The device, the self and the other: A review of the self-tracking culture

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Abstract
This paper takes self-tracking culture as the subject matter and provides an example of narrative academic literature review that explores the relationship between culture and nature. It illustrates how the embedding trajectory of a technological artefact in the social sphere can be revealed by a categorization process that uses concepts from different knowledge fields (anthropology, psychology, system studies etc.). Moreover, it shows how the interactions between core values of late modernity and core values of modernity and pre-modernity allow the emergence of a conflicting social mechanism of the self-tracking culture. From object to practices, the cultural embedding process of self-tracking devices is described as a function of their hardware or software nature, their self or body focus, their private or collective degree of exposure and their pushed or imposed degree of autonomy. The underling cultural mechanism of the self-tracking culture is portrayed in terms of a balancing loop between the purchasing behaviour motivated by late modernity values, practices created around the device, subjectivity/objectivity values-conflict and agency/trust beliefs variations.

Keywords
Self-tracking culture, self-tracking movement, dominant culture, culture, the self

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Introduction

Sociological inquiries regarding objects' propriety to organise social activity brought a new understanding on the human-technology relationship (Brown, 2001; Johnson, 1988; Czarniawska, 2006; Appadurai, 1986). Throughout human history, processes related to social order or change had a central technological dimension attached. Each stage of humankind development was accompanied by different tools meant to help one`s adaptation to the surrounding environment: wooden spears and tents, irrigation systems and houses, swords and castles, gunpowder and steam engines, gas masks and atomic bombs or computers and smartphones; technological innovations built and embedded in different geographical and cultural areas. Regardless of their instrumental or ritualic function, objects continuously shaped the ***relationship between culture and nature***: they allowed for systems of control to be created which often backfired into systems of hazards distribution (Beck, 1992). In other words, objects and tools became the medium through which culture created nature and vice-versa. In this sense Levi-Strauss notes that "*we are our tools*" (Schuman, 2011, p.4). Therefore, this paper is trying to elaborate on this perspective by applying current theoretical understandings to a state-of-art technology: ***self-tracking devices***. More precisely, this paper tries to understand how this specific type of technology gets embedded in a late modernity cultural matrix and what is the sociocultural response to it.

Self-tracking devices: Classification and practices

Diving into sociocultural aspects of this technology requires a work definition of self-tracking devices. In this sense, Deborah Lupton (2014) understands self-tracking devices as tools that facilitate individual practices of gathering, recoding and analysing data about habits, behaviours and feelings. Moreover, the author provides a series of examples which help in classifing slef-tracking devices according to their ***software or hardware*** nature. While most hardwarare devices require a software component, a within differentiation regarding their multifunctionality supports the above-mentioned distinction and adds another classification paramter regarding their focus. *General hardware* objects like smartphones or smartwatches are designed to support multiple self-tracking practices while *specific hardware* objects like running wistbands or electronic adesive patches are designed to gather, recode and analyse data regarding a specific behaviour or habit. Furthermore, *physical health software applications* that measure heart rate or calories burnt are designed around ***bodily functions*** while *social health software applications* that measure time spent on social media or financial management are built around ***social functions***. Table 1 presents a classification of slef-tracking devices according to the above mentioned distinctions. It is important to state, however, that intersectionality effects makes the boundaries to be constinously contested and redefined.

Table 1. Functional classification of self-tracking devices

		Focus	
		Self	**Body**
Nature	**Hardware**	General tracking objects Smartphones, Smartwatches	Specific tracking objects Running wistbands, Adhesive patches
	Software	Social Health applications Financial applications	Physical Health applications Health applications

Crawford et. al (2015) provide a historical perspective regarding the evolution of self-tracking devices by describing the transition from weight scales to electronnic wistbands. Similar to Lupton (2014), the authors notice the entangelment of sleves and bodies regarding self-tracking practices. For example, the practice of measuring one`s weight is imbued by social standards thus, making a health focused device act as a social focused device (Crawford *et al.*, 2015, p.483). Moreover, a finance traking application can be accompanied by a specific tracking object (a card for example) and, reversely, a health tracking application can be used by means of general tracking objects. In other words, the distinction between self-focused devices and body-focused devices is at risk of losing its meaning given the fact that both types have the ***self as the final interpreting unit***. Instead of dissmising the proposed classification, the antithesis with the entaglement argument reveals that the intersectionality between different classes of devices is responsabile for the emergence of a constructionist dimension of self-tracking practices which, as will be presented below, represents the cornerstone of a what Lupton (2014) describes as a self-tracking culture.

