Experienced Speed of Time in Durations of Known and Unknown Length

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Abstract

Experienced speed of time was modeled as a function of subjective duration and a negative exponential function was derived. In 3 experiments on the perception of retrospective and prospective durations, using the method of reproduction, speed of time and pleasantness/unpleasantness of the sound indicating the durations were estimated, both on 7-point scales. Since retrospective time perception was being studied, the 120 subjects were not informed that their task concerned time perception when a standard duration (1 out of 10, ranging between 1.3 and 20 s) was presented. The estimates differed for both variables, depending on whether the target was the standard duration, presented first in the experiments, or its reproduction. The exponential function for speed of time was confirmed for the standard duration as target; with the reproduction as target, time passed faster without systematic variations with duration. Unpleasantness varied only slightly and was about half a scale unit less in estimations of reproductions. These findings are attributed primarily to whether the target duration was unknown (the retrospectively presented standard duration) or known (the reproduction).

Key Words: duration judgments, physical time, reproduction, subjective time

Introduction

In everyday life, time seems to pass more rapidly under some conditions and more slowly under others. After an enthralling party you can hear people say: “Is it over already? Time has passed so quickly!” After a boring lecture, a common observation is that time has dragged.

From such everyday experiences one can conclude (1) there is an intuitive “feeling” of how fast time passes, to be distinguished from perceiving time as such, and (2) this feeling can vary for the same physical duration, depending, for instance, on mood, on what happens in the duration and perhaps gives it meaning, and on the particular situation. The phenomenon of the experience of how fast time passes has been largely ignored in time perception research.

In the three experiments reported in this paper we attempted to quantify the feeling of how quickly time is passing, that is, the experienced speed of time directly and examine its relation to physical as well as subjective (experienced, “sensed”) duration, for time intervals of the order of seconds. A second aim was to explore the pleasantness/unpleasantness of the sound that indicated the durations used in the experiments, and its relation to perceived speed of time.

A substantial body of literature does in fact corroborate that when subjects find a task more interesting, they perceive time as shorter and the opposite when they find a task less interesting (Loehlin, 1959). But these studies concern...
perceived time duration, not speed of time per se. The same goes for a recent overview (Brown, 2008).

Much attention has been devoted to the estimation of duration, whereas perceived speed of time, though often mentioned, has rarely been scrutinized scientifically. Fraisse (1967, p. 247, footnote 2), e.g., dismisses “speed of time” as just a figure of speech. One reason may be the lack of an objective (physical) counterpart with which to compare the experience. Certain studies use the expression "speed of time" only metaphorically (e.g., Tismer, & Wahlen, 1979; Wallach and Green, 1961). Other studies collected assessments at single occasions only, without a specified duration. We could find only one in which a quantitative measure had been used, namely a 9-point scale (Hawkins et al., 1988), though only for two durations (4 and 13 minutes); the authors found that subjects experiencing depressive affect rated speed of time as slower. In a study by Gupta and Cummings (1986) perceived speed of time was defined as the ratio of actual to perceived duration, that is: perceived speed of time = actual duration/perceived duration. When this ratio is less than unity, time appears to pass slowly; when the ratio is greater than unity, time appears to pass faster. The authors claimed that the faster the perceived speed of time on a task, the higher the task satisfaction. However, their subjects did not estimate speed of time directly.

In research on psychological time, it is necessary to distinguish between retrospective and prospective paradigms. In the retrospective paradigm the subject is unaware that s/he will be required to make duration judgments. In the prospective paradigm, the researcher informs the subject beforehand that s/he will be requested to judge a to-be-presented duration. The study presented here is part of a comprehensive series of experiments, which were designed to examine duration judgments under the prospective and retrospective paradigms, using the method of reproduction (Eisler et al., 2004). In the present paper we present results from the tasks, which concerned the experience of speed of time and of pleasantness/unpleasantness of the sound that indicated both standard durations and reproductions. (Both standard durations and reproductions were indicated by the same noise of 50 dB.)

In almost all studies of retrospective time perception, subjects have been required to estimate durations that were filled with some more or less segmented task. In contrast, our subjects were only required to listen to a continuous noise. As in previous studies, the reason was to make use of, as far as possible, only internal (biological) “clocks,” with the intention to limit nontemporal perceptual as well as cognitive influences and the ensuing complications.

