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Health promotion based on enhancement technologies: Appointments on the search of the most eternal possible vitality

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Introduction

First, it is worth clarifying that the use of the expression appointments in the subtitle can be considered in its two meanings found in Brazilian dictionaries. Can refer to either "summary, note or record of what was read, heard, seen, thought and/or felt, and that serves or not for a particular purpose" as "the act or effect of pointing, to make sharp, to emphasize the point of (something)" (Houaiss, 2009, p. 257). In addition, figurative readings fit here: the record is in the form of discussion of topics in pursuit of understanding the context that surrounds the scope of research and health care practices. At the same time, it has the pretension to present argumentative sharpness in his rhetorical style.

Also, please note the familiar metaphor of the tip of the iceberg regarding the partial knowledge we have of objects and things around us as to what lies below the water, supposedly beyond the reach of our sight and understanding. Therefore, the idea is to speculate on the submerged part of several icebergs that increasingly appear to be part of this "futurized" present with its enigmas (explicit or not) as symptoms in the health field. The very notion of preemption, as we shall see, would be a strong indicator of the situation.

Feinmann can summarize the premises of this approach (2008, p. 20) by pointing out that "the reality (its "construction" as "truth") is in the hands of power: the order power constantly imposes to the subject: truths, styles, fashions, phrases, images that the subject passively absorb". The production of scientific truth has problems "because science lacks self-reflection [...], lacks contextualizing with history and politics" (Ibid., p. 40).

These conditions reflect a triumphalist view of science, free of extraneous influences that can distort its findings that have the status of evidence, since they were produced by categories operated by rules, procedures elaborated with quality control that supposedly guarantee the truth status to ensure the accuracy of the findings. In turn, this proposition should morally model healthy behavior of individuals who have a personal obligation to take care of themselves with dedication, as part of a securitarian culture. However, several stimuli that conspire against it will remain working. This inevitably reflects ambivalent situations. Several consumption possibilities of agents potentially harmful to safety/health in terms of eating habits, including tobacco and alcohol, despite restrictions, for example, will remain affordable and, worse, tempting. And to discuss and to try to focus on the sources of stress in labor and urban life is not considered; at best, there are indications of how to manage stress that must be done, as a rule, individually, when they are not determined as activities as part of the workplace environment.

These issues are closely associated with ethical dimensions. For Bauman and Donskis (2013, p. 11),

> Everything is permeated by ambivalence. There is no longer an unequivocal social situation, in the same way that there are no inflexible actors on the stage of history. Trying to interpret this world in terms of categories such as good and evil, from the political and social perspective of black or white and of almost Manichaeism separations, today is both impossible and grotesque. This is a world that has long ceased to control itself (although seeks obsessively to control individuals), which cannot answer its own dilemmas or reduce tensions that it planted.

It is worth mentioning that such ambivalence has ties to cynicism, thought mainly as dual regulatory frameworks that enable the simultaneous convergence of two normative rationality, which, although contradictory, are combined in an integrated manner.

Here, we intend to address the issues surrounding the proposals for self-care in health promotion and that bring as focus the self-control formula, especially in the field of alimentary health to prevent weight gain and moderate the ingestion of foods that do not follow the ideals of healthy eating. Such propositions are presented as strategies of self-care, consecrated and naturalized in the field of public health and prevention in general.

Apparently, in a schematic way, it seems to prevail within these conceptions a dualistic perspective of a possible appeal to a sound mind who is guided by rational analysis of human existence. These analyzes take part on the domestication of potentially insane bodies with their harmful impulses before the possibilities of pleasure offered by modern life. The prize for that effort would be to achieve the greatest longevity (with vitality) possible.

It is necessary to say that this occurs within the neoliberal global capitalism with its canons on freedom of choice, the right to decide and the propositions supported by methodological individualism. This perspective of understanding social reality believes that social phenomena are best explained by the characteristics of individuals that are part of the phenomenon. That is, any analysis that involves sociological explanations in the macro context should consider, a priori, the micro context of individuals and their actions.

In other words, the model is configured from the autonomous and responsible subject able to establish relations of cost/benefit (but which could also be of gain/harm) in his actions and changes with the world in which he lives. Thus, individuals would be capable to choose what would be best suited to their needs and demands due to their ability to act effectively, once aware of their actions as consumer agents in a market that offers multiple options to consumers.

However, the adverse effects of this model – which are not few, nor trivial – often involve dealing with the hard side of precarization and

human suffering of excluded groups. One way to deal with these undesirable side effects is through the pathologizing of malaise. Eventually, the individuals who cannot deal properly with life dynamics established socially, which do not assume explicitly their moralist feature, especially in health, should be held responsible.

It is only possible to rationalize when there are crises of legitimacy in terms of the paradoxes produced by an economic growth and developing model of the new spirit of contemporary global capitalism (Safatle, 2008) and its model of unlimited accumulation of capital by formally peaceful means (Boltanski; Chiapello, 2009).

This "new spirit of capitalism" is at the mercy of a generalized form of cynicism configured by the presence of dual regulatory frameworks (Zizek, 1992), producing a plethora of everyday life situations in which events happen sharply marked by the sense of ambiguity. That is, the embodiment at the same time of two regulatory rationales, which, although contradictory, combine in an integrated manner. On the one hand, establishing rules for forms of social interaction and symbolic goals of self-regulation (as to the standards, aiming a population management perspective) and, on the other, by behavioral imperatives that go beyond attempts to establish boundaries in the face of demands of unlimited satisfaction (aimed at individual enjoyment without restrictions).

