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RESEARCH ARTICLE

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Dynamics of temporal experience in active and passive waiting situations

Sonja Ehret[1] | Anna K. Trukenbrod[2] | Roland Thomaschke[1]

[1]Department of Psychology, Albert-Ludwigs-University of Freiburg, Freiburg im Breisgau, Germany

[2]Department of Psychology and Ergonomics, Technische Universität Berlin, Berlin, Germany

Correspondence
Sonja Ehret, Cognition, Action, and Sustainability Unit, Department of Psychology, Albert-Ludwigs-University of Freiburg, Engelbergerstr. 41, Freiburg, 79085, Germany.
Email: sonja.ehret@psychologie.uni-freiburg.de

Summary

Activities can have substantial impacts on temporal experience. We investigated how the impact of being active develops dynamically over the course of long waiting times. Participants waited in a library building, either sitting passively or walking around actively, for between 60 and 100 minutes. Retrospectively, they reported how different aspects of their temporal experiences developed throughout their wait: duration judgments, passage of time judgments, and general awareness of time. Duration was estimated to be shorter in the passive than in the active condition throughout the wait. In an early phase, the passage of time felt slower and time awareness was felt to be higher in the passive condition. Yet, this difference was resolved over the course of the wait. We conclude that the effects of activity on temporal experiences decrease over longer waiting periods.

KEYWORDS
activity, dynamic measure, expectation, temporal experience, waiting

For many people, waiting can be an aversive experience. Studies have shown that instead of persevering and waiting, individuals prefer doing something else, such as eating (Havermans, Vancleef, Kalamatianos, & Nederkoorn, 2015), taking longer walks (Hsee, Yang, & Wang, 2010), or even giving themselves electro shocks (Wilson et al., 2014). Incorporating this desire to engage in alternative activities in the present study, we examined how the possibility of being active while waiting for over 1 hour can change the dynamical experience of time when compared to time spent waiting passively.

Waiting can be characterized by the inhibition of a goal-directed action, a lack of productive activity, predominant passivity, dependency on external variables, and temporal uncertainty (Klapproth, 2010). The lack of activity while waiting provides an individual the opportunity to pay more attention to the passage of time, as well as increase the awareness of oneself (Jokic, Zakay, & Wittmann, 2018). Hence, the passage of time can be distorted in the state of passive waiting. More precisely, wait times are usually overestimated and the passage of time feels slower and more aware (Jokic et al., 2018; Wearden, 2016; Zakay, 2015). So, for subjective well-being, not only is the actual waiting time relevant, but also how the waiting time is perceived (Klapproth, 2010).

Two other factors—impulsivity and boredom—slow down and increase awareness of the passage of time (Jokic et al., 2018; Witowska, Schmidt, & Wittmann, 2020). That is to say, especially when an activity is interesting, novel, or challenging, it engages the individual and time seems to pass faster or can even be forgotten (Droit-Volet, Trahanias, & Maniadakis, 2017; Larson & von Eye, 2006, 2010). However, these observations are not consistent, which could be explained by the large variability of activities involved (Droit-Volet et al., 2017). An increase in a person's arousal resulting from the engagement of an activity can also speed up the perceived passage of time while relaxation can decelerate the passage of time (Droit-Volet & Wearden, 2015). For prospective duration judgments, a large body of evidence has shown that the more attention a task requires,

the shorter is the estimated time (Matthews & Meck, 2016). Additionally, higher physical activity has been shown to prolong the estimates (Karşılar, Kısa, & Balcı, 2018; Sayalı, Uslu, Menceloğlu, Canbeyli, & Balcı, 2018). These findings can be explained by assuming that individuals have an internal clock system, such as in the Attentional-Gate Model (Block & Zakay, 1996), where arousal increases the pulse rate and an attentional gate regulates the accumulation of pulses through attentional resources. The comparison of accumulated pulses to reference memory results in duration judgment. When attentional resources are directed away from time, the attentional gate narrows, fewer pulses are accumulated, and estimates of time are shortened. The current study is aimed at manipulating the distribution of attention—during a passive waiting condition that lacks the possibility of active distraction and during an active waiting condition with the potential to engage in activities.

