Design Beyond the Numbers: Sharing, Comparing, Storytelling and the Need for a Quantified Us.

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Abstract. In this article we discuss the social side of self-tracking. Technologies that allow users to keep track of various aspects of their lives tend to focus on individual needs and goals (the Quantified Self), but as these technologies become more enmeshed with users' lives, appropriation practices reveal a desire of users to connect to others through self-tracking. To better support these needs, we argue for an expansion of the technology and the associated scientific field toward a more socially oriented Quantified Us, that values and facilitates interpersonal communication and connection through self-tracked data. These matters are illustrated with examples from self-tracking practice, highlighting communication needs and existing workarounds associated with self-tracking. We conclude with directions for future work.

Keywords: Quantified Self, self-tracking, technology appropriation, digital self-representation.

1 Introduction

Recent advancements in wearable and ubiquitous sensor technology have created opportunities for detailed investigations of the daily reality of life as it is lived. These opportunities have proven of interest not only to researchers, but also to the general public. Specifically, a market has arisen for products that allow users to investigate *themselves*, gaining insight into areas of their life that would previously have been inconvenient or impossible to access: how high is my heart rate? How many new places did I visit this month? Do I get an appropriate amount of REM sleep on a daily basis?

What began as a small group of early adopters from Silicon Valley expanded to a larger Quantified Self movement, and is now becoming a more mainstream phenomenon. A variety of affordable devices and applications that track location, activity, heart rate, sleep cycles, financial transactions and social interactions are available on the market, and established brands such as Apple, Samsung and Nike are playing into the trend by releasing equipment aimed at self-tracking.

Initially, the purpose of these systems has mainly been of a very individualistic nature: *self*-tracking for *self*-discovery, *self*-insight and *self*-improvement. However, as these technologies become more enmeshed with users' lives, users are inventing

ways to connect not only to themselves, but also to others through their self-tracking journey. These practices suggest a need for a broader view of the potential impact of self-tracking technologies. In this article we will argue for an expansion of the Quantified Self to a more socially oriented Quantified Us, that values and facilitates interpersonal communication and connection through self-tracked data.

In the remainder of this article, we will first elaborate on the ideology and theory behind the Quantified Self and the associated field in Human-Computer Interaction: Personal Informatics (or PI for short). We will then discuss the various motives that have been observed in practice for using these technologies. The matter of communication will then be addressed: using examples from self-tracking practice, we illustrate how users express a variety of needs concerning communication, sharing and interaction both explicitly and implicitly through use, abandonment, appropriation practices and workarounds. We further expand on these findings by discussing relevant theoretical perspectives. We conclude with directions for future work on Personal Informatics.

2   Quantified Self & Personal Informatics: theory & ideology

The term 'Quantified Self' was coined by Gary Wolf and Kevin Kelly of Wired magazine in 2007. Since then, the Quantified Self (or QS for short) movement has gained traction in 37 countries around the world (as of May 2016), with branches of the movement organizing regular meetups in various cities to exchange their experiences in self-tracking. The QS motto reads 'self-knowledge through numbers'[1], reflecting the ideology behind the movement: access to quantitative, objective data about one's life leads to true self-knowledge.

Measurements obtained through technology have a long history and carry the weight of the scientific and the objective. As Crawford at al. note, public weighing scales may be seen as a historical equivalent of today's fitness trackers, including the provision of numerical and therefore quantitative data, and the accompanying connotations of accuracy and truth [1]. This view also seems to come with the idea that more accurate self-knowledge empowers the user to take action and improve themselves based on their newfound self-insights. This view is also expressed by Gary Wolf in his 2010 TED talk on QS: "If we want to act more effectively in the world, we have to get to know ourselves better"[2].

The view of self-tracking outlined above has also permeated scientific discourse on the subject. The scientific field investigating technologies and interfaces that facilitate self-tracking or the Quantified Self has been dubbed 'Personal Informatics' (or PI) [2]. The first model of PI to emerge is the Stage-Based Model (SBM) of Personal Informatics by Li et al. [2]. According to this model, users begin their journey by preparing to track: deciding what they will track and how. This preparation stage is followed by a stage of data gathering (i.e., by means of self-tracking technology), which in turn is followed by the integration stage, during which the gathered data is

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[1] http://quantifiedself.com/
[2] https://www.ted.com/talks/gary_wolf_the_quantified_self

processed into a usable format (e.g., by collecting different data streams and producing visualizations). Once the data is complete and sufficiently processed, the user enters a stage of reflection on the data, which is then followed by the final stage, during which the insights gained are put into action.

