engage in the same amount of physical activity several days in a row. Some days are high, some days are low, some are in the middle, and we aggregate that to create an average. What if the day-to-day fluctuation is really what's important? We're missing it in our typical approach, which is why I'm taking a day-to-day look in my current research—we think this will help us do a better job of tailoring physical activity apps to meet individual users' changing needs.

With respect to mHealth, there's also the challenge of advances being made separately in research and commercial endeavors. Research moves slowly and methodically, carefully evaluating and demonstrating efficacy, but there isn't much support for commercialization. Industry moves a lot faster and can respond to market demand more easily, though many of the commercially available tools have not been tested using rigorous methods. So, it's not clear that many commercial products work to modify health behavior, and the ones that do in research trials rarely make it to market. Ideally, the research and commercial processes would complement each other, and professionals from both arenas would work together to maximize the benefits of both. We're moving toward this model, but there is still a way to go.

I'm driven toward these questions by an intense curiosity about individual differences and change over time, and how these are related to health behaviors. How and why do people differ from each other (in terms of physical activity, mHealth app response, etc.), and how do these differences change within the same person over time? These are the broad questions that health psychology and behavioral medicine are uniquely positioned to answer, and the answers could help us make important advances to improve health.

mHealth: What do you regard as the key factors of successful research?

Dr. Arigo: Having the right team for each project is key. When each team member is enthusiastic about the work and brings something unique to the table, and their skills complement each other – that tends to produce work that makes a positive impact. Another critical factor is a focus on closing projects. As researchers, we have a lot of exciting ideas, and some of us tend to be more interested in the early stages of a study than in the later stages of dissemination. But the work isn't done until the findings have been communicated to the research community, and ideally,

also communicated to the public. This communication is what allows science to advance, rather than continually reinventing the wheel in separate research groups. I enjoy each stage of the research process for different reasons, and I try to maintain a balance of projects in each stage.

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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