Some Like It Mild and Not Too Wet: The Influence of Weather on Subjective Well-Being

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Abstract

In this paper, I analyze subjective well-being data collected in the Princeton Affect and Time Survey, and investigate the responsiveness of well-being to climate and transitory weather conditions. I study general satisfaction questions about life in general, life at home, health and one's job, as well as questions concerning feelings intensities during specific episodes. I find that women are much more responsive than men to the weather, and that life satisfaction decreases with the amount of rain on the day of the interview. Low temperatures increase happiness and reduce tiredness and stress, raising net affect, and high temperatures reduce happiness, consistent with the fact that the survey was conducted in the summer.

1 Introduction

So strong is the desire to be happy that the forefathers of America embedded the pursuit of happiness in the United States' constitution, next to the rights to life and liberty. Over two hundred years later, two economists surveying the literature on happiness research induce: "It follows that economics is—or should be—about individual happiness (Frey and Stutzer, 2002, p. 402)." Five years later, the study of subjective well-being, be it of happiness, of life satisfaction, or of other measures representing inner feelings, is gaining relevance in the field of economics, as behavioral aspects of economic decisions become more and more recognized

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and modeled. Kahneman and Krueger (2006) report an increasing number of economic papers analyzing data on self-reported life satisfaction or happiness. In the face of this increase, questions regarding the validity—or the relevance—of self-reported data arise. This paper will not touch upon these issues, but will rather investigate the impact on these type of data of an external factor: the weather.

Psychologists have long studied the influence of weather on mood. One particularly interesting experiment on the topic is reported in Schwarz and Clore (1983), as Experiment 2. Schwarz and Clore conducted a phone survey assessing the respondents' perceived quality of life and present feeling state. For the purpose of investigating the impact of mood on judgements of well-being, they called subjects on either warm, sunny days, or rainy days, hoping that sunshine would bring about good moods, and rain the opposite. They indeed find that people report significantly higher general happiness, life satisfaction, and content with current life[1] on sunny days vs. on rainy days. This brings up a question: Are people consistently affected by weather conditions when they answer subjective well-being surveys? If yes, researchers studying well-being need to know about the effects of such conditions and, depending on the purpose of the study, may want to control for current weather. Rehdanz and Maddison (2005) looked at the question, but using country-level data, and found that higher mean temperatures in the summer months decrease happiness, while higher mean temperatures in the winter months increase it.

In this paper, I will attempt to determine the impact of weather conditions and climate conditions (as measured by normal temperature and precipitation) on life satisfaction and affective states at the individual level. I use data from the Princeton Affect and Time Survey (PATS), which from May to August 2006 collected time-use diaries and affective states from just under 4,000 individuals in the United States, matched with weather reports from the National Climatic Data Center. I find that, when it comes to life satisfaction, more rain on the day of the interview is associated with lower life satisfaction for women. A rainier climate decreases life satisfaction and job satisfaction for women. The results for men are less compelling, and indicate a responsiveness to rain the day preceding the interview, which is the day for which the time-use diary was collected. Looking at specific feelings during episodes of the diary day and affective states, women again show more sensitivity to weather conditions. Heavy rain and extreme temperatures seem to matter, with lower temperatures raising net

[1]Content with current life is measured by the answer to "Thinking of how your life is going now, how much would you like to change your life from what it is now?"

affect, and higher temperatures lowering it, consistent with the fact that the survey was conducted over the summer, when lower temperatures are more attractive.

This paper starts with a review of the weather-related literature in economics in Section 2. The data used in the analysis are then presented in Section 3, and the findings in Section 4. The conclusion lies in section 5, and is followed by the bibliography and the appendix.

2 Weather-related Literature in Economics

This section takes a look at the weather-related literature in economics. While the consideration for weather factors is in itself nothing new, an increasing number of studies turn to the weather either as arguably the 'ultimate' natural experiment, introducing a source of exogenous variation, or as the key to understanding previously unexplained variation, for example in the case of sunshine and stock returns, as outlined below.

The effect of weather and climatic conditions on agriculture is probably the topic that has received the most study in the weather-related economic literature. Moschini and Hennessy (2001) devote their entire chapter of the *Handbook of Agricultural Economics* to risk and uncertainty, stating that "uncontrollable elements, such as the weather, play a fundamental role in agricultural production (p. 89)." Paxson (1992) cleverly uses regional rainfall in Thailand to construct estimates of shocks to transitory income of Thai farm households, which are then used to estimate their savings behavior. Apart from agriculture, very few other areas in economics have looked at the weather. In contrast, its effect on mood, and thus on judgement and behavior, has been widely studied in psychology.[2] Sunshine encourages a positive mood, while rain is associated with negative moods. Saunders (1993) applies the psychological literature to finance in his examination of the effect of the weather on New York Stock Exchange (NYSE) daily stock prices from 1927 to 1989. He finds a small but significantly positive relation between sunshine and stock prices. He attributes it to investors' good mood on sunny days and its effect on their cognitive processes and trading decisions. Hirshleifer and Shumway (2003) look at the same question, but expand their analysis to 26 countries from 1982 to 1997. They also find that sunshine has a positive effect on stock returns. After controlling for sunshine however, other weather variables are not significant. Dowling and Lucey's (2005) study of the Irish stock market corroborates Saunders' and Hirshleifer and Shumway's findings. For their part, Goetzman and Zhu (2003) challenge the claim that investors' moods

[2]Hirshleifer and Shumway (2003) present a good review of the psychological literature on weather and mood.

are affected. They look at individual investor accounts in five major U.S. cities over a six-year period, and find that weather has no effect on the propensity to buy or sell equities. They do admit that NYSE spreads are greater on cloudy days, but they cannot really explain why.

More anecdotically, Levitt and Dubner (2005) report the story of a man who sells bagels in offices on the honor system. He drops off the bagels, together with a money box, in the morning in office kitchen rooms and comes back at the end of the day to collect the leftover bagels and his payment. He charges one dollar per bagel. Over the years he has been tracking the cheating rate, that is, the percentage of bagels that disappear without being paid for. He noticed that the weather has an effect, with unseasonably nice weather increasing the payment rate, and bitter cold, heavy rain and wind being associated with more cheating.[3]

Other research in the same vein has looked at how the weather may affect an individual's evaluation of a certain situation. As reported in Section 1, psychologists Schwarz and Clore (1983) found that people report greater life dissatisfaction on cloudy days, thus apparently commingling the effect of a single day's rain-induced bad mood with overall life evaluation. However, when first primed about the weather, subjects were better able to attribute the source of their mood, and reported the same average life satisfaction as they would on sunny days. Simonsohn (2005) argues that cloudier weather makes people place more weight on academic factors, and less on social factors and enjoyment, while making decisions about which college to enroll in. He finds that prospective college students who visit a school on a cloudy day are more likely to enroll in that school. Also, university admission officers place greater relative importance on academics when reviewing applications on cloudier days.

Weather can also be used as an instrument. Noting that hotter weather is generally associated with more crime, and inclement weather with less crime, Jacob, Lefgren and Moretti (2004) use weather shocks as instruments for identifying the impact of lagged crime on current criminal activity. Waldman, Nicholson, and Adilov (2006) investigate the impact of television watching on the incidence of autism, using rain in a reduced-form regression of autism rates on rainfall: more rain would lead to exogenous variations in television watching, which are in turn associated with a higher incidence of autism. Some studies have also looked at the impact of the weather on quality of life. Blomquist, Berger and Hoehn (1988) construct a quality of life index using the 1980 Census. They look at the effect of climatic conditions, as well as other amenities, on housing expenditures and wages in hedonic regressions. They find that precipitation, humidity, windspeed, sunshine, and temperature have a significant

[3]Levitt and Dubner (2005, p. 49) report that the overall payment rate oscillates around 85–90%.

impact, and are thus able to rank 253 urban counties. Rappaport (2004) observes that local population growth in the United States is highly correlated with warmer winter weather and cooler, less humid summer weather. He argues that people are moving to areas with better weather, due to an increasing valuation of this factor's contribution to their quality of life, which is, in turn, due to rising real incomes.

Direct and indirect effects of the weather on retail sales are examined by Starr-McCluer (2000). Using monthly data on retail sales from the Census Bureau's representative survey of retailers from 1967 to 1998, she finds a modest but significant role for unusual weather in explaining monthly fluctuations in sales. However, such effect disappears when she considers quarterly sales.

3 Data

3.1 Princeton Affect and Time Survey

The affective data come from the Princeton Affect and Time Survey (PATS). The PATS was conducted by Gallup from May 4, 2006, to August 21, 2006, and collected information on time use and affect for 3,982 individuals as part of the Random Digit Sample, covering persons of age 15 and older living in the continental United States.[4] The Random Digit Sample is nationally-representative, and selected using an Equal Probability Selection Method. Each household was randomly assigned a day of the week, and once contacted, was asked about time use and affect for the previous day. The most recent birthday selection technique was used to designate a selected respondent among all household members 15 years of age or older. The survey was done over the telephone, using the same software used by the Bureau of Labor Statistics for data collection on the American Time Use Survey (ATUS) program. After the time-use module was collected, respondent were surveyed on their affect during three randomly selected 15-minute intervals of their day, excluding time spent sleeping and grooming. The selection of episodes in thus proportional to time spent in the episode, and was done without replacement. Survey weights were designed to maximize the representativeness of the data. Summary statistics of the PATS sample are presented in Appendix Table 18.

During the Affect Module, respondents were asked to rate the intensity of six different feelings as experienced during each selected episode, using a scale of 0 to 6, where 0 marks a

[4]Another sample oversampled retirees; the retiree sample will not be used in this study.

