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A multitude of natural, social and individual time

TP van Tienoven
Vrije Universiteit Brussel, Belgium

Abstract

Elias' essay on time is often interpreted both as a critique on the juxtaposition of natural time and social time as well as a plea for a triadic conception of time in which natural time and social time both provide the 'materials' for individual choices of time. Such an interpretation implies that there exists a multitude of natural, social and individual times. First, this contribution searches literature on the sociology of time for practical approaches to natural and social temporal structures and argues how they have been at interplay in the changing collective and individual experience of time. Second, given that time is neither solely a self-evident natural phenomenon nor solely a coercive individual transcending characteristic of society, this contribution argues that the multitude of individual times is to be found in the way individuals draw on these natural and social temporal structures for the practices that make up daily life. Third, since large part of these practices is motivated by individuals' necessity for a sense of order in the continuity of daily life, this contribution furthermore argues that individual times present themselves as daily routines. These daily routines, then, can be formulated in terms of (a combination of) the rigidity of duration, timing, tempo and sequence of these practices constrained and enabled by natural and social temporal structures.

Keywords

Social time, natural time, individual time, daily routine, time-use survey

Corresponding author:
TP van Tienoven, Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium.
Email: t.p.van.tienoven@vub.be

Introduction

The most fascinating and at the same time most problematic attribute of time is that it spans all scientific disciplines. Time is fascinating because it is at the base of almost every ordering principle from nature to daily social life. In nature of the seven base units of the international system, time (i.e. the second) relates to the metre, candela and ampere. In daily life, time is used for orientation, temporal ordering and social structure. Time orientation relates to the time horizons or future perspectives of individuals based on their dependence on social conditions on the one hand and perception of the past on the other. Temporal ordering and social structures arise from the normative establishment of social temporal norms and are expressed in the way time is reckoned, timetables are constructed, and control and synchronization of time is dealt with (Bergmann, 1992).

Problematic in this is that the conceptualization of time has become part of the opposition of natural, exact sciences on the one hand, and social sciences on the other. Adam (1988) identifies three conventional ideas of time in (social) science that are grounded in the distinction between nature and society. Firstly, time t being invariant, infinitely divisible, expressed as a number, and measurable in length represents the idea of nature existing of invariant relations that are quantifiably. This contrasts the idea of societies existing of relations that change based on knowledge and thus are 'qualifiable' (Sorokin and Merton, 1937). Secondly, the idea of nature as being predictable because its regularities are timeless contrasts the idea of society as fundamentally historical and organized around values and norms (Elias, 1992). Thirdly, in essence, all time is social, because time always depends on the meaning of time (Wagn, 1976) and only humans use time to control and synchronize their lives (Moore, 1963).

One of the criticizers of this dichotomous conceptualization is Elias (1992) who states that natural time and social time are not oppositions, but that the former is needed to express the latter. Moreover, the use of both natural time and social time converge in individual time or, in the words of Tabboni, individual time is 'built on a choice which uses the material made available by existing social and natural times' (Tabboni, 2001: 20). Although Tabboni poses this statement when discussing time in the work of Elias, it seems that she forgoes on three important implications of her statement. Firstly, that natural time and social time are generic concepts for an underlying multitude of times. Secondly, that natural and social time coexist, constraining and enabling choices for individual time and thus are not part of a scientific dualism. Thirdly, that individuals have a choice to make regarding their use of time and thus not merely comply to social times (e.g. collective rhythms) and natural times (e.g. day-night cycles).

This contribution aims at addressing these implications by, firstly, searching the literature on the sociology of time for practical approaches to multitude of natural and social time. Secondly, by outlining how the changes in the experience of time have always been interplay of natural and social temporal structures, using the work of Elias. Thirdly, by arguing how individual choices of time can be recognized and how these choices can be conceptualized as individual routines, using the work of Zerubavel and some conceptual ideas of the early work of Giddens.

A multitude of natural times

Natural time in everyday life seems nothing more than a designation of the hands of the clock being as much directional as constraining for the activities making up this life. Any further inquiry to the to the concept of natural time in human thought is highly likely to move into a metaphysical discussion on the representation of reality on the one hand and the creation of time on the other hand. The former draws on the ancient dispute between the Greek school of becoming and the Greek school of being, between the existentialistic question whether reality is a constant flux or whether reality is permanent (Benjamin, 1981). The latter draws on the dispute between Newton and Leibniz. In the early modern era, Newton was convinced of an absolute time in nature, a uniform time that flows independently of all that goes on in the world and could be measured by moments of absolute time that still exist in their own right. Leibniz argued that Newton's 'moments' are abstract concepts, whereas moments are in fact classes or sets of simultaneous events and that these events are more fundamental in a philosophy of time than are moments. Leibniz advocates the idea that nothing happens without there being a reason why it should be so rather than otherwise and hence derives time from events and not the other way around (Withrow, 2003 [1975]).

Both discussions converge in a dispute in the contemporary era between Bergson and Bachelard. Bergson relates the conceptions of time with the two dispositions of the conscious: the instinct and the intellect. For the instinct, time is identical with the continuity of inner life, with the succession of conscious states, with a flow not implying a thing to flow. Since this inner time is equal for everyone, these inner times form a whole which he terms pure duration or real time and concludes that this time, that is, time that endures, is not measurable, simply because measurement implies division and superimposition and 'we cannot superimpose successive durations [. . .]; by hypothesis, the one no longer exists when the other appears' (Bergson, 2002: 208). It is impossible to delineate our states of consciousness as distinct elements in a succession. The other conception of time is the

unfolded time (as opposed to the former unfolding time). This is the time that is created when analysing duration by intellect, because it can only be done so by breaking down true durations to portions of durations or instants. These instants are no more than single snapshots that are not connected; it is either this one or any other, no before or after, no succession and thus no time. From this idea, Bergson derives what he calls spatialized time, which concurs with mathematical time. This is how mathematicians use time since they are occupied with the measurement of things and not with their nature. Spatialized time is thus used as a symbol to catch static views of a continuous changing world, of true duration. The idea that time is measured through the intermediary of motion or that time is expressed in terms of space is proved by the way the simplest words used to describe spatial relations are used for temporal relations as well (e.g. at the door vs. at noon, within prison vs. within a year) (Deutscher, 2006).