Building on existing cognitive and sociopsychological perspectives regarding self-tracking technology, Lupton (2014) creates the theoretical grounds for sociology to claim the cultural resonances produced by the diffusion of this innovation. Briefly, the author places the quantified self[2] at the heart of an emerging self-tracking culture and uses data gathered from online communities to identify ***three foci of meaning production***. First one is placed in one's ***slefhood*** and creates meaning by using concepts of self-awarness, self-improvement, self-interest, self-optimisation and self-governance (Lupton, 2014, p.79). Complementary, the second one adds an asthetic layer that describes an emotional process of ***embodiement*** of the devices (Lupton, 2014, p.81). Finnaly, third one creates a bridge between self-tracking devices and social structure by identifying ***data*** as the main channel of communication. These three dimensions provide compelling reasons for the depiction of the self-tracking movement as an unique pheonomenon which reflects and shapes our understandings of ourselves and the world. On the other hand, the idea of describing this movement as a culture is somehow questionable given the fact that, as Crawford (2015, p.484) argues, there is a large body of users not engaged in meaning transaction with other users. Here, the classification proposed by Lupton (2014, p.78) reinforces the idea of a self-tracking culture by differentiating between ***private*** and

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[2] Term used by Garry Wolf (2009) in a *Wired Magazine* article to describe the process of incorporating data into daily lives.

communal devices alongside *pushed* and *imposed* devices. Building on this distinction, Table **2** provides a typology of practices with regards to the self as the final intepreting unit.

Table 2. Self-tracking practices classification

		Degree of allowed autonomy	
		Pushed	Imposed
Degree of exposure	**Private**	Self-tracking schemata Attitudes	Self-tracking behaviours Agency
	Collective	Self-tracking advertising Discourses	Self-tracking standards Norms

The synthesis of Lupton's (2014) and Crawford et. al (2015) understandings of self-tracking practices allowed for a classification of the meaning producing elements created by the diffusion of this technology. Lupton (2014, p.78) uses a self-tracking community to illustrate different behaviours of data sharing. Crawford et al. (2015, p.487) emphasise the relationship between advertising and how self-tracking devices are framed with regards to the consumers. In other words, one is focusing on how self-tracking devices create meaning after their adoption and the other is describing the meaning-creation process before adpotion. In the attempt to merge their perspectives, the table above distinguishes *individual practices* like cognitive and behavioural processes from *collective practices* like media discourses and community engagement. Furthermore, adding autonomy as the second parameter allows for a distinction of *practices subject to influence* like attitudes and media information from *practices subject to coercion* like norms and behaviours[3]. In using exposure and autonomy as classifications paramters, the *embedding trajectory*[4] of self-tracking devices described by Lupton (2014) and Crawford (2015) becomes visible: from pushed (discourses/ attitudes) to imposed (standards/ behaviours) and from collective (discourses/ standards) to individual (attitudes/ behaviours).

