PSYCHOLOGICAL TIME IN JAPANESE AND SWEDISH MALES: A CROSS-CULTURAL COMPARISON

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Abstract

Previous research (A. D. Eisler, 1992, 1995, 2003) has demonstrated differences between African immigrants and native Swedish subjects in subjective duration, measured by the method of reproduction. The present study is part of a systematic series of experiments on time perception and culture. Possible cultural differences in subjective duration (psychological time, subjective experience of time) in relation to standard duration (physical duration, clock-time), between Japanese and Swedish males were examined. Two experiments were conducted with each group in a prospective paradigm (the experience of time-in-passing), using the methods of reproduction (Experiment 1), and verbal estimation in subjective seconds (Experiment 2). In each experiment ten standard durations, ranging from 1.3 to 20 s in logarithmic steps were used and presented 3 times each in pseudo-random order. In the reproductions a significant interaction between duration and culture was found. The Japanese subjects reproduced the standard durations up to about 6 s slightly shorter and the standard durations exceeding 11 seconds longer than the Swedish subjects. The results also revealed a significant difference in the verbal estimations of duration between the two groups. The Japanese estimated the durations shorter and less veridical than the Swedes. These differences can be described by variations in parameter values of the psychophysical power function. The present results are discussed in terms of approaches that emphasize cultural, cognitive, biological and methodological effects on subjective (psychological, perceived) duration in time perception research.

Key words: Cognition; culture; duration; method; psychophysics

The questions and speculations about time phenomena have been raised since time immemorial. Already Condillac (1798) stated that "You apply your own duration to everything outside you and by this means you imagine a common measurement which is commensurable, instant for instant, with the duration of everything in existence" (Fraisse, 1963, p. 4). On the other hand, the philosopher Immanuel Kant (1781/1934), who was the most influential thinker concerning the time concept, emphasized that time is one of the forms of humans intuition.

The Austrian physicist and philosopher Ernst Mach (1865) seems to have been the first to more empirically demonstrate that people´s estimates of clock time may differ systematically from physical clock time. Also in the recent literature about time perception it is often claimed that apparent duration differs from physical time. It is important to keep in mind that the result is said to be either acceleration or deceleration and overestimation or underestimation. A major problem is that these terms are unclear and not very informative

because nothing more specific is said about possible differences in subjective duration. In contrast, the present experiment gives a precise parametric description.

The unique human capacity to perceive time may depend on a biological clock, but it also depends on learning, experience, physical and social environment, personality, culture, and so on (see A. D. Eisler, Eisler & Derwinger, 1997). Ornstein (1969) suggested that our general temporal perspective and the intervals that serve as our units of time are derived from the kind of culture in which we live. Culture is a shared way of life of a group of people and plays a part in determining temporal behavior (Berry, Poortinga, Segall & Dasen, 1992; Deregowski, 1970; Segall, Dasen, Berry & Poortinga, 1990; Triandis, 1980). Thus, to understand time perception is to understand how people in different cultures think about the nature of time, perceive it, and how the culture´s perception of time is a reflection of their life conditions.

It seems that humans of a particular culture experience inwardly the conventional attitude toward time and consequently behave temporally according to its internalized pattern (Doob, 1971; A. D. Eisler, 1995). Humans in different cultures develop different strategies to use time and these abilities reflect the richness of ways in which subjective time can be used (A. D. Eisler, 1995, 2003). An evolutionary interpretation has been suggested (Edlund, 1987; Whitrow, 1980). I have to give way to the temptation and quote Melges (1982), "the human capacity for an extended sense of time is human´s unique evolutionary gift" (p. 13).

A. D. Eisler (1992, 1995, 2003) compared time perception of an African immigrant group and a native Swedish group of subjects, using the method of reproduction. Significant differences in the reproductions of duration were found. The African subjects reproduced the standard durations shorter than the Swedish subjects. The shorter reproductions by the Africans could be related to the lower value of the exponent in the psychophysical power function.

The present study was designed to examine possible cross-cultural differences in time perception between Japanese and Swedish native males, using both the method of reproduction and of verbal estimation with the hypothesis that temporal perspective is derived from the kind of culture people live in (Golia & Antonietti, 1992; Holm & McConnochie, 1976; Ornstein, 1969) and that culture affects time perception. More specifically, the following hypotheses were tested: (1) the prediction from a biological clock perspective was that the Japanese as well as the Swedish subjects reproduce durations about the same, and (2) from a cognitive perspective that verbal estimation of duration in subjective seconds, which is influenced by cognitive factors, will differ between the Japanese and the Swedish group.

Most psychophysical experiments deal with group data. Because of the great inter-individual parameter variations in, at least, time perception, in the present study the raw data were treated individually (see A. D. Eisler, 1995, 2003).

The theoretical starting point for the data treatment is the psychophysical power function (Stevens´ Law):

$$\Psi = \alpha\,(\Phi - \Phi_0)^{\beta},$$

where Ψ denotes subjective and Φ physical duration, and α, β, and Φ_0 parameters to be determined from the data. The exponent β characterizes the continuum under investigation, α is a proportionality constant, usually an arbitrary unit, and Φ_0 the subjective zero (A. D. Eisler & Eisler, 1994, 2009; A. D. Eisler, Eisler & Montgomery, 2004; H. Eisler, 1975, 1976, 1995, 2003; H. Eisler, Eisler & Hellström, 2009).

Method

Subjects. Thirteen Japanese and 16 Swedish men (age range 21 to 43 years) served as subjects. They were matched in age and educational level, as to both cultural groups. None of the subjects had previously participated in a time perception experiment and they were naive with regard to the experimental hypotheses. All subjects had normal hearing.