**Theory**

### Subjective Duration

The psychophysical function for duration follows Stevens’ power law, though with a break or discontinuity:

\[
\Psi = \kappa_i (\Phi - \Phi_0i)\beta, \quad \Phi < \Phi_b
\]

\[
\Psi = \kappa_u (\Phi - \Phi_0u)\beta, \quad \Phi \geq \Phi_b
\]

where \(\Psi\) denotes subjective and \(\Phi\) physical (clock) duration, the two \(\kappa\) values the units of subjective time for \(\Phi\) values below and above, respectively, the break point \(\Phi_b\), the two \(\Phi_0\) values are the corresponding subjective zero points and, finally, \(\beta\) is the exponent. The value of each of the units cannot be determined separately, but the ratio of the units of the right (higher) segment of the function over the left (lower), \(\kappa_u/\kappa_i\), denoted by \(\alpha\), can be obtained (Eisler, 2003; Eisler & Eisler, 1994; Eisler et al., 2004; Eisler, 1975; 1995; 1996; 2003; Eisler and Eisler, 1991; 1992; Eisler et al., 2008). These papers also describe how the parameters of the power function are computed from prospective duration reproductions, using the parallel-clock model. In a duration reproduction experiment the subject is presented with a standard (reference, target) duration, indicated by, e.g., a sound. After a brief empty (silent) pause the sound resumes and is terminated by the subject when s/he experiences that the reproduction, that is, the sound after the pause, has lasted as long as the standard duration. The parallel-clock model builds on two sensory registers. In the first, subjective time units are accumulated from the
onset of the to-be-reproduced standard duration until the offset of the reproduction; the second accumulates subjective time units during the reproduction. When the difference between the contents of the two registers equals the contents of the second register, the subject experiences the two durations as equally long and terminates the reproduction. Figure 1 will make this clear. Accordingly subjective duration for the reproduction, \( \Psi_r \), is half the total (standard + reproduction) subjective duration \( \Psi_t : \Psi_t = \Psi_t / 2 \). Together with Equation 1, the four parameter values, \( \beta, \Phi_0l, \Phi_0u, \) and \( \alpha \) can be determined from, e.g., ten different standard durations.

**Figure 1.** Duration reproduction according to the parallel-clock model. Subjective against total physical duration (left curve) and against reproduction (right curve). When the difference between these two subjective durations (upper arrow) equals the subjective reproduction duration (lower arrow), the subject reports equality between standard and reproduction by shutting off the sound.

**Perceived Speed of Time as a Function of Subjective Duration**

In order to model speed of time, denoted by \( \nu \) in the sequel, we assume that speed of time is a (one-to-one) function of subjective time: \( \nu = f(\Psi) \). Furthermore we assume that, in agreement with our everyday experience, the feeling of time dragging accumulates with elapsed time, but depends only on experienced speed of time the moment before. More specifically, we assume that speed of time decreases in proportion to its magnitude at any given moment:

\[
\frac{d\nu}{d\Psi} = -k\nu
\]  

Equation 2 is a common model in science, for example for first-order reactions in chemistry, or radioactive decay. Integrating yields:

\[
\int_{\nu_0}^{\nu} \frac{d\nu}{\nu} = -k \int_{0}^{\Psi} d\Psi
\]

that is

\[
\ln \nu = \ln \nu_0 - k\Psi
\]

\[
\nu = \nu_0 e^{-k\Psi}
\]

The constant \( k \), denoted by the “velocity constant,”—very timely for our purpose—, measures the rate at which speed of time decreases. The constant \( \nu_0 \) can be interpreted as speed of time experienced after an infinitesimal duration.

In a later section it is shown that the model derived above gives a very good fit to the
retrospective data obtained in the present experiments. It may be worth emphasizing that Equations 2 to 5 constitutes another example of intrasubjective relations, that is, relations between subjective variables (cf. Eisler, 1982).

Method

Experimental Design

Three experiments, consisting of the same five tasks each, were carried out. They differed only in the order in which the tasks were performed (though by necessity all experiments started with the presentation of the standard duration to be reproduced retrospectively). Ten standard durations were used, ranging from 1.3 to 20.0 seconds in logarithmic steps.

The following tasks in the experiments were carried out: (1) retrospective reproduction of a single duration per subject, (2) prospective reproduction of 10 durations, reproduced six times each (individually randomized apart from the first standard duration, which was the same as in the retrospective task), (3) retrospective verbal estimation of a single duration (the same as in the retrospective task), (4) rating of speed of time, and (5) rating of pleasantness/unpleasantness of the sound.

