



Longing for tomorrow: phenomenology, cognitive psychology, and the methodological bases of exploring time experience in depression

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Abstract

The subjective experience of time in depression has been described to be altered in complex ways, with sensations of particular slowness, delay or stillness being the most often named articulations. However, the attempts to provide empirical evidence to the phenomenon of “time slowing down in depression” have resulted in inconsistent findings. In consequence, the overall claim that depressive time somehow differs from ordinary time has often been discarded as unfounded. The article argues against such conclusion, contending that the described ambiguity might be caused by the methods employed to assess the phenomenon under observation. In the first part of the article, a reconceptualization of the experience of time in depression is proposed on the grounds of classic and contemporary phenomenological psychiatry. This leads to identify the essential features of depressive time as described both in clinical and philosophical contexts. In the second part, a critique of the existing methods of time perception assessment is conducted, with a specific focus on duration estimation and time passage perception tasks. The above-mentioned core features serve as guidelines in discussing to what degree such methods fit the phenomenon at stake. Finally, an alternative and innovative method is put forward, that might not only help to explore the scope of existing methods but might itself present an alternative to such: the micro-phenomenological interview.

Keywords Depression · Time experience · Duration estimation · Time passage perception · Phenomenological psychiatry · Micro-phenomenology

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1 Introduction

Temporal distortions in people suffering from depression have long been observed in psychiatric practice. Research into this topic dates back to the first half of the last century, when pioneering works within the field of phenomenological psychiatry first addressed the issue of time experience in several mental disorders (Straus 1928; Minkowski 1970). These first studies stressed that time is *lived*, i.e. arising from our precognitive orientation towards the future and existentially shaping our subjective experience.

Frequently, depressed time in these accounts is characterized by feelings of slowness, delay or stillness arising from a lack of such future orientation. Contemporary reports and accounts tend to confirm this conceptualization, while introducing and stratifying the essential role of the environment for the individual processes described (Fuchs 2001, 2013; Ratcliffe 2012, 2015). Particularly, depressive time is regarded in these studies as *enworlded*, i.e. as emerging from the interactions between individuals and their environment, and it is often connected to sensations of subjective desynchronization (rather than a plain reduction of the perceived speed of time).

With the rise and increasing success of empirical methods of research, these and similar theoretical assumptions have started being put to test experimentally (e.g. Mezey and Cohen 1961; Wyrick and Wyrick 1977; Kitamura and Kumar 1982; Münzel et al. 1988; Sévigny et al. 2003; Mahlberg et al. 2008; Oberfeld et al. 2014; Mioni et al. 2016). Within this context, the variety of alterations characterizing the experience of time in depressed patients has again rapidly been gathered under the functional yet much simplified notion that time “slows down” in depression, a hypothesis apparently easy to be verified by duration estimation or time passage perception tasks. Strikingly, the resulting empirical findings are far from being unanimous or compelling. In a recent meta-analysis, Thönes and Oberfeld (2015) pointed out that the available data on time perception in depression are inconclusive, if not contradictory. In consequence, the idea of a radically peculiar temporal experience characterizing depression has often been discarded as a commonplace belief that has failed the test of rigorous empirical validation.

The aim of the present article is to challenge this skeptical view. Depressive time, it will be claimed, might not only be indeed different from ordinary time, but its deviative character might also be empirically captured and specified if the procedures employed to do so undergo a serious methodological validation, attesting their capability to match the phenomenon in focus.

In the first part of the article, a careful reconceptualization of the experience of time in depression will be proposed on the grounds of classic and contemporary phenomenological psychiatry. This will lead to identify the essential features of depressive time as described both in clinical and philosophical contexts. In the second part, a critique of the existing methods of time perception assessment will be conducted, with specific focus on duration estimation and time passage perception procedures. The above-mentioned core features will serve as guidelines in discussing to what degree such methods fit the phenomenon at stake, thus permitting its proper expression. Finally, an alternative and innovative method will be put forward, that might not only help to explore the scope of existing methods but might itself present an alternative to such: the micro-phenomenological interview.

2 Redefining the object: the experience of time in depression

The aim of this section is to go back to the primary sources of the current mainstream notion that time “slows down” for patients suffering from depression and to restore this idea to its original complexity. As this reconstruction proceeds, it will become possible to highlight some of the essential traits of both ordinary and depressive time experience, as they can be described in a phenomenological key.

Firstly, we will outline the essential contributions of early phenomenological psychiatry to the topic, by introducing the main lines of research by Eugène Minkowski and Erwin Straus. In a second step, we will follow the legacy of these studies by sketching what we see as their further elaborations in the work of Thomas Fuchs and Matthew Ratcliffe.

2.1 Early phenomenological psychiatry: understanding lived time

Eugène Minkowski’s monumental *Lived Time. Phenomenological and Psychopathological Studies* (1970) is one of the most prominent phenomenological inquiries into the experience of time.¹ In this work, time is conceived in terms of an existential, structuring feature of experience as a whole: each subject’s way of being in the world is crucially related to an array of “vital phenomena” that constantly and progressively shape her or his lived temporality. The most substantial of these vital phenomena is what Minkowski calls the “*élan vital*”. The *élan vital* (i.e. vital propulsion) gives life its meaningful direction, i.e. a primary orientation towards the future, in which subjects affirm themselves and their works: “I tend forward and thus accomplish something” (Minkowski 1970, p. 44). As it can be easily inferred from this, the dimension of the future plays a central role in Minkowski’s framework. In the author’s words, “because this phenomenon contains the notion of direction in time in a primitive manner, our life is essentially oriented toward the future” (p. 80). Such orientation is further regulated by six additional vital phenomena: activity and expectation; desire and hope; prayer and ethical act (p. 80). Activity, desire and ethical act constitute three modalities of tending toward the future; expectation, hope and prayer, inversely, correspond to three ways of waiting for the future to come. The combination of these basic temporal phenomena eventually shapes the overall subjective way of being in time, i.e. *lived time*. Their interaction normally results in a harmonious lived time, supported by a positive attitude toward the future. This harmony, however, can be compromised by the occurrence of a “generating disorder”, which Minkowski names “morbid mental subduction” (p. 230). In this case, the subjects’ ordinary lived time undergoes severe disturbance, resulting in an alteration of the fundamental phenomenon of the *élan vital*. When this occurs, psychopathological disorders break out.

