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Digital Self-Tracking in Healthcare Practices of Russian and European Students

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Introduction

Nowadays digital technologies are becoming increasingly important for society. They are penetrating into various aspects of our everyday life, including areas of medicine and healthcare. A significant part of those technologies is aimed at assisting lay people with self-tracking. This role can be devoted, for example, to such devices as wearables (wrist fitness-trackers, smartwatches, smart glasses, smart shoes and clothes) or sensors embedded into a home or public space (e.g. into furniture, toothbrushes, etc.). Electronic devices and software provide ample opportunities for gathering and analysing personal data, making measurements more detailed and accurate. Furthermore, the transposition of self-tracking practices to the sphere of digital technologies makes the collection and analysis of personal data easier and quicker, and more interesting for people. Wearable devices and sensors monitor a variety of factors and indicators which later can be visualised by mobile applications or online services to present those huge amounts of data in a comprehensible and coherent way. Thus, people no longer need to write down and calculate personal information by themselves: today this task can be delegated to the digital "assistant". Such simplification of self-tracking leads to the involvement in this process of even those people who previously, in the era of non-digital tracking, felt no need for monitoring themselves.

Popularisation of self-tracking contributes to generation of a range of discourses describing this phenomenon from different (sometimes opposite) standpoints. Adopters and supporters of self-tracking highlight its ample opportunities for self-monitoring and self-empowerment (Wolf, 2010) as well as its increasingly important role in the public health system (EC, 2014). In their discourses the patient is presented as able to take an active part in the healthcare system, which makes it more democratic (while previously it was rather authoritarian). At the same time, social scientists critically analyse self-tracking, describing it as a tool of biopower which contributes to social inequality and development of a surveillance society (Lupton, 2014a). Also, it is argued that the adoption of self-tracking influences people's ideas of health and their attitudes towards their own bodies which are presented by technologies in a simplified way — through numbers.

Addressing many of those claims, Sharon (2016) argues that a major part of the criticism of self-tracking has a highly theoretical level and is hypothetical in its nature. The same is true for supporters of self-tracking whose arguments are not always empirically proven. Both sides of this debate present lay people in an exaggerated way as either "victims of individual forces" or as "rational consumers who make autonomous health choices" (Sharon 2016). At the same time, as a matter of fact, there is a lack of knowledge about the ways self-tracking practices are influencing the behaviour of people, their attitudes towards their own bodies and their ideas on health. Therefore, empirical research of factors underlying the assumptions presented in the discourses is needed.

The purpose of this study was to analyse the role of digital self-tracking in healthcare practices of students from Russia and Europe. This topic is identified as important for understanding the current situation regarding 'self-tracking for health' as it is perceived by users.

Literature review

Growing attention to the phenomenon of self-tracking contributes to generation of a range of discourses. Adopters of new technologies emphasise opportunities they provide for laypeople, e.g. self-empowerment of the patients and transformation of their role in the public health system. The same opinion is supported by the European Commission which highlights the importance of digital health development (EC, 2012, 2014). In their discourses the patient is presented as able to take an active part in the healthcare system, which makes it more democratic (while previously it was rather authoritarian). However, scientific literature refers to self-tracking in a rather critical manner, considering it a tool of biopower, and highlighting such negative aspects of tracking as increasing social inequality and development of a surveillance society, which is enforced to control itself and to be responsible for its own health. Other negative consequences discussed in the literature are issues of data privacy and security, which are not yet fully covered by legal regulations. The purpose of this section is to describe the variety of contradicting discourses present in the field of digital health, and in debates on self-tracking in particular.

Therefore, further we present major discourses involved in the debate between supporters of self-tracking and social scientists who critically analyse this phenomenon. Among such we identified: self-improvement discourse (the role of tracking in the optimisation of one's life and making it better); self-empowerment discourse (the changing role of the patient in the digitised healthcare system); discourse on the surveillance society (tracking as a way to control people); embodiment discourse and discourse on data doubles (relationship of the user and the device, the perception of one's own body through numbers); discourse on data sharing, and privacy and security of these data; inequality discourse (changes and challenges arising from new digital forms of inequality). The application of different discourses in the field shapes the representations of self-tracking, which vary from extremely positive to highly negative. None of those discourses presents a full picture but it can be seen that while some of them are adopted only by one of the "sides", other discourses perform as a battlefield where the interpretations of both — critics and supporters of self-tracking — are present.

Self-improvement discourse

Analysing discourses of self-tracking adopters Lupton (2014b) highlights the focus on the self-optimisation issue. Control over the body here is seen as an exclusively "selfish" activity forced by an interest in learning about one's own body and the desire to improve it (de Groot, 2014). This discourse overlooks collective self-tracking practices, being focused exclusively on the individualistic aspects, i.e. self-tracking is presented as a narcissist practice of an individual interested in observing himself/herself and using the collected data only for private purposes. Self-trackers monitor their activity and body functions in order to achieve certain goals which are aimed at becoming the ideal self (Lupton & Smith, 2018). As it is

stated by one of the keen self-trackers David Pogue in his article for The New York Times: "You want to be your best self. You want to put your best foot forward" (PBS Newshour, 2013 in Lupton, 2014b).

Another type of motivation within the discourse of self-improvement is the desire to be seen as caring about oneself. In this regard users report feeling positive when knowing they are doing something good, something that can contribute to their health and wellbeing (Lupton & Smith, 2018). Typically, self-tracking practices are also associated with improvement of productivity and, as a result, professional achievements.

All those self-improvements are described as dependent on individual decisions: people are viewed as being responsible for improving their life and their health. They are expected to manage themselves and their surroundings and to make decisions about their life on their own (Lupton & Smith 2018). According to Elliott (2013), the need to make choices about one's own life arises from "new individualism" of late modernity, which is characterised by the processes of reinvention of the self and the body. New individualism forces people to reconstruct their individuality and identity in the context of a highly technological and globalised world (Elliott, 2013). Individuals living in the society of compulsive consumerism, in the society based on immediate gratification, feel an urgent need for instant changes to be "in trend" and to meet the demands of contemporary culture. Self-tracking in this situation is seen as a tool allowing collection of personal data which can be used for making choices about future behaviour. Thus, the self-improvement discourse presents self-tracking practices and their goals as voluntary ones, ones seen by adopters as pleasurable and playful (Lupton, 2014a — self-tracking cultures). Furthermore, digital health technologies provide opportunities for making informed decisions even without the help of medical professionals, which goes alongside the development of neo-liberal ideas about the democratisation of the medical sphere. More precisely those ideas are presented in the next discourse on self-empowerment of laypeople.