In the present study, in addition to duration judgments based on clock time, we also focus on the subjective temporal experiences. Subjective temporal experiences involve the feeling of time dragging or flying, the so-called passage of time judgments (Wearden, 2015), and the feeling of the passage of time being completely forgotten or very much in the focus of attention, the so-called time awareness (Ehret, Roth, Zimmermann, Selter, & Thomaschke, 2020; Ehret, Schroeder, Bernet, Holzmüller, & Thomaschke, 2019). So far, these aspects of temporal experience were only measured by a single question asked at the end of the testing sessions. However, wait times become more stressful the longer they elapse (Osuna, 1985) and distress is especially high in the beginning and the end of a waiting period (Sweeny, 2018). Therefore, we developed a dynamical measure of passage of time judgments and time awareness for the current study in order to study the dynamical changes over time. To avoid interference with the experience of the passage of time itself, the dynamics of temporal experience could only be assessed retrospectively. To increase the likelihood of dynamical changes in the temporal experience, the wait time of our participants was set at approximately 90 minutes and the study was conducted in a real-life setting.

The present study is to our knowledge the first to explicitly investigate the effects of manipulating the constraints on temporal experience caused by passivity while waiting. The study goes beyond previous work by using a systematic manipulation of a passive and active waiting condition rather than an experience sampling method conducted in a natural setting. Passivity was modeled by requiring participants to stay seated while waiting in a library, whereas the active condition allowed participants to explore the building. Additionally, the retrospective measure of temporal experience over several points in time enables the evolvement of the waiting experience to be observed thereby building on previously used single measures.

For time estimates, we expected that passive waiting would contract estimates when compared to active waiting. The active condition includes physical activity in the form of walking around in the building. As previous studies have shown that the physiological arousal accompanying any bodily activity dilates time judgments (see above, and Karşılar et al., 2018), we hypothesized that the lack of such physiological arousal in the passive condition would contract time estimates. However, based on theories of attention one could also hypothesize the opposite: Passivity goes along with a higher focus on time, which in turn has been shown to dilate time judgments (see also above, and Jokic et al., 2018).

As it has been shown that passive waiting increases deceleration and awareness of the passage of time (Jokic et al., 2018; Wearden, 2016; Zakay, 2015), we expected the passage of time to slow down and the awareness of it to increase in the passive waiting condition compared to the active waiting condition. In line with Osuna (1985), we expected the wait to become more stressful over time; thus, participants would feel that time appears to pass more and more slowly and become more aware, the longer they have to wait.

1 | METHODS

1.1 | Participants

Thirty-three students (M_{age} = 26.6; SD_{age} = 6.1; 70% female, 30% male) participated in the study. A power analysis conducted for repeated-measures and within-between interactions based on an effect size of d = 0.25 (p_{α} = .05; $p_{1\text{-}\beta}$ = .9) determined the number of participants to be 46 (Faul, Erdfelder, Lang, & Buchner, 2007). To account for all counterbalancing conditions, we developed a data collection plan for 48 participants that were randomly assigned to one condition (see Data S1 for data collection plan). Due to organizational constraints, this targeted number of 48 participants could not be reached. Requirements for participation included student status, good command of German, and no regular or frequent visits to any one of the two libraries used as experimental sites over the past 3 years. All participants gave their informed consent and received 36 Euros for participation.

1.2 | Materials

1.2.1 | Manipulation of waiting condition (independent variable)

This study was conducted in a library setting because both modes of waiting, sitting passively and walking around actively, occur naturally and are socially acceptable in a library. Thus, the emotional state of the participants was not confounded by increased or diminished social pressure in either one of the conditions. The libraries used in the study are the Jacob-and-Wilhelm-Grimm-Zentrum and the Staatsbibliothek zu Berlin Potsdamer Strasse, which are located in the city center of Berlin.

We manipulated the manner of waiting by introducing the within-subject factor *waiting condition* as passive or active. In the passive waiting condition, participants were instructed to remain seated on the chair assigned to them for the whole session and wait for the experimenter to come back. Two seats in the center of each library were reserved for the experiment. The passivity of waiting could be

characterized by the restriction of movement as well as the restriction of engaging with the environment actively. In contrast, in the active waiting condition, participants were instructed to explore the inside of the library and get to know the details of the building until the experimenter picked them up. Active participants were able to move freely and engage with the environment without constraints, provided they stay inside the library. In both conditions, participants were not allowed to bring their personal belongings including timers, that is, electronic devices, watches, etc. A different waiting condition was conducted in the two libraries in order to avoid repetition effects arising from adaptation to and boredom of the environment. The order of conditions and library were counterbalanced and randomized by participant.

1.2.2 | Manipulation of expectation (independent variable)

There was an additional between-subjects factor variable for the expectation of a negative event versus no expectation of any negative event after the wait as Neubauer, Smyth, and Sliwinski (2018) have shown that the anticipation of stressors can induce negative affect in within-day real-life settings. Fifteen randomly chosen participants received additional instructions to induce the expectation of a negative event while waiting. The remaining 18 participants received no such additional instructions. However, this factor will not be discussed further due to its low test-power with the reduced sample size. Detailed descriptions and results regarding this factor can be found in Data S1.

