The Effect of Waiting Environment and Perceived Atmosphere on Temporal Experience

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ABSTRACT

Previously, it was shown that the environment of a waiting room can influence the perception of waiting time. The goal of the current study was to examine how waiting environment influ-ences temporal experience, and to explore which dimensions of room atmosphere predict the perception of waiting time. Twenty-four participants spent 90 minutes in an ordinary doctor's waiting room, and on a different day, another 90 minutes in a sacral room of a distinctly contemplative character. As dependent variables, we assessed various aspects of temporal experience, including passage-of-time judgments, time awareness judgments, and duration judgments for the waiting time. As independent variables, we assessed the perceived atmosphere of the waiting environment along different dimensional scales, including detachment, coziness, liveliness, tenseness, and valence. The results suggest that perceived valence, detachment, and tenseness of a room predict passage-of-time judgments and time awareness judgments. However, more research is needed to confirm these results. Furthermore, the results were likely biased towards an increased time awareness due to the within-subjects design of the study. Nevertheless, a possible explanation could be that especially unpleasant and detached rooms draw one's attention towards time, whereas more pleasant and less detached rooms allow attention to be deployed on the nontemporal aspects of the situation.

KEYWORDS

contemplative environment
room atmosphere
temporal experience
timing
waiting

INTRODUCTION

Waiting is mainly characterized by a lack of activity (Klapproth, 2010). Due to this lack of activity, one becomes aware of oneself and the passage of time (Jokic et al., 2018). Consequently, waiting affects the perception and experience of time (Jokic et al., 2018; Sweeny, 2018), while the context of waiting can modulate these effects (Gasparini, 1995). In the present study, we focused on the effects of waiting environments on temporal experience. Specifically, we compared two rooms with strongly contrasting functionality with regard to spending time. An ordinary waiting room in a medical doctor's office was juxtaposed with a contemplative sacral room where visitors typically spend time on purpose. The aim of the study was to investigate how the function of the waiting room affects temporal experience, and more importantly, to explore the role the atmosphere of the room plays in this context.

The potential of an environment to induce a specific feeling or mood in individuals when sojourning in that environment is often referred to as the "atmosphere" of the environment (Böhme, 2017). Atmosphere in this context can be defined as the affective qualities of a physical environment (Russel & Pratt, 1980). The physical environment does not deterministically enforce a certain perceived atmosphere. Instead, the atmosphere emerges in the interaction between the object (i.e., the physical environment) and the subject (i.e., the individual, Böhme, 2017). The perceived atmosphere might be in part due to the individual's current emotional state. However, the perception of the atmosphere itself and the emotions that can be evoked by an atmosphere have to be distinguished (Böhme, 2017). The potential of a physical environment to elicit a certain mood can be perceived even in situations where, due to the current emotional situation of the individual, it not result in that mood. For instance, an individual could recognize that a room has a relaxing atmosphere but could still feel stressed because of a long to-do list. Accordingly, the perception of atmosphere and the emotional reaction may differ. Another important factor in the perception of atmosphere is the cultural learning history, the experiences, and attitudes the individual has with respect to the type of

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building, and so forth. This factor is rather trait-like and acquired via a long learning history. Nevertheless, the environment has a decisive, yet nondeterministic, impact on perceived atmosphere, and is, in contrast to personal factors, under the experimenter's control[1]. Psychometric tools to measure different dimensions of a space's atmosphere were developed by Russell and Pratt (1980), and later Vogels (2008). Russel and Pratt (1980) defined valence and arousal as the relevant dimensions of atmosphere. Vogels' (2008) questionnaire focuses on the dimensions of detachment, liveliness, tenseness, and coziness. There are also studies using the semantic differential method with juxtapositions of bipolar adjectives (e.g., Yamasaki et al., 2015).

There is abundant evidence that emotions can strongly affect temporal experiences (Droit-Volet, 2018). Thus, a substantial part of the effect of a room on temporal experience might be due to perceived atmosphere, over and above the influence of the room context. Of course, both effects might interact or depend on each other. The present study aimed to examine whether the spatial environments themselves influence the experience of time during waiting due to their purpose. A second aim was to explore whether the perception of certain atmospheric qualities can predict the experience of time.

Regarding temporal experience, we differentiate between duration judgments, passage-of-time judgments (PoTJ, Wearden, 2015), and time awareness judgments. While duration judgments are measured by participants' estimates of time, PoTJ determine how fast or slow the passage of time felt (Wearden, 2015). Passage-of-time judgments also include feel judgments that indicate how long (in minutes) a waiting time felt (Wearden, 2015). Time awareness judgments determine to what extent the passage of time was in the subjective focus of attention or not (Ehret et al., 2019). In general, waiting times are overestimated and experienced to pass slowly and with a high time awareness (Jokic et al., 2018). Since the waiting room is more strongly associated with a real-life waiting scenario than the contemplative room, we expected that that the perception of passage of time would be slower and awareness of time would be higher in the waiting room than the contemplative room. Similar expectations can also be derived from studies that found an association between boredom and a slower passage of time and higher time awareness (Danckert & Allman, 2005; Witowska et al., 2020).

