Steps, Choices and Moral Accounting: Observations from a Step-Counting Campaign in the Workplace

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ABSTRACT
Sedentary work is a contributing factor to growing obesity levels worldwide. Research shows that step-counters can offer a way to motivate greater physical mobility. We present an in-situ study of a nation-wide workplace step-counting campaign. Our findings show that in the context of the workplace steps are a socially negotiated quantity and that participation in the campaign has an impact on those who volunteer to participate and those who opt-out. We highlight that specific health promotion initiatives do not operate in a vacuum, but are experienced as one out of many efforts offered to the employees. Using a social ecology lens we illustrate how conceptualizing a step-counting campaign as a health promotion rather than a behavior change effort can have implications for what is construed as success.

Author Keywords
Self-tracking; workplace; pedometer; health promotion; campaign; step-counter; social ecology;

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION
The increasing trend toward desk-based sedentary work appears to contribute to the growing levels of obesity worldwide, which is a known risk factor associated with diabetes, cancer and cardiovascular disease [11]. Research in health informatics [13], health-behavior change [30] and quantified self [2,8] suggests that personal tracking technologies such as step-counters can be used to motivate improvements in daily mobility [38]. In fact, Maitland notes that pedometers are the most commonly used technologies in behavior change efforts [21]. Even though the durability of positive health changes and the long-term effects of step-counters remain unknown, there is ample evidence that in the short-term, the use of these technologies can indeed improve physical mobility [16,19,35]. As pedometers gain in popularity we see examples of broad health and physical exercise campaign deployments to get people moving, targeting the workplace (e.g. 10000stepsusa.com in the US, and tælskridt.dk in Denmark). These campaigns rely on the seeming simplicity of the step-counter technology to facilitate or encourage mobility. As the use of step-counters in the workplace becomes integrated with insurance premiums and other financial incentives [6] it is important to go beyond the question of whether or not these campaigns are successful given the narrowly defined goal of increasing mobility by counting steps. We asked what does a national step-counting workplace campaign look like, in practice? How does the use of step-counters fit with social practices within a workplace where both users and non-users are co-located and interact on a daily basis? Finally, how might we re-define the notion of success of campaign efforts going beyond the quantitative measures of steps and durations?

Based on observations from a Danish workplace we offer insights into practical and social experiences of a voluntary national three-week long step-counting campaign in one particular department of an organization where the majority of employees chose to participate. We address how an individually focused technology, such as the step-counter, can become integrated in and is experienced as part of the workplace. Although many of the technology-design for behavior change interventions tend to narrowly focus on targeting specific behaviors, we illustrate how a behavior change strategy to 'get people walking' may not be quite as straight forward and instrumental as expected and discuss insights relevant to future technological interventions targeting promotion of healthier behaviors in the workplace. Finally, we propose that evaluations of these efforts would benefit from including an ecological lens as part of technology use for health promotion [21], concluding with a discussion of broader considerations for CSCW research.

BACKGROUND
Although the actual effect of step-counters is widely debated, a systematic review conducted by Bravata and colleagues concluded that sustained use of pedometers was indeed associated with increases in physical activity that resulted in positive health effects such as decreases in BMI and blood pressure [3]. Step-counters often promote a

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standard goal of 10.000 steps a day, which is an arbitrary and somewhat random number [38]. Nevertheless, research has shown that this number is similar to the recommendations of US public health guidelines, and Danish health authorities[1], recommending 30 minutes of moderate physical activity per day for adults [38].

Off-the-shelf activity sensing wearable technologies such as Fitbit, Jawbone or Nike FuelBand and smartphone trackers and health apps such as My Fitness Pal have been the focus of extensive research in HCI and CSCW [13,30]. Earlier studies demonstrated that positive reinforcements [19], user control over data visualization and interpretation [2] and the ability for users to set their own primary and secondary goals [24] were key for technology-based health interventions to be fruitful. Later work focused on more qualitative and in-situ investigations. Fritz et al. conducted an extensive study of in the wild long-term use of activity tracking devices noting that the goals and needs of long-term users change over time and need to be supported by technology designers [13]. Rooksby et al. explored the lived experience of using multiple step-counting and tracking technologies, emphasizing that people weave the use of these technologies into their everyday practices with behavior change happening across multiple technologies over time rather than through the use of one particular device [30]. Most importantly these and many other studies have noted the decidedly social nature of health technology use that comes with its own issues and benefits [8,10,20].

The Social Context of Health Technologies

Even early on, researchers realized that focusing exclusively on the individual and their internal motivations in health behavior change efforts may not be as productive, and that practical constraints should be considered [7]. For example one early study of women, who wanted to be more physically active, identified key implications for design requirements that included paying attention to practical constraints of users' everyday lives [7]. Later studies, concerned with sharing of personal achievements with physical activity have had to acknowledge the social context within which these activities are conducted, thus addressing privacy concerns [10]. Similarly, the focus on whether these technologies are successful in lowering BMI, increasing mobility and other quantitative markers tends to overlook the more qualitative aspects of the lived experience with these devices. Maitland has proposed to consider a negotiation framework to include a broader range of resources individuals have access to and constraints they may experience as part of the design process [21].

Research shows that social support and social pressure positively influence user motivation [4,18] and participation in teams increases activity levels [1,4,16]. Yet any effort toward behavior change, whether it is internally motivated by the individuals or externally motivated through health-focused interventions, involves a re-alignment of accountabilities [12,37]. By design step-counters make the embodied physical action of walking into a practice of counting. Why people do the walking that is counted by the device then can become an important point of discussion especially in the context of efforts that rely on forms of gaming or competitiveness [1,19,27]. Buis et al. observed this in their studies of team-based online health interventions [4], showing how individuals participating in team-based step-counting initiatives become accountable to each other for both the number of the steps they take and their reasons for walking.