Each mental disease, therefore, appears to be associated with a peculiar (altered) way of living and structuring time. Minkowski was not interested in providing a systematic categorization of illnesses and their respective kinds of temporal experience. He did show an interest, however, in the intuitions of a contemporary phenomenologist and psychiatrist, Erwin Straus, on endogenous depression (Straus 1928).²

¹ The volume first appeared in French in 1933.

² For an interpretation of Straus’ work, and particularly the latest developments of his reflection, see Moskalewicz 2018.

This author starts by distinguishing “ego time” (or “immanent time”) from “world time” (or “transitive time”). The former corresponds to first-person, individually perceived time; the latter refers instead to social time, the temporality each subject shares with the others. When suffering from depression, Straus claims, the ego time seems to remarkably slow down, and in some cases even to arrest; in consequence, the world time appears to speed up, becoming unsustainable to depressed subjects. This is connected, Minkowski adds, to a pathological suppression of the propulsion toward the future. His words are worth quoting at length here:

Our life is essentially oriented toward the future. When a pathological slowing-down of time occurs, this orientation is profoundly modified. According to the degree of slowing-down, sometimes the present and sometimes the past will exercise an abnormal influence; sometimes it will become impossible to deal with present situations, and sometimes the result will be a feeling of ineluctable determination by the past (p. 298).

The slowing down of subjective experience, it is suggested by the above words, is thus not the central feature in describing the temporal experience in depression. Rather, the main point at stake is the modified orientation towards the future that might show in a variety of deviating time experiences. Also, time perception in this account is precognitive, occurring to us and silently moulding our everyday life and existence, rather than being available to us as a conscious capacity that we could use to objectively estimate durations or speed. We will refer to this conceptualization from now on as *lived time*.

2.2 Contemporary phenomenological psychiatry: lived time enworlded

What both Minkowski and Straus describe appears to be an endogenous phenomenon. Being oriented towards the future constitutes an original inner existential character. The environment can point out a pathology within this orientation, but it does not seem to play an active role in its original or deviating occurrence. Rising from subjective experience and going back to it, depressive lived time seems to be an individual if not a solipsistic phenomenon. Such solipsistic character is what gets challenged by contemporary phenomenological accounts of time experience.

Contemporary research and theory on depressive time are built on the early conceptualizations summarized above. The tendency, however, has been to complexify the overall approach to time experience by placing it within a web of relations transcending the subject per se. By addressing more overtly the environmental and interpersonal aspects of subjective experience, contemporary phenomenologists understand lived time as *enworlded*.

Among the existing contributions to the topic at stake, we choose to focus on Fuchs (2001, 2013) and Ratcliffe’s (2015) accounts. Compared to other valuable works expanding their scope to non-pathological forms of depression (Wyllie 2005) or to other psychopathological temporal disturbances (Vogeley and Kupke 2007; Moskalewicz 2016), Fuchs and Ratcliffe’s accounts are devoted exclusively to clinically assessed forms of depression. Moreover, differently from other related studies

(Ghaemi 2007; Jacobs et al. 2014), they explicitly address depressive time and develop detailed and in-depth conceptualizations of the latter.

Fuchs (2001, 2013) proposes a reading of (melancholic) depression in terms of an “intersubjective desynchronization”. Human life, the psychiatrist and philosopher claims, is regulated by a basic and normally unnoticed synchrony, concerning both physiological aspects (e.g. our tendency to match daily hours of sunshine with activity and night hours with sleep) and psychosocial constructs (e.g. the institutionalized “proper time” to finish school, find a job, have children). Against this background, desynchronization is defined as “an uncoupling in the temporal relation of organism and environment, or of individuals and society” (Fuchs 2001, p. 3). Periodically, subjects experience non-pathological desynchronizations, which simply require them to adapt to external modifications or to align with social expectations. In contemporary Western society, for instance, young adults might handle the potentially stressful situation of being unemployed after their studies by searching for proper advice, by improving professional or relational skills, or even by deciding not to adhere completely to socially shared norms and beliefs about the different stages of life and how to organize them. In melancholic depression, however, desynchronization gets irreversible and complete.

In the pathological case, physiological and social uncoupling mutually enhance each other in a detrimental feedback loop. Mostly, a perceived intersubjective delay is the primal cause for, not the effect of, “a reaction of the entire organism, namely a psychophysiological slowing down or *stasis*” that is described in Husserlian terms as a “fundamental loss of conation” (i.e. intentional drive) (Fuchs 2013, p. 96). The inability to act and react, in turn, reinforces the uncoupling from the social environment. In the absence of any personal progress or achievement, the subject gets stuck in a reified and dragging time: “The depressive drops out of shared time, he lives in an ‘anachronistic’, slow-moving time of his own” (Fuchs 2013, p. 97).

Fuchs thus retrieves and develops the idea of an uncoupling between subjective and worldly time, an idea whose seeds were contained in Straus’s work. His concept of “loss of conation”, on its part, is remarkably reminiscent of Minkowski’s idea of a loss of propulsion, of the *élan vital*. In Fuchs’s account, however, the monadic breaking down of quasi-metaphysical principles (of becoming, harmony and synchrony) is replaced by the eventual defeat of depressed subjects in their ongoing struggle with unbearable environmental pressures and constraints (Fuchs 2001). Depression does not solely have its origins in a constitutional change within the individual but it is a result of a complex interaction between this individual and her or his environment.

Fuchs seems to assume that any form of melancholic depression originates from and translates into one single experiential scenario, i.e. the described sense of intersubjective desynchronization. Arguably of course, though such principle of desynchronization seems to be central across patients’ experiences as assessed by the author, it might not be generalizable to all cases. We hold it as advisable, therefore, to also consider other experiential sources and outcomes of melancholic depression, such as the following, proposed by Matthew Ratcliffe (2015).

The attempt to complicate the phenomenology of depressive (not necessarily melancholic) time is overtly declared in Ratcliffe’s work.

In his account, the temporal slowing down and the altered experiences of duration often reported by depressed subjects are symptomatic of a much broader existential

mutation. Such mutation is framed within a complex phenomenological system and described in terms of a “loss of possibilities” (Ratcliffe 2015).

In Ratcliffe’s terminology, indeed, the subjects’ way of being in the world is strictly connected to their “existential feeling”, i.e. “a variable sense of the possibilities that the world incorporates” (p. 2). Crucial, in this regards, are “significant possibilities”. Things are practically significant to subjects when they are recognized as meaningful in relation to a set of aims and projects. Only such significance enables and shapes the actual anticipation of actions and events. In a nutshell: in the moment you see a mean to reach a goal, you can see the future.