Bachelard then argues that a single true duration does not exist nor does it flow continuous. In fact, there are multiple durations of unequal length since every human, everything, every appearance, has its own duration and the only flux that exists is 'the nothingness' between all these durations (Bachelard, 1950). Any duration can only be experienced through instants, through discontinuities, and that time is, thus, an infinite succession of these isolated instants. It is humans that connect discrete instants creating cohesion or continuity between moments. This means that there are voids between these instants and that explains why some memories are forgotten – they are simply no longer connected to contemporary life because no one 'keeps these memories alive' – and others are not (see Huijer, 2012).

In this discussion, time is considered linear, infinite and unidirectional. However, the second law of thermodynamics refutes this infiniteness since it predicts the heat death of the universe. In an isolated system, there will be an increase in the degeneracy of energy (i.e. entropy) and since entropy is finite, motion (or change) in the universe will cease at the time maximum entropy is reached. This point is called the heat death of the universe since heat is a form in which energy can get the highest entropy, hence, all energy will be converted to heat.

Likewise, time cannot be linear because an isolated system with limited space will, after an adequate long time, return to their initial state. The period of elapsed time until recurrence is the Poincaré recurrence time. Poincaré was not the only philosopher concerned with the idea of recurrence. Nietzsche had the same idea of 'eternal return' (Dauer, 1975). Like Poincaré, Nietzsche also viewed the universe as a definite quantity of energy and a definite quantity of energy-centres, concluding that the universe goes through a calculable number of combinations. In a finite time, at some point every possible combination would be attained and the universe

repeats itself. In fact, even in Hellenistic times there was already a strong believe in a restoration of the universe, or as Nemesius, fourth bishop of Emesa puts it (cited in Withrow, 2003 [1975]: 7):

> The Stoics say that when the planets return, at certain fixed periods of time, to the same relative positions which they had at the beginning, when the cosmos was first constituted, this produces the conflagration and destruction of everything which exists. Then again the cosmos is restored anew in a precisely similar arrangement as before. The stars again move in their orbits, each performing its revolution in the former period, without variation.
>
> [. . .]
>
> Socrates and Plato and each individual man will live again, with the same friends and fellow-citizens. They will go through the same experiences and the same activities. Every city and village and field will be restored, just as it was. And this restoration of the universe takes place not once, but over and over again – indeed to all eternity without end.

From the above and partially in line with the approaches to time in physics relevant for the social theory of Adam (1988), a multitude of natural times can be derived that might serve as the material for choices of individual times and understanding the experience of time over history. Firstly, time is a *measure of quantity* as formulated by Newton and penetrated in daily life by the clock, although Adam (1988) justly mentioned that Newtonian time and clock time are not synonymous since Newtonian time is in principle reversible whereas clock time is not because of the irreversible juxtaposition of the numbers that count seconds, minutes, and hours. Secondly, time is *directional* and *finite* as formulated by the Second Law of Thermodynamics and Poincaré and Nietzsche, although in Christian daily life narrated by the biblical story of Creation, the coming of Christ, His Incarnation, and the Last Judgment. Thirdly, time is *linear* and *cyclical*, although not as opposites but in co-existence and each with its own function. The individual life might be argued to resemble a line, starting with birth and ending with death being one unique lifetime, whereas the collective life might be argued to resemble a cycle because with every birth another lifecycle starts (Young, 1988). Hence, the cyclical keeps things the same by reproducing the past and the linear makes things different by introducing novelty (Young and Ziman, 1971). The linear perception of time is derived from the idea of a string of historical events of irreversible order that can be placed on a line with, at least in western societies, its origin coinciding with the birth of Christ. Yet there are also events that are non-historical in a sense

that they repeat themselves (e.g. one's birthday, the Olympic Games). The experience of recurrence feeds the perception of time as a circle, as a closed period between two equal events. It is this circular, 'non-historical' conception of time that underlies the way we structure our daily life (Zerubavel, 1985) and it is the linear, 'historical' conception of time (i.e. the year) that keeps continue counting and thus makes every date or time unique. This makes the linear and the cyclical not mutually exclusive but supplementary.

In fact, fourthly, the linear can only be measured by the cyclical and for that purpose a *multitude of cycles* exists to measure both natural, fundamental as well as social concepts. What is more, some of the same linear concepts are measured by different cycles. The natural length of the day can be measured as the rotation of the earth around is axis in relation to the sun (i.e. the synodic day) or in relation to distant stars (i.e. the sidereal day). Likewise, a new-born's age is first measured in hours, followed by days, weeks, months and years (Young, 1988). Therewithal, not all cultures start counting age after birth let alone use the elements of the Gregorian calendar. Some Asian cultures count the age of girls in number of full moons after conception and traditional Chinese age reckoning starts at one and not at zero. Still other linear temporal concepts simply are not measured well by cyclical concepts. The invention of the metronome based on Christiaan Huygen's pendulum probably added even more 'vagueness' to the Italian terms of tempo for music scores than *adagio, andante, allegro* and the like were already surrounded with (Garfield, 2016). Apparently, some passing of time exists only in experience or conventions that cannot be measured by natural times.