The SBM clearly follows the line of thinking identified earlier: through technology-mediated self-tracking, users can obtain more accurate information about themselves and this self-knowledge subsequently serves as a catalyst for self-improvement. Although this view has dominated the PI field for several years, other motives for self-tracking have been identified as well.

3   Beyond self-improvement: varied motives for PI usage

The use and impact of new technologies is often difficult to predict. Taking a social constructivist view of technology (see e.g. [3]), the use and resulting impact of technology are not deterministic, but are shaped by the physical and socio-cultural environment in which they are used. People tend to find unexpected ways to interact with new technologies, weaving them into their lives and giving them meaning. This also goes for PI: in contrast to what the SBM suggests, PI usage is not necessarily always exclusively about self-improvement. Although usage motives related to self-improvement are common [2, 4–8] a diverse set of complementary motives for adoption and use of PI technology have also been observed.

Different authors provide different taxonomies of PI usage motives, but some overlap may be identified. In various studies, users report that self-tracking provides them with positive outcomes unrelated to self-insight or -improvement [2, 4–6]. For instance, self-tracking may facilitate communication or coordination with others. Other users are looking for specific rewards, be they monetary (getting a discount on an insurance premium), digital (trophies, badges) or social (praise, respect). In addition, some users view self-tracking technology as an end in itself, rather than a means to an end: simple curiosity about the data without a desire to change one's behavior, or an interest in the technology itself may drive users to PI technology [5–8].

Some of the motives mentioned above already hint at the social implications of self-tracking technology that are emerging. In the next section we focus on this social side of self-tracking, combining a theoretical perspective (what social/communication needs would one expect in PI?) with an empirical perspective (what empirical support is there for these needs?). We do not aim to provide an exhaustive review of the PI literature here; rather, we give a thematic overview of work from the PI field that highlights appropriation practices related to the need of PI users to connect with others in the context of self-tracking.

4   The social side of self-tracking

Although the Quantified Self has mainly been conceptualized as an individual endeavor, the QS community itself shows distinctly social tendencies: regular

meetups around the world, with a focus on sharing what you have tracked, how you tracked it, and what you have learned; complemented by an active online forum, as well as regular discussions via Twitter[3]. Indeed, Gary Wolf noted in an article in Wired Magazine in 2009 that "there is a strong tendency among self-trackers to share data and collaborate"[4]. Many PI tools involve capabilities that allow users to share their data via social media and some of the most popular tools involve a dedicated community of users that communicate with one another either via in-app communication channels (e.g., cycling app Strava facilitates team communication and comparison in-app[5]), or by forming Twitter communities using messages marked with specific 'hashtags' to indicate a certain topic (e.g., #nikeplus, #sleepbot). In this way, personal tracking data becomes part of the cloud of ambient awareness data that people share about themselves within their social circles.

This desire to share can be seen as an expression of the basic human need for relatedness. Self-determination theory, one of the main theories of human motivation, identifies three basic human needs: competence (the need for mastery, control), autonomy (the need to be in charge of one's own life and decisions) and relatedness (the need to connect and interact with others) (see e.g. [9]). While self-tracking, in both design and discourse, has mainly focussed on the first two needs, these technologies offer unique new possibilites of connecting with others. A similar observation has been made in the realm of self-care, where the technologies typically focus on the individual, while collaboration is potentially highly rewarding [10].

Based on theory and observed communication practices and workarounds in PI, we envision three key perspectives on interpersonal communication in the context of the Quantified Self: communication as information, communication for support and motivation, and communication for self-presentation.

4.1   Communication as information

From a practical perspective, there are third parties who may have an interest in a person's tracked data. In some cases, data sharing might mainly benefit the third party (e.g., an employer or insurance company having access to tracked data; referred to as 'exploited self-tracking' by Lupton [11]). However, in other cases sharing may benefit the self-tracking individual as well. For instance, sharing data on purchased groceries can help coordinate expenses with household members [4], shared location data may help friends to organize impromptu meetings [6, 12], can provide passive awareness of one another in a long-distance relationship [12], and can be used to communicate with others that one is safe (e.g., arrived home safely) [12], while shared activity data can create awareness about an elderly parent's activities, giving peace of mind [13–16]. In this way, self-tracking systems may become 'awareness systems' [17], which may serve a variety of social and practical purposes.