Timing research has mainly examined the effects of physical features on temporal experience. For example, Van Hagen and Galetzka (2014) examined how colored lighting and background music can change the experience of time in a virtual train station. Dimly lit surroundings appeared to evoke positive emotions and a faster passage of time. Motivational aspects also played an important role as only recreational passengers (in contrast to goal-directed passengers) experienced the passage of time as faster when exposed to stimulating compared to calming music. Also, when participants listened to music they like, they experienced time as passing faster (Areni & Grantham, 2009). In natural environments, the passage of time is experienced as slower and in a more awareness-provoking manner, and durations are overestimated compared to urban environments (Berry et al., 2015; Davydenko & Peetz, 2017; Ehret et al., 2020).

In the presented literature, environments were assumed to affect temporal experience through their physical characteristics. However, the perception of the atmosphere can also influence temporal experience. For example, it was found that a more pleasantly perceived atmosphere (due to music or spatial features) can decrease time awareness (Ehret et al., 2019). Ehret et al. (2019) focused on the valence of atmosphere created by pretested, unambiguously pleasant and unpleasant settings. The aim of the present study was to investigate temporal experience using real-life environments with atmospheres that are more complex and can be perceived differently between individuals. We assumed an exploratory focus and aimed at assessing and documenting the effects of a range of atmosphere variables on temporal experience. Besides assessing the valence of atmosphere, we also examined the effects of the atmospheric qualities of detachment, liveliness, tenseness, and coziness introduced by Vogels (2008).

METHODS

Participants

Twenty-four students (M_{age} = 24.46, SD_{age} = 3.72; 50 % female, 50 % male) participated in the study. On average, participants indicated that they were not very to moderately religious (M = 1.74, SD = 1.74 on a scale of 0 = *not religious* to 5 = *very religious*). They all signed an informed written consent form and received either 48 euro or course extra credit for their participation.

Materials

CREATION AND MEASUREMENT OF ATMOSPHERE

We manipulated the subjectively perceived atmosphere by means of two highly objectively different environments. That is, we chose two highly different rooms to elicit a sufficient variation in atmosphere ratings. In order to create a typical waiting situation, we chose a doctor's waiting room in a local general practitioner's office, appearing to the authors as having a typical waiting room atmosphere (see Figure 1). In contrast to a typical waiting room, we chose a contemplative room, the Maria Magdalena Church in Freiburg (see Figure 1), Germany. According to theoretical analyses of its architecture (e.g., Ludwig & Mawick, 2007), the church is characterized by a distinctly contemplative atmosphere.

The perceived atmosphere was assessed using a visual analog scale (VAS; Hayes & Patterson, 1921) measuring valence from "pleasant" on the leftmost end to "unpleasant" on the rightmost end, with higher values indicating a more unpleasant atmosphere (e.g., Wunsch et al., 2003). Additionally, the perceived room atmosphere was assessed with a 7-point scale questionnaire developed by Vogels (2008), measuring the underlying dimensions of coziness, liveliness, tenseness, and detachment. The 38 atmosphere-related adjectives were translated from Dutch into German.

TEMPORAL EXPERIENCE

Temporal experience was measured by PoTJ, feel judgments, time awareness judgments, and duration judgments of waiting time.

FIGURE 1.

Left: A local general practitioner's office used as the doctor's waiting room condition. Right: The interior of the Maria Magdalena church in Freiburg, Germany used as the contemplative room condition © ksg / Fotos: Christian Richters.

Following Wearden (2015), PoTJ were assessed by a visual analogue scale asking participants whether they had the feeling that during waiting time the time passed faster or slower than usual (from 0 = *slower than usual* to 100 = *faster than usual*). Additionally, passage of time was measured by participants rating their overall feel judgments in minutes ("How long did the 90 minutes of waiting time feel for you?"). For time awareness judgments, participants rated whether they paid more or less attention to time than usual on a VAS (from 0 = *less attention than usual* to 100 = *more attention than usual*). To avoid an experimental bias towards time perception, duration judgments were only retrospectively assessed on the second session. At some randomly chosen time point during the waiting time (either after one- or two-thirds of the total waiting time), the experimenter entered the room and approached the participant asking whether they felt OK. At the end of the 90-minute waiting session, the participants had to estimate (in minutes) how much time had passed since they had been asked by the experimenter and how long this duration subjectively felt as a retrospective feel judgment, in addition to the overall feel judgment. At the end of the second session, the participants were additionally asked to compare the speed of passage of time and the time awareness between the first and the second sessions on a VAS as a subjective comparison between the two sessions. Table 1 gives an overview on the different variables of temporal experience and how they were operationalized.