Activity Sensing in the Workplace

Despite the range of research on behavior change few studies have focused on the workplace – a context where sedentary practices are becoming ever more prevalent. Several studies have recruited from workplace settings, due to ease of access to e-mail lists, but these did not consider the use of the step-counter in the workplace as a focus area, nor the influence of the workplace as a specific social setting [4,19,29]. Current research in HCI on improving workplace activity is preoccupied with adding more sensors to the worker, who can then for example track their posture and stretching statistics [27], or with developing new *physical movement probes*, such as an active desk or an irritating chair [35]. Yet health-incentives in the workplace are not a new development and integrations of technology into health campaigns and insurance incentive initiatives are ongoing.

In an overview of health data collection in the workplace, Christophersen et al. note that such practices can result in significant challenges causing employees to game the system in order to combat potential financial penalties due to low step-count numbers or other health indicators [6]. Zulman et al. conducted a study of one workplace insurance incentivized walking programs and found that despite extremely high participation levels participants disliked the program [41]. In contrast, Chan et al., Vyas et al. and Buis et al. studied voluntary workplace health and physical activity interventions and campaigns, finding that participants had positive experiences and, in the case of Chan et al. and Vyas et al. demonstrating short-term success of the programs [4,5,39]. Miller et al. quantitatively demonstrated an ostensibly successful implementation of a step-counting initiative by increasing physical activity levels in pupils [22]. Yet their qualitative investigation uncovered significant amounts of unpaid "hidden work" conducted by teachers to ensure success, when this seemingly simple initiative rolled out [23]. In all cases, researchers reported that the social aspects of the program were highly influential, especially in those studies that employed a qualitative approach.

Where are the Non-users?

Despite the fact that research has repeatedly recognized the importance of the social and environmental aspects of experience with using activity-tracking technologies, few studies have focused on this. Within the area of health technolo-

[1] https://www.sundhed.dk/borger/sundhed-og-forebyggelse/livsstil/motion/motion/

gies, Munson has considered the notion of "cessation of use" as an analytical concept worth addressing but this does not cover those that opt out of participation entirely [26]. Rooksby et al. detailed some of the social experiences of the health technology users they tracked [30] and Maitland noted that technology users must negotiate with others around them to enable their successful implementation of behavior change [21]. Yet none of these researchers have considered the role of the non-users of health tracking in the context of use. Non-use of technology has previously received attention in the literature questioning assumptions about appropriateness of technology, considering the social role of non-use, or trying to understand why people might choose to or be forced to not use technology [2,31,33]. In the study at hand we consider specifically what happens when a large proportion of people in a workplace voluntarily begin using step-counters and continue to work alongside those who do not use these technologies for a range of reasons. Considerations of both use and non-use require a broader perspective than individual targeting and to do so we draw on the social ecological approach.

Social ecological approach

One of the most common goals in HCI research on health behavior change is to evaluate the rate of uptake and success of technologies and interventions. Concerns with healthy life-styles and behavior change have also been a staple in health promotion with research in the fields of communication, sociology, psychology, social ecology and public health focusing on identifying processes and practices that may or may not be effective. In this article we rely on Stokols' "social ecology model for health promotion" which proposes a holistic approach balancing individual and environmental foci [34].

The social ecological approach suggests that the focus of health promotion initiatives should be on *both* behavioral and environmental levels. Social refers to the acknowledgment that individual behavior is shaped by their social and cultural contexts. Yet individuals also have the possibility to influence physical and social features of their settings. The framework relies on the concepts of active and passive elements of health promotion initiatives. Typically, environmentally focused elements are passive, as they require no action on behalf of the user. Active elements, on the other hand, are often at the core of behavioral change models for example, requiring on-going and voluntary effort to reap benefits [34]. Health promotion initiatives incorporating both active and passive elements are more likely to have lasting effects, as they are designed to intervene at both situational and personal levels [34]. For example, offering smoking cessation courses or hotlines (active element), while also introducing smoking bans in public places, or raising tobacco prices (passive elements), jointly increases the chance of smoking cessation.

In this paper we investigate how a nation-wide step-counting campaign is experienced in situ in a specific work environment. Arguably, a step-counting campaign has a narrow focus on a specific behavior in the service of 'getting people walking'. The marker of success then might be how many people increased how much they walked during the campaign and how many continued with the use of pedometers after the campaign ends. At first glance, there is little here that might speak to the social ecology model yet our findings suggest that there are plenty of active and passive elements to campaign implementation that rely on both individual and environmental factors.

A social ecological approach makes it possible to discuss non-use more broadly than has been the case in individually focused studies, where non-use is often understood as a shortfall of the individual [28,32]. Social ecology is a way of thinking about behavior change as a social experience, that considers how a combination of active and passive elements is important for lasting impact [34]. Consequently, we can go beyond the common question of 'did it work?' By construing the step-counting campaign as a health promotion rather than a behavior change initiative [21] we can focus on how and why users utilize step-counters alongside considerations of non-use and the broader context of campaign deployment [17]. This study adds to prior studies by looking at users and non-users of step-counters in a social setting of the workplace. By investigating what the experience is like for employees in a particular department, our study considers encounters with the health campaign promoting step-counters at both site-level and individual level.

RESEARCH CONTEXT

The campaign

Tæl Skridt (Count Steps) is a bi-annual three-week long health promotion initiative conducted in the spring and fall by the Danish Company Sports association. The goal of the campaign is to walk at least 10.000 steps for 11 out of the 21 campaign days. If this goal is met, the team enters a lottery with a 1st prize of 50.000 DKK. In the 2015 spring campaign 18.112 employees participated across Denmark. Many of the private and public sector employers offer participation in this campaign as a voluntary health promotion initiative to employees who then organize themselves and engage with the campaign directly.