Even when such shared information serves no direct practical purpose, it may help people keep one another up to date and feel connected. However, excessive sharing of

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[3] https://twitter.com/quantifiedself
[4] https://www.wired.com/2009/06/lbnp-knowthyself/
[5] https://www.strava.com/

tracked data can be perceived as 'useless'. Generally speaking, there seems to be a perception that tracking-related messages posted to social media should somehow serve a purpose for the audience. Self-trackers often refrain from posting when they feel the post would not be useful to others ("You're going to post something, it should catch people's attention, because you're using up their time" [18] p.31), and the audience tends to negatively judge, and refuse to respond to, messages they feel are useless ("I scoff because why do they need to tweet this." [19], p.1632) People want to avoid appearing boring or boastful by posting things, and want to avoid overloading their audience with posts [18, 20] ("mostly when I make things private, it's more because I think they'd be boring or insignificant to my friends" [21], p.35). Thus, although users would like to keep their network in the loop on their experiences, sharing in excessive detail through existing (social media) channels evokes negative connotations for both self-trackers and their audiences.

A specific use case where sharing of self-tracked data serves to inform others is patients sharing (health) data with caregivers. Especially for chronic conditions, PI technologies may form a powerful tool that allows patients to keep track of symptoms and possible environmental triggers that affect those symptoms. Self-tracking patients report sharing data to inform their physicians with the hopes of getting help in making sense of the data, as well as to allow the construction of a personalized action plan [22]. However, although many of the participants reported a desire to share their data with their doctor ("I'd love for [my doctor] to, actually, see it." [23], p.12), many also reported that caregivers' responses to such initiatives are generally not very positive (e.g. "I feel like to them it's like someone looking up symptoms on Google, and coming up with some crazy illness that they think they have" [23], p.12). A survey with healthcare providers sheds light on possible reasons for care providers' reluctance in using data provided by patients [24]. First, care providers report that they do not feel like they have the necessary expertise to utilize patients' data properly. Secondly, the sharing capabilities of many apps are minimal, and often do not provide (direct) access to the data in a format the care providers would be able to use. In a broader sense, the concerns of patients - based on their intimate, lived experience with illness - may be fundamentally different from the concerns of their physician, further complicating communication [25].

In general, when sharing self-tracked data to inform another, both parties impose restrictions on what should be shared: what the third party wants or needs to know, but also, importantly, what the self-tracker wants to reveal. The former imposes requirements on what aspects of the data should be shared and in what format. Different 'audiences' require different data presentations, which are not currently always supported by self-tracking systems. As for the matter of what the self-tracker wants to share and with whom, this comes with its own set of considerations and requirements (e.g. see [17] for an overview of design requirements for a related class of systems known as 'awareness systems'). We will discuss this in more detail in section 4.3.

4.2 Communication for support and motivation

Although motives for PI usage vary, many users rely on self-tracking to help them change certain behavioral patterns, such as increasing physical activity, changing dietary patterns, or improving time management. Behavior change can be quite effortful; a journey that comes with obstacles and pitfalls along the way [7, 26]. Social ties may help users in several ways in their self-tracking process.

Socially facilitated self-motivation. When trying to achieve goals and change behavior, social pressure can be a force for good: people who anticipate that they will, given the chance, not act in their own best interest, may force their future selves' hand by putting up barriers beforehand (a concept referred to as 'anticipatory self-command' [27]). These barriers may involve asking a friend to 'force' you, for instance, to go running, or may even consist solely of anticipated social pressure of one's activities being visible to others. This is related to the concept of social translucence, proposed by Thomas Erickson and colleagues [28, 29], to express the idea of reciprocal awareness of shared social information: you can see my actions, I know you can see my actions, you know that I know you can see my actions, and so on. In addition to basic visibility and awareness of the other person's activity, this reciprocity also introduces accountability [30] – that is, a mutually understood possibility of being held responsible for one's actions. By sharing goals and plans with others, the resulting social pressure can help motivate people to stick with their plans and achieve their goals (for instance, in e-health interventions [31] and to promote eco-friendly behavior [32]). Specifically, this kind of behavior has been observed in the context of fitness, where some users report that the accountability associated with publicly stated goals helps motivate them [20, 33]. In a similar vein, some users report that the way their success stories inspire others serves as a motivation to stay on track as well [34].

