Supplementary information "To tolerate weather and to tolerate pain – two sides of the same coin? The Tromsø Study 7"

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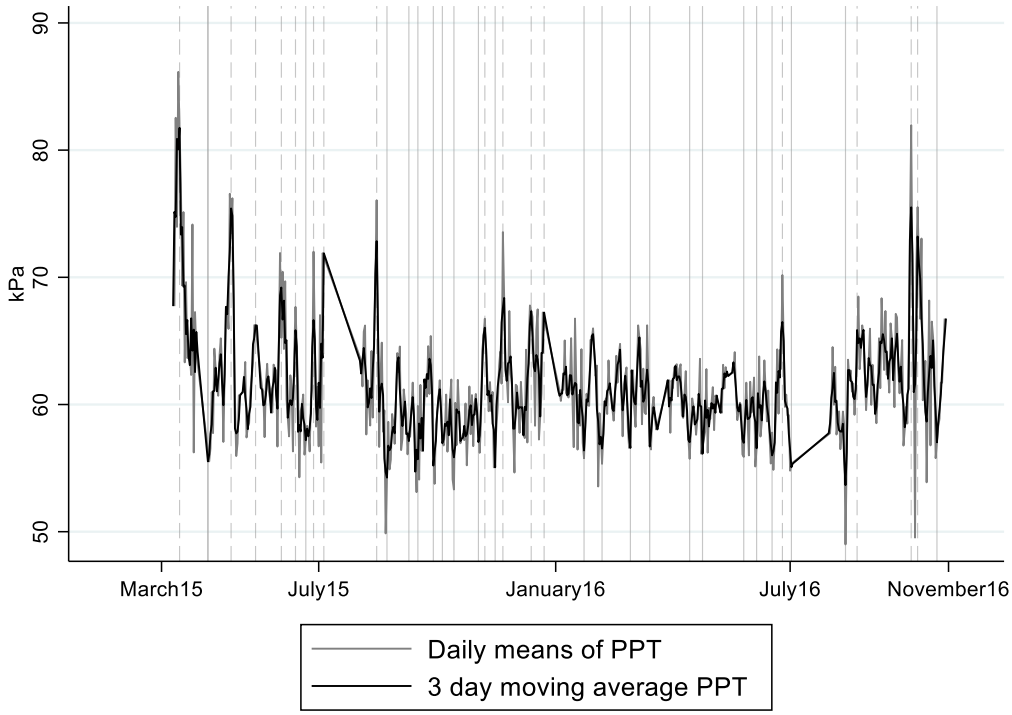
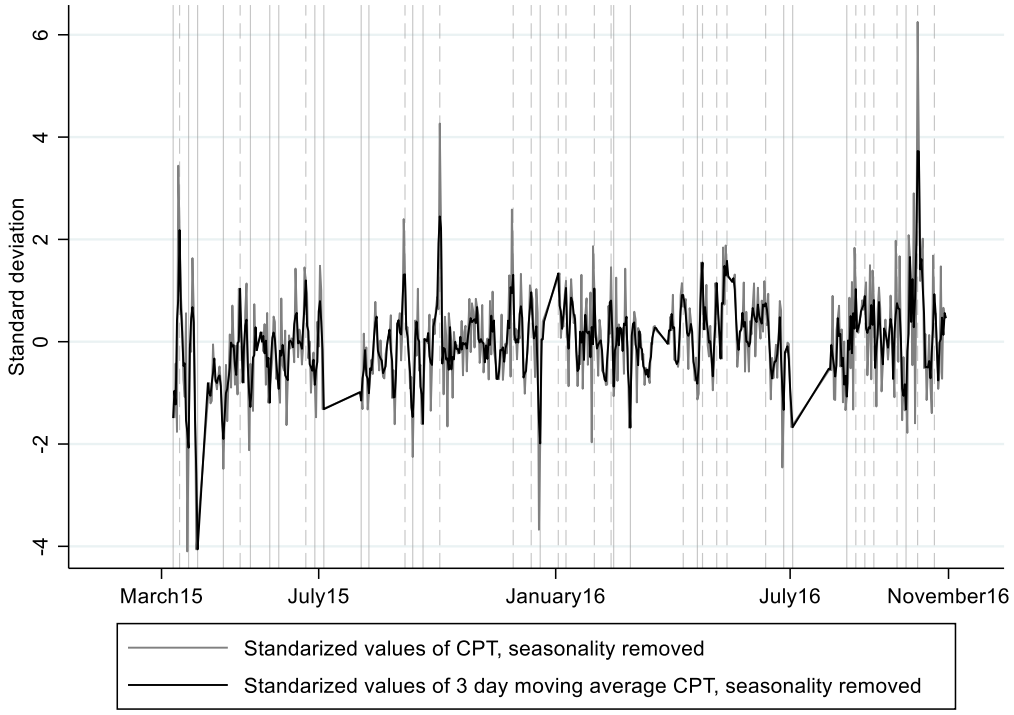
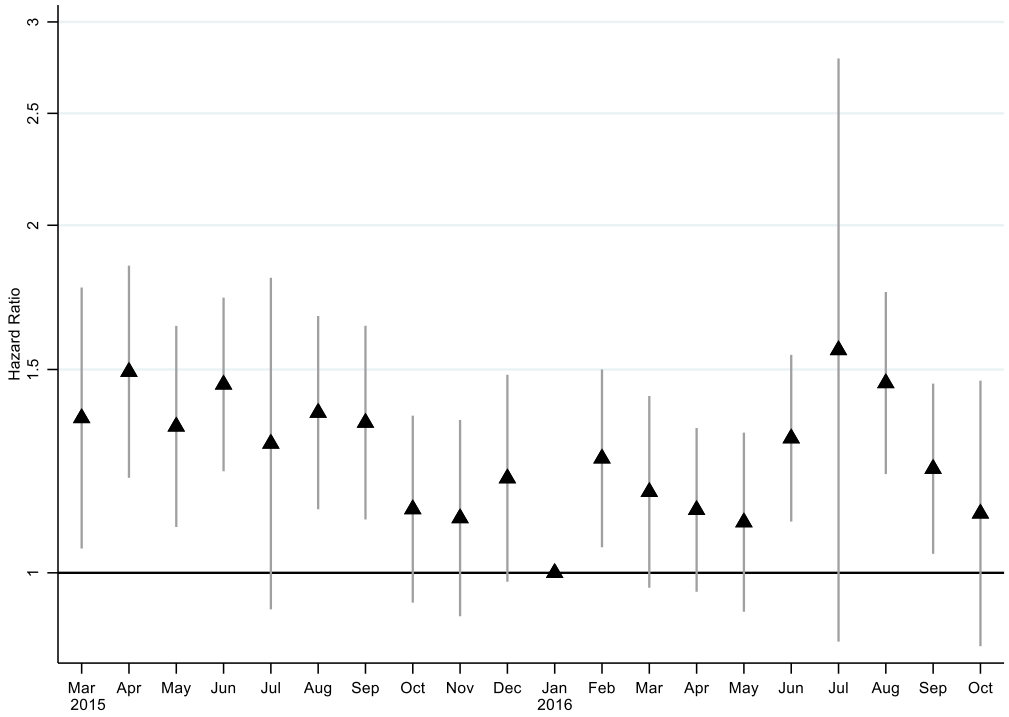


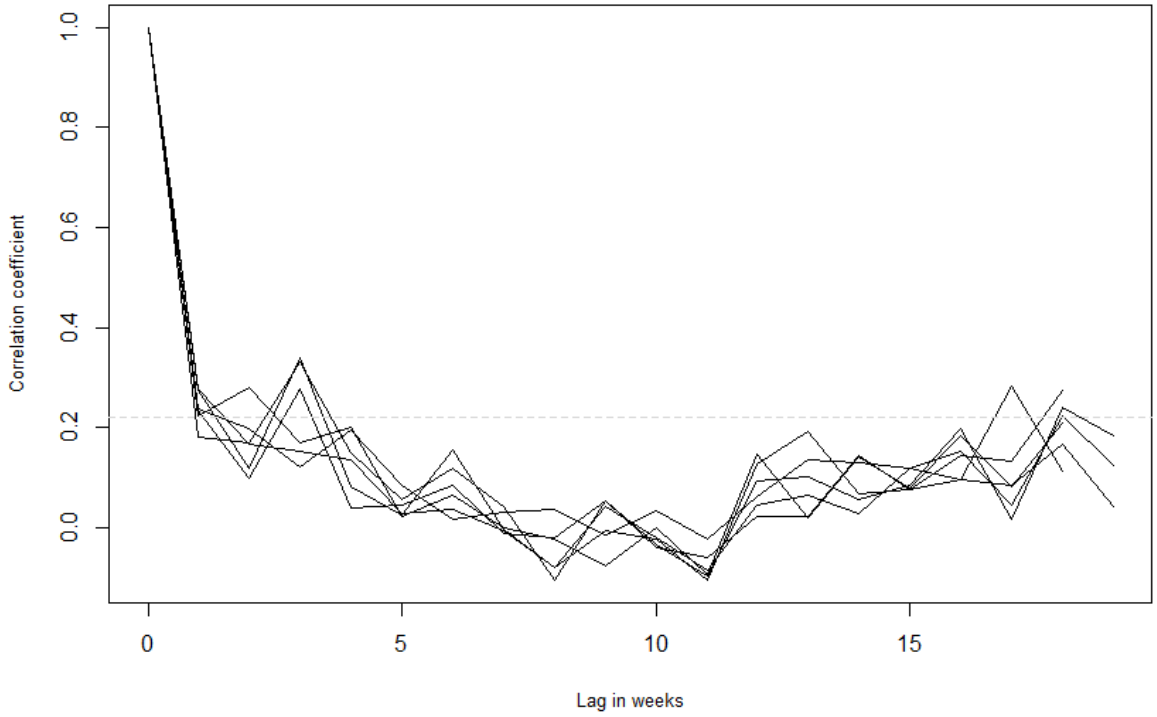