For tasks (1), (2), and (3), including data, results, and the obtained subjective scales for duration, see Eisler et al., (2004). The present paper deals with tasks (4) and (5), namely with the ratings of perceived speed of time and pleasantness/unpleasantness of the sound. The procedure used in the three experiments was identical with the exception that in Experiments 1 and 3 the subjects rated the retrospectively presented standard duration, and in Experiment 2 their own reproduction of this standard duration.

Subjects

One hundred and twenty subjects (96 female and 24 male; mean age, 28.5 years) participated individually in the experiments; most of them were students. None of the subjects had previously participated in perception experiments and they were naive to the purposes of the investigation. They were recruited for what was described as an experiment in sound perception. All the subjects reported normal hearing. Each of the 120 subjects reproduced one of the ten standard durations, so that 12 reproductions of each standard are obtained.

Apparatus

The experiment was conducted on a Swedish microcomputer (ABC80), equipped with a loudspeaker, which presented the stimuli (standard durations) and registered the reproduced durations.

Stimuli

The sound-pressure level of the noise, which indicated the durations, both standards and reproductions, was 50 dB. There were 10 standard durations, ranging from 1.3 to 20.0 seconds in logarithmic steps (1.3, 1.8, 2.5, 3.3, 4.5, 6.0, 8.1, 11.0, 14.8, 20.0 s).

Procedure

The subjects were told individually that they would be participating in a sound perception experiment in which they would be hearing a sound and asked to rate its degree of pleasantness/unpleasantness after its offset. Then the standard duration (one of the ten), indicated by noise, was presented. Table 1 shows the order of tasks in the three experiments. In Experiment 1, after the presentation of the standard duration, the subjects were immediately asked to rate the speed of time (in that presented standard duration) and then to rate the pleasantness/unpleasantness of the sound. Thereafter the subjects were told that the same noise as in the first duration would sound again and when s/he experienced that this noise had lasted as long as the first (the standard duration), s/he should terminate it by pressing a button. In Experiment 2, immediately after the presented standard duration (and the necessary instruction), the subjects made the retrospective reproduction of the standard duration. Then they were asked to rate the speed of time in the reproduced duration and to rate the pleasantness/unpleasantness of the sound in the reproduced duration. In Experiment 3, after the retrospective and prospective reproductions and the retrospective verbal estimation, the subjects were asked to rate the speed of time and the pleasantness/unpleasantness of the sound in the standard duration presented at the beginning of
the experiment.

The judgments of both variables were indicated on separate response sheets containing 7-point scales. Below a line with the numbers there was a verbal description of each category. For speed of time a value of 1 indicated very slow and a value of 7 very fast; for pleasantness/unpleasantness of the sound the value of 1 indicated most pleasant and the value of 7 most unpleasant. The subjects were to encircle the pertinent number and encouraged to use the entire range of each rating scale to represent their judgments. Since we wanted the subjects to carry out their estimation naively, just how they felt, we neither explained what we meant by "speed of time", nor demonstrated or exemplified. An experimental session lasted a total of approximately 45 minutes.

Table 1. Design of Experimental Series

<table>
<thead>
<tr>
<th>Order of tasks</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exp. 1</td>
<td>A</td>
<td>D1</td>
<td>E1</td>
<td>B</td>
<td>F</td>
<td>C</td>
</tr>
<tr>
<td>Exp. 2</td>
<td>A</td>
<td>B</td>
<td>D2</td>
<td>E2</td>
<td>C</td>
<td>F</td>
</tr>
<tr>
<td>Exp. 3</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>F</td>
<td>D1</td>
<td>E1</td>
</tr>
</tbody>
</table>

Note. Experiments dealt with in this paper are indicated by boldface type.
A: Presentation of standard duration to be judged retrospectively
B: Retrospective reproduction of the standard duration presented in A
C: Prospective reproduction of all 10 durations (six times each)
D1: Rating of speed of time in the standard duration presented in A
D2: Rating of speed of time in the reproduction of the standard duration presented in A (see B)
E1: Rating of unpleasantness of sound in the standard duration presented in A
E2: Rating of unpleasantness of sound in the reproduction of the standard duration presented in A (see B)
F: Verbal estimation of the standard duration presented in A

Results, Data Treatments, Discussions

In the sequel it should be kept in mind that the three experiments dealt with retrospective time perception. Each subject could therefore be presented with only one standard duration, and this could be done only once (disregarding the complete prospective reproductions carried out later in the sequence of tasks, see Table 1); that subject was then, so to speak, used up for retrospective time perception experiments. The 120 subjects were distributed over three experiments and ten standard durations. Each data point accordingly derives from four subjects, with a new quartet for each standard duration. The level of statistical significance is .05 if not stated otherwise.