OTHER SCALES

Despite our study's focus on atmosphere and temporal experience, we administered other test instruments targeting dimensions which are potentially related to temporal experience. Based on previous studies (Berlin et al., 2004; Droit-Volet et al., 2013; Rammsayer, 1997), we additionally assessed mood (German Multidimensional Mood State Questionnaire, Steyer et al., 1997), emotion (Self-Assessment Manikin Scale, Bradley & Lang, 1994), impulsivity (German Barratt Impulsiveness Scale, Meule et al., 2011), neuroticism, extraversion, and openness to experience (Five Factor Inventory, Borkenau & Ostendorf, 2008), religiousness, and age. A semi-structured interview was conducted at the end of each session. As our study focused on the quantitative effects of atmosphere on temporal experience, the additional variables and qualitative data are not reported within this article. The exploratory analysis of additional variables and the interview guideline are accessible at Open Science Framework (https://osf.io/hrywb/).

Procedure

All participants were tested in the church and in the doctor's waiting room, in two sessions on two different days. The order was counterbalanced. Testing was done during regular opening hours (church: 10am-5pm; doctor's waiting room: 8am-noon, 2pm-5pm) of both rooms. Before testing, participants handed over all timers (i.e., notebooks, watches, smartphones) to the experimenter.

Each testing session started with a pretest of mood and emotion. Then, participants were informed that they would be waiting inside the room for 90 minutes until the experimenter would approach them. It was entirely left to them how to spend the time while waiting in the respective condition, and what to take with them (except timers, see above). Only during the second session, after a randomly determined interval between 23 and 65 minutes from the beginning, the experimenter entered the room, briefly asking the participant if everything was OK, and immediately left the room again.

After 90 minutes of waiting in the environment, surveys and interviews were conducted in a separate room next to the rooms in which participants had waited. First, they were asked to answer questionnaires about their temporal experience, mood, emotion, and room atmosphere. Thereafter, a semi-structured interview was conducted on the perception of waiting time and the room itself. The procedure of the second session was in accordance with the first, with additional questions on estimated duration, personality, and an explicit comparison between the two environments.

TABLE 1.
Overview of Time Perception Measures and How They Were Assessed

Measure	Assessed at	Assessment method	Data transformation (interpretation)
Passage-of-time judgment (PoTJ)	End of each session	Visual analogue scale to assess the perceived speed of the passage of time	Rating/length of scale X 100 (0 = *slower than usual*, 100 = *faster than usual*)
Overall feel judgements	End of each session	Subjectively felt minutes of the 90-minute session	Raw number in minutes was used directly (90 minutes as reference: estimated and clock time identical)
Time awareness	End of each session	Visual analogue scale to assess whether participants were more or less aware of time than usual	Rating/length of scale X 100 (0 = *less attention than usual*, 100 = *more attention than usual*)
Retrospective duration judgment	End of second session	Estimated time in minutes of how much time had passed since the experimenter interrupted	(estimated time – clock time)/clock time (0 as reference: estimated and clock time identical)
Retrospective feel judgment	End of second session	Subjectively felt time (in minutes) since the experimenter interrupted	(felt time – estimated time)/ estimated time (0 as reference: felt and estimated time identical)
Comparative PoTJ	End of second session	Visual analogue scale to compare the speed of passage of time between the two conditions	Rating/length of scale X 100 (50 as reference: passage of time equal in both conditions)
Comparative time awareness	End of second session	Visual analogue scale to compare the awareness of time between the two conditions	Rating/length of scale X 100 (50 as reference: awareness of time equal in both conditions)

Design and Data Analysis

The present study examined whether the exposure to a waiting environment affects temporal experience by manipulating the within-subjects factor of environment (waiting room vs. contemplative room). This was tested by comparing the conditions with t tests for each variable measuring temporal experience. The values for PoTJ and time awareness judgments were divided by the total length of the visual analogue scale (14 cm) and multiplied by 100. For overall feel judgments, the raw numbers were used as all participants were informed about the total duration of wait time (90 min) as a reference. Retrospective duration judgments were calculated using the formula of (estimated time – clock time)/clock time and feel judgments based on this retrospective estimation were calculated using the formula of (felt time – estimated time) / estimated time.

In the second step, we performed exploratory analyses to examine whether the perception of valence, detachment, liveliness, tenseness, and coziness could predict temporal experience. Therefore, for each variable measuring temporal experience, we included all five atmosphere variables in multilevel models with a random intercept for participant ID (Field et al., 2012). Because we expected order effects, we included the order in which participants had taken part in the two conditions as an additional independent variable.

