bActive – qualitative analysis

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The bActive mobile phone app was developed to show users how much they walked in their everyday lives and used an 'always-on' design that did not require activation by the user. This study used a quasi-randomised controlled experiment to test two versions of the app: one that displayed information about the user's own walking and one that also displayed average group-level information. Men aged between 22 and 40 were recruited in Bristol using a free smart phone (the study phone) as an incentive for participation. The subsequent six-week trial monitored how many steps were taken by the 151 participants; how often they opened the app, and how long they kept it open on their phones. In addition, participants completed pre- and post-trial surveys and 27 participants took part in individual interviews or focus groups after completing the trial. This short paper gives a summary of the findings of the qualitative aspects of the *bActive* study. The quantitative analysis of the study data is reported in the accompanying paper, *bActive - quantitative analysis*.

Analysis of the interview data suggests that bActive increased walking for three reasons: 1) because it enabled users to measure how much they walked; 2) because it highlighted periods of relative inactivity, and 3) because it emphasised incidental walking. It indicates that the app exploits the negative social connotations of an inactive lifestyle and that it helps users learn ways of becoming more active without the need to sacrifice existing activities.

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The qualitative research for the bActive study was conducted in two stages: two months after the six-week trial, when the experience was fresh in participants' minds; and a year after the trial, when longer-term impacts could be explored. The interviews explored participants' attitudes to exercise and walking; whether, how and why use of the app increased walking, and whether the inclusion of social norms feedback had any additional impact.

The interview data suggests that, prior to the study, participants tended not to regard walking as "*proper*" exercise because it lacked the physical effects of exercise, such as increased heart rate, sweating and post-exercise "*buzz*". In fact they rarely spoke about walking as an activity in its own right at all: (e.g. "*you're kind of walking and you're not knowing that you're walking. You're not knowing how far you've walked*").

The interviews suggest that the step-count displays helped participants see walking as something that could be measured (e.g. "*I like the idea that you can kind of measure your steps; how much you've travelled.*") By focusing users' attention on walking, the bActive app appeared to help them consider it as something they actively did, when previously it had been a largely incidental and invisible part of other practices. Furthermore, the records of their step-counts made it easier for them to set personal benchmarks and goals (e.g. "*I was, you know, constantly checking against my previous day's steps.*")

A key element in the effectiveness of the bActive app seems to have been the display of trend data in the 'Past Week' and 'History' screens (see Figures 1 and 2). Interviewees' references to the

fluctuations in the levels of the graphs (e.g. as "*peaks and troughs*" or "*dips and spikes*") suggest that the style of the graphical feedback captured their attention and increased their awareness of the day-by-day variations in their activity levels. Furthermore, the way that participants talked about looking at the trend data suggests that this encouraged use of the app. The trend data seems to have had several effects on users. Firstly, they began to relate their daily walking patterns to their routines and schedules and were therefore more able to see how they could become more active by changing these routines and schedules. Secondly, the visualisations drew their attention to what they sometimes termed their "*good*" (more active) and "*bad*" (less active) days – such as days spent working at home – and awareness of the latter encouraged an increase in walking (e.g. *"[if] I hadn't done much like on a Wednesday, Thursday, Friday... If I'd done very little walking, I would say to my girlfriend, like, let's go and do a massive walk on Sunday or Saturday."*) Thirdly, the trend screens highlighted walking that occurred incidentally in activities such as working or shopping (e.g. "*A lot of my work is sat down at the desk but [it is] surprising how much walking you do just little bits here and there - walking around the workshop*"). This helped users learn that they could increase their walking without having to schedule new activities into their busy routines; for instance, by walking to the shops rather than driving, or by increasing the walking they did at work.

Figure 1: History screen (individual version)   Figure 2: Past Week screen (social norms version)

It is important to note that, unlike in many pedometer studies, bActive participants were not selected because they wanted or needed to walk more for the sake of their health. Indeed, some participants were already very fit and physically active. As a result, the desire to become more healthy was only one of the motivations evident in the interviews. Some participants seem to have been motivated by the negative associations of being "*lazy*", "*dossing*" and just "*sitting*". This is illustrated by the following excerpt:

> *[The app] made me notice how little I actually do walk during the week and it just shows how stationary I am actually during work time. So you actually start to think, 'maybe I should get up from my desk; maybe I should go somewhere, you know; instead of emailing this person, go see them'.*

Those who had the social norms version of the app appeared not only to respond to the individual trend data, but also seemed to be affected by the social feedback. The social data tended to make users competitive. This had two opposite effects on the amount of walking done by people in this condition. Although some participants reported walking more on days when they thought they could "*beat*" the average or get into the top 20%, some also reported compensating for this by being less

active on days when they did not think they could achieve these targets. Furthermore, some of those users who were usually below the norm seemed to have been discouraged by the social comparison and to have stopped looking at the app as a result. These patterns might explain why the overall effect of the app was similar for the two types of feedback.

In summary, the qualitative analysis of the interview data suggests that two aspects of bActive were crucial to its success: 1) the always-on design, which meant that the app recorded incidental walking and 2) the graphical display of daily walking patterns on the trend screens, which challenged some participants' ideas of themselves as active. Evidence from users who were provided with social norms feedback suggests that although the resulting sense of competitiveness can make users walk more on some days, this increase can be partially or wholly offset by reduced walking on other days. This might explain the findings of the quantitative analysis, which shows no statistically significant difference between step-counts in the two feedback conditions.

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