Self-tracking sleves: Values and reflexive processes

So far, this paper focused on how self-tracking devices - by their nature and focus – created what was named as a trajectory of embedding. One immediate implication of using this term is that a trajectory has to be directed by a series of what Parsons (1962) would call *orientating objects*. In this sense, Beck (2002, p.150) notices a voluntary compulsion to be preventive caused by the emergence of *health* and *responsibility* as core values of modernity. In other words, slef-tracking devices travel the cultural field by means of hypotetical imperatives[5] (*"If I want to be healthy/responsabile, I must track my*

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[3] The idea of coercion is formulated in terms of alternatives of action created by the device.
[4] The concept of embedding trajectory is created using Appadurai (1986, p.13) insights regarding commodities paths and refers to the temporal arranged chain of practices and processes created by and around the diffusion of an object into different cultural configurations.
[5] Description of the Kantian hypothetical imperative from Michael Rolf (2018)

body/ myself"). There are, however, other alternatives for the actor to use as means of achievieng his goals (health and responsibility). That is to say that there are two classes of guiding objects which directs self-tracking devices trajectory. Both have the self as the intepreting unit but differ, in that of one being focused on the goals and the other one being focused on the means of achievieng the desired ends. Here is where Parsons' (1962, p.59) analytical distinction between objects that orientate the choice of goals and objects that orientate the choice of means allows for a further discussion.

Table 3. Self-tracking devices trajectory of embedding and orientation

Before adoption	Orientation (Goals)	After adoption
1.Self-tracking advertising	Health	3.Self tracking standards
2.Self-tracking schemata	Responsability	4.Slef-tracking behaviours

Table 3 uses the embedding trajectory of self-tracking devices to illustrate that regardless of his choice of means, the actor is constantly orientated by objects that point to health and responsibility as goals. However, considering the distinction between pre-adoption and post-adoption phases, this paper further argues that there is also a difference regarding the primacy of orientating objects. Drawing on previous body of research in the field, Nickerson et al. (2014, p.3) demonstrate that there are three characteristics of innovations which influence their adoption: *relative advantage, ease of use* and *compatibility*. On the other hand, Parsons (1962, p.6) illustrates three motivational factors behind any social action: cognitive, cathectic and evaluative. By merging Nikerson et al. (2014) technical perspective with Parsons' (1962) cultural insights over the social action, a difference between phases can be described. The synthesis of these ideas indicate that in choising self-tracking devices as means of achievieng health and responsibility, the actor will be orientated by their *efficiency of achievieng his ends* (**cognitive**)*, their ease of embodiement and rutinization* (**cathectic**) and their *objects of orientation compatibility* (**evaluative**)*.

Efficiency of a self-tracking device in achievieng the goals dictates how the actor processes pushed schemata and becomes motivated in performing purchasing behaviours. An example here should illustrate the mechanism. Guided by the goal-orientating objects (*"I want to be healthy"* and *"I want to be responsabile"*) and influenced by advertising means-orientating objects *("This is healthy"* and *"This is responsabile"*), the actor will be pushed into a reflexive process[6] of creating a *percived efficiency of self-tracking practices* in achievieng his goals (**cognitive**). Considering different sociodemographic aspects that determines the *percived ease of embodiement and rutinization* (**cathectic**), and given the *compatibility between objects of orientation* (**evaluative**), the actor may or may not chose to engage in self-tracking practices. After the actor decided to purchase a self-tracking device, a similar but imposed process - given the alternatives of action created by the device - determines a cristalization of different

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[6] The idea of reflexivity as the main engine for the self-tracking culture is common to Lupton (2015, p.80), Rowse (2015, p.8) and Crawford (2015, p.480)

types of self-tracking practices. Unlike the example above that ilustrated a primacy of the cognitive mode, here the cathectic mode is responsabile for yet another reflexive process. Given the *actual ease of embodiement and rutinization* (**cathectic**) and *compatibility between objects of orientation* (**evaluative**), the actor will create a picture of the *actual efficency of self-tracking practices* (**cognitive**) which will determine his self-tracking behaviours.

Table 4 uses the work of Rowse (2015) to illustrate that, once pushed in self-tracking practices by compatibile objects of orientation, the user is then forced into a dissonant reflexive process created by incompatibile objects of orientation like objectivity and control. While each are detailed below.

