Available online at www.sciencedirect.com
ScienceDirect
Journal of Consumer Psychology 20 (2010) 53 – 65
Journal of CONSUMER PSYCHOLOGY

The effect of consumers' diurnal preferences on temporal behavior

Jacob Hornik [a,b,*], Chezy Ofir [c], Rinat Shaanan-satchi [a,d]

[a] *The Leon Recanati Graduate School of Business Administration, Tel Aviv University, Tel Aviv, Israel*
[b] *École Supérieure de Gestion, ESG, Paris, France*
[c] *School of Business Administration Hebrew University Mount Scopus, Jerusalem, Israel*
[d] *Open University, Israel*

Received 5 March 2009; revised 23 July 2009; accepted 12 August 2009
Available online 15 September 2009

Abstract

The purpose of this study is to determine whether customers' diurnal preferences, tested at different times of the day, affect their responses and behavior. Three studies explore whether synchrony between the peak circadian arousal period and the time of participant testing influenced participants' temporal perception and behavior. Overall, the results imply a robust synchrony and time-of-day effects on the dependent variables. The authors discuss the theoretical significance of their findings and the managerial implications for consumer research and practice.

Introduction

Contextual and situational influences are becoming an increasingly important area of inquiry in consumer research. There are many examples in the social and behavioral sciences in which the predictive validity of some measures varies systematically in accordance with various contextually independent variables. For example, with respect to consumer preferences and behavior, the amount of time between stimuli and the time of the day that individuals receive them may be important factors in determining individuals' responses (Mehrabian & Russell, 1974). If such factors are significant but uncontrolled, they may reduce the reliability and validity of test results; therefore, they have important implications for managers' decision making. Thus, the consumer psychology literature will benefit from paying attention to specific time-related contextual variables that influence individuals' behavior and cognition.

Circadian rhythms are a fundamental situational or contextual construct of human behavior (Cavallera & Giudici, 2008; Kruglanski & Pierro, 2008). Circadian rhythms are generated within the body and help coordinate the timing of internal bodily functions, such as sleeping and eating, as well as interactions with the external world, such as perceiving stimuli and making judgments and preferences. It is now believed that the circadian cycle influences a number of variables. For example, Natale, Alzani, and Cicogna (2003) illustrated differences between morning and evening individuals on cognitive efficiency in four different tasks: visual search, logical reasoning, spatial reasoning, and mathematical reasoning.

In this study, we build on the existing research base but focus on different phenomena: the relationship between individuals' circadian rhythm and their temporal behavior. When individuals reach optimal performance (i.e., when their testing times match their peak arousal periods), we refer to that as the synchrony effect (May & Hasher, 1998). Several authors have pointed to the possible associations among circadian rhythms, time of day (TOD), and time perception (e.g., Refinetti, 2006). However, to the best of our knowledge, ours is the first attempt to investigate consumers' perceptions of task duration, including underestimation and overestimation as a function of the match or mismatch between peak arousal period and time of testing. This article reports three studies on the predicted relationships between diurnal typologies and time or service evaluation, thus extending prior research on contextual influences on consumer behavior. More specifically, the three studies investigate the influence of different circadian states on the way individuals perform tasks, estimate the duration of those tasks, and evaluate their experience.

* Corresponding author.
E-mail addresses: hornik@post.tau.ac.il (J. Hornik), msofir@mscc.huji.ac.il (C. Ofir), satchi@nonstop.net.il (R. Shaanan-satchi).

1057-7408/$ - see front matter
doi:10.1016/j.jcps.2009.08.002

Conceptual background and hypotheses

Psychological time is one of the most important dimensions for understanding human behavior (Mogilner & Aaker, 2009). The perception of time, in particular, has a special role in everyday life and is an important aspect of behavior (Sackett & Meyvis, 2008). For example, waiting in line is an important aspect of understanding individuals' shopping behavior. Similarly, individuals' perception of the time it takes to link to a Web browser may affect their evaluation of a particular computer program (Ryan & Valverde, 2006). Many frameworks have been articulated for describing how individuals perceive the passage of time. One such framework is that of Ivry and Schlef (2008), who highlighted intrinsic variables like attention and reference memory as well as biological factors. Their conceptualization drew much from the contingency model that Zakay (1993) and Block and Zakay (1997) have outlined. Subsequently, other empirical investigations confirmed and elaborated on this particular phenomenon, demonstrating that individuals' estimates of duration change according to their attentional engagements (e.g., Roy & Christerfeld, 2008), arousal (Munichor & Rafaeli, 2007), and motivation (Powel-Mantel & Kellaris, 2003). Inevitably, then, researchers often discover that individuals' perceptions of time do not match reality. Other researchers have suggested that perceptions of time not only reflect individuals' intrinsic cognitive states but also are subject to a variety of environmental and situational variables (Bergadaa, 1990). Indeed, Bergadaa (1990) argued that the research community has not adequately addressed the various situational variables, such as transient mood, on the perception of time. As a result, some researchers have followed her recommendation and have empirically shown the influence of some situational variables (e.g., mood and the presence or absence of other people) on the perception of time (e.g., Hornik, 1992).