A multitude of social times

At the opposite of time derived from nature, is the idea that time – like language – is a characteristic of society that 'could not abandon [this characteristic] to the free choice of the individual without abandoning itself' (Durkheim, 1965 [1912]: 10). This idea of social time is rooted in the Durkheimian notion of time as a social fact or a category of the intellect. For Durkheim, these categories had their grounds in religion and since religion was a social construction any intellectual category had its origin in society. In the case of time, this means that the concept of time is an impersonal set of indispensable guidelines for daily life that transcend the individual. 'It is not my time that is thus arranged; it is time in general, such as it is objectively thought by everybody in a single civilisation' (Durkheim, 1965 [1912]: 10). Time, thus, is a collective analogy sprung from daily life but at the same time the structuring mechanism hereof.

According to Tabboni (2001), this Durkheimian notion of social time dominated social sciences and thus focus was kept at the collective times and socio-temporal structures. At some point, this is true. Social time for Sorokin and Merton (1937) remained defined as expressing the change or movement of social phenomena in terms of other social phenomena taken as points of reference. Social life of the group, then, is reflected in these time expressions. Whenever these time expressions become generalized, they can serve as mechanism for the coordination of daily life (Elchardus, 1985; Schöps, 1980) because 'a homogeneity of social beats and pulsations of activity makes unnecessary astronomical frames of reference' (Sorokin and Merton, 1937: 619). This also gives social time its intersubjective characteristic which is crucial for meaningful coordination of daily acting simply because otherwise expectations are not possible (Lewis and Weigert, 1981). Eventually, the use of astronomical observations for temporal coordination – the 'time Esperanto' (Sorokin and Merton, 1937) – has been forced upon mankind by these social times because local systems of social time were not able to interact with societies that had other systems of social time.

The mentioning of the rise of 'time Esperanto' might be interpreted as an attempted to explain or demonstrate the interplay of natural and social time. Such an attempt is, for example, also encountered in the anthropological study of Hall (1981 [1959]) describing the alternative use of formal time (i.e. day, week, hour) and informal time (i.e. soon, later, forever). Likewise, Melbin (1978) argues that daytime and night-time not only represent a natural opposition but also a social one in the sense that the same activity gets a different meaning depending on the time it is conducted.

Even the trichotomy of individual, social and natural time is found sociological literature. Weigert (1981), for example, distinguishes between 'self time' that is unique, 'interaction time' that is intersubjectively shared, and 'cyclic time' that is the rhythmic structure of human behaviour (i.e. day, week, hour) and in concurrence herewith, Adam (1995) defines 'my time', 'our time' and 'other time'. However, although any of these definitions of time remain in concurrence with the co-existence of individual, social and natural time, they desist from conceptualizing the multitude of times within each level.

The existence of a multitude of social times is probably best found in the work on temporal dimension of social organization of Zerubavel (1976, 1977, 1979a, 1980, 1982a, 1982b, 1985). Especially in his work on hidden rhythms, Zerubavel (1982b) not only argues that the organization of social life is subjected to temporal rigidities of the social or institutionalized, normative and (techno)logical dimensions, but also that these temporal rigidities – within all dimensions – present themselves in different forms: rigidity of duration, of tempo, of timing and of sequences. There are examples

abound: compulsory education is a form institutionalized rigidity of duration, Christian holidays is a form of institutionalized rigidity of tempo, condemnation of teenage pregnancy is a form of normative rigidity of timing, working, living together, marrying and having children as the ideal life course is a form of normative rigidity of sequence.

The co-existence of different *forms of rigidities* of both the institutionalized and normative dimensions can be interpreted as the multitude of social times. In the same way, the distinction between *private time* and *public time*, as an expression of the way in which the boundaries between the private and public sphere have become temporal and the indispensability of time in regulating someone's social accessibility, can be interpreted as 'times' within social time (Zerubavel, 1979b).

A multitude of individual times

It cannot be denied that time serves as a means for orientation, but what is lacking in the metaphysical narrative to which the discussion of the concept of time is often reduced, is the idea that the human experience of time has changed over the past and keeps changing. The fallacy that is made here consists in that time is regarded as a Kantian a priori synthesis, the idea that man is naturally endowed to form a concept of time. Elias (1992) illustrates this fallacy in a very simple manner: today time is a concept of high abstraction, whereas in the early days, time was a concept of low or specified abstraction (e.g. agricultural life was determined by the seasons, daily life by the rising and the setting of the sun). In societies that are regulated so drastically by this abstract time, people often seem to forget that they had to learn time and consider time as self-evident.

However, Elias is not only criticizing the physical or natural notion of time as a set of invariant variables grounded in the exact sciences. In fact, Elias criticizes the use of dichotomous categories in science of which the dualistic conception of time is one. Therefore, his criticism is also aimed at the Durkheimian notion of social time as an individual transcending construct of society.

If defining time is nothing more than creating a relation between an almost unchangeable physical continuum and a rapidly changing social continuum, the dualism between natural and social time, according to Elias, is a consequence of mathematizing time to a real, invariable unit to, for example, define the laws of nature of this physical continuum. This makes social time, as the coordinator of events in the social continuum, look like an arbitrary arrangement that seems to exist independently from individuals. The fact that social time depends on the mutual dependence of mankind – according to Elias defining time serves the

purpose of coordination and integration – creates the false impression that because social time is not dependent of any individual, it is also not dependent of mankind as such (Elias, 1992).