Table 4. Primacy of orientating objects

Individual objects	Before adoption		Collective objects
Schemata (Pushed)	I want to be healthy	This is healthy	Advertising (Pushed)
	I want to be responsabile	This is responsabile	
	After adpotion		
Behaviour (Imposed)	Act based on data	Objectivity	Standards (Imposed)
	Act based on interpretation	Control	

Rowse (2015, p.13) discusses the concept of objectvity, via Daston and Galison, as an epistemic value that extented in the field of self-knowledge. Therefore, objectivity is to be considered a value of the means by which the actor seeks to achieve goals like health and responsibility. This however, suppose that the actor acts based on trust in numbers and the system of experts[7] that produces them. Here is where Lupton (2014, p.83) notices an ambivalence regarding trust-investment in self-tracking devices. Rowse (2015, p.12) also argues that objectivity implies a repression of the self in which the process of reflexivity is externalised. In other words, self-tracking devices facilitate the "removal of the self from the studying the self" (Rowse, 2015, p.52). As a consequence, the practices in which the actor acts based on data provided by self-tracking devices have the unintended consequence[8] of a loss in control which, as will be presented below, can be translated in a loss in agency. Simmilary, the practices in which the actor acts based on the contextualization of data provided by the devices results in a loss of objectivity which, in turn, is translated into a loss of trust in self-tracking devices.

The compatibility of orientating objects is reponsabile for creating two distinct reflexive processes. First is a ***pushed reflexive process*** in which the actor creates a set of beliefs and intentions about self-tracking practices. This process is characterised by ***consonance*** in which late modernity cultural prerequisites like the desire to be healthy and responsabile create the context for self-tracking technology to emerge and be consumed. The second one can be understood as an ***imposed reflexive process*** in which

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[7] Giddens (1990, p.34) defines trust as "confidence in the reliability of […] a system, regarding a given set of outcomes or events, where that confidence expresses faith in […] the corectness of abstract principles (techincal knowledge)".
[8] Beck (1992, p.22) understands unintended consequences as dominant forces in society.

the actor constantly changes his beliefs and intentions given his appreciative and evaluative perceptions over self-tracking practices. This process is characterised by **disonance** in which modernity means-values of objectivity are opposed by pre-modern means-values of control[9]. The figure below illustrates the procesess described so far with the mention that the term of control was replaced with that of subjectivity, given the reasons presented in the footnote.

Figure 1. Self-tracking culture mechanism
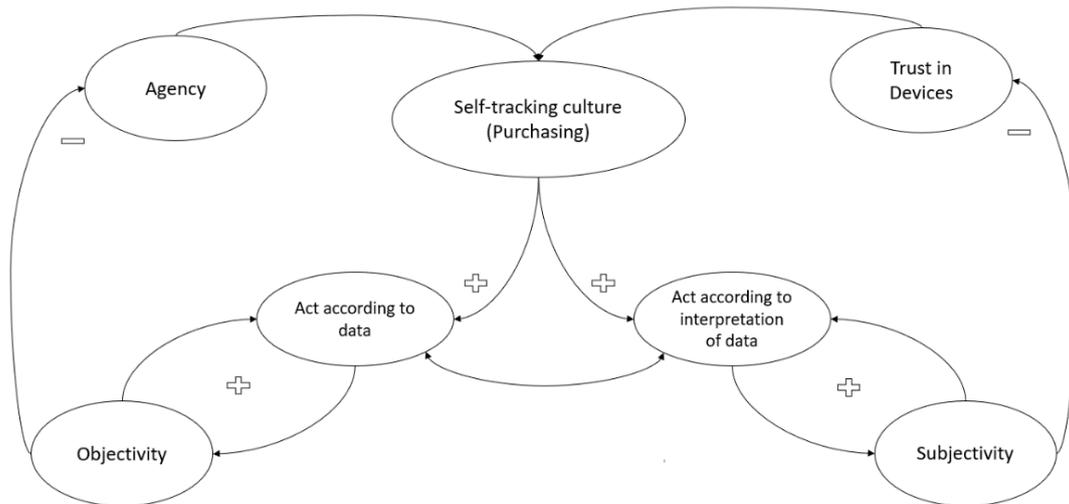
It is important to mention here that the imposenes of this process must be understood in terms of **cultural assimilation** of means-values like objectivity and control from the dominant culture to the self-tracking culture. In other words, coercion is created by a change in primacy of the orientating objects with regards to the purchasing of a device (as presented in Table 4). In choosing those practices that requires acting based on data/ objectivity (e.g.: eat/ sleep/ walk according to self-tracking devices recommendations), the actor can experience a loss in agency or subjectivity. Therefore, he will be motivated to engage in self-tracking practices that reinforces his self like engaging in a self-tracking community or opening discussions about self-tracking topics. Reversely, choosing to act based on contextualised data provided by the device (e.g.: eat/ sleep/ walk according to contextual factors), the actor can experience a loss in trust regarding self-tracking practices. Therefore, he will be motivated to engage in practices that reinforces his trust like choosing an alternative device or solution to achieve goals related to health and responsibility.