Generally employees have to pay to participate although some companies do cover the fee (50DKK). Employees in participating companies sign up as teams, elect a team captain, and commit to wearing a pedometer sensor of some kind – either a step-counter or an app downloaded to their smartphone, resulting in a significant diversity of devices. Each participant has a personal login and must manually enter their daily number of steps on the website, or have their team captain do it. The campaign website offers manual converters so that participants can include activities such as cycling, swimming, golf or house chores, into their daily step-counting totals. The website provides an overview of step totals for individual participants and teams. Every participant can see step count totals of other teams,

and step counts of other participants they might choose to challenge. Employees can choose to sign up with their own name or company initials. Within the department under study we observed that employees could identify each other on the site regardless of the username choices.

The Tæl Skridt campaign began as a purely internet mediated health promotion program, but as pedometers gained in popularity these were added because it simplified activity reporting, resulting in a substantial increase in the number of participants. In a phone interview the campaign manager noted that the least physically active participants are more active during, and after the campaign, based on subjective measures prior to and 5 months after the campaign.

The company

The Danish company under study is relatively large with more than 2.000 employees, offices in several locations inside of Denmark, and a few offices abroad. The company handles and invests customer savings and thus employees engage with a range of technologies for work tasks, resulting in a generally tech savvy workforce. The site of observation was one of the departments at the headquarters of the company. The department contains three sub-sections spread over two open office spaces, divided by a hallway with a coffee/ tea area. The three sections deal with different focus areas, but work cuts across the sections, and they jointly participate in weekly department meetings.

According to the Tæl Skridt campaign organizers the majority of participants in the campaign were involved in sedentary work practices, and had no direct relation with the self-tracking industry[2]. This defined our criteria for selecting the company to study. The company and its employees were unknown to the authors prior to the start of the study. We were able to gain access through a university contact. Prior to the start of the campaign the first author briefly explained the methods and goals of the study when she was introduced to the entire staff at a department meeting and obtained permission to conduct the study.

METHODS

In conducting the study we relied on traditional ethnographic methods of observation, informal interaction and semi-structured interviewing over the course of four weeks that included the three weeks of the campaign. The first author participated in work meetings, sat at a desk allocated to her in the open office space alongside the employees, joined in the lunch breaks, department meetings and Friday breakfasts, and generally partook in the daily life of the office during 12 workdays in March 2015. Observations were spread out to include time pre-, and post campaign. These observations provided insight into the actual use of the step-counters during office hours, as well as naturally occurring conversations between employees in the open office and during walks to the coffee machine or cafeteria. The author will, necessarily, have prompted discussion of the technology merely by her presence, however, only joined in conversations on the step-counter when these were initiated by the employees. The author participated in conversations on all subjects, showing a broad interest in the work practices and life of the employees. Authors did not participate in the campaign as participation requirements prevented this. We conducted semi-structured follow-up interviews with nine employees after the step counting campaign ended, focusing on participation/non-participation reflections and thoughts on self-tracking technologies more generally.

Counting full-, and part-time employees, as well as section leaders and interns, the department consisted of 28 employees (20 females and 8 males). 17 employees participated in the campaign (hereafter *participants*), while 11 employees did not participate for a range of reasons (hereafter *non-participants*). A few participants had devices from the prior year or had their own step counter bought outside of the campaign, some bought new step counters, while others used apps on their smartphones.

Field notes and interview transcripts were coded using open and iterative focused coding [9]. The two authors compared codes, engaging in an iterative process of analysis and writing to identify main themes emergent from the data. To indicate data sources, the quotes presented below are denoted with *interview* for follow up interviews, or *observation* for observations and conversations during the campaign. We use pseudonyms to refer to particular participants.

FINDINGS

We identified four emergent themes from the observations and follow-up interviews. We begin by considering the social nature of counting steps and the new sorts of accountabilities that emerge from this activity. As more than a third of the employees could not or did not participate in the campaign we discuss their reasons and their experience. Finally, we consider the outcomes of the campaign and what insights applying a social ecology lens can produce.

Social negotiations of steps

The technical implementation of step counters calls little attention to just what is this step that is being counted. For the most part, pedometers promote the idea that counting steps is a simple process with step being an obvious currency. Yet from the start of the campaign and continuing into the first week we observed participants putting considerable effort into figuring out what counted as a step. For example, step counters worn on the body may count steps differently than cellphone apps. Participants struggled to figure out whether the differences in their final step counts stemmed from differences across devices or differences between participants (that some were just more active). In the beginning of the campaign participants would jump up and down or shake their device, to see what made it count a step. Colleagues would walk next to each other to the canteen and back, and then compare how many steps their respective devices had counted. While we observed such experiments among participants who used the same type of device, the

[2] Phone interview with campaign organizers

diversity of step-counting devices used in the campaign no doubt contributed to how frequently and extensively participants engaged in these:

> Erica and Jane discussed step counting during a casual talk by the coffee machine. Erica explained how she had been for a run, and knew that the run was 4.5km, but that the mobile app only registered 2km. "So I decided to buy a step-counter" she explained.
>
> Jane replied: "I've had several apps in order to compare them, but right now I use the one called 'Walkabout'. Yesterday I just needed 500 more steps on the way home from the station and I was thinking to myself that that would add up perfectly, but then it ran out of battery. Really annoying!"
>
> (Female participants, observation week 1)

