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The Effect of Weather on Consumer Spending

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This paper reports the results of three studies which provide strong evidence that weather can impact consumer spending. In particular, the results of the first study highlight the important effects of temperature, humidity, snow fall, and especially sunlight, in retail sales. The second study replicates the general finding of previous research, which indicates that sunlight affects mood, while simultaneously demonstrating that mood affects spending. The third study demonstrates that mood mediates the effect of sunlight on consumer spending. The present research makes an important contribution to our understanding of consumer behavior by demonstrating that weather does affect retail sales.

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EXTENDED ABSTRACT

This paper analyzes the effect of weather on consumer spending. In particular, we propose that mood mediates the relationship between weather and consumer spending. We conduct three studies to investigate this relationship, and find that mood does indeed mediate this relationship. We utilize actual tea consumption, as well as willingness to pay for tea, as dependent variables in our studies. Tea is an appropriate product to use in order to test relationships between sales and weather because it is a neutral product. For instance, tea is the most widely consumed beverage after water, it can be found in over 80% of US households. In 2006, Americans consumed over 50 billion servings of tea, or over 2.25 billion gallons of tea.¹

We begin by reviewing literature documenting the influence of weather on human behavior. For instance, research in finance (ie, Saunders, 1993; Trombley, 1997; see also Hirshleifer and Shumway, 2003; Goetzmann and Zhu, 2005) suggests that the weather may affect stock trades. Furthermore, ample research in psychology discusses how weather influences peoples' behavior. Persinger and Levesque (1983) examined temperature, relative humidity, wind speed, sunshine hours, barometric pressure, geomagnetic activity and precipitation with respect to mood. Overall, they found that 40% of mood evaluations were accounted for by a combination of meteorological events; in particular, barometric pressure and sunshine had the greatest impact on mood. Other researchers have found that low levels of humidity (Sanders and Brizzolara, 1982), high levels of sunlight (Cunningham, 1979; Schwarz and Clore, 1983), high barometric pressure (Goldstein, 1972), and high temperature (Cunningham, 1979; Howarth and Hoffman, 1984) have all been associated with positive mood. In addition, Keller et al (2005) finds that weather's psychological influences are moderated by the season and the amount of time spent outside. Specifically, Keller et al (2005) found that pleasant weather improves mood in the spring because people have not experienced such weather during the winter months.

Although the influence of weather on behavior has been explored in fields such as finance and psychology, it has been largely ignored in the marketing literature. In fact, very little research has explored the association between weather and consumers' behavior. To date, the most direct evidence for the impact of weather on consumer behavior comes from Parsons (2001), who examines the impact that weather has on daily shopping behavior. However, he does not report sales data and, instead, focuses exclusively on the number of shoppers. More importantly, Parsons' (2001) data does not speak to the psychological mechanisms underlying the effect of weather on sales.

The effect of weather on consumer spending, as well as the influence of mood on this proposed relationship, has not yet been explored. We investigate this issue using a mixture of methods and types of data. First, we have collected daily sales data from a small retailer specializing in a single product category, along with the corresponding daily weather, over a six year time horizon, in order to examine the relationship between weather and consumer spend-

ing. Second we investigate the effect of weather on mood and consumption of the retailer's product and purchase behavior using daily panel data. Finally, we use a laboratory experiment to determine whether mood mediates the effect of (artificial) sunlight on willingness to spend on a product.

The results of the first study highlight the important effects of temperature, humidity, snow fall, and especially sunlight, in retail sales. The second study replicates the general finding of previous research, which indicates that sunlight affects mood, while simultaneously demonstrating that mood affects spending. The third study found support for the effect of sunlight on willingness to pay for a product that would be consumed sometime in the future, rather than immediately, and demonstrated the effect was fully mediated by negative affect.

Overall, the results of the studies reported in this paper provide strong evidence that weather can impact consumer spending. In particular, the observed effect of mood mediating the effect of sunlight—whether real or artificial—on consumer spending is of obvious relevance for the literature on the influence of store illumination on consumer shopping behavior. In this literature, the dominant theoretical model, the Mehrabian-Russell (1974) (M-R) model of approach-avoidance behavior, posits that the combined effects of pleasure, arousal and dominance influences people's behaviors in certain environments. Regarding lighting, the M-R (1974) model theorizes that brighter lighting increases arousal, and that the combination of pleasantness and arousal will positively influence consumers' shopping behaviors. Existing field research (ie, Summers and Hebert 2001; Areni and Kim 1994) has supported the M-R (1974) model of approach-avoidance behavior. Thus, the observed effect of lighting on consumer behavior is assumed to be mediated by arousal and pleasure. However, our results run counter to the M-R (1974) model. In particular, our results suggest it is not so much arousal nor pleasure, as the mitigation of negative affect, which explains the positive effect of high levels of illumination on shopping behaviors. Furthermore, our evidence is stronger than that of Summers and Hebert (2001), and Areni and Kim (1994), because we show that the positive influence of high illumination, caused by the mitigation of negative affect, actually influences consumer spending, while in Summers and Hebert (2001) and Areni and Kim (1994) work, the authors do not measure consumer spending.

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¹This information was downloaded from www.teausa.com on March 17, 2007

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