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[9] Considering that objectivity emerged as a way of achieving control over nature, the two terms became synonymous. The case of self-tracking practices differs in that of nature possessing agency. Therefore, the concept of control is used to describe a preference for acts by which the subject will reinforce his control over his subjective nature (self). Contrary, objectivity is used to describe a preference for acts by which the subject will reinforce his control over his objective nature (body). The purpose of labelling control and objectivity as pre-modern and modern was to emphasise how late modernity tendency of deconstruction created the grounds for conflicting values to produce a dissonant reflexive process.

Figure 1 provides a graphical representation of the mechanism presented so far, with the mention that the elements displaying the unintended consequences (loss in trust/ agency) are placed so that they illustrate the consequence of practices moving towards the oposing pole (objectivity/ subjectivity).

To summarise, this section managed to demonstrate that the process of embedding self-tracking devices into a late modernity cultural matrix creates both a consonant and dissonant reflexive process. The consonant process combines internalised goals like health and responsibility with self-tracking devices benefits to fuel the purchasing behaviour. The disonant process uses what Lupton (2014, p.82) names data doubles to create a *balancing loop*[10] between self-tracking practices as means of achieveing goals like health and responsibility and the current cultural prerequsites of the actor. The gap between the current state of the actor (caracterised by the desire to control objective and subjective aspects of his nature) and goals (caracterised by desires of health and responsibility) represents the starting point of a discussion regarding self-tracking consequences.

Self-tracking consequences: Data and roles

The argument so far depicted a rather pessimistic view on the ambivalent nature of the self-tracking culture: engaging in self-tracking practices can lead either to a loss in agency or a loss in trust. However, a loss in agency motivates the individual to reinforce the self by creating what Cova (1997) describes as *linking value*. In this sense, the works of Lupton (2014) and Rowse (2015) can be understood as descriptions of the linking value created by the self-tracking movement. In his attempt to recover his subjectivity, the actor will engage in both appreciative and evaluative interactions about self-tracking devices thus, creating a sense of shared meaning. As Rowse (2015, p.47) notices, this process also allows for the formation of critical perspectives. Therefore, the placement of autonomy loss under the advertising element is not arbitrary (Figure 1). This position not only describes *a loss in agency as source for advertising strategies* but also *as a source for critical debates.* Going further, a loss in agency for the sake of objectivity could also be translated as the emergence of a new object of orientation for the actor: *data*. One immediate consequence of data as an object of orientation is that the actor will try to integrate it by means of what Lyotard (1993) describes as narrative knowledge. Here is where Lupton (2016, p.8) argues that self-trackers use data as an object for self-narrative creations. Moreover, here is where objectivity reaches a point of diminishing returns thus, creating the tendency for narrative knowledge to attract self-tracking practices towards the subjectivity pole.