This confusion about step counting was further perpetuated because of the online converter schema. The campaign website allowed participants to convert any physical activities they liked into a number of steps calculated via a formula that included activity type, duration and intensity. Participants looked up an activity, entered the amount of time spent on it, and the level of intensity and the converter calculated the number of steps. In this way, nearly any activity could be reduced to steps. In the office one day, a female participant started a discussion amongst participants when she tried to figure out how many steps her swimming session added up to, puzzling over the level of intensity:

> *Rachel:* Maybe I just felt like it was intense! It just adds up to a crazy amount of steps. Maybe it was only 55 minutes if I have to be completely honest. So I had 6258 steps from yesterday, plus 10577 from swimming. Just imagine that it's so efficient to swim!
>
> [*Participants discuss whether it is really true that swimming amounts to so many steps*]
>
> *Rachel*: Now I am not behind anymore. I am incredibly motivated to swim some more!
>
> (Female participant, observation week 1)

Although many participants appreciated the ability to convert other activities into steps, discussions and self-reflections such as the observations described above were frequent and ranged from figuring out the mechanics of converters to needling each other over whether swimming really should be counted for as many steps as running. In this way, the steps counted by the devices were not taken as objective truths, and questions about intensity levels were genuinely considered as an issue to be reasoned about.

Fairness and moral accounting of steps

The process of becoming familiar with step-counting technologies meant that participants had to discover and negotiate the faults and benefits of their personal choices in which technologies to use. Some participants switched out devices, or tried out new apps, to find something that not only fit their specific needs, but that they also could perceive as precise and fair in the context of competitive step-counting. Consider the following discussion:

> *Jonas:* Yes, I think it might also count when you bike or something, I mean so I just saw how much I would get when I walked the dog and then of course I would count that in, but some of the other things I didn't count in because that was too much, it was like it counted too many…
>
> *Interviewer:* It counted too much?
>
> *Jonas:* I just felt like it was a bit too high
>
> *Interviewer:* And then you adjusted it
>
> *Jonas:* So it wasn't unreasonable
>
> (Male participant, interview)

In the excerpt above Jonas can only know that his step counter counted too many steps because he has compared across apps, and compared with other participants. In this way he was able to adjust his step count to a number that was not "*too much*." To Jonas as well as to many other participants step counting was clearly not a straightforward activity, but at least initially required some evaluation and negotiation. The counting of steps then was also a kind of moral reasoning, judging fairness towards other participants as well as personal achievement through numbers [14]. In a discussion of moral action Johnson [14:62] argues that moral reasoning is guided through metaphor and that "the *logic* of the metaphor determines our expectations, our reasoning, and our action." He proposes *moral accounting* as a metaphor that is concerned with what we owe other people and what they owe us – a kind of transaction oriented towards increasing our own and their well being. In the social context of competitive counting of calories, steps or other quantified health-related bodily performance indicators, the metaphor of *moral accounting* is useful for thinking about how people might reason about their "duties, rights and obligations" towards each other [14:55].

Over time participants began to agree on how many steps a given activity ought to amount to, or how *fair* a device was. While the design of the Tæl Skridt campaign allowed participants to engage in the types of activity they preferred and not just focusing on walking steps, the common goal of 10.000 steps a day resulted in people attempting to compete on equal terms. Yet the various athletic endeavors were clearly not easily reducible to the step metric demanding moral choices and extensive social negotiation.

There are several reasons why participants were occupied with the accuracy and fairness of their devices and the converter. The campaign took place in the social setting of the workplace, and participants could at any given time logon to the website and see the step counts of their colleagues. Impressions of how a colleague would do (or how well their count was thought to reflect their actual activity level) in

this campaign could potentially spill-over into the general perception of that person. Since devices at times produced different step counts, figuring out how exactly that worked and where the differences stemmed from became an important topic, to make sure that the accumulated steps (and thus the self) were evaluated as moral, reasonable and fair by others. Thus some participants were concerned with entering a particular amount of steps to the website, because they wanted to be perceived as fair and reasonable colleagues. Others, however, were clearly not above taking advantage of the confusion over activity converters and occasionally nudging their averages higher. We occasionally observed that the numbers entered on the campaign website were suspiciously round – 7000, 8500, 9300, etc.

As such, a step count was not merely an accounting of physical movement, but a socially negotiated quantity with moral valence. Thus for some, counting steps also involved moral accounting [14] that they needed to perform alongside noting down numbers from their devices, pointing to the distinctly social nature of this activity.

Group competition and accountabilities of walking

Having decided how to work out the steps and conversions, the conversation among participants transitioned into frequent discussion of how their steps were reached. Saying for example, "I reached about 15.000 steps yesterday" was followed by questions, which opened up to discussions of who had dogs to walk, who had to drive to work and thus could not walk as much, etc. This became a welcomed icebreaker, an occasion for colleagues to discuss non-work related activities and to strike up conversations in those few minutes before a meeting starts, at the coffee machine, or with colleagues that are in the periphery of ones core job tasks. While this was mostly seen as a net benefit, this could also at times result in potential breaching of work/private boundaries. Consider the following conversation in a follow-up interview:

> *Elizabeth*: They would have to ask, and say, hey, how did you get to 20.000 steps? You must have been active during the weekend. And (colleague) said, that I had 3400 steps on Sunday, so she said, did you have a hangover, and I did (laughs). So… In that way
>
> *Interviewer*: But that wasn't something you might have otherwise talked to her about?
>
> *Elizabeth*: No, I mean I can't remember if it was me or her who said it first, but that's right, you do reveal some things because of this. It is not an excuse to just say, I was lazy then…
>
> (Female participant, interview)

This interest in the source of the steps during both work and non-work hours was obvious and persistent. After all, individual behavior directly affected the team average. In this way, participants became accountable for their level of activity towards their teammates regardless of when said activity was supposed to occur. Participants tried in various ways to negotiate these new accountabilities towards their colleagues, for example by creating secondary goals and assuring similar expectancy levels within teams.