Self-empowerment discourse

With digitalisation, boundaries between healthcare delivery and self-responsibility (self-care) are blurring (Lupton, 2012). Adopters of the self-empowerment discourse focus on the changing role of the individual in the modern healthcare system. Patients are provided with opportunities not only for making online medical appointments, refilling prescriptions and communicating with their practitioners via the Internet, but also for getting their medical results online, controlling their health and monitoring their body even without being dependent on any medical institutions (Hawn, 2009).

It is argued that application of digital healthcare technologies, especially ones for self-tracking, supports the democratisation of medical sphere as such (Topol, 2015 in Sharon, 2016). While previously doctor-patient relations were predominantly one-sided and had paternalistic or authoritarian character, today patients are able to come to their practitioners with the already collected information about their health (Swan, 2009 in Sharon, 2016). As a result,

laypeople are no longer dominated by professionals. They have a wide range of tools for both collecting personal data and analysing it (with the usage of special programs or just by searching on the Internet). Coming to a doctor's appointment patients are able not only to receive but also to provide some information. Thus, from paternalistic models, relations of laypeople and professionals are transforming into a partnership.

Such empowerment of patients is presented as a solution to the crisis of public healthcare systems, which is taking place in recent decades in the western countries due to ageing of the population, rise of chronic diseases, spiraling costs, etc. (Sharon, 2016). It is stated that a new healthcare system should be preventive, participatory and "move away from a one-size-fits-all approach and towards healthcare that is tailored to the needs and characteristics of the individual" (ESF, 2012). Such healthcare system which emphasises the importance of collecting big amounts of personalised data requires active participation of citizens as generators of these data. The growing role of lay people in the public healthcare is also highlighted by the European Commission in its Green Paper on mobile health where it is stated that "mHealth solutions support the changing role of patients from a rather passive, to a more participative role" (EC, 2014, p. 5).

Thus, the self-empowerment discourse presents people as having a greater influence and control over their own health and having a higher position in the system of healthcare. At the same time, the growing role of lay people in the public health system is criticised by social scientists as it is forcing people to become self-responsible and to control the self. This opposite point of view developed within the discourse on the surveillance society is presented further.

Discourse on the surveillance society

The discourse of self-surveillance and self-discipline criticises empowerment narratives as tools of biopower. The neoliberalism of contemporary Western societies promotes the ideas of self-responsibility as a part of the governing strategy. Lay people are encouraged to take control of their health, to collect their personal data, etc. In other words, people are required to manage their health risks on their own, by collecting and analysing data on their life and their body (Lupton & Smith 2018). To explain the role of such self-tracking practices in the contemporary society, scholars (Best, 2010, Caluya, 2010, Lupton, 2014a and others) apply the theory of M. Foucault. This theory sees self-tracking as a power tool for monitoring and management of the population through which biopower is exercised. In a metaphorical way, this phenomenon is described as a "panoptic" gaze. Self-surveillance goes beyond the individual lifestyle by involving peers into self-tracking and monitoring results and enabling people to monitor the results of each other. In other words, gamification tools and opportunities to share personal data make self-trackers unconsciously involved not only in self-monitoring but also in control of others and by others (e.g. friends, followers, health promoters, insurance companies). Due to that, boundaries between individual and social discipline are blurring and the level of self-responsibility rises, making laypeople

actively participate in public health promotion and exercise of biopower. Thus, the process which is described as the empowerment of a patient becomes a way of governing and self-control (Lupton, 2012).

Being involved in self-tracking under the influence of the neoliberal and self-empowerment discourse makes it difficult to understand whether self-tracking is a voluntary choice of an individual or a result of social pressure. Sometimes scholars (Henkel et al., 2018) refer to cases where companies enforce employees to use self-tracking devices making it a part of corporate culture (to monitor the health of workers or to get discounts for insurance). In such situations of institutionalisation of self-tracking it becomes even harder to identify whether those practices are exercised voluntarily or not.

Another issue discussed is who is responsible for the creation of goals and norms with regard to health. Lupton (2012) argues that priorities are not chosen by people but rather identified and directed from above. In this case, promotion of health still appears to have a paternalistic, top-down structure, where the patient still cannot be presented as empowered. Although people tend to perceive data (especially quantitative) as something objective and trustworthy, it is argued that the data is never "raw", it is always shaped ("cooked") by socio-cultural norms, political frames, etc. (Lupton, 2016). At the same time, gamification of tracking engages users on the emotional level, making them interested in reaching socially created norms transformed into daily/weekly goals. Such goals may be additionally supported by provided challenges with peers and public discourse on health translated in the media. People perceive certain attitudes and norms even without noticing it.

Thus, the discourse on the surveillance society presents laypeople as imprisoned by neoliberal policies and sometimes misguided by the ideas of self-empowerment of by gamified technological tools. The biopower is practiced in a soft, rather invisible and latent way, making users 'voluntarily' collect data. The relationship of human and technology, presented here in a rather negative context, is a controversial issue, with its supporters and opponents. More precisely the influence of digital devices on the human body and ideas about it is described below.

Embodiment discourse

Health technologies are rapidly developing and today they went far beyond the first "machines at the bedside" (Casper & Morrison, 2010, p. 121) and provide wide opportunities for health monitoring and self-tracking. Digital technologies can not only be incorporated in the home or public space but can also be worn on the body or even be ingested (as in case of digital tablets). The relationship between humans and technologies attracts the attention of researchers since the 1980s (Lupton, 2012). Sometimes, based on the theory of Latour (2005) digital technologies are seen as "actants" having the same level of importance in communication as people (Lupton, 2013). The growing interconnection and interdependence of humans and technologies (which is especially visible in the case of chronically ill people who can be vitally dependent on their devices)

contributes to the development of the self-embodiment discourse. Social and cultural theorists discuss where this blurring boundary between the body and technologies is and how it can be revealed (Lupton, 2014b; Shaw, 2015).

