

Research Article

# The temperature premium: Warm temperatures increase product valuation

Yonat Zwebner <sup>a,\*</sup>, Leonard Lee <sup>b</sup>, Jacob Goldenberg <sup>c</sup>

<sup>a</sup> *The Hebrew University of Jerusalem, Israel*

<sup>b</sup> *Columbia University, United States*

<sup>c</sup> *Interdisciplinary Center, Herzliya, Israel and visiting professor at Columbia University, United States*

Received 28 February 2013; received in revised form 27 October 2013; accepted 5 November 2013

Available online 13 November 2013

## Abstract

A series of five field and laboratory studies reveal a *temperature-premium* effect: warm temperatures increase individuals' valuation of products. We demonstrate the effect across a variety of products using different approaches to measure or manipulate physical warmth and different assessments of product valuation. The studies suggest that exposure to physical warmth activates the concept of emotional warmth, eliciting positive reactions and increasing product valuation. Further supporting the causal role of emotional warmth, and following prior research relating greater positive feelings to reduced distance, we find that warm temperatures also reduce individuals' perceived distance from the target products.

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**Keywords:** Environmental effects; Sensory marketing; Embodied cognition; Product valuation; Emotions

## Introduction

Consider a consumer who enters a mall. He shops and cruises among the different retail stores, immersing himself in the shopping environment. While he examines and evaluates the various products on display, to what extent might the ambient temperature affect his buying decisions?

Consumers experience a myriad of sensorial stimuli in their shopping environment that may cloud their judgments and bias their decisions (Krishna, 2012; Turley & Milliman, 2000). Despite burgeoning research on the effects of temperature (Bargh & Shalev, 2012; Williams & Bargh, 2008), temperature's impact

on individuals' perception and evaluation of products has received less attention. In five studies involving both laboratory experiments and the analysis of field data from an actual shopping website, we show that individuals exposed to warm temperatures express higher valuations for a variety of products ("temperature premium"). Our work highlights the close link between bodily sensations and consumer behavior while offering a plausible theory to explain this effect.

## Warmth and affective reactions

As the metaphor "affection is warmth" suggests (Lakoff & Johnson, 1999), the notion of warmth is often conceived as an affective state (Coke, Batson, & McDavis, 1978; Davitz, 1969). Consistent with embodiment theories, we suggest that physical warmth can produce a similar affective state as emotional warmth. This association stems from the argument that many abstract psychological concepts are metaphorically grounded in concrete physical experiences (Barsalou, 1999; Lakoff & Johnson, 1980), and that objects and events that produce the same affective reactions are associated together in memory (Barsalou, Simmons, Barbey, & Wilson, 2003). The physical warmth one experiences

☆ The authors would like to thank the editors and the review team for their helpful suggestions, and Danit Ein-Gar, Ruth Mayo, David Mazursky, Xiuping Li, Jeffrey Parker, Nicholas Reinholtz, and seminar attendees at Columbia Business School for providing helpful comments during the course of this project. We are also grateful to Noa Blau, Yana Khaitovich and Eli Barenboim for assistance with data collection.

\* Corresponding author at: School of Business Administration, The Hebrew University of Jerusalem, Israel.

E-mail addresses: [yonat.zwebner@mail.huji.ac.il](mailto:yonat.zwebner@mail.huji.ac.il), [ll2399@columbia.edu](mailto:ll2399@columbia.edu), [jgoldenberg@idc.ac.il](mailto:jgoldenberg@idc.ac.il) (Y. Zwebner).

when holding a warm object or sitting in a warm room consequently activates the abstract concept of emotional warmth (e.g., intimacy, belonging). This emotional-warmth activation, in turn, generates positive affect and increases valuation of the product. This is akin to the “intraconceptual mechanism” of the effects of bodily responses on abstract concepts (Landau, Meier, & Keefer, 2010): physical experiences are a part of the representation of abstract concepts, and abstract concepts can correspondingly stimulate associated bodily responses (Zhang & Li, 2012).