Health behavior change studies have previously found that feelings of accountability made people more likely to fulfill their goals. Munson and Consolvo noted however that having different levels of goals (primary and secondary) as well as "non-judgmental reminders" was important [24]. In our study, while the campaign was relatively simple participants tended to jointly invent their own secondary goals. For example, two of the teams in the department had introduced additional internal competitions. One team captain awarded the weekly prize for winning the internal challenge (chocolates). Another team captain gave a chocolate a day to every team-member who reached 10.000 steps. These internal competitions were very important to the participants, sometimes even more so than the general goal of the campaign. The highly competitive nature of some of these internal competitions is evident in the following excerpt. In a follow-up interview, Jonas explains why he was perhaps more active during the campaign:

> *Jonas:* Well, narh, maybe, I mean this weekend I actually biked a lot, I wanted to kill Gitte [female participant], so I biked more than what I would have.
>
> (Male participant, interview)

Participants were well aware of the competitive elements of the campaign, both due to the fact that it is clearly a part of the campaign set-up, but also because some of the participants joined the campaign in the previous year and experienced differences in how much people cared about competing. The website showed both the individual amount of steps, and that of the team. In the campaigns' first iteration all of the participants signed up as one big team, as there are no limits to how many persons can join a team. This year the participants separated into four teams largely based on shared goals and level of competitiveness.

> Charlotte and Emma two female participants, discuss in a casual conversation in the office how last year it was difficult when some people wanted to walk 5.000 steps a day and others wanted to walk 15.000 steps everyday. They agreed that it wasn't fun being at the bottom of the list [the website] of the entire department last year so even if you could still compare across teams this year, these separate teams were better.
>
> (Female participants, observation week 1)

Matching expectations within the team became important to ensuring that all participants had a good experience. These new accountabilities of walking resulted in participants feeling motivated to walk an extra round with the dog at night, or bike those extra kilometers. The social ecology model suggests that health promotion efforts should seek to enhance the fit between people and their surroundings so as

to enable people to modify their behavior in accordance with their plans and preferences [34:290] The relatively unstructured nature of the campaign provided participants with the ability to control and negotiate counting steps from walking and other physical activity. Due to the ability to set secondary goals and to select teams that fit their preferences, participants were able to guide their interactions with each other and with their environment by managing levels of physical mobility as they relied on the step-counters to provide the necessary feedback.

Yet persistence of greater physical mobility after the campaign was not assured. Both during observations and in follow-up interviews participants remained positive about having to walk more precisely because this was a temporary requirement, since the campaign duration was just three weeks. For example, Rachel, who had been very active during the campaign explained in the follow-up interview:

> *Rachel:* Yesterday we were all laughing saying how nice it is we're not counting steps [anymore], so now we can't be bothered going to the canteen to get coffee, now we just walk to the café. I mean we walked because we were a part of the campaign, and it doesn't have a health benefit if you're not wearing the step counter. We laughed at that.
>
> (Female participant, interview)

Rachel, of course, was being ironic when she equated the step-counter rather than the actual walking with health. Yet this sentiment is less far-fetched than it might seem. A number of recent studies of various positive behaviors have demonstrated their association with less healthful practices. For example, people who bring their own bags to the grocery store rather than using the paper or plastic bags available at the store also tend to buy more junk food [15]. The count-steps campaign did create new, and for the time period of three weeks, largely positive accountabilities, encouraging greater mobility in a largely sedentary environment, but it also resulted in participants feeling entitled to chocolates and cakes as part of the campaign.

By making the number of steps visible participants became accountable towards their colleagues in ways, which reached out beyond the work sphere. Such accountabilities are not always a clear positive benefit as they might impinge on feelings of privacy and create uncomfortable amounts of social presure [25]. This could be one motivation for non-participants to refrain from making a commitment of participate in the campaign. As it turned out, though, non-participants had a range of reasons for not choosing to participate, but apprehensions of accountability towards colleagues, while present were not a main concern.

Step counting as social currency

The step counting was a huge subject of conversation amongst participants, and the three weeks of the campaign did not go unnoticed by non-participants. Often, participants would get so caught up in checking the status on the website, or in other behaviors such as walking to a coffee machine further away, walking to lunch in the furthest corner of the building, and even booking meeting rooms far away, that they did not notice how their non-participating colleagues were affected by this, or how they could not easily join the conversation.

Eleven of the twenty-eight employees in the department did not participate in the campaign, most commonly for administrative reasons. Interns, external consultants and part time employees were not allowed to join the campaign since they were not enrolled in the company sports association. For example, Christina expressed on several occasions that she would have really liked to join the campaign, and that it would perhaps have helped her to have more to talk about with her colleagues. However, given the campaign set up, she felt excluded, and "*couldn't contribute or participate in that conversation*." When asked about how this resembled other projects in a company, where perhaps inability to participate in every conversation is natural, she replied

> *Christina:* No, to me this was different because it has this social aspect, like, I don't feel outside like that, if someone's sitting there talking about, how far are you on that project, or did you get around to correcting this or that, what's the status, because it's a natural thing that that happens with projects, where this was like something that was accessible for almost everyone and therefore it was, it was a deselect, where in my case I just wasn't allowed. So there was a clear difference.
>
> (Female non-participant, interview)

Diana, a part-time, project-based, employee bought a step counter to try to create "*her own campaign*", as she put it. But since the score on the website was so important to participants, and Diana was not on a team, we observed how she was essentially sidelined when conversations of step counting got going in the open office space. In this sense, participation was not really about technology use per se, but about the social team-based nature of interaction and the administrative hurdles of full time status and membership in the company sports association. Going back to the social ecology model we note that the active elements of owning a step-counting device and wanting to participate must be accompanied by the passive elements of enabling administrative infrastructures for the health promotion campaign to be effective more broadly.