Table 1: Tabulations and summary statistics of feelings variables

Panel A: Women	**Percentage in each category**									
	Feeling intensity									
Feeling or variable	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**Mean**	**St.dev.**	**N**
Happy	6.0	3.1	6.5	14.8	17.6	23.5	28.5	4.19	(1.73)	7,024
Interested	8.3	4.1	8.1	14.2	16.8	19.0	29.5	4.02	(1.88)	7,025
Tired	25.0	7.6	11.1	14.5	14.7	14.2	13.0	2.81	(2.12)	7,039
Stressed	48.7	11.2	11.6	9.1	7.1	6.1	6.2	1.58	(1.95)	7,038
Sad	76.8	7.1	4.8	3.9	2.6	1.9	2.9	0.66	(1.46)	7,037
In pain	73.2	5.1	4.4	4.7	4.3	4.2	4.1	0.91	(1.74)	7,038
Net affect, excl. pain	—	—	—	—	—	—	—	3.07	(2.62)	7,016
Net affect, incl. pain	—	—	—	—	—	—	—	3.14	(2.47)	7,012
U-index, excl. pain	—	—	—	—	—	—	—	0.16	(0.37)	7,016
U-index, incl. pain	—	—	—	—	—	—	—	0.20	(0.40)	7,012
Panel B: Men	**Percentage in each category**									
	Feeling intensity									
Feeling or variable	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**Mean**	**St.dev.**	**N**
Happy	4.9	2.4	7.5	19.6	20.5	22.5	22.6	4.06	(1.62)	4,322
Interested	5.9	3.9	8.3	16.2	19.2	22.2	24.4	4.03	(1.73)	4,325
Tired	26.2	10.2	14.1	15.7	14.5	11.5	7.8	2.48	(1.99)	4,328
Stressed	47.3	14.0	13.8	9.6	6.2	4.7	4.4	1.45	(1.79)	4,325
Sad	73.4	10.1	6.4	4.1	2.7	1.7	1.7	0.64	(1.33)	4,330
In pain	71.3	6.8	6.3	5.3	4.6	2.6	3.2	0.86	(1.61)	4,327
Net affect, excl. pain	—	—	—	—	—	—	—	3.02	(2.37)	4,318
Net affect, incl. pain	—	—	—	—	—	—	—	3.08	(2.24)	4,313
U-index, excl. pain	—	—	—	—	—	—	—	0.15	(0.35)	4,318
U-index, incl. pain	—	—	—	—	—	—	—	0.18	(0.38)	4,313

Note: Sampling weights used. Feeling intensity questions are rated on a scale of 0 to 6, with 0 representing a low intensity, and 6 a high intensity. Net affect is the intensity of happiness minus the average of stressed and sad (excl. pain), or minus the average of stressed, sad, and pain (incl. pain). The U-index is 1 if stressed or sad is greater than happy (excl. pain), or if stressed, sad, or pain is greater than happy (incl. pain), and 0 otherwise.

Table 2: Tabulations and summary statistics of satisfaction variables

Panel A: Women	**Percentage in each category**						
Area of satisfaction	**Not at all satisfied**	**Not satisfied**	**Satisfied**	**Very satisfied**	**Mean**	**St. dev.**	**N**
Life	1.68	9.51	43.58	45.24	3.32	(0.71)	2,347
Home	1.28	7.91	43.47	47.34	3.37	(0.68)	2,349
Health	4.82	18.62	46.91	29.64	3.01	(0.82)	2,345
Job	2.35	13.13	53.07	31.45	3.14	(0.72)	1,062
Panel B: Men	**Percentage in each category**						
Area of satisfaction	**Not at all satisfied**	**Not satisfied**	**Satisfied**	**Very satisfied**	**Mean**	**St. dev.**	**N**
Life	1.39	9.3	46.74	42.58	3.31	(0.69)	1,446
Home	1.18	5.86	42.23	50.73	3.43	(0.66)	1,447
Health	2.98	16.46	51.76	28.8	3.06	(0.75)	1,451
Job	2.46	13.99	51.88	31.67	3.13	(0.73)	880

Note: Sampling weights used. Satisfaction questions are rated on a scale of 1 to 4, with 1 meaning "Not at all satisfied," and 4 meaning "Very satisfied."

low intensity and 6 a high intensity of the feeling. The survey covered the following feelings: happiness, tiredness, stress, sadness, interest, and pain.[5] Table 1 contains descriptive statistics for the feelings questions, as well as tabulations by intensity of feeling. At the end of the Affect Module, a set of questions about general feelings was included. Respondents were to rate their satisfaction about their life overall, their life at home, their health, and their job if they had one, on a scale of 1 to 4, where 1 meant "Not at all satisfied," 2 "Not satisfied," 3 "Satisfied," and 4 "Very satisfied." As can be seen in Table 2, which contains summary statistics and tabulations of the satisfaction questions, the majority of the people answered "Satisfied" or "Very satisfied" to these questions, with over 90% of the responses in these two categories for the life satisfaction and home satisfaction questions, and 74% and 85% for health and job satisfaction, respectively.

Two variables are constructed from the answers to the feelings questions: net affect and the U-index.[6] Both give a different measure of well-being. The net affect is computed as follows:

$$\text{Net affect} = \text{happy} - \text{mean(stressed, sad)} \quad (1)$$

[5]The ordering of the emotions in the questionnaire was randomly varied. Krueger and Stone (2007) find that when asked about a negative feeling first, the responses about the following positive feelings were slightly lowered.

[6]See Kahneman and Krueger (2006) for a presentation and discussion of net affect and the U-index as measurements of well-being.

Or, when including pain:

$$\text{Net affect, incl. pain} \quad = \quad \text{happy} \quad - \quad \text{mean(stressed, sad, pain)} \tag{2}$$

The U-index relates to the percentage of time spent in an unpleasant state (U is for 'unpleasant', and is computed according to the following equation:

$$\text{U-index} = \begin{cases} 1 & \text{if max(stressed, sad)} > \text{happy} \\ 0 & \text{otherwise} \end{cases} \tag{3}$$

When including pain, Equation 3 is modified so that the U-index compares the intensity of happy to the maximum of stressed, sad and pain. The U-index is 1 when the most intense feeling is a negative one, and its use can be justified by the fact that most episodes of people's days are pleasant, as can be seen in Table 1, and that any dominant negative emotion will, by its salience, reflect the way people judge their mood during that episode.

3.2 Weather Data

Data on the weather were added to the PATS data. The data on weather come from the National Climatic Data Center (NCDC) of the National Oceanic and Atmospheric Administration (NOAA).[7] The daily summaries from over 8,000 weather stations located across the United States were used, corresponding to the data sets 3200 and 3210. The normal temperatures and precipitation levels come from the data set CLIM84, which is based on the weather from 1971 to 2000. Weather for the day of the interview and for the day of the diary (the day preceding the interview) was carefully identified. I look at the effect of the weather on both days, and focus on precipitation and temperature. Because the PATS was conducted from May to August, snow is not significant to the study. Table 3 contains tabulations and summary statistics for the precipitation and temperature variables. For the purpose of the analysis, both rain and temperature were broken down in categorical variables, for which the breakdown is shown in Table 3. Days since last dry day counts the number of days from the day of the interview since it last rained, and is equal to zero is there is precipitation on the day of the interview. While it is possible to look at the effect of both rain the day of the interview and the day of the diary (the day preceding the interview), the high day-to-day correlation for temperatures makes it impossible to look at both the temperature of the interview day and of the diary day. Whenever temperature is going to be used in regressions, I will use temperature

[7]The data can be downloaded from http://www.ncdc.noaa.gov/oa/ncdc.html.

Table 3: Tabulations, summary statistics, and correlation matrix of weather variables

Precipitation	Percentage in each category: Amount of precipitation (inches) 0	0–0.1	0.1–0.5	0.5–1	1 and above	Mean	St. dev.	Max.
Day of interview	59.4	19.2	14.5	5.2	1.8	0.106	(0.272)	3.73
Day of diary	60.3	19.7	13.4	4.4	2.2	0.101	(0.269)	3.4
Daily normal	—	—	—	—	—	0.109	(0.055)	0.31
Days since last dry day	—	—	—	—	—	1.27	(2.39)	23

Temperature	Percentage in each category: Daily mean temperature (degrees F) Under 50	50s	60s	70s	80s	90 and above	Mean	St. dev.	Max.
Day of interview	2.5	13.5	25.3	32.1	25.0	1.7	71.6	(10.7)	100.7
Day of diary	1.9	14.4	24.7	33.8	23.4	1.8	71.6	(10.5)	101.9
Daily normal	—	—	—	—	—	—	70.4	(8.3)	91.3

Correlation matrix

	Temperature: Int. day	Diary day	Normal temp.	Precipitation: Int. day	Diary day	Normal prec.
Temp., int. day	1					
Temp., diary day	0.94	1				
Daily normal temp.	0.85	0.85	1			
Prec., int. day	-0.08	-0.01	-0.05	1		
Prec., diary day	-0.10	-0.04	-0.02	0.28	1	
Daily normal prec.	-0.03	-0.03	0.09	0.19	0.17	1
Days since last dry day	-0.20	-0.15	-0.13	0.32	0.30	0.17

Note: Sampling weights used. Precipitation is measured in inches. Days since last dry day counts the number of days since it last rained, and is equal to zero if the interview day is rainy. Temperature is mean daily temperature (the average of the minimum and the maximum temperatures for the day), in degrees Fahrenheit. Normals are daily normals.

of the day of the interview when looking at satisfaction questions, and temperature of the day of the time-use diary (the day prior to the interview) when looking at feelings questions. The rationale is that for satisfaction questions, the previous day's temperature should not matter, whereas when looking at feelings during specific episodes, it is the temperature at that time, and so on the diary day, that should matter. In any case, using either temperature does not change the results significantly, since the correlation between one day's mean temperature and the previous day's is 0.94, as can be seen in Table 3. In contrast, the same correlation for precipitation is 0.28.