In creating self-narratives, the user will start to act based on the contextualization of data thus, giving primacy to control as an object of orientation. As already mentioned, control as an object of orientation refers to a preference for acts that allow the actor to regain his subjectivity. In this sense, any data provided by the device wich does not fit

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[10] Kim (1990) describes a balancing loop as a gap created between the current and desired state of the system, given the means used for achievieng that state.

one's narrative becomes problematic. One consequence is that the actor is prone to losing his trust in the self-tracking devices as he will perform practices that distances him from objectivity as an object of orientation. Giddens (1990, p.99) points to **mistrust** as an adequate concept to describe the process of losing trust in a system of experts. In this sense, Lupton (2014), Lupton (2016), Rowse (2015) and Crawford et al. (2015) talk about different manifestations of mistrust. Lupton (2014, p.78) discusses about the *exploited* self-tracking devices category which is characterised by personal data being repurposed for the usage of others. Crawford et al. (2015, p.493) describes the process of *implicit participation* by which data from users is turned into comparison standards. Moreover, Rowse (2015, p.49) states that the process of creating comparison standards for the user creates uncertanty about the efficiency of the device thus, a loss in trust regarding the system of experts. Another possible consequence of mistrust in a specific self-tracking device could reffer to changing the system of experts while maintaing trust in the abstract system. Here is where scientific knowledge comes back into play, pushing slef-tracking practices back towards the objectivity pole. To extreme examples are provided by Crawford et al. (2015, p.493) who talks about self-tracking data used as evidence for a court law case and Rowse (2015, p.53), who gives the example of Jenifer Lyn Monrone[11].

Once engaged in self-tracking practices by a pushed reflexive process created by goal-objects of orientation (health and responsability), the agent is constrained into an imposed reflexive process created by means-objects of orientation (objectivity and control). It is important to mention that the two classes of objects are not exclusive. An example should be illustrative. Using dramaturgic terms, first reflexive process has Health and Responsibility on the frontstage while Objectivity and Control are situated in the backstage. Once the device is introduced in the stage (or bought), a change of roles takes place: Objectivity and Control enter the frontstage while Health and Responsibility move towards the backstage. Unlike the roles of Health and Responsability, Objectivity and Control are presented as conflicting characters fighting for a bigger share of the stage, each having a series of avalabile tactics and known consequences. First move belongs to Objectivity which deploys tactics of scientific knowledge with a loss in agency as a consequence. Building on this loss, Control makes the second move by means of narrative knowledge, with a loss in trust as a consequence. At this breaking point, Objectivity can deploy different deflecting mistrust tactics which can also be countered by linking value tactics deployed by Control. Finnaly, the scene is ended either by another device being introduced in the scene or by a change of scene.

Conclusions

Building on existing literature, this paper managed to show how self-tracking devices get embedded in a late modernity cultural matrix while also describing the sociocultural response to it. A functional classification with regards to the nature and focus of self-

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[11] As a reaction to data privacy issues, Monroe decided to create a self-tracking company with transparency as its core value. This example shows that scientific knowledge (or trust in the abstract system) can surpass a mistrust in a specific system of experts, thus moving practices back towards the objectivity pole.

tracking devices allowed for the identification of the self as the interpreting unit (Table 1). A classification of meaning producing practices with regards to their effects on the self-pointed toward a trajectory of embedding of self-tracking devices (Table 2). A distinction between two phases of adoption in self-tracking devices trajectory gave the opportunity to differentiate between two classes of orientating objects: health/responsibility and objectivity/ control (Table 3). Furthermore, a description of each object and their compatibility allowed for a difference in primacy with regards to the trajectory of embedding (Table 4). Finally, identification of trust and agency as two "currencies" created by self-tracking data allowed for an illustration of the self-tracking culture production and reproduction mechanism (Figure 1).

To conclude, the works of Lupton (2014), Crawford et al. (2015) and Rowse (2015) created the theoretical grounds for sociology to investigate the intended and unintended consequences of the self-tracking movement. While this paper focused on reinforcing the idea of a self-tracking culture by analysing its relationship with the dominant culture, little or no attention has been payed to aspects related to social inequalities produced by self-tracking devices (Lupton, 2014, p.83), its relationship with specific subcultures or points of equilibrium created by the ambivalence of its structure.

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