The Irony and Re-interpretation of Our Quantified Self

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ABSTRACT

The new possibilities afforded by cloud computing infrastructure, with respect to the large amounts of data that can now be collected and processed unobtrusively, have triggered a growing interest in systems that record personal life events. We go on the notion that this information can be used as a kind of extended memory to support insights into our past and our present lives. However, as we argue in this paper, the psychological processes and consequences underlying the interpretation of this data can be significantly more complex and less predictable than has generally been acknowledged.

Specifically we look at two phenomena: first, that of re-interpretation (that events are reinterpreted every time we recall them) and second, that humans participate in ironic processes such that even self-control goals can become obstacles to behavior change. In this paper we put forward that as we design life-logging systems, personal informatics or quantified-self technologies in future, will need to better find ways to take into account this psychological complexity in order to be effective and avoid inadvertent harm. We also briefly review theoretical frameworks and psychological evidence that may inform the way we design such systems going forward.

Author Keywords

Personal Informatics; Quantified Self; Life logging

ACM Classification Keywords

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

General Terms

Human Factors; Design; Measurement.

INTRODUCTION

"Know thyself" (through behavioral data that we store on the cloud) is a motto that drives much of modern HCI research (Li, Forlizzi, & Dey, 2010). The idea is that by reflecting on our past we can improve the way we lead our lives; for example, by detecting bad eating habits we can eat healthier, or by realizing the impact of sedentary behaviors we can decide to do more exercise. In essence we seek to build a computer model of 'self' and use it to understand ourselves better.

A number of researchers have developed design guidelines for specific application areas. For example, Consolvo and Everitt (Consolvo, Everitt, Smith, & Landay, 2006) provide guidelines for encouraging physical activity: 1) give proper credit 2) provide history, current status and performance measures, 3) support social influence (i.e. use social pressures and support) and 4) consider practical constraints. These guidelines have led to successful systems (Consolvo, 2009a) as well as to more generic, theory-driven, guidelines for behavior change (Consolvo, 2009b).

The theories underlying this work include the work of social psychologist Erwin Goffman (Goffman, 1959) who theorized that much of human behavior is motivated by how we would like others to view us. The Goffman framework provides a useful way of conceiving the public versus private lives we keep online. Goffman's interactionist theory was based on his "dramaturgical approach," in which behavior is seen as a series of mini-dramas in which *Individuals* perform in front of an *audience*, and both are *participants* in this *performance*. The performance has a *front* and *back-stage*. The front stage is where the audience sees the individual and the backstage is where the she is when alone. Some have described Goffman's work as social phenomenology (Matthew B. Miles & Huberman, 1994).

Another theory core to behaviour-change research is that of cognitive dissonance (Festinger, 1957) which describes the psychological discomfort (*dissonance*) felt by a person when his behaviour is at odds with his attitudes or values. These researchers argue that when the person is motivated (and has the option) to eliminate this internal conflict, behaviour change can be achieved.

These two theories provide a useful framework for the design of behaviour change applications, but they do rely on some important assumptions, which unacknowledged, have the potential to affect outcomes in unpredicted ways. Firstly, recording an event only makes it objective 'fact' in a materialistic sense, not phenomenologically. Research on personal informatics, quantified self and other life-logging

systems has largely relied on the notion that data stored to describe an event is a representation of reality that is reproducible (that is, to use Goffman's term, users would *perform* in response to this data in similar ways at different points in time). This lends itself to two assumptions that we wish to shed light on here: 1) that the information is free from potentially complex subjective interpretation, and 2) that goal reinforcement will always increase chances of goal achievement rather than act as an obstacle to it. We discuss below how both of these assumptions can potentially be problematic in light of psychological research evidence.

INTERPRETATION AND IRONY

Helping people change unhealthy behaviors so that they can live healthier, happier lives is an enormously worthwhile endeavour that deserves attention and constant reassessment. One way to begin to evaluate it more deeply is to look into the philosophical and psychological principles that underlie design decisions in these systems.

Research in psychology shows that, unsurprisingly, how people use information, self-regulate, and become motivated is an extremely multi-faceted, complex and sometimes contradictory area. We focus here on two aspects: 1) how events are reinterpreted (i.e. experienced in different ways depending on a number of uncontrolled variables) and 2) how trying to control our own thoughts and behaviour can backfire as a result of "ironic processes".

Reinterpretation

The subjectivity involved in our recollections and reinterpretations of past events is an area of study well traversed by psychologists. For example, the way we recall a painful event depends a lot on what happens towards the end of that event. If just the end of a painful experience is positive, the event is less likely to be recalled as negatively. In other words, the peak and the end of an experience have a disproportionate effect on one's memory of the event (D Kahneman & Tversky, 2003). This has been used to influence the way patients remember a colonoscopy. Studies demonstrated that by extending the length of an examination, not on medical grounds, but simply to allow the exam to finish in a more comfortable way, improves the way patients recall and describe the event later on (Daniel Kahneman, 2003).

Research on the dynamics of our experiences in the context of our relationships to digital products (Karapanos, Zimmerman, Forlizzi, & Martens, 2010) highlights the differences between experimental designs that focus on the moment-to-moment experiences (in longitudinal studies) and retrospective annotations. Don Norman has argued (Norman, 2009) that design for memories (rather than for the moment-by-moment experience) is most important. What we call reinterpretation, is influenced by the primacy

and recency effects that must be accounted for in the design.