4 Findings

This section will look in turn at the effect of the weather on answers to general satisfaction questions, followed by answers to specific feelings questions, and finally on the net affect and U-index, which are computed from the answers to the feelings questions.

4.1 General Satisfaction

The PATS data include four general satisfaction questions, relating to different spheres of life: life overall, life at home, health, and job satisfaction. All the analysis will be performed separately for men and women, and it will be shown that both sexes display different responsiveness to the weather. Regressions of the satisfaction level on weather variables are done using ordinary least squares, using the sampling weights provided with the data. Tables 4 through 11 contain the estimates from all regressions on precipitation variables, starting with women and life satisfaction. Various specifications are presented, removing normal precipitation, days since last dry day, and the diary day precipitation dummies, as well as introducing month and state fixed effects. My prior is that if rain has an effect on satisfaction levels, it would be the rain of the day of the interview, not of the diary day (the day before the interview, for which the time-use diary is collected). Column (1) of Table 4 does not include fixed effects, but includes normal daily precipitation, all dummies for the rain of the interview day and the diary day, and days since last dry day, which is included to capture the effect of strings of rainy days. All regressions include controls for age, education, marital status, race, and ethnicity, but the coefficients are not reported as they are not the focus of this study.

Normal daily precipitation significantly decreases life satisfaction, with an extra inch of normal rain (less than half a standard deviation) reducing life satisfaction by one (without state fixed effects) to two standard deviations (with state fixed effects). None of the rain dummies for the diary day are significant, but most of the ones for the interview day are, all reducing satisfaction level more or less monotonically. Going through the different columns of Table 4, it is clear that the results are pretty robust to the specification used and the inclusion of normal precipitation or days since last dry day, since the coefficients vary only slightly from column to column. The biggest change is for the coefficient on normal precipitation when going from without state fixed effects to with the fixed effects. This is not so surprising however, since the normal reflects the time of year and the geographical location of the individual. Changes in normal precipitation within state are likely to be smaller.

Table 4: Regression results, effect of precipitation on life satisfaction, women

	Dependent variable: Life satisfaction					
Independent var.	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Normal daily prec.	-0.736	—	-0.737	-0.720	-0.708	-1.925
	(0.361)**	—	(0.360)**	(0.351)**	(0.359)**	(0.702)***
Precipitation on interview day						
$0 <$ prec. < 0.1	-0.107	-0.110	-0.098	-0.108	-0.113	-0.098
	(0.055)*	(0.056)**	(0.050)**	(0.055)**	(0.055)**	(0.053)*
$0.1 \leqslant$ prec. < 0.5	-0.105	-0.120	-0.094	-0.103	-0.108	-0.089
	(0.067)	(0.067)*	(0.059)	(0.066)	(0.067)	(0.066)
$0.5 \leqslant$ prec. < 1	-0.140	-0.157	-0.132	-0.135	-0.146	-0.126
	(0.073)*	(0.073)**	(0.070)*	(0.071)*	(0.073)**	(0.073)*
$1 \leqslant$ prec.	-0.269	-0.283	-0.261	-0.259	-0.276	-0.233
	(0.138)*	(0.138)**	(0.137)*	(0.137)*	(0.137)**	(0.140)*
Precipitation on diary day (day before interview)						
$0 <$ prec. < 0.1	0.008	0.007	0.014	—	0.012	-0.023
	(0.051)	(0.051)	(0.050)	—	(0.051)	(0.050)
$0.1 \leqslant$ prec. < 0.5	0.011	-0.006	0.017	—	0.009	-0.023
	(0.061)	(0.061)	(0.059)	—	(0.061)	(0.059)
$0.5 \leqslant$ prec. < 1	0.009	-0.014	0.016	—	-0.002	-0.060
	(0.081)	(0.079)	(0.078)	—	(0.079)	(0.081)
$1 \leqslant$ prec.	0.104	0.087	0.112	—	0.091	0.062
	(0.129)	(0.133)	(0.129)	—	(0.128)	(0.124)
Days since last dry day	0.004	0.004	—	0.005	0.006	0.009
	(0.010)	(0.010)	—	(0.009)	(0.010)	(0.010)
Month fixed effects					x	x
State fixed effects						x
R-squared	0.10	0.09	0.10	0.10	0.10	0.13
F-test, int. day	2.08	2.40	2.30	2.03	2.24	1.65
Prob. > F, int. day	0.08	0.05	0.06	0.09	0.06	0.16
F-test, d. day	0.17	0.13	0.20	—	0.14	0.26
Prob. > F, d. day	0.96	0.97	0.94	—	0.97	0.91

Note: Robust standard errors in parentheses. * significant at 10%; ** significant at 5%, *** significant at 1%. Precipitation is measured in inches. Omitted categories are no rain that day. The F-tests are of the joint significance of the precipitation dummies. The regressions also include controls for education, age, marital status, race, and ethnicity. Sampling weights used. N = 2,194

Table 5: Regression results, effect of precipitation on home satisfaction, women

	Dependent variable: Home satisfaction					
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Normal daily prec.	-0.208	—	-0.209	-0.161	-0.214	-1.273
	(0.362)	—	(0.361)	(0.356)	(0.362)	(0.678)*
Precipitation on interview day						
$0 <$ prec. < 0.1	-0.085	-0.086	-0.076	-0.083	-0.086	-0.067
	(0.055)	(0.055)	(0.049)	(0.055)	(0.055)	(0.055)
$0.1 \leqslant$ prec. < 0.5	-0.142	-0.146	-0.130	-0.135	-0.143	-0.115
	(0.064)**	(0.064)**	(0.058)**	(0.063)**	(0.064)**	(0.064)*
$0.5 \leqslant$ prec. < 1	-0.036	-0.040	-0.028	-0.022	-0.035	-0.027
	(0.078)	(0.077)	(0.074)	(0.077)	(0.079)	(0.076)
$1 \leqslant$ prec.	-0.169	-0.173	-0.161	-0.152	-0.173	-0.149
	(0.136)	(0.136)	(0.135)	(0.133)	(0.137)	(0.131)
Precipitation on diary day (day before interview)						
$0 <$ prec. < 0.1	0.034	0.034	0.040	—	0.034	0.004
	(0.054)	(0.054)	(0.052)	—	(0.054)	(0.054)
$0.1 \leqslant$ prec. < 0.5	0.046	0.042	0.053	—	0.049	0.021
	(0.057)	(0.056)	(0.054)	—	(0.057)	(0.056)
$0.5 \leqslant$ prec. < 1	0.049	0.043	0.056	—	0.042	0.019
	(0.076)	(0.075)	(0.073)	—	(0.077)	(0.076)
$1 \leqslant$ prec.	0.109	0.104	0.117	—	0.114	0.090
	(0.130)	(0.131)	(0.130)	—	(0.129)	(0.122)
Days since last dry day	0.004	0.004	—	0.008	0.005	0.010
	(0.011)	(0.011)	—	(0.010)	(0.011)	(0.011)
Month fixed effects					x	x
State fixed effects						x
R-squared	0.11	0.11	0.11	0.10	0.11	0.14
F-test, interview day	1.56	1.64	1.70	1.50	1.59	1.07
Prob. > F, interview day	0.18	0.16	0.15	0.20	0.18	0.37
F-test, diary day	0.35	0.31	0.48	—	0.37	0.16
Prob. > F, diary day	0.84	0.87	0.75	—	0.83	0.96

Note: Robust standard errors in parentheses. * significant at 10%; ** significant at 5%, *** significant at 1%. Precipitation is measured in inches. Omitted categories are no rain that day. The F-tests are of the joint significance of the precipitation dummies. The regressions also include controls for education, age, marital status, race, and ethnicity. Sampling weights used. N = 2,197

Turning to satisfaction with life at home, no clear pattern emerges when looking at Table 5, except that a day with moderate rain decreases the satisfaction level. The other rain dummies are also negative, but the standard errors are too big to achieve significance. The picture in Table 6 is even more striking: none of the weather variables are significant. When considering job satisfaction (Table 7), only normal precipitation matters, with a wetter climate reducing job satisfaction: and extra inch of rain reduces job satisfaction by about 1.13, or just under 2 standard deviations, in the specifications without state fixed effects.

Tables 8 through 11 cover the same regressions but now for men. The last one, on job satisfaction, shows virtually no effect of rain on satisfaction levels. The other three present a murkier message. All the tables show the value of F-tests testing the joint significance of first the rain dummies for the day of the interview, and then for the day of the diary—which, for the latter, I argued should not have an effect on satisfaction levels. For men, none of the F-tests come out significant. (For women, the F-tests for rain on interview day in the life satisfaction regressions had a p-value under 0.1.) Table 8 presents mildly significant coefficients for rain on the *diary* day, not the interview day, though they go in the expected direction: negative and increasing in the amount of rain. However, a specification with rain entering linearly was tried (results not reported), and the coefficient does not achieve significance. A day with 0.5 to 1 inch of rain, which means a good rain but not too hard or too long, reduces health satisfaction no matter which specification is used.

While the previous tables were focusing on the impact of precipitation, Table 12 reports coefficients for regressions on temperature variables: daily normal mean temperature and mean temperature dummies. The omitted category is that of temperature in the 70s, which is what the average is. That category was omitted to highlight the effect of extreme temperatures on satisfaction levels. The specifications all include month and state fixed effects, though the choice of the specification does not change substantially the results, as seen in the previous tables exploring the different possibilities. Panel A presents the results for women. Daily normal mean temperature has a positive but small impact on life and life at home satisfaction. The rest of the table does not show much effect of the temperatures on satisfaction levels. The regressions were run including both the precipitation and the temperature variables at the same time, but given the low correlations between the two groups, the findings do not change from when both effects are investigated separately.