Some employees of course chose not to participate for practical reasons, for example, one non-participant came back from paternity leave one day in to the campaign, and another felt that the hassle of getting a step-counter, and figuring it all out, would be too much. However, neither ruled out participating next time the campaign runs. Very few employees expressed direct resistance towards to campaign. For example, in the beginning of the campaign (week 1) we observed Betina (non-participant) being asked by Jakob (participant) why she wasn't joining in:

> "*And you even bike and run and stuff*," Jakob added, indicating that participation would not be difficult for her. To this Betina replied: "*Yes, but then you have to register stuff and all kinds of things. The others have so far spent a couple of hours running around and setting up teams*," making it clear she felt they were wasting time during their work by doing this. Jakob replied: "*I haven't spent that much time*," and they left the conversation at that.

The situation was clearly somewhat uncomfortable, as Betina was openly criticizing the amount of time spent on setting up the campaign by her coworkers, and the fact that participants would spend time during their workday to register steps and discuss these with each other. In general, however, direct resistance and criticism of the campaign were not as outspoken as in the example above. Non-participants would, mainly, air their concerns or annoyance in casual conversations with the observing author, or in follow-up interviews. Therefore, participants had little reaction to non-participations' concerns, as they mostly did not encounter them. Although the tensions were present the limited time of the campaign ensured that few were voiced.

Studies of non-use suggest that choosing not to use technology can be a way to keep control over ones life [31,33]. For example, Kirsten, a female non-participant, mentioned several times during the campaign how one of her friends had become obsessed with using a step-counter, ruining her quality of life in the process because everything eventually revolved around steps. Kirsten therefore felt more in control by not using the step counter, avoiding the potential threat of overuse. Frederik expressed a different form of active resistance in a follow-up interview:

> I measure more by a feeling in my body, and when I look at myself in the mirror, and whether it is starting to bulge in the wrong places or whether I loose my breath when I go for a walk or something like that. And plus, I know that in order to keep my body well and healthy, then I need to eat reasonably and exercise, and I actually don't need to count steps to figure that out.
>
> (Frederik, male non-participant, interview)

This difference between the forms of accounting forced by the design of the technology and the valued "*feeling in my body*," ties to the notion of disenchantment where the non-user feels nostalgic about the practices that are pushed aside by new technologies [31]. It is worth noting that non-use linked to active resistance, and disenchantment, does not mean resisting *all* health initiatives or health technologies. In fact, non-participants as well as participants were often eager users of other health promotion initiatives, such as "We Bike to Work" campaign, where participants registered distance biked. Just because one type of accounting did not fit the needs and goals of some of the employees, other similar forms of accounting of physical activity clearly could.

Regardless of the reasons non-participants were clearly affected by the campaign. They experienced exclusion during the social moments of coffee break or lunch where many of their usual conversants were suddenly out of reach, concerned as they were with discussing how they might manage 10.000 steps or which activities result in most outrageous conversion rates. Some expressed frustration or mild disapproval about this, others considered joining the campaign next time just so that they could avoid the discomfort. Yet participants were largely unaware of this. One participant, Ida insisted on showing us how another department had implemented a public screen listing all participant steps and comparisons with all competitors in their department. Everyone passing through this busy department, whether participants or non-participants, could see how well individuals and teams were doing. To Ida, the absence of such a public screen in her own workspace was an indication that her department was quite relaxed about the campaign – a sentiment not shared by the non-participants.

As participants and non-participants negotiated the goal of 10.000 steps per day socially, they all at times had to make moral choices. Consider the following observation:

> End of week 2 of the campaign: Charlotte, a female participant, asks Frederik, a male non-participant, whether he wants to join her in getting coffee from the near-by coffee machine. Frederik questions this, saying; "That coffee machine? What about your steps?" Charlotte looks at him and does not reply, but just repeats her question, whether he wants to join her or not, making it obvious that she does not want to talk about step-counting at this point.

As this participant attempted to engage a non-participant co-worker, she had to negotiate in the moral accounting for her steps with someone who did not participate and yet could still hold her to account. Towards the end of the campaign many participants fatigued from the pressure of having to make their steps, and some commented on how relieved they were that the campaign was "just three weeks long". Non-participants often expressed a similar sentiment indicating that the social upheaval wrought by the commitment to counting steps was quite significant.

A social ecology approach to health in the workplace

The follow-up interviews and post campaign observations made it clear that participants were relieved to leave their step counters at home, and to be able to resume their normal daily office and activity practices.

> *Elizabeth:* (Would) have suited me fine if it was just two weeks. A bit of the motivation disappeared. And then it just turns in to a kind of control of you, sometimes you just want to be lazy, but you had to get to those 10.000, right?
>
> (Female participant, interview)

Upon completion of the campaign the team who had scheduled to get coffee every morning in the other end of the building stopped doing that, and everyone went back to eating lunch in the nearby cafeteria. The heightened activity level that was kept up during the campaign ended, and from what we could observe after the campaign, employees no longer used their pedometers at work. But does this mean that the campaign failed?