Model 1: DV ~ detachment + coziness + liveliness + tenseness + valence, random = ~ 1|ID

For retrospective duration judgments and retrospective feel judgments, we calculated a linear mixed model without random intercept as there was no repeated-measures factors involved:

Model 2: DV ~ detachment + coziness + liveliness + tenseness + valence

All metric variables were z-standardized to obtain interpretable model-coefficients. We used the maximum-likelihood method to estimate models. We analyzed the data with the software *R* (R Core Team, 2017) using the package nlme (Pinheiro et al., 2020). We also calculated the variance inflation factor (VIF) to check for collinearity. According to Hair et al. (2018), collinearity issues can occur for VIF values of 5 or above and sometimes also for 3 and above. As for all models, one VIF value was above 3, we additionally calculated five single models for each time perception variable, including the atmosphere predictors only separately:

Model 3: DV ~ atmosphere scale, (random = ~ 1|ID)

This study employed an exploratory approach and aimed at assessing the effects of a range of atmosphere variables on temporal experience. To increase statistical sensitivity, we did not adjust the level of significance for multiple testing.

RESULTS

Atmosphere Ratings of Environments

Before assessing the effects of atmosphere on temporal experience, we checked how participants generally perceived the rooms' atmospheres with *t* tests for each of the five atmosphere scales of valence, detachment, liveliness, tenseness, and coziness (see Figure 2).

The valence of the atmosphere in the waiting room was rated as statistically significantly more pleasant than in the contemplative room, $t(23) = 2.56$, $p = .018$, $d = 0.52$. The atmosphere ratings for detachment were statistically significantly higher for the contemplative room than for the waiting room, $t(23) = 6.29$, $p < .001$, $d = -1.28$, and the contemplative room was also rated as statistically significantly livelier than the waiting room, $t(23) = 3.15$, $p = .004$, $d = -0.64$ There was no statistically significant difference between the two rooms for the atmospheric dimensions of coziness, $t(23) = 1.36$, $p = .186$, $d = 0.28$, and tenseness, $t(23) = 1.45$, $p = .161$, $d = 0.30$[2].

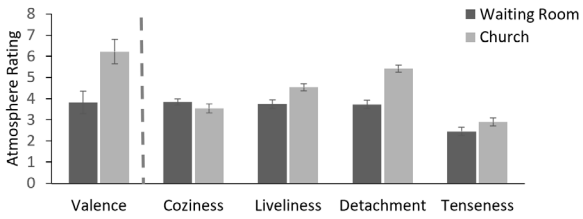

FIGURE 2.

Sample means of atmosphere ratings comparing the doctor's waiting room with the contem-plative environment. Valence was rated on a 14 cm visual analog scale (VAS) and coziness, liveliness, detachment, and tenseness were rated on a 7-point scale. The maximal value of valence was 14 (*unpleasant*), whereas the maximum value for the other four dimensions was 7. Error bars represent 1 *SD* of the mean.

The Effect of Waiting Environment on Temporal Experience

Table 2 displays the means and SDs of all variables of temporal experience. We tested if there was a direct influence of the room itself—rather than subjective ratings—on temporal experience. A within-subject analysis for indicators of temporal experience including PoTJ, overall feel judgments (i.e., how long the entire session felt), and time awareness did not reach statistical significance.

As part of exploratory analyses, we also looked at between-subject comparisons for the retrospective duration judgments, retrospective feel judgments, comparative PoTJ, and comparative time awareness. Due to the small sample size, we only looked at the effect sizes and did not perform any t tests. We found large effects for retrospective duration judgments and retrospective feel judgments. There was a tendency for time durations to be overestimated in the contemplative environment compared to the waiting room environment. Passage of time ratings were also shorter in the contemplative environment compared to the waiting environment. Furthermore, there was a small effect for comparative PoTJ and a negligible effect for comparative time awareness (see Table 2).

The correlations between the different variables of temporal experience were mostly small to moderate. A correlation table can be found in the Appendix.

Perceived Atmosphere as a Predictor for Temporal Experience

For PoTJ, neither Model 1 nor any one of the atmospheric predictors included separately in Model 3 were significant.

For overall feel judgments (i.e., how long the entire session felt), Model 1 was not statistically significant. Including the atmosphere scales separately in Model 3, we found statistically significant effects of detachment, $b = 0.34$, $t(23) = 2.37$, $p = .027$, tenseness, $b = 0.35$, $t(22) = 2.55$, $p = .018$, and valence, $b = 0.38$, $t(22) = 2.75$, $p = .011$. Passage of time was rated as slower when the atmosphere was perceived as more detached, tense, and unpleasant (see Figure 3, Panel A).