Table 6: Regression results, effect of precipitation on health satisfaction, women

	Dependent variable: Health satisfaction					
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Normal daily prec.	0.105	—	0.103	0.000	0.082	0.256
	(0.410)	—	(0.409)	(0.402)	(0.409)	(0.876)
Precipitation on interview day						
$0 <$ prec. < 0.1	-0.056	-0.056	-0.029	-0.064	-0.053	-0.048
	(0.061)	(0.061)	(0.055)	(0.060)	(0.061)	(0.060)
$0.1 \leqslant$ prec. < 0.5	-0.008	-0.006	0.026	-0.022	-0.007	0.006
	(0.075)	(0.075)	(0.069)	(0.075)	(0.075)	(0.076)
$0.5 \leqslant$ prec. < 1	-0.087	-0.084	-0.063	-0.112	-0.084	-0.063
	(0.105)	(0.105)	(0.104)	(0.105)	(0.106)	(0.107)
$1 \leqslant$ prec.	0.013	0.015	0.036	-0.025	0.013	0.007
	(0.127)	(0.127)	(0.125)	(0.127)	(0.126)	(0.129)
Precipitation on diary day (day before interview)						
$0 <$ prec. < 0.1	-0.088	-0.088	-0.070	—	-0.091	-0.087
	(0.062)	(0.062)	(0.060)	—	(0.062)	(0.061)
$0.1 \leqslant$ prec. < 0.5	-0.079	-0.076	-0.060	—	-0.076	-0.097
	(0.069)	(0.069)	(0.067)	—	(0.069)	(0.070)
$0.5 \leqslant$ prec. < 1	-0.186	-0.183	-0.166	—	-0.186	-0.176
	(0.114)	(0.112)	(0.110)	—	(0.114)	(0.114)
$1 \leqslant$ prec.	-0.131	-0.128	-0.107	—	-0.118	-0.156
	(0.134)	(0.133)	(0.131)	—	(0.136)	(0.139)
Days since last dry day	0.012	0.012	—	0.003	0.012	0.012
	(0.011)	(0.011)	—	(0.011)	(0.011)	(0.011)
Month fixed effects					x	x
State fixed effects						x
R-squared	0.07	0.07	0.07	0.07	0.07	0.10
F-test, interview day	0.38	0.38	0.28	0.48	0.34	0.28
Prob. > F, interview day	0.82	0.83	0.89	0.75	0.85	0.89
F-test, diary day	0.99	0.98	0.81	—	0.97	1.08
Prob. > F, diary day	0.41	0.42	0.52	—	0.42	0.37

Note: Robust standard errors in parentheses. * significant at 10%; ** significant at 5%, *** significant at 1%. Precipitation is measured in inches. Omitted categories are no rain that day. The F-tests are of the joint significance of the precipitation dummies. The regressions also include controls for education, age, marital status, race, and ethnicity. Sampling weights used. N = 2,192

Table 7: Regression results, effect of precipitation on job satisfaction, women

	Dependent variable: Job satisfaction					
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Normal daily prec.	-1.134	—	-1.134	-1.133	-1.134	-2.285
	(0.526)**	—	(0.526)**	(0.519)**	(0.527)**	(1.119)**
Precipitation on interview day						
$0 <$ prec. < 0.1	0.067	0.058	0.069	0.069	0.071	0.083
	(0.080)	(0.081)	(0.073)	(0.079)	(0.080)	(0.085)
$0.1 \leqslant$ prec. < 0.5	-0.114	-0.136	-0.112	-0.12	-0.112	-0.042
	(0.094)	(0.096)	(0.085)	(0.094)	(0.095)	(0.102)
$0.5 \leqslant$ prec. < 1	-0.076	-0.104	-0.075	-0.075	-0.070	-0.063
	(0.117)	(0.112)	(0.111)	(0.116)	(0.117)	(0.121)
$1 \leqslant$ prec.	-0.039	-0.082	-0.038	-0.048	-0.033	-0.027
	(0.230)	(0.228)		(0.244)	(0.230)	(0.227)
Precipitation on diary day (day before interview)						
$0 <$ prec. < 0.1	-0.044	-0.044	-0.043	—	-0.044	0.011
	(0.089)	(0.089)	(0.083)	—	(0.089)	(0.089)
$0.1 \leqslant$ prec. < 0.5	0.030	0.008	0.031	—	0.032	0.023
	(0.086)	(0.086)	(0.083)	—	(0.087)	(0.085)
$0.5 \leqslant$ prec. < 1	-0.165	-0.187	-0.164	—	-0.157	-0.200
	(0.134)	(0.132)	(0.133)	—	(0.138)	(0.138)
$1 \leqslant$ prec.	-0.113	-0.119	-0.111	—	-0.112	-0.091
	(0.263)	(0.265)	(0.270)	—	(0.264)	(0.258)
Days since last dry day	0.001	0.001	—	-0.004	-0.001	0.003
	(0.013)	(0.013)	—	(0.013)	(0.013)	(0.015)
Month fixed effects					x	x
State fixed effects						x
R-squared	0.06	0.05	0.06	0.06	0.06	0.13
F-test, interview day	1.13	1.37	1.14	1.24	1.14	0.66
Prob. > F, interview day	0.34	0.24	0.34	0.29	0.34	0.62
F-test, diary day	0.60	0.63	0.59	—	0.53	0.70
Prob. > F, diary day	0.67	0.64	0.67	—	0.71	0.59

Note: Robust standard errors in parentheses. * significant at 10%; ** significant at 5%, *** significant at 1%. Precipitation is measured in inches. Omitted categories are no rain that day. The F-tests are of the joint significance of the precipitation dummies. The regressions also include controls for education, age, marital status, race, and ethnicity. Sampling weights used. N = 987

Table 8: Regression results, effect of precipitation on life satisfaction, men

	Dependent variable: Life satisfaction					
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Normal daily prec.	-0.265	—	-0.266	-0.409	-0.255	-0.415
	(0.424)	—	(0.424)	(0.430)	(0.424)	(0.902)
Precipitation on interview day						
$0 <$ prec. < 0.1	0.072	0.072	0.074	0.06	0.074	0.073
	(0.063)	(0.063)	(0.059)	(0.063)	(0.064)	(0.066)
$0.1 \leqslant$ prec. < 0.5	-0.009	-0.013	-0.007	-0.030	-0.010	-0.005
	(0.077)	(0.077)	(0.069)	(0.078)	(0.077)	(0.083)
$0.5 \leqslant$ prec. < 1	0.075	0.072	0.077	0.069	0.074	0.080
	(0.104)	(0.103)	(0.100)	(0.099)	(0.105)	(0.102)
$1 \leqslant$ prec.	0.160	0.147	0.162	0.124	0.169	0.154
	(0.167)	(0.164)	(0.163)	(0.168)	(0.169)	(0.161)
Precipitation on diary day (day before interview)						
$0 <$ prec. < 0.1	-0.112	-0.115	-0.111	—	-0.106	-0.106
	(0.062)*	(0.062)*	(0.058)*	—	(0.061)*	(0.060)*
$0.1 \leqslant$ prec. < 0.5	-0.166	-0.173	-0.164	—	-0.164	-0.179
	(0.085)*	(0.085)**	(0.078)**	—	(0.085)*	(0.087)**
$0.5 \leqslant$ prec. < 1	-0.060	-0.070	-0.059	—	-0.047	-0.067
	(0.132)	(0.132)	(0.130)	—	(0.132)	(0.141)
$1 \leqslant$ prec.	-0.206	-0.209	-0.205	—	-0.193	-0.211
	(0.119)*	(0.118)*	(0.117)*	—	(0.118)	(0.120)*
Days since last dry day	0.001	0.001	—	-0.011	0.002	0.006
	(0.013)	(0.013)	—	(0.012)	(0.013)	(0.014)
Month fixed effects					x	x
State fixed effects						x
R-squared	0.07	0.07	0.07	0.06	0.07	0.11
F-test, interview day	0.68	0.67	0.74	0.63	0.71	0.65
Prob. > F, interview day	0.60	0.61	0.57	0.64	0.58	0.63
F-test, diary day	1.68	1.76	1.98	—	1.59	1.74
Prob. > F, diary day	0.15	0.14	0.10	—	0.18	0.14

Note: Robust standard errors in parentheses. * significant at 10%; ** significant at 5%, *** significant at 1%. Precipitation is measured in inches. Omitted categories are no rain that day. The F-tests are of the joint significance of the precipitation dummies. The regressions also include controls for education, age, marital status, race, and ethnicity. Sampling weights used. N = 1,340

Table 9: Regression results, effect of precipitation on home satisfaction, men

	Dependent variable: Home satisfaction					
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Normal daily prec.	0.289	—	0.291	0.265	0.304	0.756
	(0.362)	—	(0.362)	(0.356)	(0.361)	(0.750)
Precipitation on interview day						
$0 <$ prec. < 0.1	0.027	0.027	0.017	0.015	0.032	0.033
	(0.055)	(0.055)	(0.050)	(0.056)	(0.055)	(0.055)
$0.1 \leqslant$ prec. < 0.5	-0.006	-0.001	-0.019	-0.012	-0.007	0.025
	(0.064)	(0.064)	(0.056)	(0.064)	(0.064)	(0.067)
$0.5 \leqslant$ prec. < 1	-0.042	-0.038	-0.052	-0.04	-0.045	-0.027
	(0.099)	(0.099)	(0.096)	(0.094)	(0.100)	(0.099)
$1 \leqslant$ prec.	0.033	0.047	0.023	0.022	0.047	0.005
	(0.128)	(0.127)	(0.124)	(0.129)	(0.130)	(0.122)
Precipitation on diary day (day before interview)						
$0 <$ prec. < 0.1	-0.094	-0.090	-0.099	—	-0.084	-0.093
	(0.053)*	(0.052)*	(0.050)**	—	(0.053)	(0.052)*
$0.1 \leqslant$ prec. < 0.5	-0.002	0.006	-0.011	—	0.001	-0.009
	(0.063)	(0.062)	(0.058)	—	(0.063)	(0.064)
$0.5 \leqslant$ prec. < 1	-0.016	-0.006	-0.023	—	0.004	-0.036
	(0.128)	(0.127)	(0.129)	—	(0.128)	(0.134)
$1 \leqslant$ prec.	-0.027	-0.024	-0.031	—	-0.010	-0.021
	(0.126)	(0.126)	(0.126)	—	(0.126)	(0.127)
Days since last dry day	-0.004	-0.004	—	-0.008	-0.003	-0.005
	(0.011)	(0.011)	—	(0.010)	(0.011)	(0.010)
Month fixed effects					x	x
State fixed effects						x
R-squared	0.15	0.15	0.15	0.15	0.16	0.21
F-test, interview day	0.17	0.17	0.17	0.11	0.23	0.15
Prob. > F, interview day	0.95	0.96	0.95	0.98	0.92	0.96
F-test, diary day	0.89	0.87	1.02	—	0.75	0.87
Prob. > F, diary day	0.47	0.48	0.39	—	0.56	0.48