1.2.3 | Time variables (dependent variables)

Single measures: For duration judgments of the waiting time, participants estimated the time they spent waiting inside the library in minutes. As participants knew ahead that they would be questioned about time, we assume this measure to be prospective. Doubts about this assumption will be addressed in the discussion section (Thönes & Wittmann, 2016). Additionally, we measured the so-called "feel judgments" (Wearden, 2015, p. 167) by asking participants how long they thought time had felt in minutes compared to their estimated waiting time. To assess passage of time judgments, we used a visual analog scale (VAS) that asked participants how fast or slow time had subjectively felt from "maximum slow" (=0) to "maximum fast" (=100). Time awareness was also indicated on a VAS. We asked participants how much attention they had paid to time from "no attention to time at all" (=0) to "all attention to time" (=100).

Dynamical measures: To measure the temporal dynamics of passage of time judgments and time awareness, we developed a grid in which changes in the experience of time could retrospectively be indicated on a scale over five points in time (Figure 1).

The dynamical changes could only be assessed after, not during the waiting time, as this would have interfered with the experience of the passage of time itself. Participants would inadvertently become conscious when asked about passage of time, and their judgments on their experience of it would be skewed by an on-task questionnaire. Therefore, we adapted a method previously used in user experience research to track the dynamics of temporal experience retrospectively (Karapanos, Zimmerman, Forlizzi, & Martens, 2010). Participants were

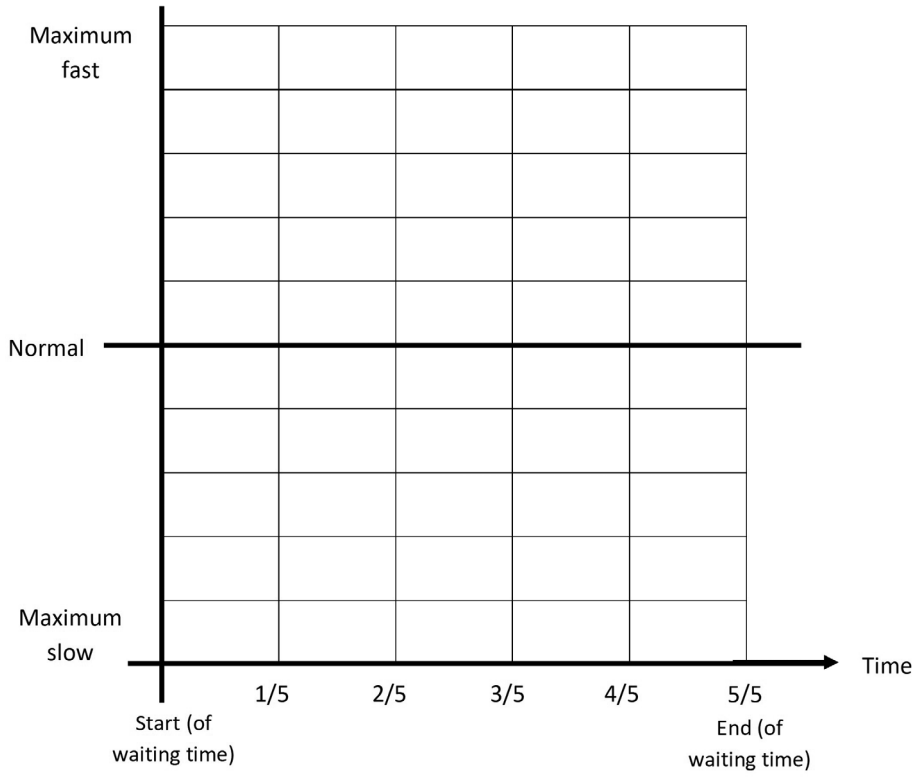

FIGURE 1 Dynamical measure of passage of time judgments. Participants were instructed to think of their entire wait inside the library and divide their wait time into five equal parts. They were asked to indicate in each column how fast or slow they felt time had passed in those five time spans compared to normal. Participants put a cross in one box of each column. For time awareness the measure was similar, with the end points of the columns representing "all attention to time" and "no attention to time" instead

instructed after the waiting period to mentally divide their waiting time into five parts, decide how the passage of time had felt during each part, and mark the corresponding boxes in the grid. Even though the scale was originally thought of as a 10-point scale for marking within the boxes (1 = maximum slow/no attention to time; 10 = maximum fast/all attention to time), participants who marked on the bold "normal" line between boxes five and six, was therefore given the value 5.5.