Generally, participants went back to their prior habits, stopped using their step counters or went back to using other types of fitness trackers they had utilized prior to the campaign. Given this, perhaps, the campaign can be seen as a failure, as the technology did not 'stick' and the prior activity levels did not translate into new and healthier habits. Yet there are other factors that must be considered. This particular workplace has a variety of health promotion initiatives offered to the employees. In the framework of the social ecological model, this is a way of including both active and passive elements. Passive elements in this particular case included a focus on healthy food in the canteen, with no juice or sodas available for lunch, a restriction on cake (only served on Thursdays), fruits available throughout the day, and every employee having height adjustable tables to support ergonomic posture and the choice for sitting or standing. Active elements included an in-house gym with several types of classes offered, with the option to use the gym with pay for a limited number of hours annually. Many health promotion campaigns were frequently on offer, such as The Sugar Sheriff (focused on leaving out sugar from the diet)[3], We Bike to Work[4] or the Tæl Skridt campaign. Thus just because some employees did not participate in step counting did not mean they were slouches.

In this way employees were able to participate in activities that were to their liking, and fit their own goals, needs and personal preferences, while balancing environmental factors, such as transport or family. For example, Kirsten, who was quite skeptical of the step counting campaign, had previously participated in an initiative where employees were offered to bring home food leftovers from the canteen, seeking to diversify the vitamins and nutrition employees received. She had really enjoyed it saying that it was helpful to bring home food, so she did not have to cook after a long days work, and that it had probably been more diverse and healthy than what she usually cooks.

Vibeke, a female participant, had a goal to go on a summer hike with a friend, and felt she needed to get fit for that trip. The Tæl Skridt campaign gave her the opportunity to work in more steps during the average day, and she enjoyed that this was something she could then talk about with colleagues. Jonas enjoyed the competitive nature of the Tæl Skridt campaign but also kept his eye on other campaigns:

> *Jonas:* I think I biked a lot because I've signed up for a bike event, Sjælsø rundt, and then we have this "Bike to work" thing in April, and it's important to get into shape for that.
>
> (Male participant, interview)

Frederik, a non-participant, was skeptical of what he saw as a narrow focus of the Tæl Skridt campaign, but was adamant about limiting sitting work, and preferred standing up at his desk, which he did almost all day. To him, standing up was the important factor in keeping healthy, not walking and counting so many steps per day.

From a social ecological perspective, the step counting campaign can be viewed as just one part of improving health in this workplace, an active part of the intervention to have healthier employees. Step counters could be seen as purely tackling individual health behavior as it requires "voluntary and sustained effort by target individuals" [34:287]. Where the step counting campaign could be interpreted as less than a complete success by itself, it was nevertheless an important part of the active/passive combination of interventions, recommended by the social ecological approach; just one part of an ongoing drive to improve health in a workplace that clearly communicates to the employees the importance of their health through policy support and financial investment. Non-participation then might not be a failure, but simply a sign of some employees choosing other active or passive elements, which suit their personal health views and environmental factors. So has the Tæl Skridt campaign failed in instituting lasting behavior change? Perhaps in the traditional sense this is the case, but in the context of exposure to new technologies, and facilitating different forms of sociability in the workplace tied to physical exercise, it could be counted as a success.

DISCUSSION

The use of technology as part of health promotion efforts is a laudable goal and our study shows that even narrowly focused and short-lived health-promotion campaigns can get people really excited about participation at least for the period of the campaign. Beyond this, our study highlights three specific points for discussion. First, we demonstrated that a step is not a clear and obvious quantity, but a socially negotiated one. Second, despite the individual nature of the technology and the emphasis on taking charge of your own steps, counting steps becomes a social endeavor often tinged with forms of moral accounting. Third, in the workplace under study employees were able to choose to participate in many different initiatives, while at the same time being targeted through passive health promotion elements (such as healthy food in the canteen, height adjustable tables or cake restrictions). Thus at least in this case, campaigns such as Tæl Skridt clearly do not operate in a vacuum but exist as part of an ecology of workplace health practices. Despite the campaign popularity, our data bear no evidence of healthier practices continuing beyond the three weeks of the campaign. Yet it is hard to say that

[3] http://sukkersheriffen.dk/produkter/zukkerfri-zone-21-dages-kampagne/
[4] http://www.vcta.dk/

the campaign failed in its goals. We discuss alternate ways to conceptualize the notion of success in this context.

Steps and walking have social meaning

No matter how simple a technology, the meaning of its output becomes socially constructed and the use of it, through persistent quantification of mundane activity can come to be felt as stressful and limiting [6]. The time spent on negotiating steps was a point of annoyance to some non-participants, as they felt it intruded on time spent on work. The figuring of the meaning of steps, the calculation of conversions, the chocolates and campaign site entries all amounted to what Miller et al. had termed "hidden work" [23]. As walking and steps did not constitute the primary work tasks of the participants, these likely couldn't be sustained for long especially since these had an effect on non-participants as well. Temporary inconvenience brought about by a technology that can be used as a stepping stone to new skills and habits is not a big issue [26], but there are two important points that this negotiation around the meaning of a step brings up. First, if the goal is to address sedentary behavior in the workplace, then designing technologies or interventions that interfere with the time spent on actual work is unlikely to be popular with employees or employers for long. To be serious about supporting health-behavior change through technologies in the workplace then is to acknowledge and to design for the hidden work and time it will take to participate. Second, and perhaps more importantly, if the very meaning of a step is not an inherently known quantity, but a notion that is socially constructed in part due to technical limitations of step-counting devices, it is important to account for the potential variability in what a step might be in the course of technology design. The step counter is often seen as an incredibly simple technology and it is too easy and tempting to overlook how steps might not be an inherently known quantity. Thus instead of introducing the step-counter as a technology that is so simple users will hardly notice it, it may be more useful to explicitly encourage users to take the time to get to know their devices and to discuss the meaning and the technical implementation of measuring steps.