For time awareness, Model 1 was not statistically significant. When included separately in Model 3, detachment, $b = 0.34$, $t(22) = 2.50$, $p = .020$, tenseness, $b = 0.35$, $t(22) = 2.62$, $p = .015$, and valence, $b = 0.41$, $t(22) = 3.21$, $p = .004$, were statistically significant predictors. Participants rated being more aware of the passage of time when they perceived the atmosphere as more detached, tense, and unpleasant (see Figure 3, Panel B).

For the retrospective duration judgments, Model 2 showed statistically significant effects for liveliness, $b = -0.72$, $t(17) = 2.21$, $p = .041$. When including the atmosphere scales separately in Model 3, liveliness, $b = -0.58$, $t(17) = 2.43$, $p = .024$ was a statistically significant predictor. Time was estimated as longer when participants perceived the atmosphere as more detached, more unpleasant, and less lively (see Figure 3, Panel C).

For retrospective feel judgments (i.e., how long the time since the experimenter interrupted felt), none of the predictors were statistically significant in both models.

The results of the mixed models can be found in Tables 2A to 2E in the Appendix.

We examined how spending time in different atmospheres can predict temporal experience. Participants spent 90 minutes in a waiting environment and in a contemplative environment, on two different days. As atmospheric dimensions, we assessed perceived valence, detachment, tenseness, coziness, and liveliness. As dependent variables for time perception, we measured PoTJ and overall feel judgments (i.e., how long the entire session felt), time awareness judgments, and retrospective duration judgments (i.e., how long since the experimenter interrupted). We examined how the purpose of an environment (wait-

TABLE 2.

Means and Standard Deviations of the Time Perception Measures

	Doctor's waiting room		Contemplative room			
	n	*M* (*SD*)	*n*	*M* (*SD*)	*p*	*d*
Passage-of-time-judgment (PoTJ)	24	40.33 (20.04)	24	39.58 (22.15)	.899	0.03
Overall feel judgements	24	77.29 (22.84)	24	81.04 24.18	.645	0.10
Time awareness	24	54.23 (25.68)	24	62.71 (25.47)	.267	0.23
Retrospective duration judgments	12	-0.23 (0.13)	12	0.13 (0.58)	-	0.86
Retrospective feel judgments	12	0.12 (0.26)	12	-0.06 (0.16)	-	0.84
Comparative PoTJ	12	51.43 (34.29)	12	44.76 (29.35)	-	0.21
Comparative time awareness	12	43.75 (27.13)	12	45.54 (26.08)	-	0.07

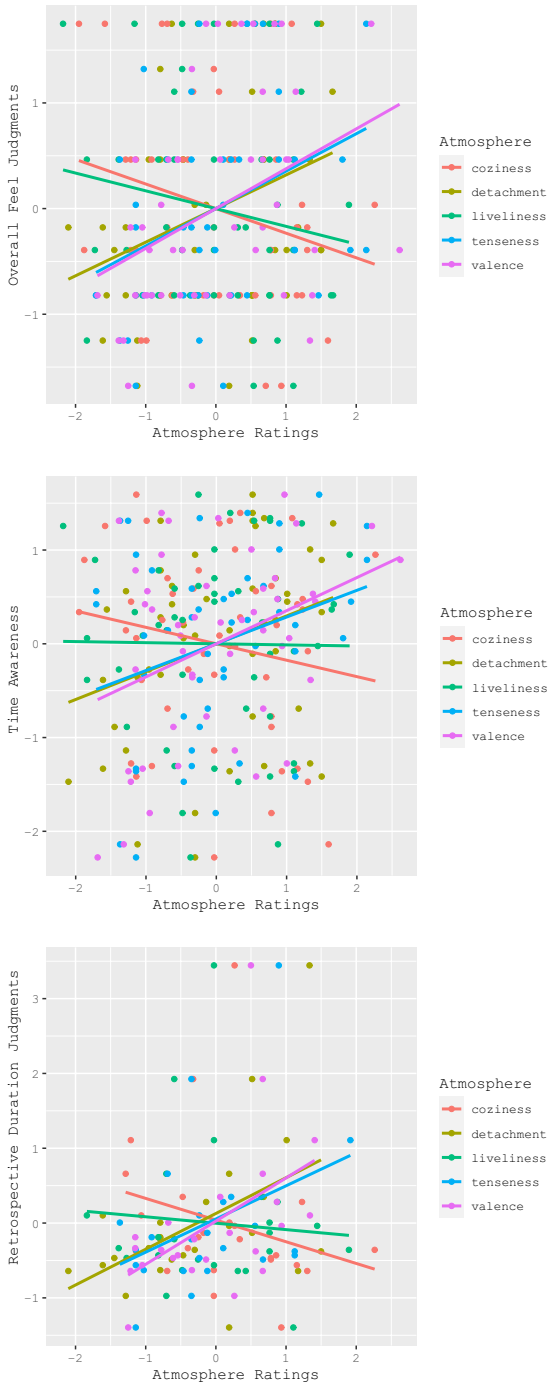

FIGURE 3.