In addition to using others as a proverbial stick, comparison to others may also be motivating in two other ways: one may compare oneself to another to better understand where one stands or how well one is doing [35], which can help to set goals. In addition, social comparison can provoke competition. People may be motivated to set and improve personal records, to out-perform others, or to avoid losing to others (so-called 'performance goals' [36]). The latter two goal types logically require information about others' performance to help them set goals and to motivate them. Indeed, this desire for social comparison and competition has been observed, especially in the domain of fitness and exercise [20, 33].

As previously mentioned, many fitness trackers include options for comparison and competition (e.g., Strava). In line with the motivations mentioned above, users have reported liking the option of comparing scores and competing with others in fitness trackers, and express annoyance when incompatibility of devices and applications used by friends keeps them from using this type of functionality [37]. Some authors have even reported users abandoning their self-tracking devices because they had planned to compete with friends who already used a different (non-compatible) device [38]. As a workaround, users may also organize their own competition when existing competition organized by a third party becomes unavailable [37].

A particular strength of social comparison via online communities is that such a channel affords careful selection of the group of peers one wishes to interact with, and compare oneself to. Where real-life friends may not necessarily share one's (fitness, health) goals, online communities include such a wide array of users that 'true peers' - who are on par with the user - are more easily found [16].

Social support. Besides offering motivation, interaction with others may also serve as social support. On a general level, sharing digital representations of one's experiences can aid in creating and maintaining social relationships [39]. Social support can consist of a number of different aspects: it can provide assurance that one is appreciated and worthy (emotional support), can validate one's actions and beliefs (appraisal support), can provide relevant information or advice that helps to make difficult decisions (informational support), and can also involve tangible help (instrumental support) [40].

Many self-trackers aim to better understand themselves (how environmental and behavioral factors affect outcomes like sleep, symptoms, happiness), or seek assistance in making changes (being more active, losing weight, quitting smoking). Groups of people with similar goals have been known to seek and provide support via social media, and to specifically seek out others like them via online support groups.

For instance, people who suffer from chronic conditions like diabetes [41] and Irritable Bowel Syndrome [42] often seek, and provide, emotional support via online support groups [41–43]. In addition, members of these communities often look to others like themselves for information to help them better understand and manage their disease. Members of the Quantified Self movement seem to have a similar information need, as expressed by their strong tradition of exchanging their self-tracking experiences, comparing notes on what to track, how best to track, what works, and what doesn't (as reflected in the numerous QS talks held at meetups).

Those who desire to lose weight or generally be more active also tend to look for tips and information from others [18, 20, 34, 44]. Emotional support plays a role in this domain as well: by sharing successes, people hope to gain social support through their social networks [20, 33]. In interactions with others struggling with the same issues, mutual empathy is often fostered through sharing and discussion of common goals, problems and experiences [44].

As with social comparison/competition, people tend to seek out others similar to themselves for social support. People are often more reserved in sharing especially their struggles and failures with their general social network [18], and 'negative' posts also tend not to be appreciated by such an audience [20]. In contrast, sharing with others who are in the same boat as you makes it easier to be vulnerable and it increases the odds of finding an immediate, and above all sympathetic response even to stories of hardship and despair [20]. Such contact can even lead to bonds beyond the context of initial contact (connecting via other social networks as well [20]), as well as 'real life' friendships if peers are found who are (roughly) co-located [34]. Still, finding the right community can be a challenge [16].

Where social comparison, competition etc. are often facilitated by self-tracking apps in certain domains (esp. fitness), social support tends to be taken elsewhere: general-purpose social media (Facebook, Twitter), groups on such social media, and specific online support- and discussion groups.

4.3   Communication for self-presentation

Through self-tracking, users create a digital representation of (aspects of) their lives. The data can therefore be seen as a reflection of the self. This idea of tracked data as a 'data double' [45] of ourselves, especially when combined with sharing of that data, may raise self-presentation concerns: does the data show what I want it to tell about me?

The term 'profile work' has been suggested to describe users' efforts to maintain and manage public profiles in online social networks [46]. For instance, in an application that stores a history of the music the user has listened to, people may 'hide' certain songs to keep them from showing up on their public profile, especially if those songs are considered embarrassing, or are incongruent with their self-image or projected taste. Symmetrically, some users report putting on music without listening to it to boost those songs' importance in their profile [46]. Similarly, in an application that stores and shares location data, users report sometimes not sharing locations because they want to maintain a certain image with particular (groups of) people (e.g. "I don't want my friends to think that I am a geek for staying in the dorm and studying on a weekend", p.188) [47].

