Quantified Self: The Road to Self-Improvement?

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Quantified Self – Personal Informatics

Quantified Self: Self-knowledge through self-tracking with technology

Personal Informatics: Class of tools that help people collect personally relevant information for the purpose of self-reflection and self-monitoring.

a.k.a. self-tracking, life-logging, self-hacking, self-experimentation, personal analytics, auto analytics, …
Tracking of People
(not to scale!)

self-tracking: includes self-tracking not consciously perceived as such

self-initiated self-tracking

Quantified Self (the group)

other-mandated self-tracking (doctor, employer, state, etc.)

All The Tracking: includes self-tracking and tracking of others (by governments, corporations, employers, individuals, etc.)

Source: Whitney Erin Boesel

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“Self knowledge through numbers”

YOU ARE JUST A NUMBER

Can you make yourself healthier and happier by logging every snore, step and mood swing? As a Californian trend for obsessive data-tracking makes its way over here, Tim Chester covers his body in gadgets to find out if self-knowledge is power. Photograph by Paul Stuart

Today I have climbed the equivalent of a tall giraffe. Coffee is my most frequent food. On average, I walk 11,726 steps a day, burning 3,089 calories, over 2.4 hours of activity. I sleep for 6 hours and 9 minutes a night. This week, my sleep efficiency is 72% and my food is 77% healthy. My BMI of 23.5 is 14 percentage points below the median for men my age, and my average daily Met score is 3.7L, although I have no idea what a Met score is.

I am, in essence, nothing more than a bundle of numbers and milestones, spurred on by LEDs and ticked by pop-up messages. A wireless accessory for the iPhone, perhaps its most sophisticated eye.

My arms are covered in bands, my pockets augmented with accelerometers, my eyes numb from all the charts, my heart pumping to the beat of a heart-rate monitor and forcing its ventricles to keep up with the national average. My head is about to explode from all the positive affirmation and gentle nudging, but it’s OK because my memories are being saved to my hard drive and my mood swings are earning me “hugs” from strangers.

I am producing, analysing and socially sharing personal data. I am becoming fitter, happier, and more productive. I am staying motivated by earning badges. I have become a Quantified Self (QS).

The QS movement that I’ve temporarily joined began as these things tended to do, in San Francisco’s Bay Area in 2007. Two Wired magazine editors, Gary Wolf and Kevin...
Self-quantification isn’t new

• Benjamin Franklin kept accounts of how he spent his time and whether he lived up to the 13 virtues he set forth for himself.

“I made a little book, in which I allotted a page for each of the virtues. I rul’d each page with red ink, so as to have seven columns, one for each day of the week, marking each column with a letter for the day. I cross’d these columns with thirteen red lines, marking the beginning of each line with the first letter of one of the virtues, on which line, and in its proper column, I might mark, by a little black spot, every fault I found upon examination to have been committed respecting that virtue upon that day.”

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Self-quantification isn’t new

- Doctors’ scales first produced in 1865.
- Public "penny scales" in 1885.
- Household scale in mid 20th C.
Self-quantification isn’t new

- 1960s: The “manpo-kei“ or "manpo-meter"
- The first device to:
  - count steps rather than distance
  - be marketed on health grounds
- Origin of 10,000 steps
Self-quantification isn’t new

My memory: A study of autobiographical memory over six years

Willem A Wagenaar

http://dx.doi.org/10.1016/0010-0285(86)90013-7

Abstract

This paper describes a study on the recall of 2400 events from the author’s daily life, recorded during a period of 6 years. One feature of the study is that all events were recorded by means of four aspects, viz., what the event was, who was involved, and where and when it happened. All events were scaled for saliency, emotional involvement, and pleasantness. Recall was cued by different combinations of the recorded aspects. For instance, given what, the task was to reproduce who, where, and when. Given who
Why self-tracking?

People have **incomplete knowledge** about themselves and the things that affect their lives, because we have:

- limited retrospective memory
- biased perceptions (grossly over- or underestimating certain behaviors, *e.g.*, productive hours at work)
- no direct access to certain behaviors or bodily states (*e.g.*, sleep apnea, blood pressure)
- no direct experience of relations between behaviors and their temporally remote outcomes (*e.g.*, media consumption patterns and sleep quality)
- no stamina, time, or patience to constantly and consistently observe some behaviors (*e.g.*, manually counting steps throughout the day).
Quantified Self: Runkeeper

RunKeeper
The personal trainer in your pocket.

Track your activities in real time & get audio updates along the way.

Set & achieve your goals with personalized guidance.
Quantified Other: Smart Diapers

“I was driving with my wife and daughter one day, when my wife asked if the baby had wet herself. I realized she was sitting in data.”

