Temperature and Precipitation Skill as a Function of the Day of the Week

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I have always wondered whether my daily weather forecasts made on Monday would exhibit somewhat less skill than those made later in the week, when presumably I would be enjoying the benefit of full day-to-day weather map continuity. This question is addressed in this note. I have examined the daily consensus probability temperature and precipitation forecasts made at the State University of New York at Albany for the period September 1969–December 1976. A total of 1023 daily forecasts were made during this period. Complete details on the game format can be found in Bosart (1975). Briefly, each day a forecast of the probability of the minimum temperature going below normal at Albany was made for 24 h periods out to four days in advance. A similar procedure was employed for probability forecasts of the chance of measurable precipitation. The Brier (1950) scoring rule was used. A unique feature of the game was the construction of a daily consensus forecast. Approximately 10–20 individual forecasts made up the daily consensus forecast. Forecast skill was measured by the percent improvement over the control forecast, which was a persistence climatology based upon 30 years of prior records at Albany.

Table 1 gives the breakdown of the average daily Brier score for consensus temperature and precipitation forecasts. The persistence climatology score is also included. No obvious difference exists among different days of the week. The average daily consensus temperature and precipitation score was 71.2 and 77.7. This yields chi-square values of 0.43 and 0.08, respectively, versus a 5% significance level chi-square of 9.49 for four degrees of freedom.

TABLE 1. Daily average consensus and control Brier score.

	Number of forecasts	Temperature		Precipitation	
		Consensus	Control	Consensus	Control
Monday	198	68.7	98.4	76.1	93.2
Tuesday	211	68.1	97.0	78.8	95.3
Wednesday	208	71.3	93.8	78.8	96.2
Thursday	203	74.0	97.5	77.7	98.2
Friday	203	73.8	97.1	77.1	97.7

TABLE 2. Daily consensus skill relative to the climatological control defined by percent improvement over the control forecast.

	Temperature	Precipitation
Monday	30.2	18.3
Tuesday	29.8	17.3
Wednesday	24.0	18.0
Thursday	24.1	20.8
Friday	23.9	21.0

Table 2 gives the daily percentage improvement of consensus over the climatological control: $[(\text{control} - \text{consensus})/\text{control}] \times 100\%$. Note the tendency for more skillful temperature forecasts on Monday and Tuesday, whereas precipitation forecast skills peak on Thursday and Friday. The results are far from statistically significant, however. The average daily consensus temperature and precipitation skill is 26.4% and 19.1%, respectively. This yields chi-square values of 1.65 and 0.60, which are well below the previous 95% significance threshold.

My preconception was that scores would be worst on Monday and then get better. For temperature just the opposite is true, with the Friday consensus skill 6% less than Monday. Precipitation skills are apparently less sensitive but follow the preconceived idea. Could it be that the temperature results represent increasing daily fatigue such that by Friday you could not care less about temperature as you begin to put forecast adrenalin into the question of weekend rain? Come Monday morning again you are refreshed by the weekend and ready to deal with temperature. Idle speculation? Perhaps, but this is what makes life interesting.

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References

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