Managing the individualistic health of populations

According to Foucault (2001), population management should be conceived as a social body taking into consideration the description of what the processes of interest would be, represented especially by rates of birth and death, length of life, wealth production and circulation. The totality of the concrete life processes in a population is the purpose of security technologies, targeting mass phenomena of population to, in theory, prevent or compensate for the dangers and risks that result from the presence of the population as a biological entity. The instruments used here are regulation and control, rather than discipline and oversight (Zizek, 1992).

The objects of biopolitics are not humans in their singularity, but its measured and aggregated biological markers at the level of populations. This device makes it possible to establish rules, set standards and determine average values. Life becomes an independent element, objective and measurable, besides constituting a practical and epistemological reality apart from concrete living beings and the peculiarities of individual experience. The notion of biopolitics is related to the emergence of disciplines such as statistics, demography, epidemiology and biology. All of them allow analyzing vital processes in the population and governing individuals and groups to developing correction, exclusion, standardization, discipline, therapy and optimization (Lemke, 2011).

The fear of taking risks and the transformation of security constitute the main virtues of society. This fueled an inclination to exaggerate the problems that society faces, generating a hyper preventive and overanxious context. This context reflects in life, which emphasizes high awareness of the risk; predisposition to panic; fear of the stranger; susceptibility to abuse/abusers; concern to control individuals that are haywire, relapse, who are negligent in a context of fragilization of trust relationships (Ibid.). As if there were a way of life compatible with the paradoxical demands of capitalism, which require a pedagogy to guide people how to move with effectiveness in a context in which paradoxes, contradictions and ambivalences manifest.

Moreover, there would have been a counterrevolution in the years 1980/90 – a product of traditional conservative morality and neo-moralism of political correctness. In turn, there is a reduction in questioning the assumptions of the relations of domination. We then have another turn of political correctness in health in terms of regulation of conduct by risk – a moral technology (Lupton, 1999) that participates in this health neo-morality, which is supported by scientific imperatives of empiricists' evidence, especially of epidemiology, and by ethical reasons about what is good and bad in terms of the relationship of each person with its health, in terms of self-care.

Both intend to give a narrative sense to individualism, but eventually isolate and alienate individuals in generating their subjectivities and

identities. In brief terms, the assumptions about the possible origins of the political correctness are located in movements supposedly of the US academic intellectual Left of the 1980s against discrimination of traditional morality, allegedly of Marxist inspiration and of the Frankfurt School. In this context of time and place, a considerable moral vocabulary adequate to the task of fighting prejudice through cultural criticism developed. Some of the new terms name morally troubling systems of domination: for example, racism, sexism, classism, heterosexism and colonialism.

The success of neo-moralism is because it is directed to the atomized individual and it seeks to give sense to his experience of isolation alienated of contemporary individualism through individualistic narrative focused on the management of oneself. At the same time, neo-moralism tries to reduce the excesses of capitalism based on consumption and blends with traditional moralizing elements, as many of them are consistent with corresponding conservative principles such as security idolatry, emphasis on restraint and moderation, based on the precautionary principle, outlined by philosophers of the nineteenth and twentieth centuries (Furedi, 2006).

This new manifestation of individualism followed deregulation in the 1980s, in order to reduce State intervention to not hinder the capital flows in global markets and stock exchanges: privatization of state enterprises; loosening of fixed employment contracts; increased supply of short-term jobs, low-paid in service sectors; loss of social security benefits; replacement of operational professionals by computer software; expulsion of active individuals for long-term unemployment, retirement or even delinquency (Türcke, 2010).

The social phenomenon translated into the precautionary principle has led equally to the development of a philosophy of care, built on a history of prudence, which reveals, at first, the dominance of the responsibility paradigm. A healthy lifestyle overall demand prevention. Even abstinence modalities can be considered as supposedly responsible defense from standards and rules against potential vices/additions caused by modern life consumption.

In the field of health individualism, individuals are constantly focused on issues related to their own ontological security and are compelled to follow self-care recommendations, adopt virtuous healthy

behaviors, consuming products and preventive arrangements as a formula for the desired long-lived vitality, minimizing malaise manifestations from precarious aspects of current lifestyles. Finally, to conclude, it is important to emphasize that there is a reason in seeking to speak the truth in terms of parrésia, even if it is not based on empirical evidence. For these, as we have seen, occupy a position of indifference as to its responsibilities in terms of the moral implications of the dynamics of its social use.

In fact, we have a task in the moral sphere, namely, acting in pursuit of other ethical and political commitments that deviate from the utilitarian perspective of the supposedly autonomous and rational agents, with the right to decide and choose their own benefits before the stipulated costs – only within possibilities greatly reduced and estranged from emancipatory dimensions. In this sense, it appears as a contribution to address the dynamics of power relations in society, which model the relationships that arise in the context of personal and collective health practices that interact with the subjective dimensions of individuals.