In his endeavour to get rid of the permeation of dichotomous thought in social theory, Elias argues that natural, individual and social time are not in opposition. Natural time and social time constrain and/or enable the choice of individual time and without both, it would be impossible to understand how the experience and representation of time changes in the course of history (Tabboni, 2001).

Changes in experience of time

According to Elias, the civilization process is central to the change in the experience or representation of time. These changes or 'time revolutions' might be argued to have taken place in line with transitions of societies from hunter-gatherer to agricultural to industrial and to post-industrial or information societies.

From hunter-gatherer to agricultural societies. In early societies time reckoning was passive and based on human physiological needs: eating when hungry, sleeping when tired. With the rise of agriculture, time reckoning becomes active: sowing before the rain. Nonetheless, time was still in hands of gods or priests who search for omens based on impersonal signs of time. This was also the way to find the 'right' time for rites, offers and other cultic activities (Hall, 1981 [1959]). Although the priest became replaced by the seasons to determine the time for sowing, harvesting, slaughtering of livestock and so on (Laeyendecker and Veerman, 2003), time reckoning remained a monopoly of the church. The main difference was that time reckoning in agrarian cultures was cyclical and of little accuracy whereas time reckoning in Christian thought was linear, unidirectional and finite (i.e. it last until the Last Judgement) (Russel, 1981). Given this finiteness and the biblical advice to 'pray without ceasing' (1 Thess. 5:17), timekeeping in Christian thought was sophisticated and had its heydays with the 'horarium' of the Rules of Saint Benedict (Verheyen, 1949; Zerubavel, 1980).

From the 12th century, agriculture became more productive which led to an increasing demand for tools created by craftsmen and an overproduction that fuelled trade. This economic boom created a money economy and a whole new profession: merchants. With trade occurring over larger and larger distances, measuring time became of major importance. Transportation time and length of time spent by craftsmen became a determinant of product prices and the duration of a loan became a determinant of interest to be raised. From now on, it was not only the monasteries that

were in need for an accurate measure of time (and space). 'For the merchant, as the natural environment gave way to the technological environment, so a new time was superimposed upon the old: where, before, time had been unforeseeable, for ever beginning again, now it became measurable, took on a direction, and could be foreseen' (Le Goff, 1970: 159). The increasing complexity of urban life demanded for temporal structures as well: signalling the opening and closing of city gates, signalling the beginning and ending of market days and calling for political or guild meetings. The limited variation of different signals bells on church towers or belfries could give, resulted in the beginning of the 14th century in the appearance of dials on these towers (Cipolla, 1978; Laeyendecker and Veerman, 2003). Thus, time as a unique property of God now became a property of humans. Glennie and Thrift (1996), though, argue not to overestimate this tendency, because the weekly rhythm with Sunday rest and the Gregorian calendar with its Christian 'holy-days' remained (and remains) of great importance for the organization of daily life.

Nonetheless, to calibrate or adjust these new clocks, the sun served as a 'master clock' for the simple reason that it was universally available (anyone almost anywhere on earth could see it), that it was reliable (there is no foreseeable possibility that it would stop), and that it was stable (sunset and sunrise could be predicted at any part of the globe). However, there are two pitfalls of using the sun to determine local time. Firstly, clocks had the Babylonian time format as a basis. The Babylonians were known to have had a time format that existed of 12 months of 30 natural days each. Every natural day first existed of 12 double-hours and later of 12 hours for the day and 12 hours for the night. The problem, though, was that, if one lets the days begin at sunrise and the nights at sunset, the 12 hours of the day endured much longer than those of the night in summer and vice versa in winter. Secondly, because sunrise does not occur simultaneously visible all over the earth, clocks were set ahead of one and another; the further one travels to the west and thus did local times differ. In the United States, a distance of 60 km results in a time difference of 3 minutes (Jespersen and Fitz-Randolph, 1977; Laeyendecker and Veerman, 2003).

However, this was not such a great issue in the still largely present agrarian society, but with the up rise of a widening trade network, merchants already began to face some troubles. These troubles not necessarily related to absolute time difference because of shifting sunrise, but to navigation at sea. Nonetheless, both are inextricably linked. Navigation at sea relied on two coordinates: longitude and latitude. Latitude could be told form reading the position of the sun at midday (on the southern hemisphere) or the height of the polar star (on the northern hemisphere) because the earth was treated as a perfect sphere with 90 degrees' angles between the equator and

either pole. Measuring longitude was theoretically a simple task. The circumference of the earth is 360 degrees and if divided in 24 segments or hours each hour represents 15 degrees of longitude. So, knowing home time and local time at sea allowed one to calculate one's longitude. The problem, however, was that back in the 17th century there was no accurate clock that could withstand the rolling and pitching of a ship and the large changes in temperature and, hence, reading time at night or without a visible sun was impossible. What became known as the longitudinal problem was eventually solved by Harrison with the invention of a pocket-watch like clock (Betts, 2006).[1]

From agricultural to industrial societies. Up until this point, each centre of human activity sets their clocks according to the midday sun where they were. With the rise of the industrial societies and increased global migration and trade, communicating longitudes at sea based on different home times became increasingly inconvenient let alone without a vertical, equator-like reference line. The latter was solved by setting the Prime Meridian in Greenwich (a result of British dominance on the world seas at that time) representing zero degrees of longitude. Whereas setting a reference for longitude at sea happened 'easily', setting a reference line for time was of different order. Nonetheless, the problem of local time differences became more and more tangent with the increase in the railway systems (and telecommunication networks) both in the United States and Europe. The improvement of railways and telecommunication led to annoying situations because local or apparent solar time differed from place to place and so standardization of time was the preferred solution. Led by the initiative of Sir Stanford Fleming, the Washington Prime Meridian Conference of 1884 decided on standard time (Blaise, 2002; Fleming, 1876). Even though the choice for the UK's Prime Meridian was a foregone conclusion, the conference became a feat of high diplomacy. Whoever would have the Prime Meridian running through their country would be at the centre of time and ensured of worldly economic and political power. That is why France resisted fiercely during the conference and that is why in Great Britain some Eurosceptics still use this argument.[2] So this standardization of time involved much more than some imaginary lines on a globe and an agreement of which one of these lines is set equal to zero. To quote sociologist Eviatar Zerubavel (1982c: 3):