Addressing this issue literature articulates the concepts of posthuman and of the cyborg (Haraway, 1988; Lupton, 1995; Shaw, 2015). Originally the concept of the cyborg which was developed along with the industrial revolution described the human body as a machine in which the human brain played the role of a computer (Lupton, 2012). Haraway (1988) argued that the integration of technologies in everyday life has changed the way people use bodies, perform activities, behave, etc. Also, cyborgification led to the transformation of individual responsibility, as now some functions are delegated to the technologies which people rely upon (Haraway, 1988). Describing a contemporary situation with digital health technologies scholars highlight the multiplicity of human-technology relationship which has many aspects lying beyond it (Lupton, 2014b).

One of them is the influence of technologies on the self-perception of users. It has been discovered that putting on fitness-devices some people may feel athletic and handsome, some fashionable and modern, and others fat and non-confident (Pink & Fors, 2017). On the one hand, there are cases when people feel so secure and safe wearing their devices that it is hard for them to imagine going somewhere without them. As the study by Pink and Fors (2017) has shown, people reported that devices are highly important for their spatial activities: when the fitness-trackers showed a deficiency of physical activity, users tended to choose longer ways home to fulfill this goal. At the same time, some adopters report being distracted and physically annoyed by gadgets they are using (Ruckenstein, 2014). Users describe tracking devices as something that does not allow them to fully appreciate the situation and enjoy it (Pink & Fors, 2017).

Another issue which is discussed in the framework of human-technology relations is the role technologies have as the part of one's body. For example, Lupton (2015) points out that technologies are performing the role of the brain which collects and remembers information about one's body. Thus, the study of Pink and Fors (2017) has shown that self-tracking technologies can be used to later replay some experiences, to look at them from aside or to check whether what you feel is "true" (matches with what devices have calculated) or not. Some perceive their data as an opportunity to render their messy life into clean and orderly organised picture (Till, 2014).

Therefore, the embodiment discourse emphasises the growing interdependence of humans and their gadgets which are becoming almost inseparable from the body and sometimes are taking over some functions of the brain (e.g. collection and analysis of information). All collected data are summarised and may represent the human body in a digital form, and that is what scholars refer to as a 'data double'.

Discourse on data doubles

By mediating people's daily routine, devices transform ideas of their own body, knowledge about which is received not through feelings but via technological tools, into digital form. The body in this discourse is presented as a data emitting machine which needs to be measured and managed (Lupton, 2013). Discussions on self-tracking often refer to numbers and quantitative indicators as the most reliable ways of getting knowledge about the self (Lupton, 2016). The image of the self-tracker is highly dependent on technologies, goes beyond the scientific discourse and widely appears in magazine and newspaper articles on the topic, e.g. "You are just a number" (The Sunday Times Magazine, 2013). Literature refers to the results of data collection as to "data doubles" or "data selves" which represent the self-tracker as a digital body, separated from himself or herself (Lupton, 2012). It is stated that data doubles influence people's behaviour and contribute to the reconfiguration and reinterpretation of concepts of the human body (Lupton, 2016). At the same time, when describing the phenomenon of data doubles, adopters of self-tracking themselves use the metaphor of a mirror which does not develop the new body, but just shows users their own body with all the habits, unconscious actions, activities, etc., which usually go unnoticed by people in their everyday life (Sharon, 2016). While discussing the issue of being represented through numbers and describing the attitudes of people towards their data doubles scholars regularly refer to the Quantified Self movement.

Discourse on data sharing

Before the expansion of the Internet, illness was an exclusively private experience (with a few exceptions of HIV/AIDS, breast cancer, etc.) (Conrad et al., 2016). People were suffering predominantly on their own even while being in healthcare institutions. They could have shared their health problems with medical professionals, families or close friends, but their illness was not discussed within the "subculture" of patients with the same disease (Conrad & Stults, 2010). With the development of technologies, the experience of being ill and of becoming healthy has transformed from private into public (Conrad et al., 2016). Creation of online support groups and social media allows users not only to exchange information but also to gain support and motivation. For example, some patients highlighted that sharing their problems and results online made them feel less oppressed by their disease as they have always felt the support of their subscribers which made them more confident and motivated (Hawn, 2009). Interestingly, the study of Prasad et al. (2014) has shown that people sometimes are more willing to share information with strangers than with friends or relatives. Members of the largest self-tracking community — the Quantified Self — highlight that those practices are not only about monitoring the self but to a great extent about one's self-presentation to others (Davis, 2013 in Lupton, 2016).

Sharing personal health data in order to get feedback from peers is not the only reason for making private information available for others. Some supporters of self-tracking highlight the importance of sharing personal data for the public good. For example, the collection of patients' data may allow medical professionals to identify which treatments are the most effective. Thus, patients are empowered

to contribute to medical research and decision making by sharing personal data. Analysis of big data provides opportunities for the production of new knowledge about illness and disease which can potentially be used in the development of preventive medicine and health promotion (Lupton, 2014a). Such focus on the significance of the role of lay people in the public health system makes individuals responsible not only for their own health but for the improvement of the population's health. Sharing personal data for the betterment of society in some cases is supported by self-trackers even if they do not receive any personal benefits (Prasad et al., 2014).

At the same time, owners of digital platforms for self-tracking who are interested in collecting aggregated data of users are actively developing different kinds of tools that are motivating people for self-tracking and encouraging them to achieve certain goals. One of the strategies for this is the gamification of self-tracking practices, i.e. adaptation of game design for a non-gaming situation. The goal of this concept is not only the entertainment of users but rather their involvement in certain activities (Nguyen et al., 2018). In some cases, gamification can be supported by a gratification approach based on a built-in reward system which allows people to collect online points or real offline benefits (Lupton, 2014a — self-tracking cultures). Introduction of real gratification for self-tracking is gaining its popularity during the last few years. For example, for regular exercising some insurance companies from USA, Germany and Australia have introduced certain bonuses: for achieving fitness goals people may get money or gift rewards, cash back or discounts from the company's partners (e.g. airline services) (Henkel et al., 2018). As it was shown by Prasad et al. (2014) when receiving gratification people become not only more active in self-tracking but also more willing to share their results with others. At the same time, the opportunity to share results within various social networking services to gain emotional support or to keep challenges with other users is also one of the tools for encouraging people to self-track. Ilhan (2018) notes that online communications with fitness peers provide users not only with motivation but also with social reinforcement, competition and entertainment. Many applications for self-tracking, for example, have introduced awarding titles for the achievement of certain goals (e.g. "King of the Mountain" in Strava) (Till, 2014, Lupton, 2015). Also, the usage of networking websites allows people to gain and exchange information on self-tracking and to present themselves.