Comparison of Experiments

Two analyses of variance (ANOVA) \([\text{experiments}(3) \times \text{duration}(10)]\), were performed, one for speed of time, and one for pleasantness/unpleasantness of the sound. Both showed a significant effect for experiments \([\text{perceived speed of time}: F(2, 90) = 8.70, \ p < .0005; \ \text{perceived pleasantness/unpleasantness of the sound}: F(2, 90) = 6.63, \ p < .005]\). In addition, speed of time showed a significant interaction with duration, \(F(18,90) = 1.78, \ p < .04\), but pleasantness/unpleasantness did not. For both dependent variables the experiment effect is due to a difference between, on the one hand, Experiments 1 and 3 (the Scheffé test showed no significant difference between these) and, on the other hand, Experiment 2.

It is noteworthy that the experience of both variables under study differs depending on whether the target stimulus is the presented standard duration or its reproduction. It can be seen from Table 1 that this effect cannot be attributed to the task order between the three experiments; the rating of perceived speed of time and pleasantness/unpleasantness in the standard duration was first in Experiment 1 and last in Experiment 3. There was no significant difference between these experiments. In Experiments 1 and 2 the ratings of perceived speed of time and pleasantness/unpleasantness of sound were performed immediately after the target duration (in Experiment 1 the standard duration and in Experiment 2 the reproduced duration) and the necessary instruction.

It may be mentioned that there were no significant differences between the three experiments in the retrospectively reproduced durations (see Eisler et al., 2004).

Speed of time

A comparison between Figures 2 and 3 shows that estimated speed of time of the retrospectively presented standard durations (Experiments 1 and 3) decreases with increasing standard duration, whereas the regression lines in Figure 3 reveal only a small systematic variation in the speed of time values in Experiment 2. Speed of time is practically constant and faster when a subject estimates her or his own duration reproductions.
speed of time is plotted in the left panel against standard durations, for the sake of comparison with Figure 2, and in the right hand panel against reproductions, in agreement with the instruction for Experiment 2 and thus against the pertinent independent variable.

Before going into the possible sources of this difference, we intend to examine the agreement of our model, as expressed in Equations 2 to 5, with the data for Experiments 1 and 3. It is obvious from Figure 3 that the model is not applicable to Experiment 2.

Figure 2. Speed of time against standard duration in seconds for Experiments 1 and 3. Each point is the mean of 4 subjects. The line is a spline curve through computed speed of time values, see text.

Figure 3. Speed of time for Experiment 2 against standard duration (left panel) and against the retrospective reproduction (right panel). Each point is the mean of 4 subjects. The lines are linear regressions.
The Speed of Time Model for Retrospectively Presented Standard Durations

In order to be able to test the model, we have to make the following assumption: The psychophysical function for duration is the same during the whole session for any one subject and its parameters can be determined from the prospective duration reproduction experiment C, see Table 1. Note that the parameter values vary between subjects, so that for any standard duration or reproduction there are different individual values of subjective duration, which have to be paired off with the same subjects’ speed and pleasantness/unpleasantness estimation. There are four steps in the computations.

1. Computation, from the prospective reproduction experiment, of the parameter values of the psychophysical function and the position of the break for each of the 80 subjects participating in Experiment 1 or 3. Individual calculations for each subject were required because the variation in the position of the break rules out using the mean of the reproductions over subjects. (For the individual computations, the means of the six reproductions of each standard were used.) This step was already carried out in the previously mentioned paper by AD Eisler, Eisler, Montgomery (2004).

2. Computation, again for each subject individually, of the subjective duration of the standard presented retrospectively at the beginning of the experiment. This was done using Equation 1a if the standard duration was shorter than the physical value of the breakpoint (with \( \kappa_u = 1 \)), otherwise with Equation 1b (with \( \kappa_u = \alpha \)).