1.2.4 | Other scales (control variables)

To assess possible affective influences of environment on individuals, we included the explorative measures of room atmosphere, mood, and emotion.

Room atmosphere was measured using a German translation of the questionnaire on the Affective Quality of the Environment (Ehret et al., 2019; Russell & Pratt, 1980) on the atmospheric dimensions of valence and arousal that was divided into four scales: unpleasant–pleasant, sleepy–arousing, gloomy–exciting, and relaxing–distressing. Each scale was measured by 10 items on an 8-point scale (1 = extremely inaccurate; 8 = extremely accurate). Mood was assessed using the German Multidimensional Mood State Questionnaire (MDBF; Steyer, Schwenkmezger, Notz, & Eid, 1997) on the scales of good/bad, awake/tired, and calm/restless. Twenty-four items (12 pre- and 12 post measures) were rated on a 5-point scale (1 = not at all; 5 = very). Emotional state was measured using the 9-point Self-Assessment Manikin Scale (SAM; Bradley & Lang, 1994) that measured the bipolar scales of valence (unhappy/happy), arousal (calm/excited), and dominance (controlled/in control).

To check the manipulation of inducing an expectation of a negative event, we asked participants to indicate on a VAS (0 = not at all, 100 = very much), how much they thought of the pending stress test during the wait, to what extent they found the announcement of the stress test to be unpleasant, and to what extent they found the test itself to be unpleasant.

Although clocks were not directly visible and participants were instructed not to check the time, we asked the participants if they had seen any clocks; and if yes, if they had noticed the time. We also recorded step count as a measure of activity. However, due to the unreliable functionality of the hardware, step count was not included in the analyses. Temperatures in both libraries were held constant by air conditioning.

We also asked general questions about the personal background of the participants; their frequency of library visits; and their fondness for and interest in libraries, both in general and in the experimental setting in particular. Interviews on the experience of time and environment were conducted after the wait was concluded. The qualitative analysis of the interviews was published elsewhere (Ehret, Trukenbrod, Gralla, & Thomaschke, 2020).

1.3 | Procedure

All participants went once to each library on two different days. In each library, they were exposed to one of the two waiting conditions (active/passive). The order of the waiting conditions and the libraries were randomized. Before each session, participants signed a consent form and handed over their personal belongings including all timers, that is, watches and laptops, etc.

The sessions started with a pretest on mood and emotion. All participants were instructed that they would spend 60–100 minutes inside the library and not to intentionally look for clocks during their time inside. They received information that the study focused on how time is experienced in libraries. In cases where participants accidentally spotted a clock, they were instructed to report the lapse honestly to the experimenter at the end of the wait time. Participants received a step counter. Right before entering the library to start their wait, participants received specific instructions on the conditions: active/passive and negative/no expectation. The order of the two negative expectation instructions was randomized over the two sessions. In the active condition, the experimenter took the participants to a fixed starting point inside the library; and in the passive condition the researcher took the participants to one of the two seats reserved for this experiment. At the end of the sessions ($M_{wait/passive}$ = 87 minutes; $SD_{wait/passive}$ = 7 minutes; $M_{wait/active}$ = 79 minutes; $SD_{wait/active}$ = 13 minutes), participants in both conditions were picked up by the experimenter. As participants in the active waiting condition needed to be located, the search for the participants started after 60 minutes of waiting time. Subsequently, participants answered quantitative questionnaires on temporal experience, mood, emotion, and atmosphere before they were interviewed. For the participants expecting a negative event, six participants had to conduct the said stress test before the questionnaires and the interview and nine participants after. The assignment was randomized. The manipulation check for the induction of expectation was assessed at the end of each session. General questions on their personal background and their perceptions of libraries were asked after the second session.

1.4 | Design

The present study included the within-subjects factor *waiting condition* (active/passive) and the between-subjects factor *expectation* (negative/none). Due to the low power of the between-subjects comparison, we only report the results for waiting condition. Please see Data S1 for additional results. For temporal dynamics of passage of time judgments and time awareness over the waiting period, we added the within-subjects factor *point in time* with five retrospective measuring points as a predictor. For dependent time variables, we assessed the single measures of estimated time, passage of time judgments, feel judgments, and time awareness. Temporal dynamics were assessed for passage of time judgments and time awareness. Affective variables, and possible environmental or individual influences were also measured.