Z-standardized values of atmosphere ratings for cozi-ness, detachment, liveliness, tenseness, and valence as predictors and overall feel judgments (a), time aware-ness (b), and retrospective duration judgments (c) as dependent time variables.

ing vs. contemplative) and the subjectively perceived atmosphere influenced the temporal experience.

Regarding our first research question of how the nature of the waiting environment contrasted by a contemplative environment can influence temporal experience, we expected that the passage of time in the waiting environment would be experienced as slower and would be overestimated. For feel judgments based on retrospective duration judgments, there was a trend towards estimating time as longer in the ordinary waiting room than in the contemplative environment. For retrospective duration judgments, there was a trend towards estimating time as shorter in the waiting environment than in the contemplative environment. As this was not expected, two alternative explanations that lie in the physical features of the used environments might account for this finding. A simple explanation could be the larger size of the contemplative compared to the waiting environment, since it was shown that time estimates are longer in larger compared to smaller rooms (Riemer et al., 2018). An alternative interpretation would draw on the relation of contemplative and restorative environments (Korpela et al., 2001; Krinke, 2005). As restorative natural environments were shown to prolong duration judgments (Davydenko & Peetz, 2017), the contemplative environment of the present study could have affected the duration judgments due to its restorative potential. It is also noteworthy that our manipulation affected feel judgments and duration judgments in opposite directions and, thus, supported the assumption that these measures involve different cognitive processes (Wearden et al., 2014).

For the overall assessment of PoTJ and time awareness, the environment itself did not have an effect, whereas the individually perceived qualities of the atmosphere played an important role. When participants perceived the atmosphere as more detached, tense, and unpleasant, this could predict longer overall feel judgments and an increase in awareness of time. The effect of perceived valence was in line with the results by Ehret et al. (2019). The present study extends these findings by the atmospheric qualities of detachment and tenseness. Apparently, the individual perception of more complex atmospheric qualities can also influence temporal experience.

For the retrospective duration judgments, we found that a less lively perception of the atmosphere could prolong the estimates.

To sum up, the results of the current study suggest that real-life environments and the perception of their atmospheric qualities affect in particular the experience of the passage of time. We found that the atmospheric qualities of valence, detachment, and tenseness have the potential to increase awareness of the passage of time and also prolong feel judgments. However, more research is needed to confirm these results. Future studies should specifically focus on individually perceived atmosphere and its effects on temporal experience. A differentiated picture of environmental effects on temporal experience might also facilitate the design of appropriate waiting environments.

The current study has several limitations. First, the sample size was small. We assumed that the long waiting times would produce effects of large magnitude. However, the reported effect sizes should not be regarded as good estimates of the true magnitude, as the estimation might be imprecise due to limited power. Second, we did not adjust the level of significance for multiple testing because our goal was to explore the effects of a range of atmosphere variables on temporal experience. Therefore, there is an increased risk of false-positive findings. Our results should be regarded as tentative and need to be confirmed by future research. Third, there may have been interaction effects between atmospheric qualities of the environment and participants' mood.

Conceptually, the perception of an atmosphere itself and the emotions that can be evoked by an atmosphere have to be distinguished (Böhme, 2017). Despite their conceptual independence, mood or emotion might nevertheless be correlated with atmosphere ratings. This should be investigated in future research.

DISCUSSION

We examined how spending time in different atmospheres can predict temporal experience. Participants spent 90 minutes in a waiting environment and in a contemplative environment, on two different days. As atmospheric dimensions, we assessed perceived valence, detachment, tenseness, coziness, and liveliness. As dependent variables for time perception, we measured PoTJ and overall feel judgments (i.e., how long the entire session felt), time awareness judgments, and retrospective duration judgments (i.e., how long since the experimenter interrupted). We examined how the purpose of an environment (waiting vs. contemplative) and the subjectively perceived atmosphere influenced the temporal experience.

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CONCLUSIONS

When waiting in an ordinary waiting environment, passage of time is perceived as slower than waiting in a contemplative sacral environment. Additionally, the three dimensions of atmosphere valence, detachment, and tenseness were substantial predictors for feel judgments and time awareness judgments. The results suggest that room atmospheres have complex and characteristic effects on temporal experience. As not all aspects of temporal experience were affected in the same way, future research might further entangle the effects of environment on timing by manipulating physical features, purpose, and atmospheric qualities independently of each other.