Depression, however, involves precisely the gradual disappearance of significant possibilities. This loss, as Ratcliffe underlines, amounts to a shift in the individuals’ existential feeling and consequently affects any aspect of their being in the world. Yet, it also has a major impact on subjective time particularly: if grasping significance is anticipating, thus realizing the protentional structure of experience, a loss of significance undermines the protentional structure of experience itself, both in its micro- and macro-dynamics. Whereas its micro-dynamics regard the short-term temporal articulation, its macro-dynamics concern what Ratcliffe calls “teleological time”, i.e. “a sense of the ongoing projects and commitments that render things significant to us” (p. 184). Thus, as he explains:

A loss of practical significance from the world would not only be an impoverishment of protention. It would also be a collapse of all the projects that give things their meaning and regulate activity, a loss of teleological time (p. 184).

Under these circumstances, he concludes, it is inevitable that time seems to slow down and even to stop. The very notion of time passage in fact is partly teleological: as such, it is unconceivable in the absence of any enduring aim, care or commitment. When nothing is expected, foreseen, planned or hoped for, time passage becomes irrelevant and eventually ceases to exist.

In essence, Ratcliffe’s account appears even more radical than Fuchs’s one. Not only would the depressed subject perceive, as Fuchs claims, a sense of delay or a lack of interest towards future goals that the others still find appealing and easier to achieve. She or he would in fact be unable to even appreciate them as significant, to even *conceive* them.³

As anticipated, however, the one just described is not the only possible temporal outcome of the depressive condition. Ratcliffe indeed also acknowledges less radical forms of loss of significance, which opens up an entire *variety* of more nuanced time-related conditions. What remains unaltered across such variety of conditions, however,

³ Such fine-grained discrepancies between Fuchs and Ratcliffe’s approaches are arguably hard to tackle by means of purely theoretical speculation. It is possible that these and other issues will be enlightened by investigating subjective temporal experience with the aid of a suitable empirical method, i.e. micro-phenomenology. As Section 4 will make clear, it is important to mention though that the exploratory character of the method does not allow for precise hypotheses here.

is a general inclination towards inactivity and waiting, which translates again into a perception of temporal dilation or stasis.⁴

On the one hand, Ratcliffe thus confirms that depression is related to the slowing down of subjective time and to the impossibility of the future. On the other hand, however, he demonstrates that shifts in time perception simply reflect a much more extensive shift, a radical alteration in the existential setup of the subjects, who are not being able anymore to see the world in its possibilities. To be altered is the overall way of being in the world of depressed subjects, a global modality of which the temporal experience is one component. The world as a whole appears drastically different, and so does subjective time. What the author's account brings to the present reconstruction, therefore, is not only a validation of the existential dimension of time experience, but also a stratification of its genesis.

2.3 Summing up

This section has scrutinized some of the most prominent contributions in the phenomenology of depressive time and has highlighted their respective conceptual cornerstones.

By this mean, we were able to flesh out the so-called phenomenon of “time slowing down in depression”, restoring its original clinical complexity. As a deviation of *lived time*, time experience of patients suffering from depression concerns their precognitive existential being in the world rather than one of their cognitive capacities. As a deviation of enworlded time, time experience of patients suffering from depression is deeply dependent on their embeddedness in a specific environment, as it occurs as a failure of synchronization with other forms of lived temporality or as a failure of seeing the environment as a pool of significant possibilities.

From now on, we will refer to this complex conceptualization if we refer to “depressive time”.

3 Rediscovering the existing methods: matching the object with the measure

This section will propose a critique of some of the most common methods to test experimentally the temporal distortions that seem to affect depressed patients. Most of these methods draw on cognitive psychology and have long been applied in the broader field of non-pathological time perception.

The critique will focus particularly on two classes of procedures: those concerning duration estimation and those pertaining to time passage perception. Each method will be discussed with regard to the degree to which it seems to match its assumed object of

⁴ It could be observed that some of the distinctions the author draws in order to build his variety of temporal experiences appear somehow blurred. Particularly, it is not entirely clear how “different degrees and kinds of conation can remain even when practical significance is lost” (Ratcliffe 2015, p. 179) if, as it seems to be suggested, significance as a category precedes in experience or is anyway broader than conation.

investigation. For this matching to be sufficiently precise, it will be claimed, it is important that the method at least partially acknowledges both the *lived* and *enworlded* aspects of (depressive) time.

The first part of the section will argue for and stress the necessity to keep the two classes of methods mentioned above separate. The second one will analyze procedures from both classes, in order to verify whether and to what extent their target objects match the complexity of (depressive) time.

3.1 “Time slowing down”: different methods for different objects

Thönes and Oberfeld’s recent meta-analysis constitutes an excellent mapping of the existing inquiries into the notion that “time slows down in depression” (Thönes and Oberfeld 2015). It will be used as an essential compass guiding through methods and results in this field.⁵ The analyzed studies immediately appear heterogeneous from a methodological standpoint. Several different procedures, indeed, have been employed over the years in the attempt to clarify the supposed phenomenon of “time slowing down in depression”.

According to Thönes and Oberfeld, five main experimental procedures have been used over the last decades to investigate the effects of depression on the sense of time: a) verbal time estimation (a stimulus is presented and subjects must indicate its duration by using conventional time units); b) time production (a time interval is given in numerical units and subjects must produce this interval, e.g. by producing a sound of the same duration); c) time reproduction (a stimulus is presented and subjects must reproduce its duration); d) duration discrimination (two stimuli of almost equal duration are presented and subjects must choose the longer one); e) rating of the subjective flow of time (e.g. by means of questionnaires, Likert scales or visual analogue scales).

Thönes and Oberfeld suggest that the first four methods of assessment differ from the last one with regard to the aspect of time experience they actually address. If the former four measure the ability to calculate the duration of a defined temporal interval, the last one concerns the subjective perception of time passage, the sense of how fast time flows. As we will pick up on this distinction, in the present article the experimental procedures ranging from a) to d) will be grouped under the comprehensive label of measures of “duration estimation” (DE); procedure e) and similar will be referred to as measures of “time passage perception” (TPP).

