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Promoting Psychological Wellbeing: Loftier Goals for New Technologies

"Don't be evil" wrote Larry Page and Sergey Brin on the eve of Google's initial public offering (IPO) in 2004. As a statement of the company's mission, the phrase resonated then, as it does now, with technology designers and developers who want to believe that the work they love to do is also improving the world. The drive to "do good with technology" is not new, but our definitions of what "good" is and how to achieve it have been undergoing some significant changes.

For a long time, "good" in the technology industry has been bound up with more easily quantifiable things like productivity, computing power, security, novelty, portability, or reduced cost. These are all valid drivers for invention, and they've taken us a long way. But we suggest that these are really proxies to a greater overall goal: happiness. The unspoken assumption is that when we have greater productivity, security, or convenience, life is better and we are happier. So what if we were to address the issue of using technology to increase happiness more directly?

Arguably, the pursuit of happiness – or what psychologists refer to with greater precision as "psychological wellbeing" – drives everything we do. But this pursuit is often indirect. Wealth has been the most commonly used proxy for psychological wellbeing. It often seems safe to assume that if people get richer, they get happier, so governments and businesses work to build systems that generate greater wealth and measure success accordingly. But economists themselves have shown that the link between wealth and wellbeing is weaker than we'd like to think, and that beyond the satisfaction of modest needs, more wealth doesn't make a society significantly happier [1].

Similarly, we frequently assume that technological progress will inherently improve our lives and increase our happiness. Technological advancement can increase wealth and improve health and longevity, therefore happiness. The nagging question remains however, that if in the last 30 years computers have come to permeate most of our waking moments, why aren't we experiencing unprecedented levels of psychological wellbeing?

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Powermat Power 2.0 Ecosystem illustration of wireless power network of charging spots controlled from the cloud, which enables to manage access to power in public places for the benefit of customers and venues.

Of course, there could be a homeostasis inherent to the human condition that one can never hope to surpass, or perhaps there are negative variables counterbalancing the positive effects of technology. Yet we can't help but suspect that technology *can* do better at improving our wellbeing than it has, and if it hasn't to date, that shouldn't come as a surprise because we haven't actually included the support of wellbeing into the design of our technology.

With advancements in big data and ubiquitous computing at our disposal [2], we think that it is the ideal moment to start measuring and designing for the impact of technologies on the psychological wellbeing of the people who use them. We have come to refer to efforts in this area as "positive computing." The term "positive computing" was originally suggested hypothetically by Tomas Sander in a 2011 book for psychologists [3]. We

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deal in depth with and make this terminology real in our forthcoming book *Positive Computing* [4].

If this sounds like a mushroom-induced, "they must be from California," kind of suggestion, note that even conservative types like economists, business leaders, and neuroscientists have taken on wellbeing with gusto. In fact, many of us in computer science and engineering have also already begun more extensively to consider the concept of well being. To understand what we've done versus what we might do in the future, we first need to get rigorously scientific about wellbeing.

In [5], motivation researchers Ryan and Deci describe the long standing distinction made between two theories of psychological wellbeing: hedonic and eudaimonic. Technologists have addressed some aspects of hedonic wellbeing, by seeking to create pleasurable devices and positive user experiences. Our ability to quantify hedonic wellbeing has been furthered by researchers like Nobel Prize winning Daniel Kahneman, who devised methods for measuring wellbeing [6].

Eudaimonic wellbeing goes beyond positive emotion and argues that lasting happiness is also contingent on reaching human potential and on personal development. Eudaimonic wellbeing is frequently evaluated using measures of life satisfaction used by economists and policy makers [1]. While attention on eudaimonic wellbeing is increasing in other fields, it remains fairly new territory for engineers.

Promoting Wellbeing Fast and Slow

We know what you're thinking. "Wellbeing is out of my area. What do engineers know about happiness anyway?" Indeed, the loveable image of the sun-starved hacker coding into the night and stopping only for a role playing game (RPG), doesn't exactly scream "expert in psychological wellbeing." It's like putting one's happiness in the hands of Sheldon Cooper.[1] But besides the fact that stereotypes aren't reality, we don't need to be experts on wellbeing research to take advantage of it. Fortunately, psychologists and neuroscientists are doing that part for us, and by partnering with them we can make technologies that have a far greater impact on our users (and ourselves).