> [Standardisation] presupposes the convertibility of subjective formulations of the duration of events and of their location in time into a standard time language, into terms which have the same meaning for others as they do for their user. Standardising temporal reference presupposes a standard

> system of units of time, which enables different people to measure the passage of time in an identical manner, and a standard time-reckoning and dating framework, which allows them to date any past, present, or future instant in a common fashion.

Or, in the words of Elias, if time attempts to capture or fixate events in a continuous flow of events, this fixation became expressed with increasing generalization and high abstraction moving away from the context or manifestation in which it was initially set up. Clocks are needed to represent this high abstraction of time and although clocks are not being 'time' themselves, this feeds the myth that time is self-existent and available to be measured by humans. This has to do with the tendency to use words that make movements to tangible things (i.e. Elias' idea of 'process-reduction' (1978: 112)) and the same happened with time, time became reified (Elias, 1992; see also Cipriani, 2013).

The (need for) standardization of time and the experienced idea of process-reduction of time decoupled lived time more and more from local rhythms and natural cycles and changed people's notion of time. Typically, the notion of time in agrarian societies (i.e. the experience of time had been closely related to natural cycles) had its orientation towards tasks, whereby tasks disclose themselves by the logic of need. Time is perceived more humanly than abstract, there is the least demarcation between work and social life, and it fuels an attitude towards labour that is wasteful and lacking urgency (Thompson, 1967). Large part of the change in the experience of time had to do with the shift form task-oriented labour to timed labour. Thompson 'blames' the industrialization for the change in the perception of time and work-discipline. The industrial revolution demanded a greater synchronization of labour and hence a greater awareness of clock time. Task oriented labour became timed labour and the change in language for the course of time is exemplary here: time does not pass anymore, but time is spent, as if it were a currency. Tayloristic and Fordistic production lines were characterized by the timing of tasks and the principle of doing it 'right the first time' (Garfield, 2016). Time became the next source of competitive advantage, with 'just in time' management (JiT) as the ultimate competitive strategy (Stalk, 1988). This tendency made Marx and Engels conclude that 'man is nothing; he is at most the carcase of time' (1976: 127) or Weber (1958 [1904–1905]), in his Protestant Ethic, that time is scarce, whereas in fact 'it is [only] man's mortality that makes time the ultimate scarce resource' (Moore, 1963: 88).

From industrial to information societies. The provisional final change in the experience of time happened when technology started to control

time and thus determines the tempo and interval of other social relationships (e.g. dinner is no longer served when the food is ready, but at 7 p.m.) and even one's personality (e.g. counting the number of hours slept) (Cottrel, 1939). The first thing in the morning everyone does when they wake up, is checking the time to 'tell us not only where we stand vis-à-vis the rest of the day, but also how to respond' and from that moment 'the clock calls the shots' (Honoré, 2005: 19). Technological progress and acceleration reducing the time needed for a number actions (e.g. transport, communication, . . .) somehow never reduced the pace of life. According to Rosa (2014) this paradox leads to a contraction of the present which causes an increased experience of time pressure. Indeed, digital technologies with at its current peak the proliferation of internet connected mobile devices not only speed up everyday life (Wajcman, 2008, 2015), but also blur the boundaries between different spheres of life through constant availability (Wajcman et al., 2008). This will (once again) change the organization of work and managers' view on productivity because they (once again) save time and might create an information advantage (Bittman et al., 2009; Ulferts et al., 2013). The experience of time as an acceleration of the pace of life presses people to respond to the social change around them. They are 'enforced by the fear of losing out in the light of the speed and flexibility demands of the social and economic world' (Rosa, 2003: 18). This latest experience of time paves way for a new form of inequality: those who can keep up with the pace and those who cannot. The reduced flexibility of women who still are bound to regular, routine schedules relating to childcare, housework and other caring responsibilities, might again put women in a disadvantaged position (Wajcman, 2008).

Choices of individual time

The changes in the experience of time in relation to the transitions of societies prove that time is neither self-evident in the sense that it is given to us by nature to measure movement, nor solely a coercive social fact or characteristic of society independent of its individual members. The latter implies that dealing with individual choices of time means theoretically stepping aside from the determinism of structuralist or functionalist approaches towards daily use of time of the members of a society. In fact, according to Elias, individual times might be considered as a characteristic of the practices through which competent agents reproduce temporal structures or social times. In turn, social times (and natural times) are the presuppositions under which these practices occur. Or, in Giddens' wordings, time is a duality of structure or the modality that links individual practices to socio-temporal structures. The outcome,

that is, the way individuals spend their time, then is an emanation of structuration.

Not many scholars have tried to come up with a vocabulary of a multitude of individual times, that is, times that can be considered as choices or grounded in motivations of interests given the presuppositions of multitudes of social and natural times. In her study on patients in the closed system of a rehabilitation centre, Calkins (1970) defines different usages of time based on different interests and practices that follow from the believe in succeeding in rehabilitation. Patients that do activities with the believe of leaving the rehabilitation centre are *passing time* and are in contrast with the *waiting time* of those who do not believe in successful rehabilitation and *killing time* of those with indecision of how to spend time. Based on practices, Calkins further defines *doing time*, the time patients must wait outside their own choice, *making time*, an opportunistic approach to activities (for those who have passing time) and *filling time*, an indifferent approach to activities (for those who have waiting time).