Exactly such distinction, however, seems not always clear in the first empirical studies in the field of time perception. Such practice continues in the most recent experimental works, in which data from DE and TPP tasks are sometimes mixed up when it comes to draw general conclusions about depressive time and its features (Mahlberg et al. 2008). Precisely, from the first studies on, researchers have been resorting to either one or the other methodological class, without necessarily stating that they were doing so in order to tackle one specific aspect of time experience. In consequence, an understanding seems to have arisen, according to which there would

⁵ The study evaluated “the inconsistent results from 16 previous studies on time perception in depression, representing data of 433 depressive patients and 485 healthy control subjects” (Thönes and Oberfeld 2015, p. 359).

be one single dimension of time experience, possibly impaired in depression, and several methods to examine it.

Such understanding might actually be grounded in how the methods at stake have possibly been invented based on actual experience. In real life, indeed, we normally realize that time was flying (time passage perception) by watching our clocks and becoming aware of a mistake in our duration estimation, or conversely we watch our clock to check our duration estimation because we have the impression that time is dragging. This seems to suggest that a natural integration might exist between the two time dimensions in focus. The fact that the latter might be connected, however, does not imply that they are *exactly* the same thing, nor that time perception per se should be assessed by means of a method that *solely* addresses one of the two.

In reality, however, DE and TPP have been the object of a sort of methodological competition in this sense. A turning point in such competition can be identified when reading some of the existing studies on depressive time in a chronological order. One class of methods in fact, the DE one, tended to succeed and replace the other at a given historical point (though an interesting revival of TPP procedures is to be observed in very recent years: e.g. Vogel et al. 2018). Indeed, the first wave of experimental inquiries into time in depression used time passage perception measurements, often even in combination with additional methods addressing the existential dimension of time. Wyrick and Wyrick (1977), for instance, asked patients to complete short stories by using different tenses in order to check their temporal orientation (i.e. Story Root Test). By administering this task and personal time passage questionnaires, they were able to state that depressed people were significantly more past oriented and significantly more prone to report time to pass slowly than controls (Wyrick and Wyrick 1977). Among others, Münzel and colleagues (Münzel et al. 1988) confirmed this last result by asking participants to rate the speed of time passage in relation to different everyday situations, such as being with others or being idle.

Over the years, however, the alternative methodological class has progressively taken over, on the basis of claims of its supposedly superior “objectivity”. The conviction that DE procedures are scientifically more reliable than TPP ones, already recognizable and implicit in many previous works, is most clearly expressed by Mahlberg and colleagues (Mahlberg et al. 2008), when they state:

In the past, the subjective aspects of experiencing time have often been evaluated using self-rating scales, e.g. by simply asking patients how slow or fast their experience of time flow is. More objective methods have measured subjects’ sense of time using time estimation or time production tasks (p. 1).

Since on trial here is not the procedure’s pertinence but its objectivity, the unquestioned shift from one methodological class to the other must imply that both aim at the same phenomenon, yet the second does so more precisely.

Such an assumption, however, should be put into question. First, a proper discussion about how and why precisely DE procedures should prove more objective than TPP has been lacking. DE’s superiority, as this quote testifies, has mostly just been taken for granted. Even less problematized, however, was the supposed interchangeability of the two methods of assessment at stake. What is implicitly stated, in fact, is that the two

methods' respective objects of investigation are interchangeable as well. Thus, the subjective speed of time flow within a given interval is taken to be equal to (or at least inferable from) the reported perceived duration of the same interval.

Serious objections can be raised against this presumed equivalence between duration estimation and time passage perception. At least three of them deserve to be mentioned here.

First, and most simply, the idea that DE and TPP are *exactly* the same thing is easily put into question by everyday experience. A commonplace yet effective demonstration of their reciprocal independence is offered by familiar situations (e.g. waiting for a bus) in which we *know* (i.e. can correctly estimate) that a certain event had a certain duration, yet we *feel like* it lasted much longer (or shorter). The fact that DE and TPP are possibly connected in ecological settings should not overshadow their individual quality. In other words, a claim of relatedness should not be taken as a claim of interchangeability, especially in the experimental context. Precisely, when explicitly asked to estimate a duration, participants might abstract from their time passage perception, and instead using other cues to fulfil the task.

Second, and relevant to be noted in the context of scientific investigation, the supposed equivalence (or difference) at stake has rarely been tested. As Droit-Volet and Wearden (2016) have pointed out, few studies have examined the relation between duration judgements and passage of time judgements. When they did so, moreover, they did not find any trivial connection between the two (Wearden 2005; Eugeni et al. [forthcoming](#)). At the moment, as a matter of fact, there is no compelling evidence that DE and TPP refer to one and the same mechanism or aspect of time experience, nor the relation between them has been adequately clarified.

Third, and probably most important, studies adopting respectively DE and TPP tasks in order to study time experience in depression produced different and even diverging results. Taken together, studies employing DE tasks present a great variability in their outcomes. In some cases, no significant differences emerged between depressed participants and controls (e.g. Kitamura and Kumar 1983, Oberfeld et al. 2014). In other cases, depressed participants were found to overestimate durations compared to controls (e.g. Münzel et al. 1988), then again they were observed to underestimate time intervals (e.g. Tysk 1984). Studies employing TPP tasks, on the other hand, proved more consistent and generally confirmed that depressed subjects have a tendency to perceive time to pass more slowly than controls (e.g. Wyrick and Wyrick 1977; Münzel et al. 1988; Bschor et al. 2004). The discrepancy between the two classes of studies is mirrored in Thönes and Oberfeld's meta-analysis (2015), in which statistically significant differences emerged between depressed and control subjects with regard to time passage perception but not in the case of duration judgements. This observation might point again to the fact that the way DE and TPP tasks are currently administered is not helping the possible connection between the corresponding time dimensions to be expressed. On the contrary, the methods being used might indeed intervene on the way the latter dimensions are expressed and contribute to set them artificially apart.

All the above considered, it seems important then to reiterate that, at least in the current experimental practice, the difference between DE and TPP as *procedures* of assessment is likely to mirror a substantial distinction between their *objects* of assessment. Therefore, when the aim is to grasp and describe depressive time, the two methods should not be employed interchangeably. Instead, an effort should be put in

evaluating whether and to what degree, based on their operative features, the two methods bring to light an object of investigation that is able to capture the main features of depressive time as described in the phenomenological accounts. The next section will attempt to clarify precisely this issue. Two leading questions will orient the discussion. Which kind of object (i.e. which aspect of time perception) do current DE and TPP procedures respectively bring to light? Can depressive time be caught by such object?

