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RESEARCH ARTICLE

Toward time-based design: Creating an applied time evaluation checklist for urban design research

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Abstract

The perception of a 3D space, in which movement takes place, is subjectively based on experience. The pedestrians' perception of subjective duration is one of the related issues that receive little attention in urban design literature. Pedestrians often misperceive the required time to pass a certain distance. A wide range of factors affects one's perception of time in urban environments. These factors include individual factors (e.g., gender, age, and psychological state), social and cultural contexts, purpose and motivation for being in the space, and knowledge of the given area. This study aims to create an applied checklist that can be used by urban designers in analyzing the effects of individual experience on subjective duration. This checklist will enable urban designers to perform a phenomenological assessment of time perception and compare this perception in different urban spaces, thereby improving pedestrians' experiences of time through a purposeful design. A combination of exploratory and descriptive analytical research is used as methodology due to the complexity of time perception.

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1. Introduction

Experts from several fields (e.g., philosophy, cognitive psychology, neurology, mathematics, and physics) have discussed individual time perception. However, few studies

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have been performed in the area of environmental design, especially concerning urban environments. Moreover, research from other disciplines, particularly in cognitive psychology, has yet to be applied to the relationship between urban environments and time perception.

Bosselmann (1998: 91) stated that "designers have remarkable power to affect the perception of time." According to his findings, certain qualities of physical space influence individuals' subjective experience of time duration. By consciously arranging these qualities, designers can manipulate this experience by considering their overall designs on a bipolar scale. Design goals may focus on the immediate awareness of the passing of time as "slower" or "quicker," and the reflective estimate of duration as "shorter" or "longer," as tested in two quasi-experiments.

The time-based design and the precise effects of time perception on pedestrian behavior have not been thoroughly investigated. However, certainty regarding the relationship between the environment and the subjective duration is observed. Therefore, urban designers need to understand the effects of this relationship on the behavior of people in urban areas. Thus, this study elaborates on the problem of time, time perception, and duration. The findings of previous studies are used to develop and present a functional checklist of the most important principles of physical space that affect the estimation of subjective duration.

2. Problem of time

Time is arguably the most elusive and the most powerful scientific intangible that shapes people's lives because most things that change on this Earth and in the universe happen and are governed by time. Thus, change could barely be measured without time. Time is stealthy and imperceptible; it makes its presence known by transforming people's sense of time into sensation. Although time cannot be seen, touched, or heard, the regularity of what appears to be its passage in seasons, in the orchestrated shift from dawn to dusk to dark, and in the aging of people's bodies is observed. The pulsing beat of time can be felt by people and can be heard through the precise ticking of a clock (Langone, 2000: 7).

"Literal time is a matter of event comparison" (Lakoff and Johnson, 1999: 139). Hence, time is constituted by virtue of motion events that serve to facilitate event comparison. Indeed, not only events but also their temporal relations are perceived (Le Poidevin, 2009: 1).

Gibson (1986) argued that although events are perceived, time itself is not. Accordingly, time results in abstracting relations, such as comparison among events and consequently constitutes an "intellectual achievement." Hence, time is abstract on the basis that temporal experience is not directly perceived (Evans, 2003: 15).

Temporal experience may constitute a response to external sensory experience. It may also be represented at the conceptual level in terms of experience that relates to sensory domains; thus, temporality itself is of internal provenance. That is, temporality at the base may be a subjective, albeit real, experience, which is as basic and fundamental as sensations because of the perception of external sensorimotor experience. Indeed, this position accords with Grady's (1997) influential claim that a bifurcation in conceptual structure exists between concepts derived from sensory experience (i.e., image concepts) and those derived from subjective experience (i.e., response concepts; Evans, 2003: 16).

3. Time perception

Colors, sounds, and textures can be seen, heard, and felt, respectively. Some aspects of the world are perceived through a particular sense. Other aspects, such as shape, are perceived through more than one sense. However, what sense(s) is (are) used when perceiving time? Certainly, time is not associated with one particular sense. In fact, to say that the passing of time passing can be seen, heard, or touched is odd. Moreover, even if all the senses were prevented from functioning for a while, the passing of time could still be noticed through the changing patterns of people's thought (Le Poidevin, 2009: 1).

Time perception, according to Fraisse's conception, is "the attention to or apprehension of change through the integration of a series of stimuli and characterized by the ability to conceive duration, simultaneity, and succession" (Roeckelein, 2000: 53), which implies that time in perception bears no straightforward relationships to physical time (Li, 2003: 1). Hence, the subjective duration experienced by a pedestrian may be different from the objective (real) time passed. Thus, even if all our senses were prevented from functioning for a while, the passing of time could still be noticed through the changing pattern of our thought (Le Poidevin, 2009: 1). In this respect, Gell (1992) posits that:

> *Perception is intrinsically time-perception, and conversely, time-perception, or internal time-consciousness, is just perception itself... That is to say, time is not something we encounter as a feature of contingent reality, as if it lay outside us, waiting to be perceived along with tables and chairs and the rest of the perceptible contents of the universe. Instead, subjective time arises as an inescapable feature of the perceptual process itself, which enters into the perception of anything whatsoever* (Gell, 1992: 231).

Many personal experiences and experimental studies have confirmed that situations and circumstances under which they occur play an important role in time perception. Happy hours, for instance, are perceived by an individual as time passing fast, whereas 20 min of waiting for a bus appears long, and one minute of pain is perceived to be significantly longer. Moreover, "interesting" time periods pass by quickly (Bruss and Rüschendorf, 2010: 364). Time perception in a given period is also closely connected with the number of new, unusual, or remarkable events that occur in this period (see James, 1890; Block and Zakay, 1997). The periods that are filled with new events are momentarily perceived as passing by quickly. In retrospect, these periods have made an impression and now seem considerably longer than less exciting periods of life. Thus, time has been coined as a "dimension of perception and experience" (Bruss and Rüschendorf, 2010: 364).