There is a need for critical analysis of the oppressors modes produced by cynical rationality that naturalize and sustain the demand for addressing the subjective modes of subjection. It appears, for example, in the use of healthy food seals of approval by scientific societies in many processed foods."Health care, through these paths, is reduced to an ideal of freedom from disease, food treated for disease avoidance and human life subject to standards set by technical experts" (Villagelim et al., 2012). Thus, it legitimizes and regulates food as medicine in a cynically institutionalized way by experts. It is important to pay attention to games of interest and power and resist the moralistic treatment of health risks through restrictive normativity of promoting healthy food as an exaggerated idea of sociocultural weight control.

Enhancement technologies

This text is about enhancement technologies (HETs) and its function of mainly selling the possibility (real or virtual) to maintain and provide both youthful appearance and longevity with vitality to humans.

Firstly, it is important to define our way of addressing this theme. For this, we must refer to the bioethicist Elliott (2003) in its consideration of these technologies illustrated by issues related to the prosaic man's cane. Does it becomes, in a sense, part of the blind person? Yes or no? If so, how? The attempt to produce answers to these questions can generate perplexity, because it will inevitably depend on what we mean by that person. If by person we mean human body, the answer will have to characterize whether the cane is seen as a body extension or a kind of prosthesis with an important orientation role in a predominantly organized world for the huge majority that can see.

However, if person (we could think of the notion of subject, but it is not our intention to address psychoanalytic considerations) implies any idea that can try to decipher the question "Who am I?" through identity approaches, we can assume that one of these ideas would be via the construction of an idea of self. So, in brief terms, one way to formulate the question may signal that in the late-modern Western world the idea of oneself can be explained by not overlapping exactly the ideas of body, mind and even spirit (it is not worth mentioning here where this issue can lead us), but it is linked to all of these ideas.

According to Elliott (2003), the notion of yourself, besides other aspects, constitutes a moral concept, a nuclear place where feelings like pride and shame manifest. Despite the possible controversies of this explanation, it serves to set that the expression 'enhancement technologies' indicates the possibility that it appears to be morally important for such technologies the fact that they are allegedly used to "self-improvement".

However, this is unsatisfactory in analytical terms. Discussing what would be self-improvement seems to distract us from essential issues. The focus here is the need for improvement to people, because it affects something crucial for vectors that act on repeated construction, always incomplete, of their notions of themselves. As Elliott says, when preferring to deal with the idea of self than of self-improvement to think about the enhancement technologies, it is: "[...] because our ambivalence about many HETs is often an ambivalence about the types of people we want to be. The question is not whether there is any moral cost in the pursuit of

becoming better, but if there is any moral cost in the pursuit of becoming different" (Ibid., p. 27).

To Crawford (2006), in a culture that gives so much value to health, people are defined, in part, by the success or failure to commit to healthy behaviors. This links to alleged character and virtue structures to which is attributed the ability to sustain such behaviors. The ways usually considered to obtain health and the conditions considered salutary are predicates that configure the idea of oneself and become building blocks of modern identity, acting in the moral field of modern societies.

On the other hand, Bauman (2005) expands the treatment of this issue, indicating that some people can choose how to build their identity, but some people do not, as in the plot of Elysium, because the possibility to choose also constitutes a powerful element in social stratification. At one end of these processes, are located those that can establish and abolish their identities, according to what they wish on a broad menu of options. At the other end, are those who had refused access to the possibility of choice and consumption through their identities, since they do not meet the socio-economic requirements for this benefit. Their identities are defined elsewhere, determined by others. "[...] – Identities that they themselves resent, but are not allowed to leave neither of which can get rid of. Identities that stereotype, humiliate, dehumanize, stigmatize [...]" (Ibid., p. 44).

The promotion of expanded health

The expression "promotion of expanded health" intentionally plays with an ambiguity of meaning. On the one hand, it serves to designate the health promotion strategies – based mainly to avoid risks and form a corresponding identity, usually based on the "Holy Trinity": diet, physical activity and avoiding tobacco use (Nettleton, 1997). These recommendations were legitimated, established, widespread and currently adopted (at least partially or considered as an issue) by large groups of people globally. In addition, they are supported by a progressive expansion of a sense

of hyper prevention in health through medical, epidemiological, communication/media speeches in the last three decades (Castiel; Sanz-Valero; Vasconcelos-Silva, 2011). One of the clearest emblems of this expansion can be seen in the widespread increase in public restrictions on smoking practices and in the divulged expansion of health and longevity conditions for those who can follow sustainably the ideas of self-care in health.

On the other hand, the idea of expansion is related to a photographic metaphor of magnifying images to highlight and notice details that escape the usual dimensions in photographic development. In this case, it means moving out of the scope of the evidence of dominant enunciation and trying to understand the evidence of its possible political and ideological joints.

Broom (2008) points to the unintended consequences of primary prevention project. Undeniably, such a project can be described favorably, with good prospects in establishing its cost/benefit or effectiveness. In the case of a critical perspective, we will discuss briefly four questionable features of this project:

- Its focus on the individual and the corresponding behavioral risk factors. Even when it generates positive effects, there are three issues: blaming the victim, that failure to adopt a healthy lifestyle (and reach the right measures); erasing structural factors – political, urban, socio-economic, ethnic and gender differences –; intensifying compulsive surveillance: the responsibility to be constantly alert to yourself and others – about the "Holy Trinity" already mentioned: what to eat, exercising routinely, avoid smoking, etc. As Broom says,

> [...] the default option of the individual as the author of its own destiny is constantly restored. A comprehensive public policy interested in practical interventions and 'modifiable' factors becomes a self-fulfilling prophecy; we bring it into play and, in the end, only investigate and act on factors that have been defined as modifiable. Elements of policy, culture and social structure are seen as being outside the scope of public policy or disappear or are presented in a sentence or two (2008, p. 131).