3.2 “Time slowing down”: duration estimation, time passage perception, and depressive time

In the first part of the article, the lived character of subjective time was identified, stressing its existential and precognitive features and observing that the impairment characterizing depression affects these aspects of time perception. Furthermore, the enworlded character of the same phenomenon was brought to attention, pointing out that depression originates when subjects inhabit a specific environment in altered ways. Thus, asking whether a method can measure the depressive temporal impairment means asking whether it creates the conditions to refer to the experience of *living* time into a specific *world*.

The analysis will start by discussing the type of tasks and stimuli employed in the duration estimation class. Duration estimation procedures – some of which were listed above – comprise a variety of tasks. All of them, nonetheless, seem to imply a certain degree and a certain kind of quantification. This is obviously likely for verbal time estimation, in which subjects are explicitly asked to express a duration judgement in numerical units. However, it is also likely, for instance, in the case of the production task, in which a numerical information must be transformed into a concrete temporal interval, and possibly even in the reproduction task, in which two intervals must be mentally compared based on their extension. It seems therefore that higher processes involving cognitive effort are called upon. Hence, what the assessment might ultimately address is a quite elaborated, second-order output that might not be affected by the actual impairment of the lived time. As suggested above, depressive time is a matter of immediate perception rather than voluntary quantification and calculation. By shifting the focus on the latter, and by cutting DE’s potential links with other and less clock-related aspects of time perception, the most common DE tasks might fail in addressing the phenomenon in this lived component.

Additionally, when looking at the stimuli employed in this class of procedures, two points can be touched upon.

First, the time intervals being used to test DE ability are extremely variable, ranging from few milliseconds (e.g. Tysk 1984; Sévigny et al. 2003) to several seconds or even minutes (e.g. Mahlberg et al. 2008; Oberfeld et al. 2014). This is problematic since different intervals can correspond to even radically different physiological mechanisms and faculties, normally developed in relation to distinct ecological needs (Buonomano 2007). Hence, a single time scale should probably be selected in order to obtain comparable data.

Second, the great majority of studies asks participants to judge the duration of short (1 s to 10 s) or even ultrashort (< 1 s) time intervals, whose content consists in simple visual or auditory stimuli presented in the lab (Thönes and Oberfeld 2015).

This quite naturally leads to the “enworlding” problem. An ideal method of assessment should lay the grounds for subjects to experience time as they normally do it. It is likely complicated to allow the subjects’ everyday environment to play its usual role in shaping time perception within an experimental setting. Most DE methods, however, simply appear to give in from the start. Leaving aside the extremely short duration of the target time intervals, indeed, no attempt is made to connect the participants’ temporal judgement to any element of their ordinary experience outside the experimental situation (Tysk 1984; Sévigny et al. 2003; Mahlberg et al. 2008; Mioni et al. 2016).

In a nutshell, it can fast be hypothesized that DE methods overlook both the lived and the enworlded quality of the assumingly slowed-down experience of time in depression. In doing so, they are presumably unlikely to get to grips with the particular form of time experience that is typical of this psychopathological condition.

The procedures for assessing time passage perception are different both in the tasks and in the stimuli employed. As for the tasks, these procedures require a subjective/qualitative rather than objective/quantitative judgement of the time past. Precisely, subjects are asked about their subjective perception of the pace of the temporal flow, rather than their estimation of the objective duration of events. Therefore, TPP tasks focus on an aspect of time perception not as remote from lived and enworlded experience as the one being tackled in DE tasks. In this sense, the methods addressing time passage perception seem keener to acknowledge and address the lived character of depressive time. However, judgements are asked to be given by marking a point on visual analogue or Likert scales (e.g. Münzel et al. 1988, Bschor et al. 2004). Consequently, subjects are still required to somehow translate an experiential variable into some sort of quantification. This kind of effort, once again, arguably brings into play second-order processes that may not necessarily fall within the scope of depressive time.

It is the choice of the stimuli, however, that suggests most strongly that TPP procedures ultimately fail to address lived and enworlded time. In some approaches, subjects are asked about their sense of the temporal flow in general (that is, how fast does time pass for them “normally”). It is evident that this does not capture the enworldedness of the phenomenon. In other cases, the task is anchored to specific situations of everyday life, such as reading (Kitamura and Kumar 1982) or being with others (Münzel et al. 1988). Such anchoring arguably helps subjects to focus on their spontaneous perception of time passage, since the latter is framed within a context in which it is immediately lived rather than cognitively processed. On a second view, however, it still remains on a too general level to grasp the enworlded character of the phenomenon. Obviously, time passes subjectively at different paces depending on the precise book you are reading in a precise moment or the precise people you are with at a certain occasion. These differences, which play a major role in defining depressive time, are not taken into account when testing time passage perception with reference to general types of situations instead of specific instances of experience.

Hence, it can be concluded that TPP procedures seem to get closer than DE ones to the actual experience of time in depression. However, they still likely fall short in capturing the complexity of this phenomenon as lived and enworlded.

3.3 Summing up

This section has examined two popular classes of methods for assessing time experience in depression, addressing respectively duration estimation and time passage perception. Our reflections showed that DE procedures seem to neglect the lived character of time experience, by requiring a shift from a spontaneous to a primarily cognitive attitude that might not be affected by the actual impairment of lived time connected to depression. Also, they prove unconcerned about the “enworlding” issue, since they usually bypass judgement contextualization.

TPP procedures, on their part, demonstrate a greater awareness of depressive time in its complexity. Yet, by not anchoring the required temporal judgements to specific instances of experience, they ultimately fall short in grasping subjective time as lived and enworlded.

It must be stressed, though, that these observations stay hypotheses and might be incomplete with regard to the actual experiences of people performing the respective tasks. In the next and last part of the article, a method and experimental setup specifically designed to investigate these issues further will be sketched.

4 A new frontier in methodology: micro-phenomenology as a research hypothesis

This last part of the article introduces the micro-phenomenological method. This interview and analysis technique, as it will be argued below, not only is potentially capable of further clarifying the scope of the two approaches discussed above but may even be part of the solution of overcoming the intrinsic limitations of those.

First, a synthetic introduction to micro-phenomenology will be provided, in order to present the method’s theoretical and operative cornerstones. Then, the applicability of this method to the experience of time in depression will be discussed. This will be done by sketching the lines of a feasible experimental design involving the use of the micro-phenomenological method and highlighting both its advantages and shortcomings in this particular case.