Furthermore, the findings presented here highlight the stress of competition for steps, which was not welcome past the relatively short duration of the campaign. This suggests that gamification and persistent long-term quantification of activity at work more generally and activities related to health specifically may become detrimental to themselves in the long term even when producing active improvements in the short-term. Perhaps it may be instructive to change the game often and sometimes stop counting.

The social costs of moral accounting

No matter how individually focused the technology design might be, the performance of step counting is distinctly social and can manifest in unexpected forms of moral accounting. In our study few constraints were in place to ensure that participants truthfully reported their step counts. Yet many worried about their technologies potentially unfairly inflating the evidence of their walking efforts. Moral accounting [14] is based on the notion of wealth, relating moral action to increases in personal well-being. Thus making more steps would lead to increase in personal well being if it is conducted *fairly*, without taking undue advantage of or impinging on the needs of others too much. The notion of moral accounting is useful as it forces us to think in terms of social dependencies and accountabilities beyond the oversimplification of social networks and interpersonal privacy concerns. With deployments of health technologies in workplaces, the kind of accounting individuals might need to do involves not only their personal step goals, but also the social relationships and social dependencies they must maintain despite these.

If we are to take seriously that decision making around the use of step-counters can become a form of moral accounting then it is important to consider both users as well as non-users of the technologies, user obligations outside the individual health goals and the environments within which they operate. The enforced sharing of progress for all participants, visible to all other participants surely resulted in efforts to improve personal performance but it also lead to ensuring that the reporting of steps, while still occasionally nudged or rounded up, remained at least visibly fair. Participants worked to renegotiate their own moral accountabilities by creating different teams and thus trying to manage expectations. As part of this effort, participants also created their own secondary goals although this was not directly supported by the campaign [24].

Future health technologies might take this into account and support the creation of preferred goal settings by the user, acknowledging that chocolates or other less healthy treats might become a part of what it means to be healthy. Working seriously with the concept of moral accounting, how might we create tools, that harvest the benefits of creating accountabilities, but respect the delicate work and private life balance that is at times breached in initiatives, that put particular behaviors as the ultimate goal, making all means fair game? After all, while moral well-being can be accumulated, it is not something that comes exclusively from individual action but depends also on the "good actions of other people" [14:54]. Moral accounting then offers a way to tie together the more technologically and individually focused approaches favored by HCI and CSCW with the more holistic approaches proposed in social ecology and health promotion [21,34].

Designing for a social ecology of health

In research on health behavior change and in the body of work on health promotion what constitutes success has been difficult to define and to measure [17,40]. Whether health promotion campaigns are a success or failure in traditional behavior-change terms of influencing changes in habitual behavior remains an open question. Yet the notion of success and the question of 'did it work' are not trivial and

should not be dismissed. As the Tæl Skridt campaign repeats twice per year it is possible that after several iterations behavior change does in fact occur. The short run of each campaign cycle may allow people to continue getting excited and not too tired of it. In order to assess the benefit of campaign participation, however, it is important to look beyond the questions of success or failure of one campaign. Individual health interventions such as the Tæl Skridt campaign do not operate in a vacuum and thus do not need to be overwhelmingly successful to raise the overall level of activity among employees. The social ecological approach suggests that in designing interventions for behavior change it is important to think in terms of suites of efforts rather than single technologies or individualized approaches.

CSCW/HCI researchers have already begun discussions of where and how might we set in to improve health (individual/environmental levels) and with which tools (active/passive) [21,32]. A social ecological approach can provide a common starting ground by emphasizing the need to bring in both active and passive tools, and to target individual, group and perhaps environmental levels at the same time [34]. We have argued in this article that participants, and non-participants, already experience health promotion initiatives as one element of many that targets not only individual behavior but also the social context of the workplace. What would it mean for research to stop debating the classic individual/environment gap, but to realize that these are inherently connected, and that initiatives should be built to reflect this?

HEALTH PROMOTION OR BEHAVIOR CHANGE?

Following Maitland [21] in this article we have focused on the Tæl Skridt campaign as an example of a health promotion rather than a behavior change effort. This is a significant shift in focus, enabled by the use of the social ecology lens [34]. Unlike behavior change, health promotion takes its departure from healthy behavior as a baseline to be supported and encouraged rather than addressing sickness and unhealthy behavior as something to be changed [21,36]. That is, health promotion focuses more on leveraging existing resources and addressing the broader context of health behavior practices, rather than driving toward eliciting consistency in behaviors oriented towards one specific goal, such as walking more. This means that health promotion efforts by definition must offer more flexibility and control to individuals because they recognize the diversity of environmental constraints that people encounter.

Single point of feedback technologies such as activity trackers offer obvious solutions for those who have their own motivation and health goals and may only require easy to understand feedback that supports their own efforts towards healthier behaviors. Alternatively, those that may be curious about potentially engaging in healthier practices but lack the motivation to do so are less likely to continue use beyond the novelty effect. From a health promotion point of view it would be a mistake to conceptualize the lack of motivation in the second group as merely an individual shortcoming that can be overcome through nudges, incentives or threats. Rather, it is important to understand the broader context of available resources and constraints that may have an impact on motivation and healthy behaviors.

The Tæl Skridt campaign is successful as a form of health promotion, rather than as a behavior change effort, for two reasons. First the campaign is designed broadly enough to allow participants significant control over the form of their eventual participation. Second, its success stems not from a single or bi-annual three-week deployment, but from the fact that it is a part of broader effort to promote overall health supported by state and commercial actors. From a health promotion point of view, the goal is to keep notions of health and examples of easily achieved healthy physical activity salient, rather than insisting on repetitive performance of one particular behavior. Whether it is cycling to work, eating less cake or walking 10.000 steps, the idea is to foster a general healthier outlook and not the accumulation of quantitative evidence of walking.

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