- The evidence-based perspective: there are limitations to reach guaranteed protocols by employing meta-analysis and systematic reviews used in clinical and hospital settings to community context (the focus is individualistic). In addition, there are studies that show the bias power of pharmaceutical corporations to generate alleged evidence for the efficacy of new drugs produced (Dumit, 2012; Elliott, 2010);
- The practice of medicalization or, more specifically, preventive therapeuticalization: for example, obesity, sedentary lifestyle, prediabetes, prehypertension and hypercholesterolemia as risk situations that usually require treatment;
- Links with neoliberalism, the commodification and consumerism: the valuation of the individual is a central element in sustainable neo-liberalism; the redefinition of the citizen as a consumer and the ascendancy of privatization and commodification have created circumstances in which health problems (and its prevention) become issues surrounding market defined by power corporations, biotechnology, pharmaceuticals and HETs, etc. "Paradoxically, the convergence of commercialization and individualism may have the effect of allowing the appropriation of the discourse of individual rights by private biotechnology and pharmaceutical corporations who are quite ready to put human rights on the market" (Broom, 2008, p. 134).

There is also the matter of health promotion/prevention having to review collective benefits against the risks of individuals. What are the justifications to intervene collectively to protect people who are not also at risk (and may not want to be protected)? The health prevention/promotion closes a matter of apparent consent (implicitly) massively informed, based on risks and choices of adopting self-care measures (Dumit, 2012).

In other words, decisions that require persuasion informed through massive recommendations capable of stimulating individuals, so that each one should self-care, self-control, not lose self-esteem and maintain self-confidence, even if not necessarily to benefit from current campaigns to reduce hypertension, heart disease, cancer, etc.

According to Crawford (2006), we must consider that there seems to be a conservative perspective in the field of health promotion and prevention: moral authorities recommend the fundamental importance of self-discipline. Moralism and survival arise in conjunction with this self-discipline; a discipline to fulfill moral precepts and for the pursuit of self-interest – chasing after your dream to become self-sufficient and successful according to the prevailing social values. For this, it is important to be good, that is, disciplined, avoiding or knowing how to deal with risky things, with temperance and a utilitarian managerial sense, evaluating life in terms of ends and means.

Therefore, individuals want to maintain their existence, facing the many demands of life by managing responsibly – at their own risk, fostering the possibility of minimizing the effects of aging and achieving longevity with vitality. Health is allegorically established in parallel with the cultural contradictions of capitalism: it consists of narratives and practices through which people struggle, seek to make sense to and strive to achieve a balance between conflicting imperatives: pleasure and moderation.

The anti-aging enhancement technologies

A typology of sciences/practices related to the aging control was proposed and adapted from Vincent (2007). In schematic terms, it is important to consider that there may be areas of overlap between the categories:

1) Cosmetics (symptoms relief) – a) cosmetic practices: Botox, plastic surgery, anti-wrinkle creams, etc.; b) prophylactic regimens: diet, exercise, healthy lifestyles; c) compensatory techniques: drugs for erectile dysfunction, growth hormone;
2) Medical (healing) – a) regenerative medicine: therapy with stem cells; b) clinical interventions for specific aging diseases (cancer, arthritis, heart disease); c) medical therapies based on change of lifestyle: diets and exercises directed to degenerative aging diseases;
3) Biological (prevention) – a) epidemiological research: populations of centenarians and genes; b) evolutionary modeling:

discover and overcome the evolutionary limits of life duration; c) science of cellular processes and its respective aging; d) genomic science: mapping and gene sequencing to verify genetic processes responsible for aging, allowing the development of gene therapies that can slow, stop or reverse aging processes;

4) Immortalist (elimination) – redemptive goal of medicine for definitive improvement – achieve immortality: a) through substances and devices allegedly able to extend longevity, including cryogenic chambers; b) scientific programs for biological and/or cybernetic immortality.

Vincent (2007) considers that, in general, groups of professionals use war metaphors, declare a war against advanced age and show aging within a cultural perspective that sees it as a naturalized biological event that needs to be attacked and defeated. There are experts that: 1) claim their technical capacity to address such phenomena by proposing and practicing cosmetic interventions to remove and mitigate signs of aging in order to stigmatize it as undesirable and unpleasant; 2) turn advanced age into a disease and fight it; 3) propose to strategically meet cellular and molecular processes related to aging in order to expand lifetime limits; 4) intended to make immortality possible. Groups 1 and 4 employ more war allegories to describe its function, while groups 2 and 3 camouflage the paradox of the purpose of understanding the diseases of the elderly, supporting the goal of expanding life and, at the same time, avoid dealing with the moral dilemmas of that extension.

What each one of us is willing to do to live longer?