4.1 Micro-phenomenology: an introduction

Micro-phenomenology as a research program is to be framed within Francisco Varela’s broader neurophenomenological project. In his famous 1996 paper, Varela pointed out the overgrowth of third-person approaches to human experience at the expense of first-person strategies. In the same instance, he urged the scientific community to do the necessary work to change this course by improving rigorous methods for gathering first-person data about subjective experience in its immediate and lived quality. For this purpose, he was inviting contemporary phenomenologists and psychologists already committed to the topic to engage in a thorough debate about felt experience and how to

“become aware” of it (Vermersch 1994; Depraz et al. 1996 – written in parallel with Varela’s manifesto of neurophenomenology).⁶

Micro-phenomenology aims precisely at answering Varela’s call by developing a model of interview and analysis that enables to plumb lived experience with great precision. The scholar who cleared the path to the method was Pierre Vermersch, who first laid down the principles of what he defined *entretien d’explicitation*, i.e. a way of assessing first-person experience mainly in educational contexts. Other related researchers subsequently appropriated Vermersch’s model for the scientific field. The model thus was refined and expanded in scope to become what currently is known as elicitation or micro-phenomenological interview (Petitmengin 2006; Bitbol and Petitmengin 2013, 2017). The fundamental steps in this kind of investigation, which requires a trained interviewer, consist in the following. First, the interviewees are asked to select a past *singular* lived experience (e.g. an action, a feeling, a state of consciousness, a mental process such as imagining or remembering). Second, they are invited to re-enact and thereby to *evoke* specific units of that experience. Then, they are guided to shift their attention from the “what” and “why” (i.e. contents and explanations) to the “how” (e.g. modes of unfolding) of it to bring the not yet reflected aspects of the experience to consciousness. It is important for this endeavor that the interviewees progressively abandon the so-called satellite dimensions of experience (e.g. theoretical knowledge, judgements, preconceived representations, goals) in order to focus uniquely on its most immediate and felt quality. Finally, the participants are helped to describe through verbalization the precise time course of their experience in all the dimensions at stake (sensory, kinaesthetic, emotional etc.) (Bitbol and Petitmengin 2013). This process can be considered as the creation of a new vocabulary, best catching the nuances of the specific experience at stake, that in itself does not replace such experience but enhances the capacity to perceive and reenact such subtle differences.⁷

In the analysis phase then, an appropriate number of interviews is gathered and analyzed comparatively. By doing so, it is possible to extract general patterns or structures that reveal the “invariant” features of the action or state at hand. Thus, micro-phenomenology not only allows very fine-grained descriptions of individual and singular experiences, but also offers the opportunity to build on them in order to obtain generalizable results.

Given its insistence on the immediate and spontaneous quality of experience, micro-phenomenology seems a promising methodological option for investigating the lived and enworlded dimension of subjective time in depression as it is able to break complex actions and states into their various experiential layers and phases. Moreover, in the same way it might be helpful in exploring the experiential dimension of different time

⁶ In Varela’s seminal article on neurophenomenology (1996), reference is made to a “forthcoming” publication titled *Exploring Experience with a Method*. The announced publication attests the authors’ joint work during that crucial period, eventually resulted in their best-known 2003 book *On becoming aware. A pragmatics of experiencing*.

⁷ Petitmengin and Bitbol describe this in parallel to an oenological education, which is indeed changing the experience of drinking wine, however not in the sense of destroying it by a too analytic approach, but of enriching the degustation via the creation of a vocabulary enabling to describe more nuances of the phenomenon than could be specified and thus experienced before (Petitmengin and Bitbol 2009; see for a parallel description of the effect of micro-phenomenology on meditators Petitmengin et al. 2017, Section 4.2.).

perception assessments (DE, TPP) as introduced above, by this helping to illuminate the quantitative results achieved so far.

In the next paragraphs, therefore, the applicability of the micro-phenomenological interview to the so-called phenomenon of “time slowing down in perception” will be put to test. A practice-oriented approach will be proposed, with a possible micro-phenomenological experimental design being described and discussed.

4.2 Towards a better understanding of DE and TPP, and further: a micro-phenomenological approach

As it was claimed in Section 3.1, the relation between duration estimation and time passage perception judgements has not been adequately explored yet. The lack of clarity about what DE on the one hand and TPP tasks on the other assess might be part of the problem when it comes to the inconsistency of the studies about the experience of time in depression. In this section, it is argued that micro-phenomenology might have the potential of improving the understanding of the differences between DE and TPP, as well as their possible interaction. Moreover, it is proposed that the method might serve as a new tool to assess differences in depressive time experience. Precisely, micro-phenomenology could be used to address the following questions:

- a) Is DE different from TPP, as the two are accomplished via different routes on the consciously accessible level? How do the two relate to each other?
- b) Can micro-phenomenology eventually help to experimentally distinguish ordinary from deviating forms of time experience better than DE and TPP?
- c) Can micro-phenomenology suggest improvements of the traditional time perception tasks, by shaping new methods that prove more sensitive to such deviations than the latter but also more time-effective than micro-phenomenology itself? Can it also help closing the supposed existing gap between DE and TPP as originally integrated dimensions of time experience?

In order to address the questions above, we propose the following experimental plan.

A first *within-subject* experiment (EXP 1) should explore the experiential processes underlying healthy participants' performance in a DE or TPP task via micro-phenomenology. For this purpose, participants should be presented with a stimulus (for example a video clip) and given the usual DE or TPP assessment tasks, i.e. they should be asked to estimate the duration of the stimulus and to rate the speed of time passage during the experience of it. Right after this, micro-phenomenological interviews should be conducted, taking as their starting point the moment in which the participants received the instructions for the DE or TPP task (counterbalanced in order) and reconstructing the experiential phases leading to the final judgements. This setup essentially would allow testing the claim that the measurements used, on the consciously accessible level, trigger different processes, which might not necessarily be grounded in lived and enworlded time experience, neither reflect the possible integration of duration estimation and time passage perception.

A second experiment should replicate this precise study with patients suffering from depression, in order to explore if the experiential processes assessed are modulated by the disease and how.

Finally, a third experiment (EXP 3) could investigate whether the micro-phenomenological approach itself can help to overcome the hypothesized discrepancy between currently assessed objects and depressive time. The setup of this experiment depends on the outcome of the first two, in the sense that the insights gained should be used to create a new time perception task procedure, better adapted to capture the actual experiential deviations found. Given our own critique of the non-enworldedness of the procedures used so far, aspects that might show crucial are the length and content of the stimuli as well as the instructions used to trigger relevant experiential aspects. Also, in order to close an existing gap between DE and TPP, it would be fruitful to test new strategies for allowing their supposedly natural integration to be expressed and assessed.