1.5 | Statistical analysis

Time variables were analyzed using multilevel models (Field, Miles, & Field, 2012). We analyzed the data with the software *R* (R Core

Team, 2017) using the package *nlme* (Pinheiro, Bates, DebRoy, Sarkar, & Core Team, 2020). Prior to the analyses, metric variables were z-standardized to obtain interpretable model-coefficients. Values for estimated time were normalized using the equation (*estimated time – clock time)/clock time*. Values above zero indicate a dilation of time, below zero a contraction. Feel judgments were calculated using the equation (*felt time – estimated time)/estimated time*. Values above zero indicate a felt deceleration of time, values below zero a felt acceleration of time.

The VAS-values (in cm) for passage of time judgments and time awareness were divided by the total length of the VAS and multiplied by 100, with higher values indicating a faster passage of time for passage of time judgments and more awareness of time for time awareness.

For mood and emotion, differential values of the pre- and post-measures were calculated. The scales of valence of emotional state (SAM) and awake-tired (MDBF) significantly correlated with all variables of subjective temporal experience and were used as additional predictors in the analysis of single measures. The results of a model

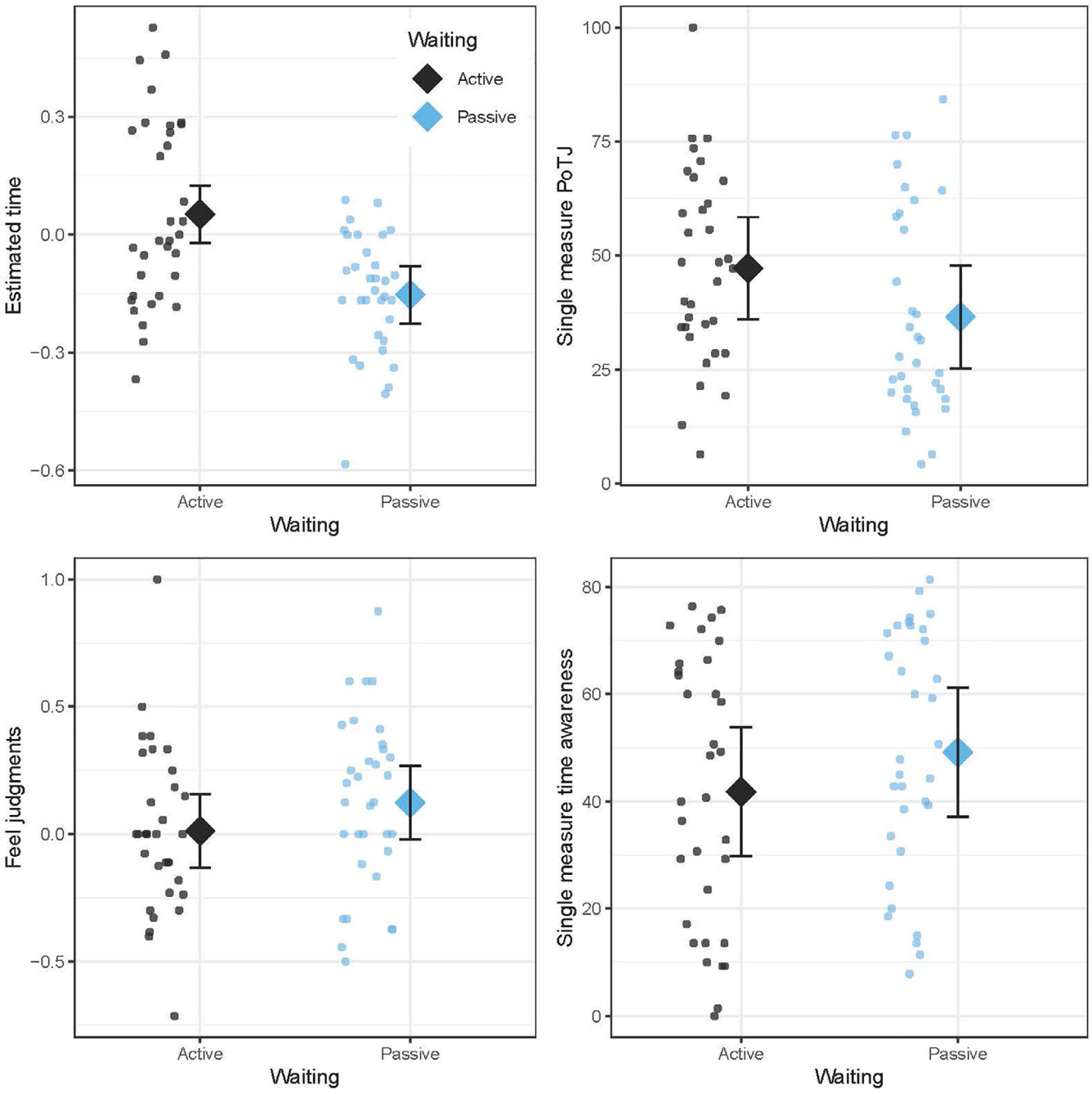

FIGURE 2 Means and individual values for single measures of subjective time for the within-subjects factor waiting time. Error bars represent the 95% SE confidence interval [Colour figure can be viewed at wileyonlinelibrary.com]

including these predictors as well as the factor *expectation* can be found in Data S1. Estimated time did not correlate with the variables of emotion, mood, or atmosphere.