This question may seem simple and, in a way, it is, because it fails to consider, in brief terms, several important contextual elements that affect health beyond the access to available HETs and the importance of personal responsibility that currently prevails in the contexts of health promotion and longevity, where the focus is predominantly individual. However, even then, with these safeguards, we will continue, because this

is the path that is presented to us from the perspective of the dominant personal responsibility for self-treatment in health.

It is important now to analyze the context of the formulation of the question and its authorship. It was formulated by Taubes (2011), a journalist specialized in science, in a commemorative text of the 30th anniversary of Discover magazine –which shows the categorical statement on the cover that had passed 30 years that changed everything (1980-2010). Taubes was a writer in this journal during part of that period. Another story proposed a more general question to various exponents of the field of science and technology:"To where we go from here?".

Taubes is also known, among other things, by a book that criticizes diets (*Good Calories, Bad Calories: Fats, Carbs, and the Controversial Science of Diet and Health*, 2007) and an article entitled *Epidemiology faces its limits*, published by the prestigious journal Science in 1995. In the article, Taubes, co-author along with Charles Mann, already examined the main difficulties of epidemiological research to affirm, among other things, that the control of lifestyle and environmental factors justified the anxiety that the prescriptions of healthy self-care caused (Taubes; Mann, 1995).

Of course, since then, epidemiological studies give signals, due to the range of published studies, meta-analyzes and systematic reviews conducted, that they have accumulated *evidence* seeking to substantiate the relevance of a *healthy lifestyle* in *promoting* individual *health* (we here use the consecrated expressions in italics) even if an adverse effect of this is the expansion of moralistic speeches on health and also anxiety facing difficulties to follow and maintain the prescriptions of a healthy lifestyle.

Taubes (2011) focuses on the possibilities of increased longevity and asks about the goal of the three-digit age. More than that? Forever? Or maybe something more reasonable according to the outlook of our time: a possible feasibly life period (for those who have access to technological advances), according to the age group considered, depending on today's youth and thus of probably how to achieve such benefits as to longevity that would be forthcoming in a near future.

So, before you answer the question that opens this section, it is also necessary to imagine, symptomatically, in tune with utilitarian times, a possible imaginary analysis of"sacrifice-benefit"as to what you are willing

to do to get extra years. Or, following an analogy with videogames, what to do to earn more "life".

Therefore, we must be willing to follow the preventive catechism of healthy lifestyles in terms of diet, weight control, exercise, moderate use of alcohol and safe sex practices, among others, trying whenever possible (or, if possible, always) to be guided by self-discipline/self-control. And, when appropriate, using recommended drugs, for example, to control hypercholesterolemia or other existing panacea that promise longevity (such as resveratrol, coenzyme Q10 or sirtuin enzymes), even after their real effectiveness has been discussed in some studies (Taubes, 2011).

The longevity perspective

Several studies, works and authors are dedicated to this theme. Considering the purpose of an assay like this, it is not appropriate to make a systematic review or anything similar, but to go over a few things in search for elements that may even play the role of indications that perhaps may be configured as symptoms or manifestations of the spirit of our time.

Within the biological category of Vincent's HETs (2007), it is important to consider the question of decoding the genes responsible for longevity that would be inherited and their relationships with certain aspects of lifestyle, diet and what is often referred to as environment. There are studies on centenarians' clusters indicating that a large number of people would have groups of genes that serve for this purpose.

For example, in *The Longevity Genes Project* (2015) at the Albert Einstein College of Medicine, Dr. Nir Barzilai and his team conducted genetic research in more than 500 healthy elderly between 95 and 112 years and their children. According to the group's website, identification of longevity genes by researchers can lead to new treatments with drugs that can help people live longer, lead healthier lives and prevent or significantly delay disease related to aging, such as Alzheimer's disease, type 2 diabetes and cardiovascular disease.

By the way, Barzilai was interviewed for Taubes (2011) in the story previously reported and mentions that when the project began recruiting

centenarians, they realized they had a family history of longevity. However, there was no evidence among them of the predominance of a healthy lifestyle: only 2% were vegetarians, no one exercised regularly and 30% were overweight or obese in the 1950s, when there was not a lot of people overweight or obese. Almost 30% had smoked two cigarettes packets for over 40 years.

However, after that, let's say, curiosity, soon we got the message that for us, others, smoking cigarettes will not stop killing us prematurely and not getting regular exercise will not make us live longer...

Another group studying centenarians, which started in 1995 – The New England Centenarian Study (2012) – describes their recent findings in studies published in 2012. Among others: a) many genes are involved in the centennial longevity; b) they found 281 genetic markers growing on prediction in terms of accuracy, respectively, 61%, 73% and 85% for centenarians of 100, 102 and 105 years, suggesting, according to researchers, that the genetic component of superlongevity becomes progressively higher among older people; these markers indicate at least 130 genes that act in Alzheimer's disease, diabetes, cancers, hypertension and biological mechanisms of aging; c) centenarians have genetic variants that are associated with high risk for the referred diseases, as for the population, but their survival advantage is due to the existence of genetic variants associated with longevity; d) people have genetic profiles based on these 281 markers (each having three variations, which are in turn associated with specific probabilities of achieving a very advanced age) (Sebastiani et al., 2012).