In addition to these considerations about what to share with whom, there is also a question of *how* to share (i.e. in what format). Many self-tracking systems, especially those in the fitness domain, provide the option of sharing standardized messages on social media (e.g. Facebook or Twitter). However, such system-generated messages are often poorly received by the intended audience, who feel the messages are impersonal and therefore not valuable or worth responding to [19]. Personal messages, on the other hand, are highly appreciated by the audience, who feel these messages are more 'real' [34]. Posts augmented with pictures are also appreciated more [19].

Self-trackers themselves have also indicated that they feel a need to augment the tracked numbers with personal comments about their meaning when sharing [33]. This is in line with the view that when people have a natural propensity toward storytelling: in his book The Stories We Are: An Essay on Self-Creation [48], William Randall argues stories are the way we naturally attempt to capture and give meaning to the complexities of our lives. It has been argued that self-tracking technologies are typically constructed around stories of competition, achievement, and self-control, while other stories, like those of enjoyment, failure and self-acceptance are not (sufficiently) supported [49].

In addition, part of the value of our experiences lies in the social interactions they afford. Sharing and discussing experiences with others helps us place and understand those experiences and gives them meaning (see e.g. [50]). Taking into account these perspectives, it is no surprise that decontextualized and impersonal fragments of information like bare numbers or standardized messages simply fail to adequately convey the richness of the real-life experiences they represent. In conclusion, as aptly put by one participant: "The numbers don't communicate everything" ([33], p.463).

5 Toward a social Quantified Self: Quantified Us

Quantified Self systems, to an extent, are communication systems. Sometimes very explicit, conscious decisions are made to share; at other times sharing is an implicit, perhaps automatic feature of the system. Importantly, many QS systems have not been designed with social interaction in mind. This has consequences for the type of information that can be shared (experiences/stories instead of numbers and graphs; rich multimodal data, including videos, pictures, music, etc.), the control one has over the act of sharing (automated, user-initiated; privacy control; differentiation of sharing within different social groups), the tools available for image management, review & revision (retroactively).

Some existing self-tracking technologies facilitate certain types of communication, mainly social comparison via in-app communication, and sharing automatically generated messages through existing social network services like Facebook or Twitter. For other communication needs users generally resort to using other communication channels, specifically for emotional and informational support from a dedicated network of 'true peers', as well as more personalized sharing of the self-tracking journey with one's existing social network. These naturally occurring solutions do not necessarily represent a problem: since users have different communication needs, with different audiences requiring different approaches, separate channels may be a natural way for users to satisfy their heterogeneous communication needs. However, in spite of users' creativity in finding workarounds to satisfy the needs for social interaction that arise around self-tracking, there have been reports of users abandoning self-tracking systems when workarounds cannot be found, or other systems are found to be better suited to the users' desire to connect to others [38]. This suggests that, in spite of observed workarounds, there is a demand for better support of social functionality in self-tracking systems, and that meeting this demand may provide benefits for both users and providers of these systems.

Specifically, the technology in its current state is not optimally aligned with the different communication channels utilized by its users and does not support sharing capacities needed to achieve different communication goals. In addition, little support is currently available for users to manage their various audiences. General social networks are in place by default, but it is still a challenge for users to find a network of 'true peers' from which they can derive benefits different from, and additional to, those obtained through interactions with their existing social network. An additional challenge is keeping the various audiences separate while supporting the appropriate level and type of sharing with each. To move the field forward, we suggest four design considerations that reflect the communication needs identified in this article.

Support peer finding. People want to connect with others like them, to share experiences, ideas, tips and tricks; to feel connected and share emotional support; to compete and compare. There can be value in connecting to bigger, aggregated (and anonymous) data of others – in order to compare your performance against a larger group, to find out what is "normal", or compete against people in your neighborhood, or those who are running on the same track as you (but not at that time). All this works best when interacting with those who are, in the ways that matter in that

context, like you. This requires careful selection, as the characteristics that make a person 'just like me' depend on the context: do they struggle with the same disease or problem? Do they run as fast as me? Are they planning on losing the same amount of weight as me? Does age matter? Culture? Etc. To optimize the connections made and benefits gained by connecting with others through self-tracking, we need to support users in finding their 'true peers'.

Support selective sharing and transitions between communication channels. Some things should be shared with everyone, others things just with some, other things with no one. We maintain different images with different groups of people, and want to share mainly image-consistent things. In addition, we prefer not to share things with people who will not find them useful, and that audience is grateful if we don't. Some things we'd rather not share at all, if we feel they are generally embarrassing or are otherwise not in line with the image we have of ourselves. To avoid users not sharing in fear of oversharing, and help users target those audiences that will like what they have to say (and, presumably, produce maximum benefit), we need to support selective sharing.