Elchardus (1983) defines time based on the meaning people attribute to their actions. He distinguishes between *social time, time for physiological gratification, time for personal gratification* and *meaningless time*. Social time, that refers to the claims others (i.e. persons, groups, institutions) make on individuals, is than further subdivided into *obligatory time*, motivated from legal obligations (like contracts), *instrumental time*, used as means to an end, *time for social alliance*, motivated to maintain relations with others, and *dutiful time*, motivated by duty. The meaning of these times stems from actions motivated from the avoidance of sanctions and these sanctions are grounded in the four-sanction paradigm from Parsons (see Glorieux, 1993). Inducement as a positive situational sanction concurs with instrumental time, deterrence as a negative situational sanction with obligatory time, persuasion as a positive intentional sanction with time for social alliance, and activation or commitments as a negative intentional sanction with dutiful time (Glorieux, 1993). Even though this demonstrates how meaningful action (or choices for individual time) arises within the structures of social time, this motivated action is externally and compulsively controlled and aimed at avoiding utilitarian and moral sanctions. Giddens (1976) yet argues that attachment to moral ideals does not arise from social coercion but lies at the origin of purposive action.

For completeness, it is worth mentioning that there are also scholars that attempted to overcome the issue of natural and social temporal structures and individual uses of time altogether by using different grounds to conceptualize time. Gurvitch (1963), for example, defines his social times based on the gradation of discontinuity and continuity of social activity. Every social activity has its own time ranging from time of 'long duration', which

is extremely continuous, through 'deceptive time', 'time of irregular cycles between appearance and disappearance', 'cyclical time', 'time remaining by itself', 'time alternating between advance and backwardness', 'time in advance of itself', to 'explosive time', which is extremely discontinuous. As societies try to control these times, they construct a hierarchy of times from which social structure arises. Cipriani (2013), in turn, grounds the 'many faces of social time' in a hierarchical linear perspective only. Using economic language, he defines 'micro time', as moments in life, 'meso time', as a series of moments (i.e. a life course), 'macro time', spanning multiple series of moments (i.e. generations), and 'mega time', the overarching time running from the Big Bang on.

Daily routines

Apart from seeing individual times as the outcome of the interplay of (socio-)temporal structures and individual needs for social interaction, there is yet another conceptual idea in Giddens' early work that allows for a conceptualization of individual times. According to Giddens (1984), social interaction is motivated by the necessity for 'ontological security' that arises from a need for a 'sense of trust'. This ontological security is derived from a common culture that is the result of the collective way in which actors use semantic and moral rules in their interaction (in which they reproduce semantic and moral structures). Within this interaction, knowledge on the interpretation schemes and norms that mediate between interaction and structure are assumed to be self-evident, which makes ontological security routinely grounded. The production of social interaction presents itself thus as day-to-day routine practices or routine uses of time. Individual or group routines thus are the result of temporally structuring the day, the week, the year, …, within natural and social temporal orders in a way that it creates stability and predictability for daily conduct.

Both the natural temporal cyclicity (e.g. the night-day cycle, seasons) and the social temporal cyclicity (e.g. the weeks, collective rhythms, customs and traditions) are essential for the experience of stability and sameness in everyday life (Weigert, 1981). Within these temporal structures agents construct routine uses of time like individual choices of time bearing on the materials of natural and social times as assumed by Tabboni (2001) based on the work of Elias (1992) and outlined in the above.

Despite Giddens (1976) aversion of organizing social sciences in line with natural sciences (and especially biology) the idea of individual routines underlies the attempt of Young and Ziman (1971) to come up with terminology for chronosociology based on the terminology of chronobiology

(see also Young and Schuller, 1988). Although the nomenclature has not made it into sociology of time, from their idea it is only a small step to realize that the same parameters of time (i.e. duration, timing, tempo and sequence) that are used to formulate the rigidity of social and natural time as with Zerubavel (1982b), also might be used to formulate the rigidity of individual time or, in other words, daily routines. Defining the different aspects of daily routines of human behaviour then gives the following:

a) *routine of duration*, that is when doing an activity, always doing it for the same duration (e.g. when sporting, always for an hour);
b) *routine of timing*, that is when doing an activity, always doing it at the same time (e.g. when getting out of bed, always at 7 a.m.);
c) *routine of tempo*, that is doing an activity with a fixed rate of recurrence (e.g. reading the newspaper every day);
d) *routine of sequence*, that is always have one activity followed by the other (e.g. after getting out of bed, always taking a shower).

Daily activities can either be part of a single routine or a combination of two or more routines. One might, for example, go sporting every Tuesday and Thursday (i.e. routine of tempo), always after work (i.e. routine of sequence) and always for an hour (i.e. routine of duration), but since the end of the working day varies, not always at the same time.

It is important to note that daily routines as individual times result from adjusting individual practices and socio-temporal structures. Daily routines are the result of a process of structuration and the degree to which individual times or daily routines concur with collective rhythms or socio-temporal structures might thus vary. Daily routines are not assigned rational characteristics that allow increasing skills, diminishing fatigue, focussing attention to the unpredictable, and economizing memory (Gershuny, 2000; Young, 1988). Nor should daily routines be equated with habits or sequences of simple, automated behaviour (James, 1950 [1890]) that are entrained 'whenever a similar set of circumstances is encountered, regardless the time of day or year' (Birchall, 1988: 175). Daily routines, as individual choices of time resulting in daily order and the continuation hereof in everyday life, in all its manifestations are a tangible and measurable element of the reproduction of daily social life and when studied allow to link temporal structuration to temporal structures.