Furthermore, the fact that experiences are remembered differently to the way they are felt during the event, can be extended to multiple points of remembering. Every time we are asked to remember an experience, we will remember it in a way that is somewhat different. Karpanos highlighted the limitation of reductive approaches of measuring experience over time, although the implications of this to other domains such as quantified self where not discussed. It is not, for example, just recency or the peak-end rule that affect the way we remember something, but also proximity to significant events (Barsalou, 1988). The psychological and neuroscientific evidence of how we re-experience and predict the future, is too extensive to cover here. Evidence even suggests that mental time travel, as it is often called, has its own neural structures (Botzung, 2008). If our memories are generally re-interpreted, what happens when events are recorded, and the information is repeatedly presented to the user as a realistic model of events and Self? The question remains an open one for our community and promises to elucidate a richer pathway to future personal technologies.

Ironic Processes

The work of D. Wegner (D. M. Wegner & Pennebaker, 1993) and others has revealed how difficult it is to convince ourselves to do or think something, and that attempts to control our mind can, in fact, yield the opposite effect. Their studies have shown evidence of what Wegner has called "ironic effects" within several domains. For example, in one study showing the effect of "ironic mood", individuals asked to make themselves happy actually become sad, and others when asked to make themselves sad frequently become happier (D. M. . Wegner, Erber, & Zanakos, 1993). In another study, people under stress trying to relax become anxious, while those not trying did not. The potential implications of these findings for behaviour change technologies is evident. Systems designed to remind, encourage or motivate users towards healthier behaviour could conceivably have backfire effects. For example, studies on smoking addiction have shown that when people attempt thought suppression (that is, to try to stop thinking about cigarettes) they actually smoked more than the control group (Erskine, A K Georgiou, & J Kvavilashvili, 2010).

These phenomena could help us unpack some of the current outcomes data on behavior change efforts. For example that currently only 10% of individuals are motivated to change their behavior based on biological and behavioral data alone (Waltz, 2012), and that social networking and gamification strategies are helpful.

DESIGN IMPLICATIONS

Persuasive technologies already consider various possible reactions to their designs based on cognitive dissonance

research. According to the cognitive dissonance theory a person who, for example, believes he is overweight because of a lack of exercise, and who is aware of the negative health implications of being overweight, would be motivated to change the experience in one of several ways. He could change his behavior (eg. do more exercise), change his views ('I am not overweight' or "exercise isn't the problem"), rationalize the dissonance (eg. 'its OK, I am going through a tough time right now'), or avoid situations that highlight the dissonance (not visit the doctor who may point out the problem).

We believe knowledge of re-interpretation and irony effects would allow us to add a number of further possible user reactions to this user experience list: that the data will be 1) disregarded or negated, 2) personally reinterpreted, or 3) externally reinterpreted (as described below). Considering some of these as additional possible reactions can help us understand design outcomes and to design more effectively.

Disregarded – negated. A user may decide the data logged is not useful, or even inaccurate. The website is then abandoned or considered unreliable, misrepresentative or dishonest.

Personally reinterpreted. For example, a user revisits a photo of himself with a group of friends 15 years ago. He might re-situate it (e.g. imagining it was a birthday when it was actually a funeral), or re-appraise its emotional impact (assuming it was an exciting event, when instead it was tedious). Furthermore, there are a multitude of arbitrary circumstances present at the time of revisiting the photo which can actually cause us to "remember" the event in a different light. Even our posture and facial expression, for example, have causal effects on how emotional information is processed (Niedenthal, 2007).

Of course one could argue that more metadata around the photograph would solve this problem. But the data does not contain the interpretation (eg. even a funeral can leave enjoyable impressions to do with reuniting with old friends and family). The original interpretation is produced when the interaction is experienced.

Externally reinterpreted. In the above scenario, the photograph is likely to have been shared with friends, and they may have posted their own captions (right or wrong), reflecting their own interpretations or reinterpretations. When we read these captions, like it or not, the information becomes part of the computer model of 'self' and effects our newly constructed experience of the memory and artifact.

Taking it one step further, we can imagine a future type of marketing that would strategically place advertisements in order to capitalize on this moment of re-interpretation. In this hypothetical scenario, the user's photo, which pictures a bottled beverage is presented beside an advertisement with a slogan like "life is happier when you drink hyper cola" linking product placement with your personal photograph. As what you might call, "experience placement", the brand inserts itself into a user's meaning-making around events, experience and self. The external ad becomes part of the personal reinterpretation of the data.

One hopes this approach remains strictly hypothetical, it doesn't seem drastically science fictional. More importantly, that it is technically conceivable illustrates the multitude of ways context, environment and competing media can contribute to subjective re-interpretations. On the other hand, what elements of interface and interaction design might support this phenomena in order to support positive change, remains to be uncovered.

The ironic processes described above should also be considered in the design of motivational applications. Asking users to continuously focus on a particular goal, could backfire or produce unexpected results. Depending on the person and the circumstances, motivational messages relating to exercise, diet or other wellness goals may need to be adjusted or tailored more carefully lest they become a hindrance to the people they are designed to support. Adaptive technologies, profiling and data mining may prove to have a role here.

CONCLUSIONS

In order to design more effective applications of persuasive, motivational and reflective technologies, we need to be wary of a simplistic notion of a rationale consistent self, and begin to inform our design with psychological research that reveals the multitude of ways context, environment and subjective interpretation play a part. Neglecting to acknowledge psychological phenomena like re-interpretation and ironic processes could lead to disappointing, unpredicted or even damaging results. Our position in this paper is that a more sophisticated view of memory, reflection and behavior, that takes into account the reality of the complex psychological phenomena involved, is an exciting and critical next step in the development of personal informatics technologies that improve our lives.

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