Note: Robust standard errors in parentheses. * significant at 10%; ** significant at 5%, *** significant at 1%. Precipitation is measured in inches. Omitted categories are no rain that day. The F-tests are of the joint significance of the precipitation dummies. The regressions also include controls for education, age, marital status, race, and ethnicity. Sampling weights used. N = 1,341

Table 10: Regression results, effect of precipitation on health satisfaction, men

	Dependent variable: Health satisfaction					
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Normal daily prec.	0.276	—	0.275	0.238	0.270	0.288
	(0.473)	—	(0.473)	(0.467)	(0.470)	(1.004)
Precipitation on interview day						
$0 <$ prec. < 0.1	-0.007	-0.007	0.000	-0.022	-0.008	-0.005
	(0.072)	(0.072)	(0.065)	(0.072)	(0.071)	(0.074)
$0.1 \leqslant$ prec. < 0.5	0.021	0.026	0.030	0.019	0.020	0.065
	(0.075)	(0.074)	(0.064)	(0.076)	(0.074)	(0.075)
$0.5 \leqslant$ prec. < 1	-0.216	-0.212	-0.209	-0.211	-0.214	-0.204
	(0.118)*	(0.117)*	(0.113)*	(0.116)*	(0.120)*	(0.113)*
$1 \leqslant$ prec.	0.050	0.063	0.057	0.048	0.057	0.049
	(0.181)	(0.183)	(0.175)	(0.177)	(0.186)	(0.188)
Precipitation on diary day (day before interview)						
$0 <$ prec. < 0.1	-0.132	-0.128	-0.128	—	-0.132	-0.120
	(0.063)**	(0.063)**	(0.061)**	—	(0.063)**	(0.062)*
$0.1 \leqslant$ prec. < 0.5	-0.003	0.005	0.002	—	-0.005	-0.018
	(0.078)	(0.078)	(0.072)	—	(0.078)	(0.080)
$0.5 \leqslant$ prec. < 1	-0.034	-0.024	-0.029	—	-0.026	-0.054
	(0.120)	(0.118)	(0.119)	—	(0.120)	(0.126)
$1 \leqslant$ prec.	0.038	0.041	0.041	—	0.045	-0.001
	(0.147)	(0.147)	(0.146)	—	(0.147)	(0.146)
Days since last dry day	0.003	0.003	—	-0.002	0.004	-0.004
	(0.014)	(0.014)	—	(0.013)	(0.013)	(0.014)
Month fixed effects					x	x
State fixed effects						x
R-squared	0.06	0.06	0.06	0.06	0.07	0.10
F-test, interview day	1.09	1.10	1.10	1.05	1.04	1.42
Prob. > F, interview day	0.36	0.35	0.36	0.38	0.38	0.22
F-test, diary day	1.31	1.29	1.3	—	1.34	1.02
Prob. > F, diary day	0.26	0.27	0.27	—	0.25	0.39

Note: Robust standard errors in parentheses. * significant at 10%; ** significant at 5%, *** significant at 1%. Precipitation is measured in inches. Omitted categories are no rain that day. The F-tests are of the joint significance of the precipitation dummies. The regressions also include controls for education, age, marital status, race, and ethnicity. Sampling weights used. N = 1,345

Table 11: Regression results, effect of precipitation on job satisfaction, men

	Dependent variable: Job satisfaction					
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Normal daily prec.	-0.112	—	-0.082	-0.154	-0.094	0.037
	(0.591)	—	(0.588)	(0.595)	(0.592)	(1.364)
Precipitation on interview day						
$0 <$ prec. < 0.1	0.058	0.059	0.005	0.062	0.064	0.047
	(0.094)	(0.094)	(0.081)	(0.093)	(0.093)	(0.096)
$0.1 \leqslant$ prec. < 0.5	0.036	0.035	-0.034	0.029	0.042	0.081
	(0.102)	(0.100)	(0.092)	(0.101)	(0.102)	(0.108)
$0.5 \leqslant$ prec. < 1	-0.010	-0.012	-0.060	-0.003	-0.009	0.004
	(0.165)	(0.165)	(0.158)	(0.162)	(0.167)	(0.168)
$1 \leqslant$ prec.	0.127	0.124	0.079	0.125	0.115	0.213
	(0.234)	(0.232)	(0.233)	(0.227)	(0.229)	(0.205)
Precipitation on diary day (day before interview)						
$0 <$ prec. < 0.1	0.024	0.023	-0.006	—	0.031	0.086
	(0.085)	(0.086)	(0.081)	—	(0.085)	(0.089)
$0.1 \leqslant$ prec. < 0.5	-0.142	-0.145	-0.180	—	-0.140	-0.129
	(0.103)	(0.103)	(0.097)*	—	(0.103)	(0.106)
$0.5 \leqslant$ prec. < 1	0.082	0.077	0.045	—	0.077	0.163
	(0.159)	(0.159)	(0.164)	—	(0.159)	(0.175)
$1 \leqslant$ prec.	-0.039	-0.040	-0.071	—	-0.032	0.007
	(0.202)	(0.203)	(0.201)	—	(0.203)	(0.225)
Days since last dry day	-0.023	-0.023	—	-0.028	-0.026	-0.026
	(0.019)	(0.019)	—	(0.017)*	(0.019)	(0.021)
Month fixed effects					x	x
State fixed effects						x
R-squared	0.04	0.04	0.04	0.04	0.05	0.09
F-test, interview day	0.16	0.16	0.11	0.17	0.17	0.37
Prob. > F, interview day	0.96	0.96	0.98	0.95	0.95	0.83
F-test, diary day	0.80	0.81	1.01	—	0.81	1.25
Prob. > F, diary day	0.52	0.52	0.40	—	0.52	0.29

Note: Robust standard errors in parentheses. * significant at 10%; ** significant at 5%, *** significant at 1%. Precipitation is measured in inches. Omitted categories are no rain that day. The F-tests are of the joint significance of the precipitation dummies. The regressions also include controls for education, age, marital status, race, and ethnicity. Sampling weights used. N = 817

Table 12: Regression results, effect of temperature on satisfaction

Panel A: Women	**Dependent variable: Area of satisfaction**			
Independent variable	**Life**	**Home**	**Health**	**Job**
Daily normal temperature	0.008	0.010	0.004	-0.006
	(0.004)**	(0.004)***	(0.005)	(0.006)
Temperature on interview day				
Under 50	0.113	0.113	0.214	0.020
	(0.152)	(0.110)	(0.162)	(0.175)
50s	-0.010	0.090	0.109	-0.215
	(0.079)	(0.073)	(0.084)	(0.119)*
60s	-0.003	0.005	0.006	-0.054
	(0.055)	(0.054)	(0.063)	(0.079)
80s	-0.086	-0.110	-0.070	-0.013
	(0.057)	(0.050)**	(0.063)	(0.084)
90 and above	-0.060	-0.022	0.296	0.173
	(0.118)	(0.107)	(0.192)	(0.177)
N	2226	2228	2224	1005
R-squared	0.09	0.11	0.07	0.05
F-test	0.59	1.39	1.64	1.06
Prob > F	0.71	0.23	0.15	0.38
Panel B: Men	**Dependent variable: Area of satisfaction**			
Independent variable	**Life**	**Home**	**Health**	**Job**
Daily normal temperature	0.003	0.001	0.001	-0.002
	(0.005)	(0.004)	(0.005)	(0.006)
Temperature on interview day				
Under 50	0.041	-0.009	-0.213	-0.034
	(0.146)	(0.122)	(0.156)	(0.215)
50s	0.068	-0.032	-0.013	-0.060
	(0.081)	(0.080)	(0.094)	(0.119)
60s	0.030	0.044	-0.068	-0.015
	(0.062)	(0.055)	(0.065)	(0.085)
80s	0.074	0.109	-0.014	0.088
	(0.065)	(0.058)*	(0.071)	(0.091)
90 and above	-0.016	-0.023	-0.014	-0.105
	(0.139)	(0.122)	(0.160)	(0.201)
N	1373	1374	1378	838
R-squared	0.06	0.15	0.06	0.03
F-test	0.45	1.06	0.55	0.41
Prob > F	0.81	0.38	0.74	0.84

Note: Robust standard errors in parentheses. * significant at 10%; ** significant at 5%, *** significant at 1%. Daily normal temperature is in degrees Fahrenheit. Omitted category is temperature in the 70s. The F-test is of the joint significance of the temperature dummies. The regressions also include controls for education, age, marital status, race, and ethnicity. No fixed effects for month or state. Sampling weights used.