Therefore, with the digitalisation of the medical sphere laypeople have more opportunities for sharing personal data, and, as a result, becoming increasingly involved in this process. At the same time, the boundary between voluntary and involuntary sharing is blurring, and both scholars and adopters of tracking are becoming concerned about the privacy and security of personal data.

Discourse on data privacy and security

The usage of individual data for public purposes is widely criticised and referred to as "free labor" or "digital labor" (Sharon, 2016). Those concepts are used in the framework of the digital data economy, a part of which is the information collected on people's health-related behaviour. Scholars discuss the ways self-tracking

data can be used by the corporations that own and run platforms for data collection. Generally, the concept of digital labor introduced by Terranova (2000) covers any unpaid activities resulting in the generation of value for the owners of digital platforms and software. As far as self-tracking generates income for the corporations which produce devices and own platforms, the data produced by users is considered to be valuable (Till, 2014). The value can be received from users in two ways: they create free content for those platforms and they collect personal data which can be sold with, mainly, marketing purposes (McEwen, 2017).

Regarding the issue of data privacy and security, the second situation is the prior one: the huge amounts of data collected for self-knowledge are transformed into valuable capital which can be potentially exploited in a variety of ways (McEwen, 2017). For example, the privacy policies of "Fitbit" and "Nike" — two of the leaders on the market of wearables for self-tracking — state that companies may collect and sell users' data, share it with partners and make it available for the public by publishing researches and reports (Till, 2014). However, it is highlighted that all the information is analysed and presented in an aggregate way without references to information of individual users (McEwen, 2017).

Despite the fact companies are interested in large amounts of data which can become profitable only in the aggregated forms, scholars still question the ethical dimension of data collection (Lupton, 2014a). The level of control people have over their data results in their potential privacy concerns. Pentronio (2002) describes three dimensions of privacy concerns: perceived surveillance — the feeling of being observed; perceived intrusion — an unwanted presence of others; attitude towards secondary data — concerns about it being collected and used by others. As it is shown by Bol et al. (2018), concerns about loss of privacy influence self-tracking practices of users and result in the limited adoption of technologies and selective sharing of data. Interestingly, people with high privacy concerns are less likely to use data aggregators than people with fewer concerns but, at the same time, they are more actively adopting reproductive health apps (Bol et al., 2018). That fact demonstrates that users may consider different kinds of health information as having different levels of sensitivity and privacy. This notion is also supported by the findings of Prasad et al. (2014) which state that people are less willing to share their demographic information or location but more open about other kinds of data (even sensitive ones) that has been collected by their device.

One of the cases in which the loss of data privacy becomes highly problematic is the development of "employee wellness programs" (Till, 2014). The introduction by certain companies of fitness-trackers and other devices as a tool for monitoring and managing the behaviour and health of employees has a goal of increasing productivity of workers and lowering insurance costs (Lupton, 2014a). Digital tracking is already introduced in a range of large organisations (e.g. Tesco, Amazon) and is reported by Fitbit to be one of the fastest-growing areas of expansion of digital health technologies (Nield, 2014 in Till, 2014). Introduction of such initiatives at the workplace is not only questioning the voluntariness of tracking but also blurs the boundaries of data privacy. As far as managers and

employers enjoy full access to the data of all the workers, trackers themselves are lose control over personal data and become concerned about whether their data may go beyond their interests.

People are afraid of their data not only being repurposed or misused but even used against them, limiting or violating their human rights or privileges (Lupton, 2016). For example, one of the blogs on self-tracking describes cases when people were denied to access the employment, credits and insurances because their personal self-tracked data became available for those institutions (Lupton, 2016). The risk of personal information being accessed by tax offices, credit agencies, potential employers or insurance companies provides users with the awareness of being discriminated because of their health-related behaviour. Regarding this issue, Gary Wolf, co-founder of Quantified Self, argues that individuals' data should be seriously protected from unwanted use by others (Wolf, 2014).

Thus, major criticism on data privacy and security emphasises the danger of loss of control over personal information which can go far beyond the individual apart from his or her will. It refers to cases in which people are not willing to share their results or do not want to be identified. Such involuntary data sharing alongside with some other issues can lead to discrimination and violation or limitation of human rights, which is discussed in detail in the discourse on increasing digital inequality.

Summarising the above discourses, we can say that there is no unanimous opinion. While some people are focusing on the benefits of self-tracking as a part of the new, digitised and more personalised healthcare system, others are highlighting such negative issues as limitation of freedom and growing inequality.

Although the debates on the advantages and disadvantages of gadgets for health are becoming increasingly active with the popularisation of digital technologies, there is still a limited amount of empirical research into self-tracking. A major part of contemporary literature has an exclusively theoretical nature, and only a few articles are based on empirical studies.

In this regard, we suggest the necessity of conducting empirical research in order to collect the data on the current practices of self-tracking and to explore the situation in the Russian-European context. Collection of empirical data in different countries allows to exclude the influence of the 'national' factor (economic, political, cultural) and to focus precisely on the individual practices of tracking and some cross-border tendencies of monitoring the self. The design of the empirical research, as well as data analysis and the discussion section, are presented in the following chapter.

Methodology

The empirical data for the study was collected by conducting a series of in-depth interviews with self-trackers. This method was chosen as the data collection method due to its potential in exploring the general situation in the field. The

interviews were semi-structured, aligned with the objectives of the research, but, at the same time, they allowed to cover more issues and topics when needed. Furthermore, semi-structured interviews provide valuable material for discourse analysis as they present the 'original voice' of the interviewee.

For the analysis of the interviews such methods as axial coding and discourse analysis were applied. The first one allowed to identify the repeated topics and situations which were mentioned by participants as a part of their tracking experience. The second one aimed to explore terminology and discourses people apply to describe their practices.