A major situational variable that has received much attention in academia is the role of individuals' circadian rhythms on perception and behavior. Surprisingly, contemporary models of consumer behavior do not explicitly recognize the role of this important physiological construct on consumer behavior. At best, the term antecedent state is used to encompass all of the momentary, financial, psychological, and physiological baggage with which consumers arrive at a marketing interaction (Hornik, 1981). In contrast to the emerging literature examining controlled processes across TOD, there is little evidence regarding synchrony effects on key consumer behavior constructs. Only a few studies in consumer research have treated TOD as a major behavioral condition, and most of them have done so as a limited independent measure (Chebat, Limgoes, & Gelinas-Chebat, 1997; Hornik, 1988; Yoon, 1997; Yoon, Lee, & Danziger, 2007). For example, Hornik (1988) addressed the relationship between circadian cycles and information processing. His results suggest that the effects of a match (or mismatch) between peak rhythm period (i.e., acrophase) and time of testing can affect the type of processing strategies that consumers use. Chebat et al. (1997) showed that circadian orientation affects the depth of advertising information that consumers process.

Circadian rhythms are cycles within living organisms that take about 24 h to complete from start to finish. It is well established that performance tends to peak at a certain level of circadian arousal, presumably when greater cognitive resources are available, and this peak occurs, more or less regularly, at a specific point in the day. Hence, individual variation in circadian arousal patterns can significantly alter performance across the day (Yoon, Cole, & Lee, 2010). It has also been suggested that the rhythmic modifications of alertness in morning (M_t) and evening (E_t) types have a direct influence on cognitive performance (Natale & Cicogna, 1996), as circadian orientation affects the energy dimension of activation and alertness (Tankova, Adan, & Buela-Casal, 1994), which is an antecedent to attention and resource availability (Matthews and Davies, 2001), and subsequently to information processing. Indeed, performing at the optimal time of circadian arousal has been found to enhance simple automatic tasks (Owens et al., 1998), tasks involving immediate and delayed recall and recognition (Adan, 1991), and certain types of complex reasoning tasks (Bodenhausen, 1990). More current research (Yang, Hasher, & Wilson, 2007; Yoon, May, Goldstein, & Hasher, in press) has attempted to identify the specific cognitive processes affected by the synchrony of time of testing and peak arousal periods. In a comprehensive review of extent theories and findings, Cavallera and Giudici (2008) show that circadian types are related to cognitive performances such as speed of information processing, memory, narrative comprehension, alertness, and visual tasks.

Theories that purport to explain such findings suggest that as arousal (or oral temperature) increases across the day, the processing of new information becomes less efficient in general as an optimal level of excitation is exceeded. This is reflected in a deterioration of immediate memory performance. However, a higher level of arousal benefits the efficient retrieval of consolidated information from memory, such that delayed memory may exhibit an improvement as base arousal levels increase (e.g., throughout the day). A number of metabolic indexes reflect arousal levels. Increased arousal is associated with various physiological changes such as increased heart rate, increased body temperature, increased rate of breathing, increased oxygen consumption, increased glucose uptake, and faster reaction times (Refinetti, 2006). Therefore, it has been argued that circadian fluctuation data associated with behavioral and cognitive performance should be recorded and evaluated with greater accuracy for individual differences to be considered relevant and reliable (Goldstein, Hahn, Hasher, Wiprzycka, & Zelazo, 2007; Kruglanski & Pierro, 2008; Refinetti, 2006).

One of the most discriminating criteria in the evaluation of chronotypes is morningness–eveningness typology (i.e., "a classification of organisms into morning types, evening types, and intermediate types according to their usual phase of entrainment under light–dark cycle," *Dictionary of Circadian Physiology*), which reflects differences relating to the sleep–wake cycle, the circadian rhythms of physiological variables (e.g., body temperature), and the evaluation of subjective alertness and proactiveness. About half of individuals fall into one of two categories: a morning type (M_t) or an evening type