Table 13: Regression results, effect of weather on feeling happy, women

Independent variable	**Dependent variable: Intensity of feeling happy, 0–6**				
Daily normal prec.	-0.356	-0.350	-0.274	-0.223	0.430
	(0.734)	(0.744)	(0.749)	(0.730)	(1.418)
Precipitation on interview day					
0 < prec. < 0.1	0.055	0.054	0.040	0.005	0.009
	(0.098)	(0.098)	(0.099)	(0.097)	(0.096)
0.1 ⩽ prec. < 0.5	-0.118	-0.117	-0.094	-0.124	-0.128
	(0.117)	(0.117)	(0.119)	(0.116)	(0.114)
0.5 ⩽ prec. < 1	0.009	0.006	0.007	-0.021	0.033
	(0.195)	(0.194)	(0.191)	(0.190)	(0.191)
1 ⩽ prec.	-0.112	-0.101	-0.037	-0.076	-0.077
	(0.268)	(0.268)	(0.272)	(0.233)	(0.228)
Precipitation on diary day (day before interview)					
0 < prec. < 0.1	-0.108	-0.104	-0.091	-0.092	-0.087
	(0.099)	(0.099)	(0.099)	(0.097)	(0.097)
0.1 ⩽ prec. < 0.5	0.071	0.064	0.075	0.080	0.100
	(0.118)	(0.117)	(0.117)	(0.115)	(0.117)
0.5 ⩽ prec. < 1	-0.111	-0.104	-0.084	-0.037	-0.032
	(0.178)	(0.179)	(0.181)	(0.172)	(0.172)
1 ⩽ prec.	0.277	0.243	0.290	0.290	0.297
	(0.296)	(0.297)	(0.289)	(0.284)	(0.292)
Daily normal temp.	0.007	0.008	0.009	0.009	0.002
	(0.008)	(0.008)	(0.008)	(0.008)	(0.012)
Temperature on diary day					
Under 50	0.556	0.572	0.541	0.564	0.662
	(0.256)**	(0.258)**	(0.269)**	(0.271)**	(0.283)**
50s	-0.115	-0.125	-0.153	-0.126	-0.143
	(0.157)	(0.158)	(0.156)	(0.154)	(0.157)
60s	0.010	-0.005	0.000	-0.020	-0.010
	(0.109)	(0.109)	(0.107)	(0.106)	(0.107)
80s	-0.187	-0.168	-0.159	-0.172	-0.185
	(0.109)*	(0.109)	(0.110)	(0.109)	(0.108)*
90 and above	-0.714	-0.699	-0.695	-0.713	-0.785
	(0.293)**	(0.292)**	(0.296)**	(0.291)**	(0.309)**
Month fixed effects		x	x	x	x
Day of week fixed effects			x	x	x
Activity fixed effects				x	x
State fixed effects				x	x
R-squared	0.03	0.03	0.04	0.08	0.09
F-test, prec. interview day	0.51	0.49	0.28	0.34	0.43
Prob. > F, prec. interview day	0.73	0.74	0.89	0.85	0.79
F-test, prec. diary day	0.89	0.75	0.79	0.80	0.86
Prob. > F, prec. diary day	0.47	0.56	0.53	0.52	0.49
F-test, temp.	3.03	3.03	2.95	2.92	3.45
Prob. > F, temp.	0.01	0.01	0.01	0.01	0.00

Note: Clustered standard errors in parentheses (at individual level). * significant at 10%; ** significant at 5%, *** significant at 1%. Precipitation is measured in inches, mean temperature in degrees Fahrenheit. Omitted categories are no rain that day and mean temp. in the 70s. The F-tests are of the joint significance of the prec. and temp. dummies. The regressions also include controls for education, age, marital status, race, and ethnicity. Sampling weights used. N = 6,278

4.2 Feelings

Respondents were asked to characterize the intensity of six different feelings, each of which for three different time-use episodes during the diary day. It is thus possible to not only have month and state fixed effects, but also day of week and activity fixed effects, as well as clustering of standard errors at the individual level to allow for intra-cluster correlations. Table 13 shows the results of the different specifications, for women and their answer to the intensity of feeling 'happy.' Neither the precipitation on the day of interview nor on the diary day had any significant influence on happiness. Mean temperature has an effect: all the F-tests of the joint significance of the temperature dummies are conclusive.[8] Low temperatures raise happiness and high ones lower it. Since the Princeton Affect and Time Survey was conducted in summer months, this seems reasonable, and is also consistent with the evidence found by Rehdanz and Maddison (2005). The introduction of the different fixed effects do not change the findings, confirming the robustness of the sensitivity of women to extreme temperatures, at least in the intensity of their happiness. Going from a temperature in the 70s, which is the average mean temperature in the sample, to a temperature below 50 raises happiness by about 0.38 of a standard deviation, while going to the other extreme, a mercury rising above 90, will decrease it by about 0.45 of a standard deviation. These changes are not large, but are substantial.

For the rest of the feelings, the estimates will only be presented for the specification including all the fixed effects, since inspection of Table 13 shows that varying the fixed effects does not alter the results in any meaningful way. Table 14 includes the regression results for women. Looking at temperatures, the F-tests show joint significance for the feelings happy, tired, and stressed. Lower temperatures decrease tiredness, stress, and to a lesser extent sadness, and relatively high temperatures marginally increase the intensity of sadness. The normal temperature only has an impact on sadness, with higher normal temperatures decreasing sadness, which does not necessarily contradict the coefficient for higher temperature the day of the diary: perhaps warmer climates are associated with less sad feelings, but for a given day, and relative to the normal, a higher temperature may increase sadness.

For women, the effect of precipitation is concentrated on the variables tired, stressed, and sad, though for only the first are the rain dummies on diary day jointly significant. More rain is associated with *less* intensity of tiredness and stress. That rain is associated with less stress

[8]The same analysis was done using maximum temperature instead of mean temperature. The two are so highly correlated however (correlation over 0.95) that the results are the same, just shifted up by 10 degrees, the average difference between mean and max temperatures.

Table 14: Regression results, effect of weather on feelings, women

Independent var.	Dependent variable: Intensity of feeling (0–6)					
	Happy	**Inter-ested**	**Tired**	**Stressed**	**Sad**	**Pain**
Daily normal prec.	0.430	0.056	0.703	0.141	1.050	-0.316
	(1.418)	(1.466)	(1.740)	(1.586)	(1.219)	(1.546)
Precipitation on interview day						
$0 <$ prec. < 0.1	0.009	0.239	0.057	0.073	0.047	0.194
	(0.096)	(0.096)**	(0.124)	(0.112)	(0.088)	(0.114)*
$0.1 \leqslant$ prec. < 0.5	-0.128	-0.005	0.275	0.181	0.116	0.100
	(0.114)	(0.118)	(0.152)*	(0.134)	(0.104)	(0.136)
$0.5 \leqslant$ prec. < 1	0.033	0.157	0.018	0.272	0.134	0.238
	(0.191)	(0.172)	(0.192)	(0.208)	(0.178)	(0.215)
$1 \leqslant$ prec.	-0.077	0.116	0.412	0.312	-0.004	-0.041
	(0.228)	(0.182)	(0.301)	(0.231)	(0.167)	(0.217)
Precipitation on diary day (day before interview)						
$0 <$ prec. < 0.1	-0.087	-0.061	0.077	0.208	0.107	0.187
	(0.097)	(0.103)	(0.124)	(0.125)*	(0.097)	(0.113)*
$0.1 \leqslant$ prec. < 0.5	0.100	-0.022	0.058	0.011	-0.041	0.141
	(0.117)	(0.111)	(0.146)	(0.123)	(0.101)	(0.134)
$0.5 \leqslant$ prec. < 1	-0.032	-0.219	-0.409	-0.247	-0.236	-0.122
	(0.172)	(0.192)	(0.180)**	(0.166)	(0.136)*	(0.169)
$1 \leqslant$ prec.	0.297	0.340	-0.762	-0.401	-0.164	0.050
	(0.292)	(0.254)	(0.373)**	(0.242)*	(0.219)	(0.254)
Daily normal temp.	0.002	0.003	-0.01	-0.021	-0.024	-0.007
	(0.012)	(0.012)	(0.016)	(0.014)	(0.011)**	(0.013)
Temperature on diary day						
Under 50	0.662	0.033	-0.967	-0.912	-0.378	-0.151
	(0.283)**	(0.306)	(0.304)***	(0.239)***	(0.215)*	(0.262)
50s	-0.143	-0.117	-0.300	-0.197	-0.16	0.004
	(0.157)	(0.163)	(0.195)	(0.173)	(0.118)	(0.166)
60s	-0.010	-0.021	-0.208	-0.137	-0.093	0.083
	(0.107)	(0.111)	(0.137)	(0.121)	(0.087)	(0.114)
80s	-0.185	-0.067	-0.064	0.202	0.172	0.095
	(0.108)*	(0.105)	(0.134)	(0.124)	(0.096)*	(0.124)
90 and above	-0.785	0.075	-0.597	0.396	0.282	-0.403
	(0.309)**	(0.295)	(0.408)	(0.356)	(0.201)	(0.269)
N	6278	6279	6293	6292	6291	6292
R-squared	0.09	0.11	0.09	0.12	0.08	0.09
F-test, prec. int. day	0.43	1.81	1.18	0.99	0.42	1.03
Pr. > F, prec. i. day	0.79	0.13	0.32	0.41	0.79	0.39
F-test, prec. d. day	0.86	0.90	2.88	2.38	1.63	1.14
Pr. > F, prec. d. day	0.49	0.46	0.02	0.05	0.16	0.34
F-test, temp.	3.45	0.29	2.73	3.44	1.44	1.12
Pr. > F, temp.	0.00	0.92	0.02	0.00	0.21	0.35

Note: Clustered standard errors in parentheses (at individual level). * significant at 10%; ** significant at 5%, *** significant at 1%. Precipitation is measured in inches, mean temperature in degrees Fahrenheit. Omitted categories are no rain that day and mean temperature in the 70s. The F-tests are of the joint significance of the precipitation and temperature dummies. The regressions also include controls for education, age, marital status, race, and ethnicity. Month, day of week, activity, and state fixed effects included. Sampling weights used.