There is also the compression of morbidity theory in supercentenarians (over 110 years of age), which appears to have been tested in a sample of 100 supercentenarians, when it was possible to investigate that people who approach the limit of human survival (110-125 years) really compress their morbidity around the end of their lives (Andersen et al., 2002).

It is also important to consider the complex relationship between epigenetics and longevity, in which one must take into account the emergence of epigenetic influence on the discovery that genes do not handle causality in phylogenetic nor ontogenetic terms. Epigenetics is fast becom-

ing a crucial dimension of aging and longevity. It is important to clearly define what is meant by epigenetic

> [...] The study of the mechanisms that lead to 'persistent' developmental changes in the activities of the genes and their effects, but that do not involve altered sequences of DNA bases. An important epigenetic component is the 'epigenetic inheritance', the transmission of phenotypic variation that is not from differences in the sequences of DNA bases from one generation of cells to the next (Jablonka; Lamm, 2011, p. 19).

Those who are centenarians retard epigenetic changes and could pass on this preservation capacity to their descendants, due to methylation processes (a form of epigenesis).

Of course, the message about extragenetic factors is repeated, especially those assigned to healthy lifestyles, which should slow the development of diseases related to aging and therefore change the health and the life duration of the population. To fully understand the desirable phenotypes of healthy aging and longevity, it seems to be necessary to examine the entire genome of large numbers of healthy older people to observe at the same time, both common alleles as rare ones, with careful stratification control and taking into account nongenetic factors such as the environment (or, in other words, what constitutes the context of life) (Fight Aging, 2013).

However, for Taubes (2011) it would be more reasonable, not the goal of centenary, but the goal that corresponds to the period of healthy life. More than suffering from heart disease or cancer at our 50s or 60s and therefore requiring expensive treatments and drugs to survive up to 75 years, "[...] we will age more slowly. We will still be affected by such chronic diseases, but 10 or 20 years later, shortening the time of hospitalization, nursing homes, home health care and the money that we and society as a whole have to spend on medical care" (p. 4). Taubes, without specifying, supports the utilitarian rationality of dominant cost-benefit for the goal of healthy aging – as long as possible. Apart from the differences, it is reasonable to think that we are in the theoretical perspective

of compression of morbidity proposal for another 10 or 20 years ahead, mentioned previously in the discussion of genetic aspects of centenarity.

The Immortalist perspective

According to Hall (2003), you can see that in recent decades, medical science lined up to face the "problem" of aging (and its terrible side effect, death) in a substantially different way in relation to any era of the history of medical interventions. Current efforts to extend life by medicine are impressive. Hyperbolically, doctors can, in certain circumstances, be designated as merchants of immortality.

Now we can cogitate that aging now exists as a separate phenomenon, degenerative, which, as one tries to know it better, naturally, we want to see if it is possible to fix the process and repel the laws of mortality. The civilization in the forms of preventive medicine, public health and hygiene, vaccination and other measures, including HETs, increased lifetime. It does not seem absurd to say that aging is an artifact of civilization.

At this point, the text goes through ways where we begin to live with the feeling that the scientific statute starts to unsettle facing futurological and marketing claims that arise. An illustration of this review can be assumed by the already known controversy about the scientific legitimacy of the practices called antiaging medicine.

Sometimes, we risk transiting through peculiar narratives, eventually focusing on elements that can border fantasy and/or caricature. Among the options available in the immortalist market, to assume this perspective, we chose to start with a hi-tech design, symptomatically called Avatar, by a Russian media entrepreneur – Dimitry Itskov, who offered in 2012 a kind of cybernetic immortality to billionaires who agree to have their brains transplanted to robots –, a scene with elements already marked by at least an exotic blend of entrepreneurship and science fiction with elements of farce, delirium and/or opportunism. The entrepreneur would have hired 30 scientists to make the project viable in ten years and sent letters offering the opportunity to participate as lenders to billionaires, according to Forbes magazine list (Daily Mail, 2014).

This perspective has affinity with another project, much more widespread and whose applicant enjoys a status possibly less conducive to incisive interpretations. We are talking about Raymond Kurzweil (RK) – American author, inventor, futurist, and currently, engineering director at Google company. It is difficult to synthesize information on RK. There are several portals, publications, inventions, videos, books, articles, multimedia, and blog. He is involved in fields such as optical character recognition, text synthesis to speech, text recognition technology and even electronic keyboards. His books talk about health, futurology, artificial intelligence, technological singularity (a topic to which we will return) (Kurzweiltech, 2014).

Interestingly, in the context that interests us, RK is also a prolific author in the field of HETs directed to longevity before becoming an immortalist, according to Vincent classification (2007), cited previously. He wrote books on diet and nutrition. Among them, *The 10% Solution for a Healthy Life: How to Reduce Fat in Your Diet and Eliminate Virtually All Risk of Heart Disease* (Kurzweil, 1994), in which he argues that high levels of fat are the cause of many health problems in the United States and to cut the total calories consumed to 10% of current's level would be the best index for most people; *Fantastic Voyage: Live Long Enough to Live Forever* (Kurzweil; Grossman, 2004), co-authored with doctor Terry Grossman, describes discoveries in the areas of genomics, biotechnology and nanotechnology that can allow us to live longer; *Transcend: Nine Steps to Living Well Forever* (Kurzweil; Grossman, 2009), also co-authored with Grossman, features a development of the previous book, with a program based on thousands of scientific studies, which shows that advances in medicine and technology will allow us to extend our life expectancy and delay the aging process – in fact, there is a portal of both authors that sells products for this purpose (Ray and Terry's Longevity Products, 2014).