In the present paper, we calculated a model that focused on the main effect of waiting condition on all single measures of subjective temporal experience. As these models are based on a singular categorial factor, we used a repeated ANVOA based on the ez-package (Lawrence, 2016). For temporal dynamics of passage of time judgments and time awareness, we calculated a model including main effects of waiting condition, point in time, and their interaction. Here, we used linear mixed effect models with maximum-likelihood estimations to treat point in time as a linear predictor. The independent variables were included as centered factors in the analysis: as sum contrasts for waiting condition and as a centered numeric predictor for point in time. According to Nakagawa and Schielzeth (2013), we reported marginal and conditional R^2 computed with the help of the MuMIn package (Bartoń, 2019).

The results of the full model including main effects, two-way interactions, and the three-way interaction of waiting condition, expectation, and point in time can be found in Data S1.

2 | RESULTS

2.1 | Single-measures

For estimated time, we found a significant main effect for waiting condition, $F(1,32) = 32.73$, $p < .001$, $\eta^2_G = .216$. As we expected, participants estimated time to be shorter in the passive than in the active waiting condition (Figure 2). As estimated time was normalized based on the actual time waited, this means that participants underestimated the actual waiting time in the passive condition (negative value) while they slightly overestimated it in the active waiting condition (positive value). The estimates ranged from 37 to 98 minutes for the passive condition and from 50 to 130 minutes for the active waiting condition.

For the single measure of passage of time judgments, waiting condition reached only marginal significance, $F(1,32) = 3.71$, $p = .063$, $\eta^2_G = .058$, with participants experiencing time descriptively faster in the active than in the passive waiting condition. For feel judgments, waiting condition was not a significant predictor, $F(1,32) = 2.46$, $p = .127$, $\eta^2_G = .028$. The single measure of time awareness was also not significantly predicted by waiting condition $F(1,32) = 1.55$, $p = .221$, $\eta^2_G = .024$. Additionally, we analyzed order effects by including order of the waiting condition as a between-subjects factor into the variance analysis for all four single-measure time variables. There were neither significant main effects for order of waiting condition nor significant interactions between order and the manipulation of waiting condition for all four variables.

2.2 | Temporal dynamics of passage of time judgments and time awareness

While the manipulation of waiting condition did not show a significant influence on the single measures of subjective temporal experience,