Stimuli. Ten standard durations, ranging from 1.3 to 20 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) were used. The durations, both standards and reproductions, were indicated by noise of 50 dB.

Procedure. In the first experiment the subjects were instructed individually to reproduce the standard durations. In the second experiment they were required to verbally estimate in seconds the presented standard duration´s length (the same standard durations as in the reproduction session). In each session, the 10 standard durations were presented three times each in an individual pseudo-random series. Thus each subject made 60 judgments (3 x 10 x 2= 60), 30 reproductions and 30 estimations.

Data treatment and results

The arithmetic mean over the 3 reproductions, and the 3 estimates of every standard duration were computed for each subject separately.

An analysis of variance showed a significant difference in verbal estimation of durations between the Japanese and the Swedish group [$F(1,27) = 5.26$, $p = .03$]. (See Figure 1). In the reproduction the analysis of variance revealed only a significant interaction between duration and culture [$F(9,243) = 9.26$, $p < .0001$. (See Figure 2).

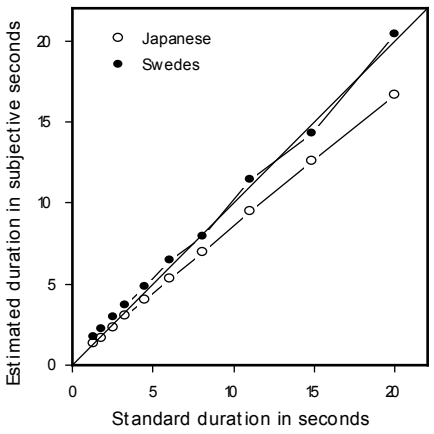

Figure 1

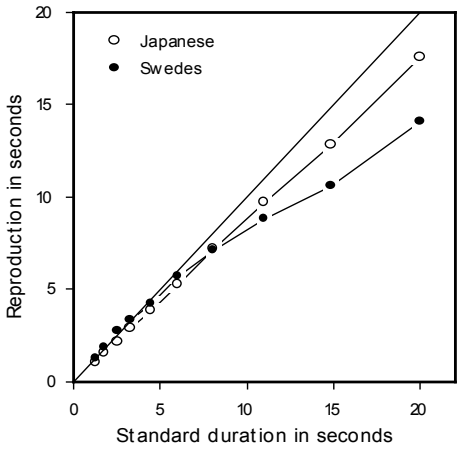

Figure 2

The Japanese subjects reproduced the standard durations up to about 6 s slightly shorter and the standard durations exceeding 11 seconds longer than the Swedish group. Finally, the most notable finding is that there was no significant difference between the reproduction and the verbal estimation of durations in the Japanese as opposed to the Swedish group (see Figure 3 and Figure 4).

In the reproduction the value of the exponent β was .92 for Japanese and .89 for the Swedish group (see A. D. Eisler, 1992, 1995; A. D. Eisler & Eisler, 1994; H. Eisler, 1995 and H. Eisler & Eisler, 1992).

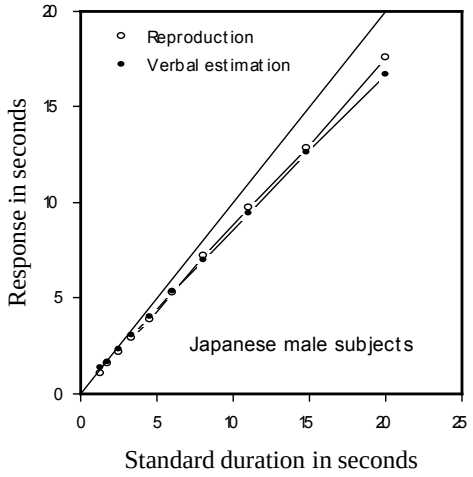

Figure 3

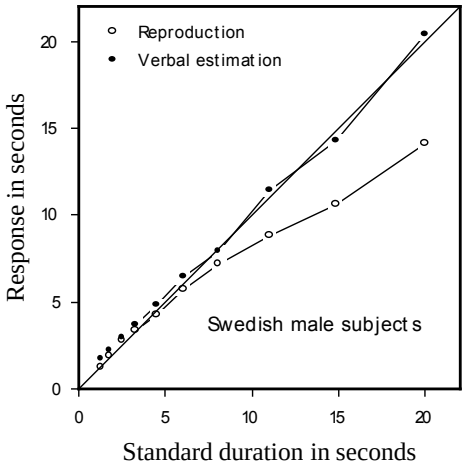

Figure 4

Discussion

The results of these experiments show that time perception for short intervals in a prospective paradigm, measured by method of verbal estimation, are influenced by culture. The Japanese males verbally estimated the durations shorter and less veridical that the Swedes. In contrast there was no differences in the reproduction of durations between the two groups. Thus it may be argued that the method of reproduction is based on biological processes to a larger extent and less influenced by cognitive factors. On the other hand, surprisingly, it was shown that reproduction and verbal estimation by the Japanese group were about the same, as opposed to the Swedish. Our predictions were that there would be differences between the verbal estimations and the reproductions both in the Japanese and in the Swedish group.

Our tentative conclusion is therefore that time perception for short intervals measured by verbal estimation are influenced by culture that is by learning, experience, etc. In reproduction, on the other hand, it seems that a purely biological mechanism is involved, which is unaffected by cognitive factors. Our present results support the concept of an internal clock in accordance with Treisman (1963).

Today there already exists a solid experimental basis for the description of subjective (psychological, perceived) time. But viewed in this way, we need to examine more specific phenomena, as for instance the effects of personality, cultural differences, etc. Until now generally, psychophysicists have tended to disregard the possible effects of culture in the research. Interest in this issue seems to have faded, perhaps because it entered a cul-de-sac.

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