In the course of the coding we identified two levels of elements, which were later used to structure the work. The first level includes simplest codes, describing either types of tracking and related issues (codes: non-digital tracking; digital tracking of … [steps/heartbeat/sleep/periods/other]; motivation for tracking; beginning of tracking; quitting the tracking; etc.) or aspects of healthcare process (codes: communication with doctors; perception of healthy lifestyle; own lifestyle; trust to the Internet; etc.). Those codes have arisen from the empirical data, from the speech of the participants and the experience they shared. Codes of this level are used for organising collected data and are described in detail in the section 4 of the empirical chapter. The second level consists of more advanced codes, covering more complex issues and focusing on the aspects showing up within various self-tracking or healthcare practices (codes: activity; self-improvement; self-empowerment; self-control; disadvantages of tracking; communication with devices; collective tracking; etc.). Those categories were developed on the basis of literature review with the reference to the collected empirical data.

As far as the study is exploratory in its nature, the size of the sample is dictated by the necessity to overview a variety of patterns of self-tracking, without having a goal to collect data for quantitative analysis. Therefore, data collection was ceased with the saturation of the sample. In other words, we have finished field research when major theoretical categories became sated enough to answer the research questions.

The participants of the study are 26 students (17 female and 9 male informants, aged from 19 to 27) from Russia and Europe (sample includes students coming originally from Finland, Germany, Italy, Belgium and Russia). All the participants are either practising self-tracking at the moment or used to do it in the past. The sample was created with the application of the snowball technique; field research was conducted in three geographical locations: Saint Petersburg, Russia; Helsinki, Finland; and Munich, Germany.

Students as a sample were chosen based on their characteristics as a social group. On the one hand, they are one of the most active consumers of new technologies and are the most likely to have experience in digital tracking. On the other hand, they are already to a certain degree independent in their healthcare practices and therefore can share their individual experience of caring about the self.

The focus on cases of Russia and Europe is dictated by their low involvement in contemporary studies on self-tracking. As of the moment, the majority of empirical research is conducted in the US, while the situation in other geographical regions

keeps being unexplored. At the same time, it should be stated that we do not have a goal of comparing two cases in order to find some differences. Contrarily, following the idea of Mannheim (1997) we are interested in identifying some universal patterns of tracking which would not be dependent on the context of a single country/healthcare system. In other words, collection of empirical material in various sociocultural environments would allow to minimise the influence of external factors present in a specific national context and to focus on the experience of tracking common for people from different cities and countries.

Results

Summarising the practices of tracking described by students we can detect some repeating patterns, attitudes and situations, common for different users. For example, many participants highlighted the importance of being active, shared concerns about data privacy or reflected on feeling obsessed. These as well as several other issues are combined in a number of categories which are presented below. Those categories describe the key aspects of self-tracking as they are perceived by students.

Activity as a lifestyle goal

Physical activity is one of the most commonly mentioned categories, which students use to describe both a healthy lifestyle and self-tracking practices.

Being physically active and exercising more is one of the main motivators for self-tracking, especially when it comes to step counting or training. Students report to have different daily or monthly goals as well as refer to a variety of standards or recommendations on the amount of necessary physical activity. But they all share the desire to exercise more. For some participants, it arises from own feelings or reflection on spending too much time sitting at the desk. *"I always wanted to move more because I felt, like, sometimes, because you're students you just sit in the library and don't do so much" (Int. 5).* For others — from the analysis of self-tracking results when they don't meet their average daily goal. Anyway, the will to move more became a part of everyday life on which students do not reflect, rather doing it unconsciously as some daily routine. *"There are simple things...like...do I do these things because of this [smartwatch]? I would say 'no'. But generally I think I'm more active. I try to be more active. And if someone is like 'hey, wanna go out?', I'm like 'yeah, I should, cause I don't have enough steps' and so on" (Int. 6).*

Also, the need to be physically active is perceived as a core element of a healthy lifestyle the students were asked to describe. It comes at the very first place and is the most commonly mentioned aspect among the participants. At the same time, almost no one has drawn a direct connection between tracking and healthcare. Therefore, the links are the following: "I track steps because it helps me to move more; to be healthy I have to move more" but not "I track steps to be

healthy". In other words, 'physical activity' performs as some kind of a transitional category mediating the interconnection between digital tracking and personal healthcare.

Data privacy and security

Participants of the study were asked to describe their attitudes towards privacy and security of digital data they collect while tracking themselves. It can be said from the beginning, that opinions divided and there was no agreement on this issue among students. Some were extremely critical about the practices of data collection and even mentioned this as a reason for them or their friends to quit or limit tracking. *"But also, the reason why I stopped sharing tracked information with everyone or not so actively filling out my health profile on the iPhone apps is just cause I realised: this is my free data, which I give, and which then maybe can be used either against me or simply, without me" (Int. 20).* Students reported trying to minimise the amount of unnecessary information they are putting on the app or to divide this information among different programs so that they would not be aggregated by the same company.

At the same time, there are students who feel more comfortable giving away their own data. On the one hand, they are conscious about the inevitability of this process, which is taking place anyway, no matter what they think about it. *"I try not to think about it. Because I know it's definitely used for something <...> but I try just to ignore that. I mean, I can't do anything about it. And I'm too lazy to go back to paper [tracking]" (Int. 1).* On the other hand, they do not consider the self-tracking data to be intimate enough, to somehow harm them when is used by others. *"I know, anyone can access this information but I don't think that it would really matter to me if it happens" (Int. 3).* Furthermore, some users voluntarily share their data in order to get some real-life bonuses. For example, Russian mobile operator 'Beeline' has developed a program in which adopters may earn extra Internet packages for reaching daily step or sleep goals (Beeline website, 2020). In Germany, by providing results of tracking to some insurance companies people may receive personal offers or discounts for their medical insurance. Thus, organisations from different spheres are developing practices to support voluntary data sharing.

However, not all the users are willing to share their data, and not all kinds of data are perceived as appropriate for sharing. For the majority, the number of steps is the data that can be easily given to some open-source; the same applies to the distance covered by walking, running or cycling. When the numbers exceed average values, users may post them on some social media to show off their achievements. But even when they are extremely low, some students reported sharing them, just to make jokes about themselves.

While distance is the kind of data that can be shared, the rout is something the majority of people are more concerned about. Some students report feeling more vulnerable when knowing their location is always tracked. Others are annoyed by

location-based advertisements. At the same time, they feel there is nothing they can change, as they can be tracked with their phone anyway, and the phone is something they cannot give up using.