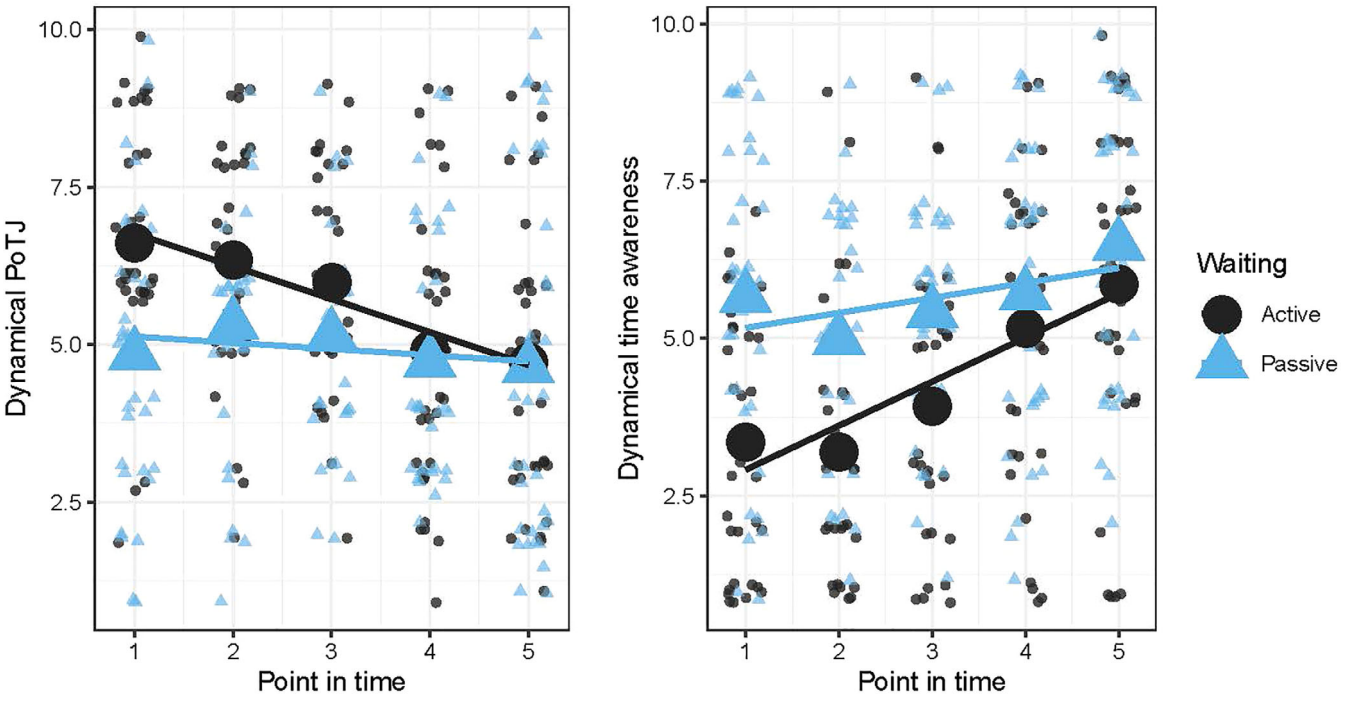

FIGURE 3 Interaction of waiting condition and point in time for the dynamical measure of passage of time judgments (A) and time awareness (B). Large dots represent mean values and lines represent the linear regression. Higher values indicate faster passage of time and higher time awareness [Colour figure can be viewed at wileyonlinelibrary.com]

we found significant effects on the temporal dynamics of passage of time judgments and time awareness in Model 2. For passage of time judgments, the model fit was R^2_m = .09, R^2_c = .26. We found significant main effects for waiting condition, b = 0.18, $t(163)$ = 3.80, p < .001, and for point in time, b = −0.14, $t(131)$ = 4.22, p < .001. There was also a significant interaction between waiting condition and point in time, b = −0.10, $t(163)$ = 2.88, p = .005 (Figure 3A). Analyzing the waiting conditions separately revealed that passage of time judgments only varied significantly over points in time for the active waiting condition, b = −0.24, $t(131)$ = 5.60, p < .001, but not for the passive waiting condition. In Figure 3A, it becomes evident that the slope is steeper for the active condition as passage of time slows down more than in the passive condition.

Comparing the waiting conditions for each point in time, we found a significant difference between passive and active waiting for the first point in time, $t(32)$ = 4.29, p < .001, for the second point in time, $t(32)$ = 2.60, p = .014, for the third point in time, $t(32)$ = 2.08, p = .046, but no difference for the fourth and fifth point of time, t's < 1, p's > .7. The three-way interaction was not significant.

For the dynamical measure of time awareness, the model fit was R^2_m = .17, R^2_c = .34. There were significant main effects for waiting condition, b = −0.27, $t(162)$ = 6.01, p < .001, and point in time, b = 0.19, $t(131)$ = 5.99, p < .001. We found a significant interaction between waiting condition and point in time, b = 0.09, $t(162)$ = 2.95, p = .004 (Figure 3B).

Analyzing the influence of point in time separately for both conditions, we found a significant main effect within the passive waiting condition, b = 0.10, $t(131)$ = 2.15, p = .033, and the active waiting condition, b = 0.28, $t(130)$ = 7.35, p < .001. Again, Figure 3B depicts that the slope for the active waiting condition is evidently steeper than the passive condition as time awareness increases faster. When comparing the waiting condition within each point in time, we found a significant difference for the first point in time, $t(32)$ = 4.44, p < .001, the second point in time, $t(32)$ = 3.84, p < .001, the third point in time, $t(31)$ = 3.65, p = .001, but not for the fourth and fifth points in time, t's > −1.2, p's > .25.

3 | DISCUSSION

In the present study, we examined how being active during waiting influences temporal experiences dynamically over time. To this end, 33 participants waited on one occasion passively and actively on another in two different libraries. We assessed estimated time, passage of time judgments, feel judgments, and time awareness. We found that time was estimated to be shorter in the passive waiting condition when compared to the active waiting condition. For the dynamics of passage of time judgments and time awareness, in the beginning participants perceived the passage of time to be slower and were more aware in the passive waiting condition compared to the active waiting condition. This difference dissolved over time and the temporal experience in the active waiting condition leveled the passive waiting condition after about half of the waiting time.