Support storytelling and emotional self-expression. People prefer to tell, and to hear, real stories, of real people going through real life. There is more to that than numbers**.** Adding pictures, personal messages and narratives and the opportunity for users to explain, for themselves and for others, what their data means to them supports a true connection between those who share and those who receive. Importantly, the stories we tell are charged with emotions – the joy of achievement, the pride of overcoming adversities and personal barriers, but also the disappointment of failure and the struggles associated difficult lifestyle changes. People need tools to express themselves emotionally, to add a layer of interpersonal and subjective depth to the objective numbers of distances traversed, calories burnt, or days gone without smoking. Moreover, those same tools need to allow for a range of emotionally and socially appropriate responses to someone else's shared information. In order to express acceptance and belonging, admiration and awe, empathy and social support, friendly banter and Schadenfreude, a single 'Like' button will not suffice. To move beyond impersonal, standardized messages to fostering true connections between self-trackers and their various audiences, we need to support those users in telling their story and sharing experiences with their data, their way.

Support peripheral awareness. Existing ways of sharing in self-tracking can evoke expectations of (positive) response from the audience, and an expectation that users will only share what is interesting or useful to their audience. Although such conversation-style communication can be useful for certain communication purposes, sometimes sharing is not about expectations of reciprocity, support or other explicit responses; sometimes sharing is simply about keeping others in the loop, about staying connected [51]. The construct of a conversation with direct messages - and the (sometimes unnecessary and unwanted) mutual social obligations that these entail - is not suited for this type of sharing. A useful alternative perspective in this context is that of 'slow technology', which foregoes explicit, fast, direct displays in favor of artefacts that support high-level peripheral awareness [52]. These more ambient,

peripheral ways of sharing information may help users to keep their audience up to date on an impressionistic level while avoiding the potential social backlash (e.g., expectations, information overload, and disappointments) of excessive and explicit sharing.

6   Conclusion

Arguably, what differentiates humans from other living species is our ability for self-reflection. To observe and analyze our own thoughts, emotions, and intentions; to reflect on past behaviors and to plan future behaviors. There is little doubt that such reflective ability can drive self-improvement, and introducing self-tracking technology to that mix greatly enhances our powers of analysis and prediction. It helps us to uncover lawful relationships between our behavior and its consequences, and to leverage the level of control that we might exert over our physical health, our mental wellbeing, our productivity, or other variables we care about. At the same time, humans are a deeply social species. We share a basic instinct for attachment; a fundamental need for affiliation, for meaningful social connection and social support. We need others to survive and to thrive. We care deeply what other think of us, and are strongly motivated to adopt behaviors that will enhance our social connectedness. As a consequence, our self-reflections are complex combinations of first and third-person perspectives onto the self. Many third-person perspectives onto ourselves – from parents, peers, and significant others – have been internalized over the course of our lifespan, and have become an integral part of how we look at and understand ourselves.

When seen in this light, it is no surprise that self-tracking tools are are used not merely as tools for self-knowledge, serving us as private, embodied beings. Appropriation practices of self-tracking tools reveal that the tools themselves, and the data they provide, play an important and inevitable role as artefacts for social sharing, for seeing ourselves through the eyes of others, for comparing ourselves to others, for showing to others who we are. They have the potential to build or restore our self-image through receiving and providing acknowledgement, respect, admiration, empathy or support. At the same time, they hold the potential to embarrass or shame us; to make us feel inadequate, self-conscious, or guilty. This is a key realization that is part and parcel of the examined life and the reflective self.

Although the Quantified Self is generally perceived as an individualistic enterprise, we have argued in this paper that in practice, self-tracking is laced with social tendencies and that by accepting, incorporating, and explicitly supporting this more socially oriented view of the Quantified Self, many benefits may be gained. A movement towards a 'Quantified Us' requires more than some clever data visualization tools in order to share pretty pictures. We need tools for sharing stories, experiences, and atmospheres. We need tools that support emotional expressiveness. We need tools for responding and empathizing, for selective self-disclosure, reciprocity, and building mutual trust, cooperation, team spirit and friendship. The guidelines we have provided indicate first steps in a direction where self-tracking systems will support this kind of rich interpersonal communication. In time, a

Quantified Us approach has the potential to go beyond the narrowly defined, individualistic goals associated with the Quantified Self and reap the many additional benefits social embeddedness affords.

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