Conclusion

Tabboni's (2001) analysis of Elias' critique on the dualism of natural and social time ended with a presumption that individual choices of time have

to exist. These choices bear on different (characteristics of) natural and social times. This presumption implied that (1) a multitude of natural and social time exists, that (2) natural and social time coexist as a set of constraints and possibilities that (3) allow for individuals to make choices in their use of time. This contribution demonstrated that literature on the sociology of time and social theories contain valid reasons for these presumptions to hold. Firstly, the multitude of natural times entails the abstract characteristics of time, its measurable quality, its direction, and its linearity and cyclicity in all its variations. The multitude of social times entails normative and institutionalized socio-temporal structures practically best conceptualized by Zerubavel (1982b) as the rigidities of the elements of time (i.e. duration, tempo, timing, sequence) and constraint by normative, institutionalized and (techno)logical dimensions.

Secondly, following Elias' (1992) critique of the dichotomous categorization of concepts in science, the history of the experience of time clearly demonstrated that natural time and social time were always both 'at work' during major changes in the experience of time. At low levels of abstraction, seasons were important for agricultural life, but at the same time priests search for omens to predict 'right' times for social activities like rites. At high levels of abstraction clock time (as being natural mathematized time) is important for, for example, transport, but at the same time started to dominate and put pressure on social life.

Thirdly, Elias (1992) blames the development of social science by the example of natural science for coming up with the idea of social time as a law that seems to be independent of mankind. Like Giddens, Elias argues that traditional social sciences searched for social laws that capture the stability of a social continuum in the same way that natural laws captured the physical continuum. As natural time is the invariable unit that defines these natural laws, one thus falsely assumes social time to be the invariable unit that defines social laws. In other words, people forget that social constructs like time actually exist dependent of mankind and as a result experience social time in the same way they experience natural laws like gravity. Elias thereby breaks with the idea that social temporal structure exists independent of individuals, but supposes a tripartite interaction with natural times and social times providing the conditions for establishing individual times (Tabboni, 2001). These individual times are motivated by individuals' necessity for a sense of order in continuity in daily life and that is order presents itself in the form of day-to-day routine. As a result and by large, these daily routines will follow socio-temporal structures, but the conceptual difference with for example Durkheim's structuralism is that Elias and Giddens argue that individual times *draw* on socio-temporal

(and natural temporal) structures but are not *determined* by these (law-like) structures.

If the scholarly sociological literature on individual choices of time is scarce, this surely holds for sociological literature on routines. In his classic account on the 'matter of habits' Camic argues how and why routine (often equated with habits) has disappeared from sociology and redefines habit as 'a more or less self-actuating disposition or tendency to engage in a previously adopted or acquired form of action' (1986: 1044) that represents a continuum that runs from simple to complex forms of action that are being repeated. The automatic, unconscious behaviours, then, are at the lower end of this continuum. At a middle point Camic situates habits as actions or social conducts that in certain circumstances are 'selected' based on a reflexive process, like individual routines. The upper end of the habit continuum contains habits that are 'durable and generalized dispositions that suffuses a person's action throughout an entire domain of life, or in the extreme instance, throughout all of life – in which case the term comes to mean the whole manner, turn, cast, or mould of the personality' (Camic, 1986: 1046). Even though Camic explicitly states that the middle- and high-end part of the habit continuum might be of relevance for social scientists because it involves patterns of social conduct, routine uses of time as conceptualized here above remain underrepresented in empirical social research.

There is a simple reason for that. Routines are often taken for granted and might be overlooked as a result of the 'law of the disappearing cycle' (i.e. the more taken for granted, the less one is aware of it) (Young, 1988). According to Giddens, though, agents are not less aware of their routines, but are not used to (and not asked to) articulate their behaviour in propositional terms (e.g. I did this because of that and that reason). Daily routines are part of a shared knowledge on how to move through different situations in social life. Moreover, in interaction in social life an actor assumes that other competent actors share this knowledge and supposes that these other actors know that he or she assumes this. The ability to know what one has to know to interact in social life is part of the practical consciousness and consists of knowledge that actors cannot necessarily articulate, but nevertheless is understood. Hence, it logically follows that it is difficult to empirically assess this knowledge. After all, actors are not used to or might not be able to articulate. Up to now, Giddens' call 'that the study of practical consciousness must be incorporated in research work' and his promising statement that 'it would be an error to suppose that non-discursive components of consciousness are necessarily more difficult to study empirically than the discursive' (Giddens, 1984: xxx) find little resonance in the sociological empirics.

Much empirical research relies on interviews or survey questionnaire but especially in the case of studying day-to-day routines or behaviour in general these methods seem inadequate. If people have trouble recalling their day-to-day behaviour because they are not used to account for things like daily routines, then *observing* what people do seems much more appropriate than *asking* what they do. These observational data do exists and in today's world even more than before: big data. Big data are traces of the activities of everyday life and might reveal how we (unconsciousness) temporally structure the day (e.g. clocking at work), the week (e.g. checking in at the gym, use of loyalty card a grocery store), the month (e.g. payments like wages, mortgages, insurances), the year (e.g. online bookings of holidays) (Van Tienoven et al., 2013).