Taken together, the proposed experimental steps would provide new and more insightful evidence about DE and TPP processes in healthy and depressed people, and unprecedented data about time experience as lived and enworlded in both groups.

4.3 Possible methodological issues

Although micro-phenomenology presents itself as a highly promising methodological option for improving the study of time experience and especially of time perception in depressed subjects, its use in the experimental study sketched above might raise the following three issues.

First, it might be argued that asking people about their conscious cognitive processes in solving a task might not lead to answers that reflect the “actual” cognitive, let alone neural and physiological processes ongoing in the period questioned. What has to be clarified, however, is that the claim of phenomenological psychiatry presented in this paper did not entail differences on this latter level. The descriptions rather focus on a pure experiential level, which is precisely the one assessed by micro-phenomenology. What our study setup is designed to elucidate is whether the experience of the DE and TPP assessment is reflecting any reference to the experience of lived time in general and, in case it does not, how participants on this level otherwise conceptualize and solve the task. Undoubtedly, this leaves open the possibility of confabulation. Though the micro-phenomenological method cannot completely prevent this usual component of memory, there is evidence that its design at least reduces the likelihood of this phenomenon. An extensive discussion of this issue is led at other places (Petitmengin et al. 2013).

Second, it has been said that the micro-phenomenological interview must focus on singular, well-defined lived situations that can be re-evoked in the moment of the interview. Precisely, too long stimuli might aggravate the evocation process. On the other hand our discussion of the experimental procedures used previously to assess DE and TPP has suggested that very short and simple stimuli might fail to elicit a lived and enworlded time experience as a whole as they are just not ecological in this respect. Hence, the stimuli used in experiments 1 and 2 should be carefully chosen during a necessary pilot phase preceding the launch of the study and the issues found should be reflected in the setup of experiment 3.

Thirdly, it might be questioned why it is necessary to introduce micro-phenomenology at all, when the alternative could be to use the skill from the clinical sector. Clinical interviews, indeed, sometimes were used precisely to investigate

depressive time. Stanghellini and colleagues (Stanghellini et al. 2016), for instance, conducted a retrospective study on 550 clinical semi-structured interviews, run by an experienced psychiatrist and subsequently elaborated according to the principles of qualitative analysis (Consensual Qualitative Research). As the authors explains, the interview comprised time-related questions like: “Did you experience some strangeness in the flowing of time, for instance, in time duration?” or “Do you experience the speed of time as accelerated or decelerated?” (Stanghellini et al. 2016, p. 6).

While these questions clearly offer more possibilities to assess the peculiarity of time experience in patients suffering from depression than DE or TPP tasks, it is worth underlining that a fundamental difference stays between clinical and micro-phenomenological interviews. Precisely, the former, due to its structured or semi-structured nature, is exposed to a risk of inductiveness, i.e. of anticipating content-related aspects of the interviewees’ experience that might have not otherwise be reported as relevant. On the contrary, as explained above, micro-phenomenology circumvents such risk by refusing any predetermined interviewing structure and by solely relying on helping the interviewee to re-evoked and closely describe a particular experience. Differently from the standard clinical practice, the micro-phenomenological procedure offers to the interviewees the greatest degree of expressive freedom and spontaneity. At the same time, it minimizes the interviewer’s interference and interpretive bias due to the way experience is to be explored according to its rigorous method in recording and analysis (Petitmengin 2006). It is in this latter aspect, lastly, that micro-phenomenology is likely to be superior in the collection of scientific data, when compared to the doubtlessly highly valuable but also highly individual assessment and treatment procedures of psychotherapists and psychiatrists. Based on this, micro-phenomenology can be claimed to provide a method-specific contribution to the study of (depressive) time experience.

4.4 Summing up

This section has presented an additional methodological option to be taken into account when trying to examine subjective temporal experience in depression, namely the micro-phenomenological interview. By defining and discussing a feasible experimental design involving the use of this type of interview, the section has claimed that micro-phenomenology might enhance the understanding of the processes implied in DE and TPP judgements, and also pave the way for a more accurate study of subjective time.

5 Conclusion. Time experience in depression: an open challenge

This article invested in understanding why the results of current empirical research do not seem to match the conceptualization of “time slowing down in depression”. We have argued that such label might be part of the problem in the first place, since it proves quite reductive. As our revision of phenomenological psychiatry demonstrated, time in depression does not simply slow down: it undergoes profound and non-linear modifications based on the lived and enworlded character of time experience in general, that are likely not to be captured simply by a reduction of speed under arbitrary circumstances. Via a discussion of the quantitative methods used so far, we furthermore

claimed that such false synthetic formulation might have induced researchers to develop and employ methods that fail to do justice to the complexity of the phenomenon – and therefore might not find the results expected. On this basis, lastly, the micro-phenomenological option was introduced. Via a reflection on its advantages as well as its potential limitations, we outlined an experimental procedure using micro-phenomenology to a) illuminate the scope of existing time experience measures (DE and TPP), b) capture the actual differences between time experience of non-patients and patients and c) improve the existing methods on the basis of the results of a) and b) to be able to really contribute to the debate.

In conclusion: we suggest that quantitative research should reconsider the question of time-related disturbances in depressed patients with regard to the critique done above. According to our argumentation, the experience of time in depression and its characterization in terms of slowness and connected attributes stay an open challenge and a partially unsolved mystery. In the resolution of such enigma, methodological debate and awareness seem key, indispensable requirements. We hope that this paper has set the first stone to reignite such.

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References

- Bitbol, M., & Petitmengin, C. (2013). A defense of introspection from within. *Constructivist Foundations*, 8(3), 269–279.
- Bitbol, M., & Petitmengin, C. (2017). Neurophenomenology and the micro-phenomenological interview. In M. Velmans & S. Schneider (Eds.), *The Blackwell companion to consciousness* (pp. 726–739). Chichester: Wiley.
- Bschor, T., Ising, M., Bauer, M., Lewitzka, U., Skerstupeit, M., Müller-Oerlinghausen, B., & Baethge, C. (2004). Time experience and time judgment in major depression, mania and healthy subjects. A controlled study of 93 subjects. *Acta Psychiatrica Scandinavica*, 109, 222–229.
- Buonomano, D. V. (2007). The biology of time across different scales. *Nature Chemical Biology*, 3(10), 594–597.
- Depraz, N., Varela, F., & Veermersch, P. (1996). Exploring experience with a method (forthcoming).
- Droit-Volet, S., & Wearden, J. (2016). Passage of time judgements are not duration judgements: Evidence from a study using experience sampling methodology. *Frontiers in Psychology*, 7, 176.
- Eugeni, R., Balzarotti, S., Cavaletti, F., & D’Aloia, A. (forthcoming). It doesn’t SEEM_IT, but it is. A neurofilmological approach to the subjective experience and estimation of moving image time. In A. Pennisi (Ed.), *Dimensions of performativity. Interdisciplinary approaches to an extended theory of cognitive creativity*. Springer.
- Fuchs, T. (2001). Melancholia as a desynchronization. Towards a psychopathology of interpersonal time. *Psychopathology*, 34, 179–186.
- Fuchs, T. (2013). Temporality and psychopathology. *Phenomenology and the Cognitive Sciences*, 12(1), 75–104.