FOOTNOTES

1. To make the concept and manipulation of perceived atmosphere clearer, consider an analogy to psychopharmacological experiments. In such experiments, the experimenter might, for example, administer high and low dosages of alcohol before a cognitive task in order to determine the impact of alcohol on cognition. In such experiments, the experimenter typically does not treat the administered dosage as the main independent variable. Participants usually differ strongly in body weight, metabolic characteristics, liver function and so forth so that the same administered amount leads to different blood alcohol

levels. Thus, instead of the administered dosage, typically, the resulting blood alcohol level figures as the main independent variable. This logic is analogous to our use of perceived atmosphere: We manipulated the objective environment in a way that is likely to elicit highly different perceived atmospheres of the environments. However, these objective environments do not deterministically enforce a certain perceived atmosphere. Thus, the main independent variable is the actually perceived atmosphere, not the environmental manipulation.

2. Additionally, we found a few correlations between mood or emotion with atmosphere ratings. For the contemplative room, we found correlations between positive/negative mood and detached atmosphere ratings, $r(22) = .56$, $p = .004$; positive/negative mood and cozy atmosphere ratings, $r(22) = .-50$, $p = .013$; positive/negative mood and tense atmosphere ratings, $r(22) = .45$, $p = .008$; positive/negative mood and atmosphere valence ratings, $r(22) = .63$, $p = .001$; and awake/tired and cozy atmosphere ratings, $r(22) = .45$, $p = .028$. For the doctor's waiting room, we found correlations between positive/negative mood and atmosphere valence ratings, $r(21) = .43$, $p = .043$; calm/nervous mood and tense atmosphere ratings, $r(22) = .52$, $p = .012$; calm/nervous mood and atmosphere valence ratings, $r(21) = .63$, $p = .002$; emotional arousal and atmosphere valence ratings, $r(21) = -.48$, $p = .021$; and emotional valence and atmosphere valence ratings, $r(21) = .42$, $p = .046$.

ACKNOWLEDGEMENTS

This work was funded by the German Research Foundation under Grant 197396619–SFB 1015).

The authors report no conflict of interest.

DATA AVAILABILITY

Data are available on the Open Science Framework at osf.io/hrywb/

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RECEIVED 29.07.2021 | ACCEPTED 27.04.2022

APPENDIX

TABLE A1.
Correlations Between the Different Variables of Temporal Experience

		Waiting room					Contemplative room				
		PoTJ	oFJ	TA	rDJ[a]	rFJ[a]	PoTJ	oFJ	TA	rDJa	rFJa
Waiting room	PoTJ	1									
	oFJ	−0.19	1								
	TA	−0.18	0.20	1							
	rDJ	0.10	0.63	−0.35	1						
	rFJ	−0.41	0.08	0.78	−0.52	1					
Contemplative room	PoTJ	0.09	0.60	0.10	-	-	1				
	oFJ	0.52	−0.40	−0.28	-	-	−0.58	1			
	TA	0.26	−0.32	−0.02	-	-	−0.22	0.36	1		
	rDJ[a]	-	-	-	-	-	−0.61	0.69	0.48	1	
	rFJ[a]	-	-	-	-	-	0.04	-0.03	0.17	0.08	1

Note. PoTJ = passage-of-time judgments, oFJ = overall feel judgments, TA = time awareness, rDJ = retrospective duration judgments, rFJ = Retrospective feel judgments.

[a] The *n* of these correlations was only 12 because these measures were only assessed in one session.

TABLE A2.
Results of the Mixed Models for PoTJ

Model 1 (all factors included in one model)					
Atmosphere variable	*b*	CI	*t*	*p*	*df*
Detachment	−0.28	−0.74 – 0.18	1.19	.250	19.00
Coziness	−0.38	−0.91 – 0.15	1.39	.179	19.00
Liveliness	0.37	−0.09 – 0.82	1.56	.134	19.00
Tenseness	−0.09	−0.55 – 0.36	0.40	.695	19.00
Valence	−0.02	−0.49 – 0.45	0.10	.923	22.00
Model 3 (separate models for each atmosphere variable)					
Atmosphere variable	*b*	CI	*t*	*p*	*df*
Detachment	−0.11	−0.40 – 0.17	0.79	.436	22.00
Coziness	0.05	−0.25 – 0.35	0.32	.750	22.00
Liveliness	0.18	−0.11 – 0.47	1.23	.232	22.00
Tenseness	−0.20	−0.48 – 0.08	1.41	.173	22.00
Valence	−0.13	−0.41 – 0.15	0.91	.370	22.00

Note. PoTJ = Passage-of-time judgments. In Model 1 all of the atmosphere variables were included as predictors in one single model. In Model 3 the atmosphere variables were included individ-ually. That is, a separate model was calculated for every atmosphere variable.