3. Computation of the means over the 40 subjects from Experiment 1 and over the 40 subjects from Experiment 3 of both computed subjective duration \( \Psi \) and estimated speed of time \( \nu \).

4. Finally Equations 4 and 5 were fitted to the 20 data points. The results were \( \nu_0 = 5.45 \) and \( k = 0.0653 \) with the coefficient of determination \( R^2 = .71 \) for Equation 5 and the correlation \( r = .84 \) for Equation 4, a fit that supports the model. In Figure 4 the X-axis is subjective duration in both panels; the Y-axis is estimated speed of time in the left panel, and its natural logarithm in the right. The exponential and the straight line, respectively, illustrate the fit. Remember that each data point is the mean of only four subjects, and that there are four different subjects behind each point. A comparison between the wavy line in Figure 2 and the theoretical function in the left panel of Figure 4 demonstrate that subjective, rather than clock time, is the pertinent independent variable.

Though we have two parameter values, \( \nu_0 \) and \( k \), for the two free constants of speed of time, an interval scale according to instruction, one might be inclined to introduce a third parameter to keep the possible values of speed of time within the prescribed scale limits 1 - 7. The \( \nu \) value according to Equation 5 tends toward zero when subjective duration increases over all bounds. However, using

\[
\nu = \nu_0 e^{-k
\Psi} + b
\]

results in a worse fit for all \( b > 0 \) when using Equation 4. A tentative explanation is that the expression “time came to a complete standstill” is applicable to extremely long (subjective) durations and that the subjects, in spite of the prescribed scale level, used a ratio scale for speed of time.

Pleasantness/unpleasantness of Sound

Figure 5 shows mean estimates of pleasantness/unpleasantness of sound plotted against standard durations. Experiments 1 and 3 are pooled.

Interestingly, as mentioned before, perceived pleasantness/unpleasantness of the sound showed the same pattern as perceived speed of time, namely a significant effect between estimation of the standard (Experiments 1 and 3 with no significant difference between them according to Scheffé’s test), and estimation of the reproduction (Experiment 2). Ratings of pleasantness/unpleasantness of sound did not vary much with standard duration, at least for durations exceeding 3 s, see Figure 5. The slight increase in unpleasantness with standard duration is perhaps not surprising. More interestingly, the subjects with their own reproduction as target duration (Experiment 2) rated the perceived sound as more pleasant by about half a scale unit than those with the standard duration as target (Experiments 1 and 3).
In that connection it may be mentioned that the correlation between speed of time and unpleasantness is $r = -0.20$, $p = 0.025$; Hawkins et al. (1988) obtained a similar result, $r = -0.38$ between “subjective speed of time passage” and “enjoyment ratings.” This result was expected: The less the unpleasantness, the faster time flows.

Figure 4. Left panel: Speed of time against subjective duration for Experiments 1 and 3. The curve is the fitted exponential. Right panel: Natural logarithm of speed of time against subjective duration. Lack of systematic deviations from the regression line testifies to the correctness of the model.

**Defined and Estimated Speed of Time**

Gupta and Cummings (1986) defined subjective speed of time as the ratio of clock time to subjective time. We investigated this relation. There are three data sets that can be used as subjective time: (1) the retrospective reproductions, (2) the verbal estimates, and (3) subjective duration computed from the parameters of the power function. We computed these three ratios for each subject. Each of the three sets of 120 computed values of speed of time was correlated with the corresponding direct ratings. No significant correlation was obtained for any of the three measures of subjective time (nor was any significance obtained when treating the three experiments separately). The conclusion is that the definition of speed of time suggested by Gupta and Cummings (1986) does not agree with empirically obtained estimates. This is perhaps not too surprising because we deal with subjective variables only; from the point of view of intrasubjective relations, clock duration may be on a nominal scale.

Figure 5. Unpleasantness of sound against target duration (standard duration, Experiments 1 and 3 pooled, and retrospective reproduction, Experiment 2). Each point is the mean of 4 subjects in Experiment 2, and of 8 in the pooled Experiments 1 and 3. Regression lines inserted.
General Discussion
The purpose of the research presented in this paper was to measure experienced speed of time by direct estimation, to study factors that might influence perceived speed of time and to model speed of time mathematically. In the same experimental series the pleasantness/unpleasantness of the sound that indicated the durations was estimated and the data obtained were analyzed and related to speed of time.