- Ghaemi, S. N. (2007). Feeling and time: The phenomenology of mood disorders, depressive realism, and existential psychotherapy. *Schizophrenia Bulletin*, *33*(1), 122–130.
- Jacobs, K., Stephan, A., Paskaleva-Yankova, A., & Wiltzky, W. (2014). Existential and atmospheric feelings in depressive compartment. *Philosophy, Psychiatry, & Psychology*, *21*(2), 89–110.
- Kitamura, T., & Kumar, R. (1982). Time passes slowly for patients with depressive states. *Acta Psychiatrica Scandinavica*, *65*, 415–420.
- Kitamura, T., & Kumar, R. (1983). Time estimation and time production in depressive patients. *Acta Psychiatrica Scandinavica*, *68*, 15–21.
- Mahlberg, R., Kienast, T., Bschor, T., & Adli, M. (2008). Evaluation of time memory in acutely depressed patients, manic patients, and healthy controls using a time reproduction task. *European Psychiatry*, *23*, 430–433.
- Mezey, A. G., & Cohen, S. I. (1961). The effect of depressive illness on time judgment and time experience. *Journal of Neurology, Neurosurgery and Psychiatry*, *24*, 266–268.
- Minkowski, E. (1970). *Lived time. Phenomenological and psychopathological studies*. Translated by Nancy Metzler. Evanston: Northwestern University Press.
- Mioni, G., Stablum, F., Prunetti, E., & Grondin, S. (2016). Time perception in anxious and depressed patients: A comparison between time reproduction and time production tasks. *Journal of Affective Disorders*, *196*, 154–163.
- Moskalewicz, M. (2016). Disturbed temporalities. Insights from phenomenological psychiatry. *Time and Society*, *25*(2), 234–252.
- Moskalewicz, M. (2018). Toward a unified view of time: Erwin W. Straus' phenomenological psychopathology of temporal experience. *Phenomenology and the Cognitive Sciences*, *17*, 65–80.
- Münzel, K., Gendner, G., Steinberg, R., & Raith, L. (1988). Time estimation of depressive patients: The influence of interval content. *European Archives of Psychiatry and Neurological Sciences*, *237*, 171–178.
- Oberfeld, D., Thönes, S., Palayoor, B. J., & Hecht, H. (2014). Depression does not affect time perception and time-to-contact estimation. *Frontiers in Psychology*, *5*, 810.
- Petitmengin, C. (2006). Describing one's subjective experience in the second person: An interview method for the science of consciousness. *Phenomenology and the Cognitive Sciences*, *5*, 229–269.
- Petitmengin, C., & Bitbol, M. (2009). The validity of first-person descriptions as authenticity and coherence. *Journal of Consciousness Studies*, *16*(10–12), 363–404.
- Petitmengin, C., Remillieux, A., Cahour, B., & Carter-Thomas, S. (2013). A gap in Nisbett and Wilson's findings? A first-person access to our cognitive processes. *Consciousness and Cognition*, *22*(2), 654–669.
- Petitmengin, C., van Beek, M., Bitbol, M., Nissou, J.-M., & Roepstorff, A. (2017). What is it like to meditate? Methods and issues for a micro-phenomenological description of meditative experience. *Journal of Consciousness Studies*, *24*(5–6), 170–198.
- Ratcliffe, M. (2012). Varieties of temporal experience in depression. *Journal of Medicine and Philosophy*, *37*(2), 114–138.
- Ratcliffe, M. (2015). *Experiences of depression. A study in phenomenology*. Oxford: Oxford University Press.
- Sévigny, M.-C., Everett, J., & Grondin, S. (2003). Depression, attention, and time estimation. *Brain and Cognition*, *53*, 351–353.
- Stanghellini, G., Ballerini, M., Presenza, S., Mancini, M., Northoff, G., & Cutting, J. (2016). Abnormal time experiences in major depression: An empirical qualitative study. *Psychopathology*, *50*(2), 125–140.
- Straus, E. (1928). Das Zeiterlebnis in der endogenen Depression und in der psychopathischen Verstimmung. *Monatsschrift für Psychiatrie und Neurologie*, *68*, 640–656.
- Thönes, S., & Oberfeld, D. (2015). Time perception in depression: A meta-analysis. *Journal of Affective Disorders*, *175*, 359–372.
- Tysk, L. (1984). Time Perception and Affective Disorders. *Perceptual and Motor Skills*, *58*, 455–464.
- Varela, F. (1996). Neurophenomenology. A methodological remedy to the hard problem. *Journal of Consciousness Studies*, *3*(4), 330–349.
- Vermersch, P. (1994). *L'entretien d'explicitation*. Paris: Éditions ESF.
- Vogel, D. H., Krämer, K., Schoofs, T., Kupke, C., & Vogeley, K. (2018). Disturbed experience of time in depression – Evidence from content analysis. *Frontiers in Human Neuroscience*, *12*, 66.
- Vogeley, K., & Kupke, C. (2007). Disturbances of time consciousness from a phenomenological and a neuroscientific perspective. *Schizophrenia Bulletin*, *33*(1), 157–165.
- Wearden, J. (2005). The wrong tree. Time perception and time experience in the elderly. In J. Duncan, L. Phillips, & P. McLeod (Eds.), *Measuring the mind: Speed, age, and control* (pp. 137–158). Oxford: Oxford University Press.
- Wyllie, M. (2005). Lived time and psychopathology. *Philosophy, Psychiatry, & Psychology*, *12*(3), 173–185.
- Wyrick, R. A., & Wyrick, C. (1977). Time experience during depression. *Archive of General Psychiatry*, *34*, 1441–1443.