Table 15: Regression results, effect of weather on feelings, men

	Dependent variable: Intensity of feeling (0–6)					
Independent var.	**Happy**	**Interested**	**Tired**	**Stressed**	**Sad**	**Pain**
Daily normal prec.	0.425	0.733	0.625	-1.602	-0.466	2.383
	(1.473)	(1.459)	(1.907)	(1.646)	(1.300)	(1.813)
Precipitation on interview day						
$0 <$ prec. < 0.1	-0.210	-0.073	-0.196	0.019	-0.121	-0.032
	(0.112)*	(0.100)	(0.128)	(0.126)	(0.095)	(0.121)
$0.1 \leqslant$ prec. < 0.5	-0.391	-0.056	-0.243	-0.130	-0.078	-0.243
	(0.129)***	(0.116)	(0.139)*	(0.124)	(0.097)	(0.120)**
$0.5 \leqslant$ prec. < 1	-0.200	-0.008	-0.265	-0.387	-0.242	-0.189
	(0.182)	(0.168)	(0.224)	(0.202)*	(0.131)*	(0.214)
$1 \leqslant$ prec.	-0.021	0.013	-0.101	-0.481	-0.486	0.137
	(0.324)	(0.268)	(0.289)	(0.331)	(0.169)***	(0.296)
Precipitation on diary day (day before interview)						
$0 <$ prec. < 0.1	0.015	0.148	-0.070	0.085	0.140	0.172
	(0.098)	(0.096)	(0.126)	(0.117)	(0.094)	(0.116)
$0.1 \leqslant$ prec. < 0.5	0.099	0.089	0.164	-0.023	-0.053	0.109
	(0.127)	(0.123)	(0.161)	(0.141)	(0.093)	(0.129)
$0.5 \leqslant$ prec. < 1	0.218	0.237	-0.141	0.010	0.029	-0.039
	(0.249)	(0.208)	(0.257)	(0.194)	(0.170)	(0.211)
$1 \leqslant$ prec.	-0.457	-0.400	-0.261	0.129	0.329	-0.161
	(0.271)*	(0.214)*	(0.237)	(0.263)	(0.214)	(0.208)
Daily normal temp.	-0.003	-0.012	0.018	0.001	-0.017	-0.019
	(0.014)	(0.015)	(0.017)	(0.016)	(0.014)	(0.016)
Temperature on diary day						
Under 50	0.323	0.195	-0.112	-0.237	-0.389	-0.202
	(0.235)	(0.285)	(0.450)	(0.323)	(0.203)*	(0.328)
50s	0.053	0.109	-0.058	0.026	-0.092	-0.008
	(0.165)	(0.176)	(0.192)	(0.188)	(0.134)	(0.211)
60s	-0.026	-0.011	0.154	0.001	-0.007	0.061
	(0.108)	(0.107)	(0.129)	(0.120)	(0.094)	(0.119)
80s	-0.175	-0.108	-0.175	-0.172	0.031	-0.112
	(0.124)	(0.124)	(0.148)	(0.146)	(0.105)	(0.136)
90 and above	-0.234	0.034	0.136	-0.220	0.021	-0.101
	(0.226)	(0.257)	(0.426)	(0.278)	(0.211)	(0.292)
N	3854	3854	3857	3855	3859	3857
R-squared	0.10	0.10	0.10	0.15	0.10	0.13
F-test, prec. i. day	2.68	0.17	1.20	1.50	2.54	1.29
Pr. > F, prec. i. day	0.03	0.95	0.31	0.20	0.04	0.27
F-test, prec. d. day	1.19	2.23	0.93	0.21	1.41	1.08
Pr. > F, prec. d. day	0.31	0.06	0.45	0.93	0.23	0.36
F-test, temp.	0.81	0.35	1.13	0.56	0.90	0.41
Pr. > F, temp.	0.54	0.89	0.34	0.73	0.48	0.84

Note: Clustered standard errors in parentheses (at individual level). * significant at 10%; ** significant at 5%, *** significant at 1%. Precipitation is measured in inches, mean temperature in degrees Fahrenheit. Omitted categories are no rain that day and mean temperature in the 70s. The F-tests are of the joint significance of the precipitation and temperature dummies. The regressions also include controls for education, age, marital status, race, and ethnicity. Month, day of week, activity, and state fixed effects included. Sampling weights used.

is hardly news: scientists have long described the impact of increased levels of negative ions in the air triggered by heavy rain as relieving stress, and owners of air ionizers can describe their benefits. That rain decreases tiredness is a less intuitive result, given that rain has a tendency to make people sleepier and groggier. Perhaps the longer sleep that people may get on very rainy day actually reduces tiredness during the day, or perhaps when asked about tiredness on rainy days, survey respondents attribute their tiredness to the rain and thus 'factor out' the rain in their answer.

Turning to Table 15, it is clear that men are less responsive to the weather in their feelings intensities. There is basically no response to the temperature, and for rain on the diary day, only high rain has a marginally significant negative impact on happiness and interest. A bigger puzzle is the bigger response to precipitation *on the interview day*. Why rain on the day of the interview, and not of the diary, which is when the episode about which the feeling is asked occurred, would influence answers is less clear. The regressions were run looking separately at precipitation on either day, both the results did not change substantially, dismissing the possibility of a perverse correlation between the two sets of variables. Rain of a medium intensity on the interview day reduces happiness, pain, and to a lesser extent tiredness, and heavier rain reduces stress and sadness.

4.3 Net Affect

Finally, results from regressions explaining the net affect and the U-index can be found in Tables 16 for women and 17 for men. Because both of these well-being measures are computed from the answers to the feelings questions (see Equations 1, 2 and 3 for the formulas), it is reasonable to think that the effect of the weather on these should be compounding the effects of the individual feelings shown in Tables 14 and 15. The effect of temperature for women is clear, as can be seen in Table 16: following the pattern found for the happy feeling, low temperatures increase net affect and high ones decrease it, whether or not pain is included in the calculation. Low temperatures also decrease the U-index. Precipitation on the diary day matters for women: a little rain will decrease net affect and raise the U-index, but heavy will have the opposite effect. This is most likely due to the calming impact of heavy rain on tiredness and stress, which was previously discussed. For men, just three estimates are barely significant, confirming previous findings of men's non-responsiveness to the weather. The bottom rows of Table 17 show that none of the F-tests for the joint significance of the weather dummies are conclusive.

Table 16: Regression results, effect of weather on net affect and U-index, women

	Dependent variable			
	Net affect		**U-index**	
Independent var.	**excl. pain**	**incl. pain**	**excl. pain**	**incl. pain**
Daily normal prec.	0.01	0.29	-010	-0.15
	(2.24)	(2.17)	(0.29)	(0.32)
Precipitation on interview day				
$0 <$ prec. < 0.1	- 0.05	-0.09	0.01	0.02
	(0.15)	(0.15)	(0.02)	(0.02)
$0.1 \leqslant$ prec. < 0.5	-0.27	-0.25	0.03	0.02
	(0.19)	(0.18)	(0.02)	(0.03)
$0.5 \leqslant$ prec. < 1	-0.17	-0.18	-0.01	0.00
	(0.30)	(0.27)	(0.04)	(0.04)
$1 \leqslant$ prec.	-0.23	-0.16	0.01	0.02
	(0.29)	(0.30)	(0.05)	(0.05)
Precipitation on diary day (day before interview)				
$0 <$ prec. < 0.1	-0.25	-0.26	0.06	0.05
	(0.16)	(0.15)	(0.02)**	(0.02)**
$0.1 \leqslant$ prec. < 0.5	0.12	0.06	-0.01	0.00
	(0.18)	(0.18)	(0.02)	(0.03)
$0.5 \leqslant$ prec. < 1	0.21	0.16	-0.03	-0.04
	(0.22)	(0.21)	(0.03)	(0.04)
$1 \leqslant$ prec.	0.58	0.47	-0.05	-0.09
	(0.33)	(0.31)	(0.03)	(0.03)***
Daily normal temp.	0.03	0.02	0.00	0.00
	(0.02)	(0.02)	(0.00)	(0.00)
Temperature on diary day				
Under 50	1.32	1.16	-0.11	-0.12
	(0.41)***	(0.41)***	(0.04)***	(0.05)**
50s	0.04	-0.02	0.01	0.02
	(0.23)	(0.23)	(0.03)	(0.04)
60s	0.11	0.04	0.01	0.00
	(0.16)	(0.16)	(0.02)	(0.02)
80s	-0.37	-0.34	0.03	0.03
	(0.17)**	(0.16)**	(0.02)	(0.02)
90 and above	-1.12	-0.88	0.05	0.05
	(0.46)**	(0.43)**	(0.06)	(0.07)
N	6270	6266	6270	6266
R-squared	0.11	0.10	0.07	0.07
F-test, prec. interview day	0.62	0.54	0.50	0.38
Pr. > F, prec. interview day	0.65	0.70	0.73	0.82
F-test, prec. diary day	2.09	1.91	3.03	4.49
Pr. > F, prec. diary day	0.08	0.11	0.02	0.00
F-test, temperature	3.90	3.11	3.48	2.36
Pr. > F, temperature	0.00	0.01	0.00	0.04

Note: Clustered standard errors in parentheses (at individual level). * significant at 10%; ** significant at 5%, *** significant at 1%. Precipitation is measured in inches, mean temperature in degrees Fahrenheit. Omitted categories are no rain that day and mean temperature in the 70s. The F-tests are of the joint significance of the precipitation and temperature dummies. The regressions also include controls for education, age, marital status, race, and ethnicity. Month, day of week, activity, and state fixed effects included. Sampling weights used.