To test the conjecture that exposure to physical warmth activates the concept of emotional warmth and its associated positive feelings, we conducted a preliminary online study (all studies were conducted in Hebrew). Forty-four students living in Israel (50% female; mean age = 29.5) participated in this study in exchange for NIS4 (equivalent to US\$1.12). Participants were randomly assigned to either a warm or a cool condition. We manipulated temperature by asking participants to place their palms on either their computer’s warmest spot or their desk’s coolest spot for 10 s and to estimate its temperature in the guise of testing temperature-estimation abilities. Subsequently, in a purportedly unrelated task, participants viewed a product (chocolate cake) and rated their feelings along eight dimensions, half pertaining to feelings of emotional warmth (e.g., close, intimacy) whereas the other half pertaining to other positive attitudes unrelated to emotional warmth (e.g., innovative, fascinating) (1 = not at all; 7 = very much). Participants in the *warm* condition reported feeling greater emotional warmth ( $M = 3.90$ ,  $SD = 1.50$ ) than participants in the *cool* condition ( $M = 2.97$ ,  $SD = 1.51$ ;  $t(42) = 2.06$ ,  $p = .046$ ). However, participants’ emotional-warmth unrelated assessments did not differ across conditions (all  $p > .58$ ).

### Warmth and product valuations

Environmental factors (e.g., music and lighting), despite being product-irrelevant, often shape consumers’ response to external products and purchase decisions (Belk, 1975; Krishna, 2012). We posit that the incidental positive affect, which exposure to physical warmth triggers by invoking the abstract concept of emotional warmth, has a spillover effect that engenders congruent (positive) product valuations.

Our temperature-premium hypothesis is conceptually consistent with the implications of two separate streams of research. First, temperature has recently been found to influence interpersonal relationships and individuals’ judgment of others (Bargh & Shalev, 2012; Vess, 2012; Zhong & Leonardelli, 2008). Physical warmth, for instance, promotes social warmth (Bargh & Shalev, 2012), fosters interpersonal trust (Kang, Williams, Clark, Gray, & Bargh, 2011), and enhances one’s positive assessment of others (Williams & Bargh, 2008). Second, individuals tend to anthropomorphosize inanimate objects around them (Aggarwal & McGill, 2007), and often develop and maintain strong personal relationships with brands (Albert, 2010; Fournier, 1998). Considering these findings, we expect physical warmth to also positively influence individuals’ evaluation of inanimate objects. Consistent with this prediction, thinking of the color of one’s car in

“warm” (vs. “cold”) terms positively influenced evaluations of the car (Chandler & Schwarz, 2010). However, while physical warmth induces emotional warmth that influences *subjective* valuations of target products (e.g., willingness-to-pay), it may have lower impact on *objective* assessments (e.g., retail price) of these products.

We examine how physical warmth influences product valuation in five field and lab studies. Study 1 analyzes real behavior on a popular online-shopping website, revealing that warm temperatures increase product-purchase intention. In studies 2A and 2B, we replicated the basic effect of temperature on product valuation in a controlled lab setting. We then examined in studies 3 and 4 the underlying process of this effect using mediation analysis and testing whether warmth influences distance perception. We examined the impact of temperature by recording actual temperature over a 24-month period (Study 1), manipulating ambient temperature (Study 2B), or exposing participants to objects of different temperatures in an unrelated task (Studies 2A, 3, and 4). We operationalized product valuation by measuring intention-to-purchase (Study 1), willingness-to-pay for target products (Studies 2A, 2B, and 4), or likelihood of choosing a target product over cash (Study 3).

### Study 1: Field study

We first examined whether temperature effects on product valuation are observable in a noisy real-world environment, using data from a large price-comparison shopping portal (see Appendix for details). Product information on this portal is organized into various broad product domains, each containing a number of product categories and sub-categories. Through navigating the hierarchy of categories or searching for specific products, visitors can compare the details (e.g., prices) of multiple external sellers for the same product. By clicking on a “To-Purchase” button for a particular seller, they can then access the seller’s website directly from the portal to purchase the product. The number of “To-Purchase” clicks for a product category thus provides a measure for shoppers’ purchase intention of products in that category.

We focus on this intention-to-purchase measure, analyzing 24 months of available data (September 2010–August 2012;  $n = 6,364,239$  clicks) from eight product categories (e.g., watches). Specifically, we examined how daily temperatures affected purchase intention within these categories. We calculated the average temperature for each day ( $M = 20.4$  °C,  $SD = 6.0$  °C, range = 6.3 °C to 31.6 °C) and conducted three regressions to examine whether physical warmth increases purchase intention (see Appendix). Model 1 tests the basic temperature-premium effect, regressing intention-to-purchase on temperature and dummy variables to control for day of the week and product category. In Model 2, we added a quadratic term for temperature to investigate a potential nonlinear effect: we expect the temperature-premium effect to attenuate as temperature reaches higher levels. Finally, to rule out an alternative explanation that vacation times or specific seasons drive the effect, Model 3 incorporates additional seasonality-related dummy variables.

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