There are two independent variables in the design: The experimental conditions (estimating standard durations or reproductions) and the length of the standard durations.

The most interesting result is the large difference in the estimates of speed of time between the different targets: the retrospectively presented standard duration and the reproduction. As a function of duration, at the threshold, that is \( F = 0 \), the speed of time values are very close, somewhat above a value of 5. However, with increasing standard durations, speed of time decreases exponentially when the target duration is the retrospectively presented standard duration, whereas it is almost constant when the target is the reproduction.

We shall first list the obvious differences between the two conditions: (1) the subject is listening passively to the standard duration ("waiting"), but has a task to perform during the reproduction, (2) the length of the duration is unknown to the subject when waiting for the standard duration to end, whereas it is at least approximately known in the reproduction (from the to-be-reproduced standard duration), and (3) in contrast to the standard duration the subject has control over the reproduced duration (by being able to terminate it by a button press).

In particular, the standard duration may be experienced as more uniform since the subject has no task to perform. Taken together with the effect of not knowing the length of the duration, as time progresses, time seems to pass increasingly slowly (see fig 4). The opposite occurs in the reproduced duration. There some activity is required, and, in addition to the knowledge of the duration length, and within the context of making a comparative judgment of two equivalent durations, the general effect is that time seems to elapse faster, and at a constant rate. Thus, though the length of the two durations should be subjectively equal, the two cognitive processes are quite different.

Another finding worth noting is the drastic difference in pleasantness/unpleasantness between the two conditions. Unpleasantness is about half a scale unit less when the subject assesses the sound in the reproduced duration. It is hardly surprising that a waiting period of unknown length is less pleasant than the corresponding time period under the subject’s control.

For speed of time, on the other hand, we think the most important difference is previous knowledge of the length of the duration. As opposed to the retrospective paradigm, estimating an attribute, like speed of time or pleasantness/unpleasantness of sound, of a reproduced duration might be considered to be carried out in accordance with the prospective paradigm.

Starting from the exponentially decreasing model for speed of time during passive waiting, one may ask, when we say that time passes slowly: In relation to what? Gupta and Cummings (1986) have clock time (actual time) as standard. That seemed to make sense because everyday remarks about speed of time mostly occur after consulting a watch. But we have a feeling that time drags regardless of our watch—we look at our watch again and again just because time is felt to be dawdling. The experience of time flying or dragging probably depends on a cutoff point on the speed of time function, perhaps with an individual value of \( \psi_0 \) as point of reference.

Fraisse (1967; 1984) claimed that waiting, and expectancies in general, draw attention to the passage of time and thereby increase experienced duration. The classic example of this effect is “a watched pot never boils.” When, on the other hand, attention is directed away from time’s passage, and toward event or task characteristics, experienced duration decreases and time appears to pass more quickly.

The strategy and results in the present experiments allow a more detailed description of the phenomenon of speed of time and make it possible to be more precise. Knowing a duration,
that is, being precued, directs attention to time left (until the end of the duration): The prospective paradigm. Waiting, the duration being unknown, directs attention to time elapsed (from the start of the duration): The retrospective paradigm.

In summary, experienced speed of time increases with already experienced and thus known duration, control of it and thereby requiring some activity during it. Without knowledge and control speed of time decreases with subjective duration.

Viewed in this perspective, it is perhaps not surprising that people like to plan activities with regard to time; knowing how long a certain interval will last is preferable. This, in turn, supports our finding that when people do not know how long a duration will last, time appears to flow more and more slowly.

**Conclusion**

It is well known, that the philosophy of the ancient Greeks was dominated by the assumption that perfect knowledge was essentially geometrical. The ancient Mayan Indians, on the other hand, were obsessed with the idea of time. The Maya were great horologists, genuine students of time. They measured the lunar cycle and solar year, lunar and solar eclipses, and the risings of Venus and Mars with great accuracy. In many cases, their measurements were more accurate than those of the coeval Europeans. The Maya were interested not only in the quantities of time but also, in its qualities (Whitrow, 1980). In our Western highly technological culture it may well be a wholesome lesson to be reminded of that we, too, have become obsessed - like the Maya a long time ago, but in another way - with timekeeping, or the feeling of time passing (slowly, rapidly, or not at all) and clock-watching, down to the level of nanoseconds.
References