Such aspects of tracking as sleeping, heartbeat, periods and food intake are usually less private for users, as they cannot imagine this information to be helpful for someone or used against them, especially in the aggregated form. *"Firstly, who needs information, how many steps I have taken, or when my period will begin? Or how much I sleep <...> if there is someone who is studying sleeping processes, maybe it might be interesting to them. But if someone is interested, they can just write to me and I will answer them. Well, I don't think that this information can somehow really affect my security or privacy. Because, even if you steal it, it is anyway rather impersonal" (Int. 16).* However, for a few students, the same data became more intimate when it came to sharing it with some people they know in person (e.g. colleagues). In other words, although the data about heartbeat or sleeping is not seen as extremely secret, some users feel uncomfortable knowing that someone from their surroundings may follow their well-being or daily regime in real time.

At the same time, many students are free to share their data with their close friends or relatives. In some cases, it is done just out of curiosity or for fun. In other cases students feel more motivated when they are able to compare results with others, to have some kind of competition (especially when it comes to activity goals). As for heart rate tracking, users describe the main advantage of being able to see each other's results as the possibility to follow the well-being of relatives with heart problems and to take action when necessary.

To sum up, the attitudes of students toward the issue of data security vary from person to person, depending on their background and life views. Some are very suspicious about the collection of their digital data and try to limit this process, while others are not concerned at all or are convinced of the inevitability of data collection. Mainly, feelings about the privacy of tracked data in terms of sharing depend on two factors: 1. the kind of data (some aspects are more private, other less so); 2. the receiver of data (users are more willing to share information with complete strangers and aggregator companies or with close friends/relatives and less willing to share it with people they know in person, but are not too close with).

Self-control by self-tracking

Describing the advantages of tracking, students regularly referred to the opportunity to organise their own life, to feel having it under the control. Daily, weekly or monthly check-ups allow seeing changes in lifestyle habits and one's own body. Graphs created by applications summarise big amounts of data about the person and present it in a coherent and intuitive way. Such quantified data is perceived as a representation of an 'objective' progress, which opposes the 'subjective' understanding of one's own well-being based on feelings. *"The numbers are really easier to read and understand. In terms of ... your feelings, they are not always objective <...> I mean, if you compare numbers and feelings,*

then numbers… they are simply more objective" (Int. 22). Therefore, self-trackers feel more in control of themselves, when they have some devices enabling them to measure their own life and to see its strong and weak elements.

Interestingly, for a few students the feeling of self-control was based not exclusively on numbers and results, but on the very process of tracking. They reported becoming more organised, more careful about planning their own day, etc. since they started tracking their own life. Regardless of whether the tracking was digital or on the paper, students felt they had everything under the control just because they were doing all this tracking, just because they were giving it some effort. *"It's such a process when you feel that 'here I am organised, I have everything under control, I'm sitting and writing everything in a notebook" (Int. 17).*

Thus, we can see that students are willing to have their own life under the control, to organise their own lifestyle by introducing regime and discipline, e.g. like it was described in the case with sleeping habits. This kind of self-organisation is described as necessary to oppose the 'chaos' of everyday life, something that would help to survive and succeed in a rapidly changing world. *"Self-control and organisation in general, it gives you an advantage over the chaos that is going on around you. People who do not stick to a routine are usually less focused in general, and less successful. Because when you have a clear plan and clear boundaries ... not when you deprive yourself of something important, but when you know that "in this area, I have to keep control and be disciplined", then you get an advantage over other people" (Int. 21).* Of course, the will to be more organised is not universally shared, and not all of the students name it as their priority. Nevertheless, the issue of controlling oneself through tracking practices is quite common and is shared by the majority of participants.

Collective tracking

Above, we have already discussed some practices of collective tracking and sharing personal data with friends, family or other people from one's surroundings. As it was mentioned, such options allow, on one hand, to get extra motivation by introducing an element of competition, and on the other hand, to keep track of the well-being of your relatives. Although many students had an experience of sharing personal data with at least some close friends, for the majority it is not a regular practice. Students report to see self-tracking as a rather personal issue, something they do for themselves, not intended to be shared with someone. They do not expect feedback from others unless they reach some impressive results. *"Well, I can say to my mom like 'hey, my friends and I have walked so many km!' <...>But no, it's not important for me what others think [about my tracking] … yeah, it's just for myself. I don't think anyone has the right to influence or to say something about what I'm doing" (Int. 1).*

Although it is common for apps to provide in-built networks where users may share their progress and support each other, none of our participants reported being a part of one. None of them was familiar with world-wide tracking community 'Quantified Self (QS)' or any other communities of trackers or bloggers promoting self-tracking. *"I do not follow any public [communities], the*

communities of people who share their progress and stuff … I think it's weird. But it is a pretty big community, I think. But I am doing it [sharing progress] just with friends or family" (Int. 10).

Therefore, while the contemporary literature discusses the influence of such communities on people, participants of our study perceived self-tracking as an individual practice, in which they do not need support from complete strangers. It can be shaped by the experience of their surroundings, but not by some communities or anonymous people from networks of self-trackers.

Disadvantages of self-tracking

Overall, students report to be satisfied with their self-tracking and see it either as a helpful tool for reaching certain goals or as a device bringing them joy. Therefore, when asked about the negative sides of tracking, some of them got frustrated and could not name a single element of what they do not like in self-tracking. Others mentioned several aspects which may be annoying and which they are not fully satisfied with. It was common for students to refer to some technical problems (e.g. with charging), physical discomfort from wearing a wrist tracker, irritating notifications about those aspects of tracking which are considered unimportant or the lack of data security.

Additionally, several students pointed to such negative consequence of tracking as an obsession with the results of tracking or its very process. As it was already mentioned in the previous sections, such feelings could be the reason for users to take a break from tracking or quit it completely. Participants reported being too focused on the numbers they get, checking them all the time, feeling uncomfortable going out without their tracking device, etc. Although reflecting on the control gadgets have over them, not all of the users were able and were willing to stop tracking. On one hand, they still saw a lot of positive aspects of tracking; on the other hand, it was psychologically difficult for them to give up such a strong habit. They were used to wearing their gadgets 24/7, and some even reported feeling physically uncomfortable not having a tracker on the wrist. *"I always have to wear it. Like, I cannot go out without it. I feel like I'm naked (laughs). I just can't"* (Int. 2). One of the students even shared that she noticed that the marketing strategy of the trackers' producers force users to wear devices all the time, in order to make the habit of self-tracking as strong as possible. *"They are waterproof, you can wear them even in the shower and everywhere. I've never thought about it before, but this is such a tricky move that you'll get used to wearing them all the time. Your watch makes sure you never take it off"* (Int. 20).