For estimated time, the results were as expected. According to the Attentional-Gate Model, the results suggest that the low arousal in the passive waiting condition compared to the high arousal in the active condition could have slowed down the pacemaker so that fewer pulses could be accumulated which resulted in shorter estimates. Another explanation would conflict with Zakay's (2015) assumption that waiting times automatically engages prospective duration judgments. This explanation implies that the temporal task was not prospective, but retrospectively reconstructed from memory. As retrospective duration judgments were determined by the amount of information processed (Pöppel & Bao, 2014), low information processing while waiting passively could have shortened duration judgments in the present study. Thönes and Wittmann (2016) also suggest that estimates of time span in the minute-hour range can be seen as prospective timing, which is limited by working memory capacity. Our study cannot, however, dissociate between those options. Therefore, further research is necessary.

The pattern found for the dynamical measure of passage of time judgments and time awareness can be explained by an increase of distress over waiting time (Osuna, 1985). Adding to distress, the temporal uncertainty of the waiting situation comes back to mind with the end approaching (Sweeny, 2018). Due to the lack of activity while waiting passively, participants had a high level of time awareness from the beginning to the end of the experiment. As the expected end of the wait time approaches, also for the active condition, the focus shifts from the activity to the passage of time. Thus, passage of time becomes more aware and starts dragging. There was no difference between active and passive waiting for the single-measures of passage of time judgments and time awareness. One explanation might be that the single-measures only reflect the subjective temporal experience in the end of the wait time and do not take the whole wait time into account. This underlines the importance of employing dynamical measures to fully understand temporal experience while waiting.

Although the presented dynamical measure of temporal experience has the advantage of being less invasive than measuring throughout the wait, the retrospective nature of it could have distorted effects on temporal experiences due to memory interferences. In user experience design, it is already a commonly applied method (Karapanos et al., 2010). Thus, the validation of the measure in the context of temporal experiences should be the subject of future research. The manipulation of the waiting condition aimed to focus on passivity as an important characteristic of waiting time; and thus, drastically affected the extent of potential activities (Klapproth, 2010). Yet, the manipulation could be naturally confounded—the sensory stimulation while walking around and sitting could have differed. Additionally, the active condition was goal-directed ("go explore") to keep participants active whereas the passive condition did not include any such request. On the other hand, to keep sitting for over an hour could also be seen as a challenging goal. The passive condition could also have been more boring to the participants than the active condition. However, according to Eastwood, Frischen, Fenske, and Smilek (2012), boredom can be linked to both, high arousal (restlessness) and low arousal (lethargy). Moreover, wait times in the active

condition were shorter and more variable than in the passive condition. Therefore, future research should focus on disentangling different influences further. Regarding the between-subjects factor expectation, results reported in Data S1 should be interpreted with caution due to the very small sample size; and thus, low test power.

It is also important to note that the results of the current study only reflect the general, systematic tendency of the temporal experience. When looking at the data on an individual level, participants also present non-linear trends (for details see Data S1). Several studies showed that dispositional factors like impulsivity and self-regulation can have an influence on the experience of waiting. (Jokic et al., 2018; Witowska et al., 2020). Sweeny (2018) also showed that states of consciousness such as flow and mindfulness can support coping with uncertainty in waiting situations. Therefore, future studies should also focus on individual influences that account for different patterns in the dynamics of temporal experiences.

We conclude for subjective temporal experience that the possibility of engaging in activities becomes less important the longer the wait time elapses. As the assessment of the dynamics of subjective temporal experiences seems promising, future studies should focus on these dynamics for different waiting situations; for example, examine the effects of uncertainty and self-determination on waiting under controlled conditions.

4 | CONCLUSION

The present study showed that temporal experiences of wait times differ between passive and active wait times over the course of time. While waiting passively, the passage of time is perceived to pass slower and individuals are more aware of the passage of time than while waiting actively, especially in the beginning. However, the temporal experience adapts in an active condition over time due to a more rapid increase of time awareness and a deceleration of passage of time over the course of waiting. This could be an effect of temporal uncertainty and distress coming back to one's mind, shifting the focus from the current activity to the waiting time. So, with regard to subjective temporal experiences, the longer you wait the less it matters what you do.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

DATA AVAILABILITY STATEMENT

Raw data are available in Open Science osf.io/kpt3h.

ORCID

Sonja Ehret https://orcid.org/0000-0002-6698-9945
Anna K. Trukenbrod https://orcid.org/0000-0003-4994-2288

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SUPPORTING INFORMATION

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