Economists have partnered with psychologists in areas like choice architecture (i.e., "nudges") to help people make healthier decisions. Nudging generally focuses on scaffolding the automatic decision-making we often use even for significant life decisions. Those working in persuasive technologies are no strangers to choice architecture and how it can be used for human welfare or for profit.

In the area of personal informatics, aka "quantified self" [7], researchers have generally taken a different approach. Rather than guiding behavior towards an end, they work to inform it. They use data collected via inputs like sensors to build tools that help users reflect on their behaviors (e.g., exercise habits or sleeping routines).

Most current examples relate to physical wellness, but the very same techniques can be used for supporting psychological well being. We might think about the above approaches as aligned to what Kahneman calls "Thinking Fast and Slow." In other words, software designed to support wellbeing could do so by scaffolding "thinking fast" moments (e.g., using choice architecture to help nudge off-the-cuff decisions). Or—and this second option may appeal to those concerned by the paternalistic overtones of the former—software can be designed to support "thinking slow" moments, when we benefit from visualizations and feedback that can help inform reflection and planning.

Carving a Landscape of Positive Computing

We might better understand the potential for positive computing by categorizing it based on how techniques to support wellbeing are integrated into software. In this regard, we observe at least three useful categories: preventative, active, and dedicated.

- **Preventative** technologies treat obstacles to wellbeing as errors (just as usability violations warrant redesign). For example, imagine a redesign of Facebook undertaken when an evaluation reveals that an interface element encourages cyber bullying.
- **Active** technologies are those in which a *new feature* is added *specifically* to promote one or more factors of well being. For example, software designers might choose to add a "thanks" button based on the evidence that expressing gratitude increases overall wellbeing.
- Finally, **dedicated** positive computing technologies are those *built from the ground up* to promote one or more factors of wellbeing. These are the easiest to identify today, in apps like *Super Better, bLife* or the *Mindfulness App* which were created to develop resilience, implement positive psychology and encourage mindfulness respectively.

In addition to a growing number of apps, studies on computer-based mental health interventions can stand as early models for positive computing. For example, a number of interventions for the development of socio-emotional intelligence have been used successfully in schools and by clinical psychologists. See Schueller and colleagues [8], for an example on empathy and gratitude).

Other factors with causal links to wellbeing include autonomy, relatedness, and competence, which together form the basis of Deci and Ryan's self-determination theory. Psychologists have built a rich body

[1]A fictional character on the American TV series *Big Bang Theory* whose scientific prowess is matched only by his utter lack of emotional intelligence.

of knowledge around this and other theories that engineers could draw on to inform design. Although multiple theories of wellbeing describe autonomy as critical, technologists frequently privilege automation which can leave users frustrated and helpless (as Don Norman thoroughly illustrates in *The Design of Future Things* [9]). When designers and developers draw on a sophisticated understanding of wellbeing, benefits to the user experience must surely follow.

In other areas, virtual environments have been shown to have a significant impact on "helping behaviors" [see the Stanford study of altruism for example [10]] or to "promote an awareness of attention during cognitive training" [11]. Our own work with the Young and Well Cooperative Research Centre looks at supporting wellbeing in young people via the Internet. The list of examples in the category of "dedicated" positive computing is already long. But the impact of the tools in this category is limited to those in the population willing to seek them out and use them. The greatest potential will be reached when our day-to-day technological experience is guided by consideration for our human flourishing—when even companies like Microsoft, Facebook, and Apple are evaluating how their products affect psychological wellbeing as part of the iterative design cycle. We are inspired by a vision of the future in which computing professionals contribute to a rigorous and dynamic interdisciplinary effort towards digital experience that is deeply human-centered.

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Why has this not been done already? The answer lies in the way cities do business. If you want to build something, you hire and engineer and architect. If you want to secure an area, you hire a security expert. If you want to remodel a downtown area, you hire urban designers. If you need new street lights, you call the utility. Who would champion such a ubiquitous system? It has to begin with mayors and city managers, county executives, governors, and the U.S. Department of Homeland Security. Once a model has been established it becomes far easier for others to follow.

Let us all hope that we figure out how to save money by avoiding so many wireless platforms and develop a common operating methodology that takes us far into the future – before it's too late. This is not about Big Brother, it is about the reality of urban populations developing a means to monitor and control their environment, reduce chaos in the event of a disaster, and do so with a day to day system that provides an informed and enlivened community.

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