According to observations of students, the intensity of obsession has changed with time, being stronger at the very beginning and decreasing after the first several weeks/months. Also, the urge to precisely follow the results of tracking was lower during some busy or eventful time period (e.g. during university examinations) and was higher in the spare time. Therefore, the obsession with self-tracking appeared to be directly dependent on the priorities of the user at the certain life stage, becoming stronger in leisure time or when the gadget is new and calls the user to pay more attention to it.

Discussion

Reflecting on collected empirical information, we can identify a number of narratives which are developing with the popularisation of tracking. As self-tracking is becoming a part of the daily life of laypeople, new relationships with others, with gadgets and with their own bodies arise. Users are changing their lifestyle, their habits, their routine. Some changes are also occurring in the practices of seeking and receiving medical help. Below we discuss the most salient and interesting tendencies as they are perceived by users and as they are presented in the scientific literature.

Tracking device as 'digital counterpart'

In the processes of tracking, devices perform several functions: 1. Collection and analysis of information ('digital brain'); 2. Representation of the user's life in graphs and numbers ('digital body'); 3. Offering advice and control of user's behaviour ('digital doctor'); 4. Communication with the user through motivation and support ('digital friend').

With regard to the mentioned issues, some scholars articulate the concept of 'data doubles' (Lupton, 2016). It presents the tracking device as creating a digital copy, digital double of the user, which is based on the collected quantitative information and is separated from the person. In other words, the device provides an opportunity to analyse the self from the outside, focusing rather on 'objective' numbers than on 'subjective' feelings.

Although the idea of a 'data double' is fairly relevant for the analysis of self-tracking, it does not cover all the roles of tracking listed above. It is primarily concentrated on the representation of the person in the digital form not taking into account the 'social' functions of devices (e.g. social control, motivation, support). Therefore, I would suggest expanding the concept, considering not only such functions as 'digital brain' and 'digital body' but also the communicative aspect of tracking where the device may perform the role of another person ('digital doctor', 'digital friend'). The understanding of trackers as 'digital counterparts' rather than 'data doubles' would allow elaborating the analysis by including a wider range of aspects, which participants of our study found to be more relevant than once articulated in the literature under the concept of 'data doubles'.

While scholars discuss the replacement of body feelings with tracking numbers (Lupton & Smith 2018), which is, of course, to a certain degree present among our participants, I aim to focus on the results of such replacement. As it was described in the previous chapter, it is common for students to perceive quantitative data as more objective and reliable. Therefore, they tend to replace body feelings with tracked numbers, or at least to combine both sources of information. Of course, the level of trust in numbers does not only differ from user to user, but also depends on the type of data tracked. But what is more important and more interesting is the way data is taken by users and the reactions it causes.

Our participants regularly referred to their device as some social being with which they may communicate, specifically, asking for advice, motivation or control. The whole process of tracking as it was presented by students is to a great degree based on this user-device tandem, which was for the majority far more important than other relationships built on the basis of self-tracking. In other words, users required getting feedback from their 'digital counterparts' in the first place, and only then from their peers and other people (including doctors). As a result, tracking devices appeared to have a great influence on students in terms of their mental state. In the discourse of users, the tracking device was presented as an independent being, able not only to collect and analyse data but also to provide or cause specific reactions. Participants reported experiencing a wide spectrum of emotions caused by communication with their 'digital counterpart', from highly positive (happiness, gladness, feeling of having everything under control) to extremely negative (stress, shame, obsession). Importantly, emotional reactions could be caused not only by results of tracking (e.g. when the daily goal is achieved or not) but also with the communication with the gadget itself. For example, when failing to achieve some goals or exceeding limits students were not only upset with the results but where also ashamed to report this information to their device, as if it would be disappointed or disillusioned.

From such emotional connection arises the feeling of social control represented by a tracking device. The fixation of certain goals not only in mind but in an app makes limits and restrictions more serious and more real. The situation is close to the one when you share some ideas with peers and you are forced to implement them because of certain social pressure and feeling responsible before others. In the case of tracking, the emotions are similar, but the role of peers providing control from the outside is delegated to digital devices. For some users tracking becomes a duty, a kind of everyday activity they have to do from day to day, and from which they may need a break.

Summarising, students perceive trackers as separate subjects, performing not only the role of the mirror, presenting the life of the user in a quantified way but rather as a full-fledged actor. Such 'digital counterparts' perform a number of social roles, to a certain degree replacing a medical assistant giving advice, friends providing support and peers presenting social control.

Transformation of healthcare practices

Scholars, as well as politicians and social activists are involved in the discussion about the transformation of healthcare systems in the era of digitalisation. Some believe in self-empowerment of the patients who are provided with a wide scope of information and opportunities to simplify the process of help-receiving. With the development of new technologies, medical professionals are no longer the only source of medical knowledge (Hawn, 2009). As laypeople became able to collect information about themselves and to analyse it on their own, they are not dominated by professionals anymore. Therefore digitalisation is seen as making healthcare systems more democratic. At the same time, others argue that new conditions force people to care about themselves on their own. Patients are to become self-responsible with the support of technologies, which do not only

assist in data collection but also provide opportunities to control their peers, performing as a kind of 'panoptic' gaze. Thus, digitalisation of healthcare leads to the creation of a surveillance society.

Based on empirical data, we can say that such an element of digitalisation as self-tracking does not have a significant impact on the changes in the healthcare of students, as they do not draw a direct connection between those two aspects. At the same time, there are cases when devices may be involved in some health-related practices. For example, when some tracked information seems questionable (e.g. instability of heartbeat or irregularity of periods) it may become a reason to see a doctor. In this regard, devices serve as data aggregators, providing the user with some information he/she otherwise would not be able to receive. Sometimes apps and wearables may also offer advice on recommended goals, activities, etc. At the same time, they do not fully replace doctors in terms of diagnosing and treating some illnesses. Therefore, devices are performing as medical assistants rather than medical professionals: they are helping with being healthier but not with solving health problems.