The problem with big data is that they are often restricted to a single activity of daily life and lack contextual information to understand the meaning of the activity. A sounder and scientifically approved way to capture daily life in an (more) objective way would be an activity-based registration method. Such a method is time diary research, in which people chronologically – often for at least 24 hours – register their activities by providing beginning and ending times, secondary activities, presence of others, location, and, depending on the research design, other contextual information like the meaning of activities. Currently, the use of time diaries is assumed to give the most reliable results of capturing (part of) the non-discursive components of daily human behaviour, but the length of the observation window is crucial to make any assessment of the continuity of order in daily social life as derived from individual routines (Van Tienoven et al., 2017). If restricted to days or maybe even weeks, these data remain merely snapshots of daily life, whereas the structural properties of social systems are stabilized over time (and space).

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Notes

1. Already in 1675 King Charles II appointed astronomer John Flamsteed, the first astronomer to work in the Royal Observatory, to find a way to navigate at sea. This theme became even more pressing when a disaster at sea in 1707 killed over

2000 people. On the 2nd of November 1707, a fleet of 15 ships entered the English Channel and were thought to sail safely west of Ushant. However, bad weather and no accurate means to calculate their longitude, made the fleet sail straight into the rocky Isles of Scilly and four ships were lost. This drama made the Board of Longitude of the British Government award a price of £20,000 (about 2.4 million Euro in today's money) for a solution to the problem. Their condition: timekeeping needed to have an accuracy of 2.8 seconds a day (Betts, 2006). The longitude problem, as it became known, was eventually solved by John Harrison who developed a series of marine chronometers also known as the H1 to H5 sea clocks that, after a herculean restoration done by R.T. Gould, are at display in the National Maritime Museum in Greenwich. When Harrison started this challenge, the only precision timekeepers were pendulum clocks. By itself, pendulum clocks were already a marvellous invention of the Dutch mathematician, physician, astronomer and inventor Christiaan Huygens around 1656. Before the development of the pendulum clock, timekeepers relied on natural 'frequencies' of heavenly bodies like the sundial or often inaccurate and finite mechanisms like clepsydra's (water clocks) or hourglasses. The free-swinging pendulum, however, provided countable swings that could keep track of time, and with the invention of the escapement – a mechanism that, at each swing, softly pushes the pendulum like a child's swing is kept in motion by someone pushing – could be kept in regular motion (Andrewes, 2012; Jespersen and Fitz-Randolph, 1977). Although it improved timekeeping significantly, back at sea there is no need to say that having a pendulum clock on a rolling and pitching ship, its metal parts expanding and contracting with temperature changes and sprayed with salt water, will not tell time correctly. Harrison's main concern therefore was to develop a clock that remained horizontal at all times, which he solved with a 'cage roller bearing' that became the predecessor of the caged ball bearing used in many machines up to now. He also came up with a bimetal construction to adjust for expansion and contraction of materials due to fluctuations in temperature. (A construction that is still used in, for example, thermostats.) His first three sea clocks were large and heavy (H3 was 59 centimetres in height and weighted 43 kilograms including its case that should protect it against the salt water) and not accurate enough due to flaws in the oscillator (the part that regulates the speed at which the timekeeper operates). In 1753, he then realized that small timepieces with small, high frequency oscillators, are much more stable, and, thus, his H4 (which won him half of the price money) and his H5 (which won him the rest of the price money) looked more like pocket-watches, but did solve the longitude problem (Betts, 2006). Accurate navigation at sea was now possible.

2. The initiation of the 'world standard time' was as much work – though of a different kind – as solving the longitudinal problem, which converges in the story of Sir Stanford Fleming (1827–1915), the Time Lord who proved to be the protagonist and initiator of standard time (Blaise, 2002). It was a matter of politics that culminated in the Prime Meridian Conference in 1884 in Washington when 19 of the 25 'civilized' countries that were invited by president Arthur met to settle the issue of 'world standard time'. Nonetheless, the outcome was already

known since the American railroads already used the Greenwich prime meridian for their 'railroad time' and threatened with a strike if chosen otherwise. All countries had already resigned to this except for one that would resist the Greenwich meridian until the end. It was the country that had his astronomical tradition, proud history, and dignity bound up to the *ligne sacré*, the Paris Meridian: France. The Washington conference became a feat of high diplomacy (or an amusing soap opera). The first trouble started with the French translations of all documents in which an unfortunate English naval officer used words like 'the common prime', which angered the French. Next the French rejected the motion that the conference had the executive powers and can only nominate, resulting in a vote that made all countries implicitly accepting the conference's objectives. Although defeated at this point, the French avowedly state that they 'will never agree to emblazon on her charts "degrees west or east of Greenwich!"' (Blaise, 2002: 204). The French did not give up and demanded a 'neutral' prime meridian. This was initially what Fleming suggested in his paper: an 'anti-prime' 180 degrees opposite of the Greenwich meridian (Fleming, 1876). What he did not thought of was that this implied that the date line would run through England and split the country in two days. The argument against the French demand for a neutral meridian was that once one defines neutrality, it loses its neutral nature. Even the French metre is not neutral simply because all measurements are de-neutralized by the properties of the measurer. In the end, the conference shifted to more pragmatic arguments stating that neutrality may or may not exist, but practicality does. This lit the fuse. The French were clearly irritated and refused to partake in a solution in which convenience is 'the advantage to yourselves [...] of having nothing to change, in either your maps, customs, or traditions' (Blaise, 2002: 206). In the end, the French abstained from voting and kept promise: Greenwich Mean Time (GMT) never appeared on any French chart (Smith, 1976). They use 'Paris mean time, retarded by nine minutes, twenty-one seconds'. Ironically, in 1967 France becomes the home of the *Temps Universel Coordonné* (Universal Coordinated Time – UTC), which has replaced GMT almost everywhere except ... in Great Britain.

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