Table 17: Regression results, effect of weather on net affect and U-index, men

	Dependent variable			
	Net affect		U-index	
Independent var.	**excl. pain**	**incl. pain**	**excl. pain**	**incl. pain**
Daily normal prec.	1.35	0.24	0.11	0.45
	(2.22)	(2.12)	(0.29)	(0.34)
Precipitation on interview day				
$0 <$ prec. < 0.1	-0.17	-0.18	0.03	0.04
	(0.17)	(0.16)	(0.02)	(0.03)
$0.1 \leqslant$ prec. < 0.5	-0.29	-0.25	0.02	0.03
	(0.18)	(0.17)	(0.03)	(0.03)
$0.5 \leqslant$ prec. < 1	0.11	0.07	-0.02	0.01
	(0.25)	(0.25)	(0.03)	(0.04)
$1 \leqslant$ prec.	0.46	0.25	-0.08	-0.04
	(0.47)	(0.45)	(0.06)	(0.07)
Precipitation on diary day (day before interview)				
$0 <$ prec. < 0.1	-0.09	-0.11	-0.01	0.00
	(0.15)	(0.14)	(0.02)	(0.02)
$0.1 \leqslant$ prec. < 0.5	0.14	0.08	0.00	0.00
	(0.20)	(0.19)	(0.03)	(0.03)
$0.5 \leqslant$ prec. < 1	0.19	0.21	-0.02	-0.05
	(0.31)	(0.31)	(0.05)	(0.05)
$1 \leqslant$ prec.	-0.69	-0.55	0.09	0.05
	(0.38)	(0.36)	(0.06)	(0.06)
Daily normal temp.	0.01	0.01	0.00	0.00
	(0.02)	(0.02)	(0.00)	(0.00)
Temperature on diary day				
Under 50	0.63	0.59	0.00	0.00
	(0.36)	(0.36)	(0.05)	(0.05)
50s	0.10	0.10	0.02	0.03
	(0.25)	(0.25)	(0.04)	(0.04)
60s	-0.02	-0.04	0.01	0.02
	(0.16)	(0.16)	(0.02)	(0.03)
80s	-0.11	-0.09	-0.01	-0.01
	(0.19)	(0.17)	(0.03)	(0.03)
90 and above	-0.13	-0.12	-0.05	-0.08
	(0.32)	(0.31)	(0.06)	(0.06)
N	3850	3846	3850	3846
R-squared	0.12	0.11	0.09	0.08
F-test, prec. interview day	1.35	0.97	1.10	0.79
Pr. > F, prec. interview day	0.25	0.42	0.35	0.53
F-test, prec. diary day	1.28	0.99	0.81	0.46
Pr. > F, prec. diary day	0.27	0.41	0.52	0.76
F-test, temperature	0.77	0.72	0.25	0.55
Pr. > F, temperature	0.57	0.61	0.94	0.74

Note: Clustered standard errors in parentheses (at individual level). * significant at 10%; ** significant at 5%, *** significant at 1%. Precipitation is measured in inches, mean temperature in degrees Fahrenheit. Omitted categories are no rain that day and mean temperature in the 70s. The F-tests are of the joint significance of the precipitation and temperature dummies. The regressions also include controls for education, age, marital status, race, and ethnicity. Month, day of week, activity, and state fixed effects included. Sampling weights used.

5 Conclusion

In this paper, subjective well-being data from the Princeton Affect and Time Survey, the PATS, were supplemented by weather data to investigate the effect of precipitation and temperature, both transitory and average, on satisfaction levels and feelings intensities. Overall, women appear more responsive to environmental variables, showing lower life satisfaction on rainier days. Satisfaction in the specific areas of the PATS, home, health and job, is much less influenced by rain, apart maybe from rainier climates being associated with lower job satisfaction. The effect of the daily normals has to be interpreted carefully however: whereas the rain and temperature on a given day can be considered exogenous and arguably have a causal effect, the normals are not, and are subject to selection bias if people move to certain areas because of the weather, a claim supported by Rappaport (2006). Temperatures have the greatest effect on the intensity of happiness, tiredness, and stress, and thus show up in the net affect and U-index results too. Low temperatures provide the biggest boost, which since the PATS was run in the summer months, from May to August, seems a reasonable finding. It would be interesting to compare this with results coming from data collected in the winter, to see if the effect is reversed, as suggested in Rehdanz and Maddison (2005). There is some evidence that rain reduces tiredness and stress, which in turn reduces the U-index associated with heavy rain. The results for men are simply not robust enough for any clear conclusion to be drawn from this study on the responsiveness of men's satisfaction levels and feelings to the weather.

If the past few years are any predictor of the direction future research in economics will take, then we can expect to see more studies incorporating subjective well-being data in their analysis. Knowing how such data are sensitive to elements like the temperature and amount of rain is important if researchers want to tease out the effect of transitory shocks to the weather, to focus on other variables and circumstances of interest. This paper provides evidence that current conditions will matter more to women than to men, and that simply controlling for month and state will not be sufficient to control for fluctuations around normal conditions and day-to-day variations. Whether or not that is something that needs to be controlled for in any given study will be left up to the econometrician.

References

Blomquist, Glenn C., Mark C. Berger, and John P. Hoehn (1988), "New Estimates of Quality of Life in Urban Areas," *American Economic Review* 78 (1): 89–107.

Dowling, Michael and Brian M. Lucey (2005), "Weather, Biorhythms, Beliefs and Stock Returns—Some Preliminary Irish Evidence," *International Review of Financial Analysis* 14 (3): 337–355.

Frey, Bruno S. and Alois Stutzer (2002), "What Can Economists Learn from Happiness Research?" *Journal of Economic Literature* 40 (2): 402–435.

Goetzmann, William N. and Ning Zhu (2003), "Rain or Shine: Where Is the Weather Effect?" Working Paper No. 9,465, National Bureau of Economic Research, Cambridge, MA, February 2003.

Hirshleifer, David and Tyler Shumway (2003), "Good Day Sunshine: Stock Returns and the Weather," *The Journal of Finance* 58 (3): 1009–1032.

Jacob, Brian, Lars Lefgren, and Enrico Moretti (2004), "The Dynamics of Criminal Behavior: Evidence from Weather Shocks," Working Paper No. 10,739, National Bureau of Economic Research, Cambridge, MA.

Kahneman, Daniel and Alan B. Krueger (2006), "Developments in the Measurement of Subjective Well-Being," *Journal of Economic Perspectives* 20 (1): 3–24.

Kahneman, Daniel, Alan B. Krueger, David A. Schkade, Norbert Schwarz and Arthur A. Stone (2004), "A Survey Method for Characterizing Daily Life Experience: The Day Reconstruction Method," *Science* 26 (3 December 2004): 1776–1780.

Krueger, Alan B. and Arthur A. Stone (2007), "A Pain Profile of the American Public: Results of a Diary Day," mimeo., Department of Economics, Princeton University.

Levitt, Steven D. and Stephen J. Dubner (2005), *Freakonomics: A Rogue Economist Explores the Hidden Side of Everything*, HarperCollins Publishers Inc., New York, NY, 242 pages.

Moschini, Giancarlo and David A. Hennessy (2001), "Uncertainty, Risk Aversion, and Risk Management for Agricultural Producers," in *Handbook of Agricultural Economics*, Bruce L. Gardner and Gordon C. Rausser, eds., Amsterdam, North-Holland, Vol. 1, Part 1, 88–153.

Paxson, Christina H. (1992), "Using Weather Variability to Estimate the Response

of Savings to Transitory Income in Thailand," *American Economic Review* 82 (1): 15–33.

Rappaport, Jordan (2006), "Moving to Nice Weather," RWP 03-07, Research Division, Federal Reserve Bank of Kansas City.

Rehdanz, Katrin and David Maddison (2005), "Climate and Happiness," *Ecological Economics* 52 (2005): 111–125.

Saunders, Edward M. Jr. (1993), "Stock Prices and Wall Street Weather," *American Economic Review* 83 (5): 1337–1345.

Schwarz, N., and G.L. Clore (1983), "Mood, Misattribution, and Judgments of Well-being: Informative and Directive Functions of Affective States," *Journal of Personality and Social Psychology* 45 (3): 513–523.

Simonsohn, Uri (2007), "Clouds Make Nerds Look Good: Field Evidence of The Impact of Incidental Factors on Decision Making," *Journal of Behavioral Decision Making* 20 (2): 143–152.

Starr-McCluer, Martha (2000), "The Effects of Weather on Retail Sales," FEDS Working Paper No. 2000-08, Federal Reserve Board of Governors, Washington, D.C.

Waldman, Michael, Sean Nicholson and Nodir Adilov (2006), "Does Television Cause Autism?" Working Paper No. 12,632, National Bureau of Economic Research, Cambridge, MA.

6 Appendix

Table 18: Summary statistics of demographic variables

	Mean	
Variable	**Women**	**Men**
Age	45.22	45.01
	(18.25)	(19.24)
Race and ethnicity		
White	0.850	0.853
	(0.357)	(0.355)
Black	0.074	0.069
	(0.261)	(0.254)
Asian	0.016	0.019
	(0.125)	(0.135)
Other race	0.061	0.060
	(0.239)	(0.237)
Hispanic	0.094	0.085
	(0.292)	(0.279)
Marital status		
Single	0.216	0.259
	(0.411)	(0.438)
Married	0.595	0.634
	(0.491)	(0.482)
Separated, divorced, or widowed	0.159	0.086
	(0.366)	(0.281)
Education		
High school dropout	0.123	0.117
	(0.328)	(0.322)
High school diploma	0.250	0.255
	(0.433)	(0.436)
Some college	0.186	0.146
	(0.389)	(0.353)
College diploma	0.307	0.351
	(0.461)	(0.477)
More than college	0.128	0.124
	(0.334)	(0.330)
N	2362	1457

Note: Sampling weights used. Standard deviations are in parentheses.