Although students do not perceive tracking devices as helpful in dealing with health problems, the majority reported rarely going to doctors even when something is wrong. This avoidance of professional healthcare is based on such factor as lack of trust towards both doctors and medical institutions. However, the tendency of dealing with illnesses on their own would not be possible for laypeople without the development of information technologies. In this regard, the Internet is playing a far more important role in digitalisation of healthcare then tracking devices.

Online sources are used not only as sources of information about healthy habits but also for solving some health problems. Even when going to the doctor, students reported double-checking some information or at least trying to self-diagnose before the visit of a medical professional. At the same time, it should be highlighted that participants reported a low level of trust towards the majority of online sources. In other words, they are used to appealing to the Internet but remain fairly critical and sceptical about such information. The biggest credit among web-sources is given to the blogs and forums where the author is identified and deserves some trust and respect.

Comparing attitudes towards information gained from the Internet and from medical professionals, the latter is seen by students as more trustworthy. At the same time, the simplicity of searching for advice online and the opportunity of reading the commentaries and opinions of authors with different standpoint makes this way of getting information popular.

Summing up, digital tracking devices are transforming some health-related practices of students even if they might not realise it. However, such devices are rarely used for dealing with some health problems. Meanwhile, the Internet, by performing informational and educational functions is actively involved in practices related to illness situations. It provides users with the freedom of hearing different opinions on the same questions and helps to clarify some issues. Interestingly, in cases with both doctors and authors of online articles, it is important for students to feel the trust in the person. Therefore, digital

technologies are making the health and illness experience of users easier by providing them with a choice. At the same time, users themselves highlight the risks of getting such autonomy, which is potentially fraught with self-treatment and loss of trust in medical professionals.

Transformation of lifestyle

The usage of tracking devices on an everyday basis has transformed and changed not only health-related practices but also some daily routines of students. Such activities as walking instead of taking public transport or while calling someone became common for students as they started tracking their steps. Eating behaviour became more mindful for those who monitor calories intake. In a similar way, many actions became more valuable for students since they began some measurements. Such changes are not presented or described in scientific literature. At the same time, they are an important part of the 'new' lifestyle of self-trackers.

Of course, not all the participants reported having trust in their devices, not all of them take their results seriously. At the same time, even those who do it rather out of curiosity and without much consistency, are reporting some transformations in their lifestyle. The most visible transformation is the introduction of new habits. The most common practice for participants is to increase their physical activity: by walking more, by training more, or just by taking the stairs instead of the elevator. The category of 'activity' can be tracked in a variety of ways (e.g. covered distance, burned calories, etc.). Generally, the need to be active was present in the discourse of all participants. Such a trend for activity takes its place as well in the public discourse on healthy lifestyle supported and elaborated by tracking devices.

Self-tracking has transformed not only some routine practices but also the way users think about their lifestyle, the way they perceive their actions. For example, many did not pay any attention to their sleep unless they got a wearable which measures it. After that, some started learning more about good sleeping habits and trying to apply them, others were not able to change anything, and therefore became disappointed each time they went to bed too late. Thus, users followed different strategies in similar situations. But the common thing is that all of them started paying more attention to such aspect as sleep, even unconsciously. The same is true with other kinds of tracking.

Therefore, elements which students are tracking are becoming certain criteria which they apply for measuring how healthy their lifestyle is. And even if the user is not too passionate about reaching some goals and allows himself/herself to take days-off or have cheat days, such aspects as activity or food consumption are still perceived are scales on which their lifestyle could be measured. In other words, self-tracking experience transforms the way students perceive their everyday life. Some aspects of life (such as activity, eating, sleeping) gain special importance for users, which can be seen from their discourse. For example, when

describing a healthy lifestyle the majority pointed precisely to the things he/she was tracking. Although students do not associate self-tracking with caring about health, the aspects they track are gaining increasing importance for them.

Summarising, we can say that self-tracking practices lead not only to the introduction of some new habits or actions in the daily routine of users, but they also influence the way students think about their life. The students' perception of 'what is healthy' based on past experience and public discourse is being shaped and transformed by their tracking practices. While collecting data about themselves, they are consciously or unconsciously identifying aspects which are starting to serve as some criteria of a proper healthy lifestyle.

Conclusion

Scholars critically analyse the digitisation processes as introducing not only new opportunities but also new challenges for society. Self-tracking in this context is seen as a tool for making laypeople responsible for their own well-being, and, therefore, disbursing the public health system. However, our study has shown that the majority of students do not perceive a wearable or a tracking app as an instrument of personal healthcare. For them, it serves rather for having fun or for monitoring their own behaviour without the goal to become healthier. Although many users aim to become more active with the help of their digital assistants, they do not draw a direct connection between tracking and healthcare.

Analysing self-tracking and healthcare practices of people as arising from their habitus and performed in coordination with their past experience, we can identify several factors influencing those practices. As such may serve: disease history of the person and of his/her family; the social circle of a person — friends, peers, family, and their lifestyle and tracking experience; education — in terms of sources for getting knowledge about health and approaches to its analysis; own lifestyle — occupation, hobbies, etc. All mentioned factors may influence the motivation for self-tracking, its intensity, regularity and the list of aspects which are tracked. For example, health problems may prompt people to monitor more precisely certain body characteristics (e.g. heartbeat); the tracking experience of friends and an opportunity to compete with them can make users more actively involved in tracking; busy lifestyle (e.g. pre-examination weeks) with no free-time may, contrarily, distract people from monitoring their own body on a regular basis.

Thus, taking into account the influence of past experience on self-tracking practices of the users, the weakness of connection that students draw between their self-tracking and healthcare practices may be explained by their relatively moderate disease experience. At the same time, it can be assumed that the situation will be different for other age groups or for people with chronic illnesses.

The findings of the exploratory study presented in this paper provide an indispensable grounding for further theoretical debates and empirical research, as it describes the main tendencies in digitalised healthcare and self-tracking. As guidelines for further studies we may suggest analysis of tracking practices among other social groups, whose background differs from the background of students (e.g. elderly people, chronically ill people). It would also be interesting

to more deeply explore digitised healthcare practices of laypeople, paying attention to various online practices (telemedicine, online prescribing, etc.) and their influence on the doctor-patient relationship.

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