TABLE A3.
Results of the Mixed Models for Overall Feel Judgments

Model 1 (all factors included in one model)					
Atmosphere variable	*b*	CI	*t*	*p*	*df*
Detachment	0.31	−0.13 – 0.76	1.38	.184	19.00
Coziness	0.24	−0.25 – 0.73	0.96	.350	19.00
Liveliness	−0.23	−0.66 – 0.20	1.03	.315	19.00
Tenseness	0.04	−0.39 – 0.48	0.20	.844	19.00
Valence	0.25	−0.20 – 0.71	1.09	.291	22.00
Model 3 (separate models for each atmosphere variable)					
Atmosphere variable	*b*	CI	*t*	*p*	*df*
Detachment	0.34	0.05 – 0.62	2.37	**.027**	22.00
Coziness	−0.23	−0.52 – 0.06	1.61	.121	22.00
Liveliness	−0.16	−0.46 – 0.14	1.08	.292	22.00
Tenseness	0.35	0.08 – 0.63	2.55	**.018**	22.00
Valence	0.38	0.10 – 0.65	2.75	**.011**	22.00

Note. In Model 1 all of the atmosphere variables were included as predictors in one single model. In Model 3 the atmosphere variables were included individually. That is, a separate model was calculated for every atmosphere variable.

TABLE A4.
Results of the Mixed Models for Time Awareness

Model 1 (all factors included in one model)					
Atmosphere variable	*b*	CI	*t*	*p*	*df*
Detachment	0.15	-0.28 – 0.58	0.66	.515	19.00
Coziness	0.01	-0.50 – 0.53	0.05	.958	19.00
Liveliness	0.04	-0.39 – 0.47	0.19	.854	19.00
Tenseness	0.09	-0.35 – 0.52	0.39	.702	19.00
Valence	0.28	-0.15 – 0.71	1.25	.225	22.00
Model 3 (separate models for each atmosphere variable)					
Atmosphere variable	*b*	CI	*t*	*p*	*df*
Detachment	0.34	0.07 – 0.61	2.50	**.020**	22.0
Coziness	−0.26	−0.55 – 0.04	1.73	.096	22.00
Liveliness	−0.00	−0.31 – 0.30	0.03	.978	22.00
Tenseness	0.35	0.08 – 0.63	2.62	**.015**	22.00
Valence	0.41	0.15 – 0.66	3.21	**.004**	22.00

Note. In Model 1 all of the atmosphere variables were included as predictors in one single model. In Model 3 the atmosphere variables were included individually. That is, a separate model was calculated for every atmosphere variable.

TABLE A5.
Results of the Mixed Models for Retrospective Duration Judgments

Model 2 (all factors included in one model)					
Atmosphere variable	*b*	CI	*t*	*p*	*df*
Detachment	0.66	−0.35 – 1.66	1.38	0.184	17.00
Coziness	0.53	−0.18 – 1.24	1.58	0.133	17.00
Liveliness	−0.72	−1.42 – −0.03	2.21	**0.041**	17.00
Tenseness	−0.10	−0.75 – 0.55	0.32	0.750	17.00
Valence	0.42	−0.33 – 1.17	1.18	0.255	17.00
Model 3 (separate models for each atmosphere variable)					
Atmosphere variable	*b*	CI	*t*	*p*	*df*
Detachment	0.47	−0.28 – 1.23	1.31	.204	21.00
Coziness	−0.21	−0.67 – 0.24	0.97	.341	21.00
Liveliness	−0.58	−1.07 – −0.08	2.43	**.024**	21.00
Tenseness	0.33	−0.15 – 0.82	1.43	.168	21.00
Valence	0.44	−0.10 – 0.98	1.70	.103	21.00

Note. In Model 2 all of the atmosphere variables were included as predictors in one single model. In Model 3 the atmosphere variables were included individually. That is, a separate model was calculated for every atmosphere variable.

TABLE A5.
Results of the Mixed Models for Retrospective Feel Judgments

Model 2 (all factors included in one model)					
Atmosphere variable	*b*	CI	*t*	*p*	*df*
Detachment	0.80	-0.35 – 1.94	1.46	.161	17.00
Coziness	0.34	-0.47 – 1.16	0.89	.385	17.00
Liveliness	0.05	-0.74 – 0.85	0.14	.888	17.00
Tenseness	-0.19	-0.93 – 0.55	0.53	.601	17.00
Valence	0.01	-0.85 – 0.86	0.02	.986	17.00
Model 3 (separate models for each atmosphere variable)					
Atmosphere variable	*b*	CI	*t*	*p*	*df*
Detachment	0.35	−0.42 – 1.12	0.94	.359	21.00
Coziness	0.19	−0.27 – 0.65	0.86	.399	21.00
Liveliness	0.25	−0.30 – 0.80	0.96	.347	21.00
Tenseness	−0.04	−0.55 – 0.47	0.16	.872	21.00
Valence	−0.25	−0.82 – 0.31	0.93	.361	21.00

Note. In Model 2 all of the atmosphere variables were included as predictors in one single model. In Model 3 the atmosphere variables were included individually. That is, a separate model was calculated for every atmosphere variable.