However, the immortalist proposal is in the book *The Singularity is Near: When Humans Transcend Biology* (Kurzweil, 2005), which was turned into a film that mixes documentary and fiction produced and co-directed by RK in 2010. The idea of uniqueness employed consists in a math metaphor to study space black holes, space-time region in which the known laws of physics cease to exist.

The technological singularity is a term coined by Vernon Vinge – mathematician and science fiction writer. It would be a future period (around 2045) during which the speed of technological change is so fast and its impact so profound that human life will be irreversibly transformed by concepts that we will trust to give new meaning to our lives, from business models to human life cycle, including death itself. We will have effective software models of human intelligence, able to combine the advantages of human intelligence (inference, creativity and imagination) with the advantages of machine intelligence (memory, speed, accuracy, absence of tiredness).

We will be able to redo all the organs and systems in our biological bodies and brains to be vastly more capable. The so-called emotional intelligence will be expanded and controlled by nonbiological intelligence. Some of our emotional responses will be modulated by nonbiological intelligence to optimize our intelligence in the context of our fragile and limited biological bodies. As the virtual reality of the nervous system manifests in terms of resolution and reliability, our experiences will increasingly occur in virtual environments. In virtual reality, we can be a different person both physically and emotionally.

This process will continue until the nonbiological intelligence expands and reaches patterns of energy and matter for optimized computing – based on our understanding of computational physics. When we reach this limit, the intelligence of our civilization will continue expanding to the rest of the universe, until you reach the maximum speed at which information can move. Finally, the whole universe will be occupied with our intelligence. We will determine our own destiny and not the physical forces that govern the celestial mechanics. Of course, this is a very controversial proposal, which generated debates about its feasibility – viewable on the internet. However, there is no room nor is it our purpose to deepen this particular discussion.

Another emblematic immortalist character is the British gerontologist Aubrey de Grey, living in the USA. His enterprise also has several portals, text, video, etc. In fact, belongs to him, similarly to RK, the comment: personal marketing is the soul of business. Physically, either by coincidence or not, Grey's long beard make him look like a descendant

of Methuselah. Actually, one of his portals is the Methuselah Foundation. There we have a summary of his proposal for regenerative medicine as "the future of health care, promising cures for everything from heart disease to diabetes, dramatically reducing costs and extending healthy life. But it needs public investment and coordination to mature" (Methuselah Foundation, 2015).

His idea of regenerative medicine is in another portal: called SENS Research Foundation. SENS is the acronym for Strategies for Engineered Negligible Senescence. Next, is his formula to reach such an achievement, when dealing with the seven types of aging damage: cell loss or slow replacement of cells (Parkinson); cellular excess/senescence: cells that do not divide nor die, producing harmful secretions; accumulation of mutations in chromosomes causing cancer; mutations in mitochondria that can accelerate aging; indigestible molecules (cellular waste) produced by molecular processes within cells (atherosclerosis, neurodegenerative disease); indigestible molecules (extracellular junk): protein remains (Alzheimer's); accumulation of crosslinking extracellular protein: cells which are held together by new chemical bonds; when in excess, produce loss of elasticity (arteriosclerosis, presbyopia) (SENS Research Foundation, 2014). There is also, of course, on the internet, criticism to Grey's proposals, but is not our job to analyze these aspects.

Final comments

There are some possibilities of Foucault's analytic treatment to the issues presented. For example, to cogitate the biopolitics dimension of self-care and regulation based on governmentality manifesting in an enhanced form. However, it is also possible to move forward to aggregate and adapt Zizek's comment to indicate that the blurring of the boundaries between machine and organism is based on the fact that the dynamics of capitalism today would have overcome the logic of totalizing normality and adopted the logic the erratic excess (Zournazi; Massumi, 2002). The more diverse and more erratic, more convenient, since normality started to weaken and the regularities become less strict. This context is part of the

capitalist logic of surplus value production. It is not about the institutional disciplinary power (sovereign) to establish the natural order of things. It is the power of global capitalism to produce goods and niche markets that has developed and proliferated in this way (Ibid.), but also at the same time it increased the precarious field for symbolic roads that existed to address human finitude, the market takes care to offer a coveted consumer object of desire: the added longevity to be afforded by HETs.

On the other hand, within the reflections on biopolitics technologies of prevention, preemptive is a term used in specific ways in Portuguese, but apparently there is greater amplitude in English, to even be considered a paradigm – preemptive paradigm (Diprose, 2008). In short, it is the intervention that occurs before the action could hinder plans or actions of that person that needs to anticipate the action of another and act-reacting to what is assumed he assumes to be detrimental – in short, a preemptive strike. It is a strategic concept on the military/competitive environment, considerably likely to be affected by adverse reactions that result from errors of judgment.

It is used, for example, in military aggressive strategies (the Iraq invasion, the preventive attack on the alleged weapons of mass destruction) or even in the marketing between competing companies/corporations. However, the verb preemption indicates, above all,"a priori appropriation of something, the right to purchase something before others, the government's right to appropriate something (as a property)" (One Look Dictionary Search, 2014). Preemption in Portuguese has equivalent terms: precedence in purchasing; advance purchase; in computer science: in a multitasking environment, an action or event that causes change when processing from one application to another (Houaiss, 2009).