Yaroslav Faybishenko, Founder of Pixie Scientific
Quantified Us: Asthmapolis

PropellorHealth: https://www.propellerhealth.com/
Reasons for self-tracking may vary
(Rooksby et al, 2014)

- **Directive tracking**: goal-driven (e.g., lose weight), behavior change implied
- **Documentary tracking**: documenting rather than changing activities (e.g., how many steps do I walk during a typical day?)
- **Diagnostic tracking**: looking for links between two things (e.g., effects of medication and food intake on stomach ache)
- **Collecting rewards**: score points, register achievements (e.g., register the highest possible speed on a stretch of road)
- **Fetished tracking**: pure interest in technology

“Tracking over short term is not necessarily to give up or fail” – Rooksby et al, 2014
Tools for Self-tracking

QS guide to self tracking tools lists over 500 tools including

- health (185)
- fitness (124)
- social (95)
- lifestyle (76)
- medicine (60)
- mood (59)
- location (57)
- productivity (55)
- food (54)
- energy (36)
- sleep (34)
- relationships (19)

Source: http://quantifiedself.com/guide/

From: Choe et al (2014)
1 in 10 Americans over 18 now owns an activity tracker

U.S. Activity Tracker Ownership
(Endeavour Partners, September 2013)
Almost any aspect of a person's life can be tracked.

**Percent of Activity Tracker Owners vs. Percent of U.S. Population By Age**

*(Endeavour Partners, September 2013)*
Two major drivers of Quantified Self

1: Technology developments

- Mobile phone as a computational platform, miniaturization of sensors and the other components of sensor systems, and improvements in connectivity infrastructure and data storage
- Nascent fields in Comp Science and HCI: Ubiquitous computing, wearable computing, digital health, persuasive technology, gamification, exertion interfaces, …
Proliferation in wearables
The Smartphone as Sensor Laboratory

- Accelerometer
- Gyroscope
- Magnetometer
- Barometer
- Proximity
- Light sensor
- Touch screen
- GPS
- WiFi
- Bluetooth
- GSM/CDMA Cell
- NFC: Near Field
- Camera (front)
- Camera (back)

14 sensors!
Two major drivers of Quantified Self

2: Socio-cultural shift towards biomedicalisation

• “a habit of thought that makes medicine the most readily available explanation for why things are the way they are” – Neff & Nafus, 2016
  • Technoscientific transformation of health and illness
  • Biomedical interpretations of moods, feelings, activities, health, life success (instead of, e.g., cultural or social interpretations)
  • Increased focus on modifiable risk factors, such as unhealthy diets, physical inactivity, tobacco use, and harmful use of alcohol. These factors are modifiable in the sense that they are, at least in part, assumed to be a consequence of a series of behavioral or lifestyle choices
Managing modifiable risk factors

“Self Knowledge Through Numbers”

User need or goal

Self-tracking

Self-knowledge

Behavior change

Health/ wellbeing/ productivity

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A typical response?

“This device has changed my perception about my exercise because it helped me become aware of the fact that I am less active. I was surprised by how much using the FitBit made me more motivated and competitive with myself. I really liked being able to see my own progress.”

– participant P1 from Shih et al (2015) study
Many wearables fail to engage long-term – why?

Declining Rate of Sustained Activity Tracker Use Over Ownership

(Endeavour Partners, September 2013)
Many wearables fail to engage long-term – why?

1. Food and drinks
2. Workout routine
3. 10 years of self-tracking
My early (and crappy) trackers

- SUXES Digital pedometer (and FM radio!)
- Cresta Digital Motion Sensor
- Cheap 😊
- But: Low accuracy, no internet connectivity (no sharing, no coaching, no GPS, etc), flimsy design, falls & breaks easily, …
Philips Directlife (5 years ago)

+ Nice design and easy to wear format
+ Intuitive feedback
+ Online overview and support
+ Targeted at everyday lifestyle interventions, not improved athleticism

- Monthly fee (after 1 year)
- Online support repeats itself (canned sentences)
- Not a great social sharing interface
- Various activities not rewarded (i.e., not tracked)
Ready to step up your running game? Get quick tips, immerse yourself in our training articles or draw inspiration from the community.

**MOTIVATION**

Running and travel | 7 marathons on 7 continents

We run the world | Running motivation from the Polar community

READ ARTICLE

READ ARTICLE
My health goals? My community?
Self tracking to support behavior change?
Self-tracking: Mind the gaps!

Perceptual/Cognitive Awareness

Psychological Involvement

Behavioral Engagement

Data → Information → Personal meaning → Action

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7 Design Considerations for Personal Informatics devices

1. Reliable (precision) and robust (across activities) tracking
2. Design for a diversity of users – not everyone’s a sixpack in the making
3. Design for awareness of and engagement with the device itself – stimulate and reward exploration: tease, praise, share fun facts, …
4. Stimulate self-curiosity and self-learning while avoiding self-evaluation, self-judgement, or healthism
5. Support action and the formation of new habits: implementation steps, coaching, gamification, temporal & physical context
6. Connect to relevant communities: Zone of Proximal Development, offer relevant comparisons
7. Design for sociality, support annotation, storytelling, sharing and social support mechanisms – warts and all
Further exploration

Personal Informatics, Self-Insight and Behavior Change: a Critical Review of Current Literature

Elisabeth T. Kersten - van Dijk, Joyce H.D.M. Westerink, Femke Beute & Wijnand A. Ijsselsteijn


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Thank you for your attention! 😊

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