There was also a specialized use in preemptive analgesia (but not only for preventive diagnostics/therapies using other drugs/interventions) in dentistry, medicine and veterinary medicine, meaning, in short, something like eliminating the problem before it arises or give evidence of that, nor giving a problem the opportunity to even arise. (Dejean et al, 2008; Liporaci-Junior, 2012). Undeniably, we are in the territory of anticipatory interventions, consistent with the scope of securitization of our time – a

relatively trivial example: the morning-after pill, prevention of pregnancy due to unsafe sex.

Regarding the HETs of longevity and immortality, the two meanings are opportune, both preemption, as possible precedence of a few when accessing them over others, as preemptive, in war metaphors of preemptive strike on war on aging (Vincent, 2007).

One of the problems of this model is that, instead of facing a health-threatening event as part of the context, its occurrence is magnified as standardized reference to threatening situations to health/safety of living populations. This idea is also extrapolated to economic security. If we add that to a perspective of fear management (or risks), this way of thinking leads to a dynamics of harm reduction policies (and aging as a damage) through technical control measures for health/security, aiming to protect the planet, nations, groups and individuals from the unpredictability of future – without a minimum and reasonably consensual diagnosis (if that is feasible) of what the present is (Diprose, 2008).

In other words, this impossibility of success of hyperprevention proposals (promotion, protection, prevention, precaution and preemption) aiming longevity is linked to the notion of future securitization, within a conception of a certain future imagined by the regulation of all aspects of modern life. In a way, it turns the present a hostage of an idea of future. How to know what the future holds, even when health futurologists ensure high relative probabilities to the scenarios they view (avoiding terms of high mythological content, as oracles and prophecies)?

Well, there will always be a lack of information and knowledge that will stop from overcoming the scenario of uncertainty and risk. It does not matter how detailed, accurate, and rigorous data collecting is, we cannot assume that it will have sufficient data, which risk calculations are satisfactory for future policies of risk management. We remain deciding on risks from elements that include suspicion, arbitrariness, precautionary excesses and preemptive abuses facing possible threats (Stockdale, 2013).

Baudrillard (2002) produces reflections on what he calls the reality murder and perfect crime, especially opportune in relation to Kurzweil's proposals. The reality murder means, for Baudrillard, a displacement of the origin, end, past and future, continuity and rationality. What we live is a

virtual world in which the referent disappeared, the subject and its object. This current state was only possible thanks to a perfect crime, which is precisely the one that destroys not only the victim but also any evidence that the crime was committed. The sentence of this whole process is still quite enigmatic. Even if all paths point to the significant virtualization of the world or to its radical illusion caused by rampant technological development, one cannot draw a safe end.

Concerns about longevity and immortality are symptoms of primal fear of death as manifestations of the spirit of this time that serves the commodification of that fear. According to Bauman (2008), possible strategies for dealing with the knowledge of finitude are: building bridges between life and death through the promise of eternal life of the soul; daily staging the deaths of strangers (trivialization), loss of close people (with a range of affective bonds) and the metaphorical death by loving separation; shift the focus of attention for the surveillance and control of death causes (risk).

In addition to the non-rational formulas of heavenly life (by merit, through the immortal soul), stay for posterity (individual fame) could be achieved by heroic acts recognized as such. Now, there are moral tales indicating that technoscientific reason and the market may postpone suffering and death or even save us. The fragility of human bonds accentuates a lack of protection facing of death. Death is deconstructed, in tune with the spirit of modernity by factorization and constant vigilance in pursuit of integral risk prevention. This mission fails a priori before its limits – especially after emphasizing the perspective of individual responsibility and the dimension of unpredictability –; does not sound feasible nor possible to prevent every risk that can threaten us, perhaps not even most of them.

A final word about the HETs. It can be said that modern era began with the compulsory pursuit of happiness – with a status of right, duty and higher purpose for those who can afford it. We then have the pursuit of happiness as personal self-satisfaction in an exercise that links individualism and global capitalism. Markets change the dream of happiness as a state of satisfactory life to the endless search for the means to achieve a happy life that always seems to be ahead. The game for the pursuit of happiness is to run, not to get there.

In a society of consumers, we will be happy as long as the hope to be happy is not lost, but the pursuit of happiness is competitive. It is the paradox of a society that sets for all a standard that most cannot reach. Most people seek happiness where they cannot find it.

For Elliott (2003), the ultimate happiness is the human dream of permanence, infinite longevity, eternity of the human being. Suffering and unhappiness become problems of brain chemistry – self-satisfaction: individual psychological well-being. It is life as a project of planning and managing life that maps, organize, choose and compare it with other projects in the pursuit of a happiness that demands individual responsibility. The HETs act as tools supposedly to produce a better design, more successful, long-lived and, if possible, immortal, according to the prevailing context of sustainable neoliberalism. The pursuit of happiness becomes a strange kind of duty that demands HETs to ensure that life produce reasons for maximized self-satisfaction. Even better, with the possibility of a long-lived life as eternal as possible... Too bad the life – what a brief life – of those who usually stay out.

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