Supplementary figure 1: Daily means of pressure pain tolerance (PPT) and the 3-day moving average of the daily means of PPT. The local minima and maxima in PPT were chosen from the moving average. Solid vertical lines indicate minima and dashed vertical lines indicate maxima



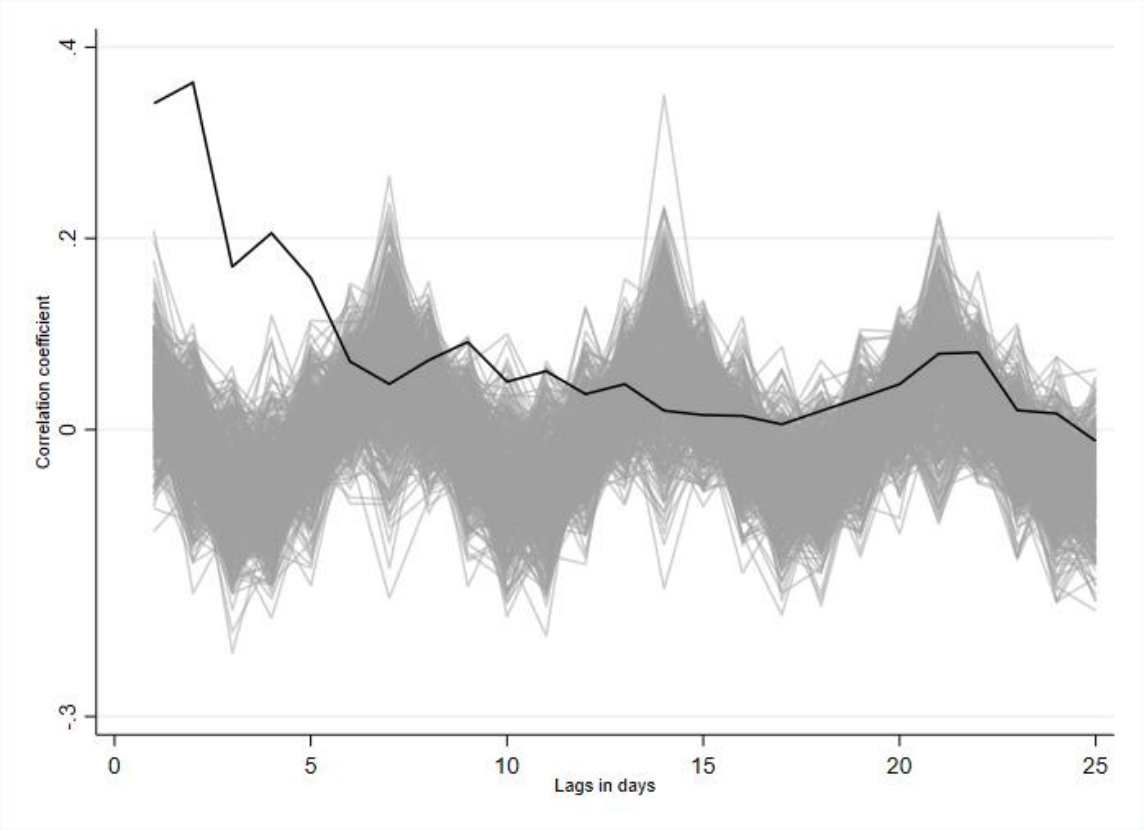
Supplementary figure 2: Standardized values of cold pain tolerance (CPT) after removal of seasonal variation and the 3-day moving average of the standardized values of CPT. The local minima and maxima in CPT were chosen from the moving average. Solid vertical lines indicate minima and dashed vertical lines indicate maxima.



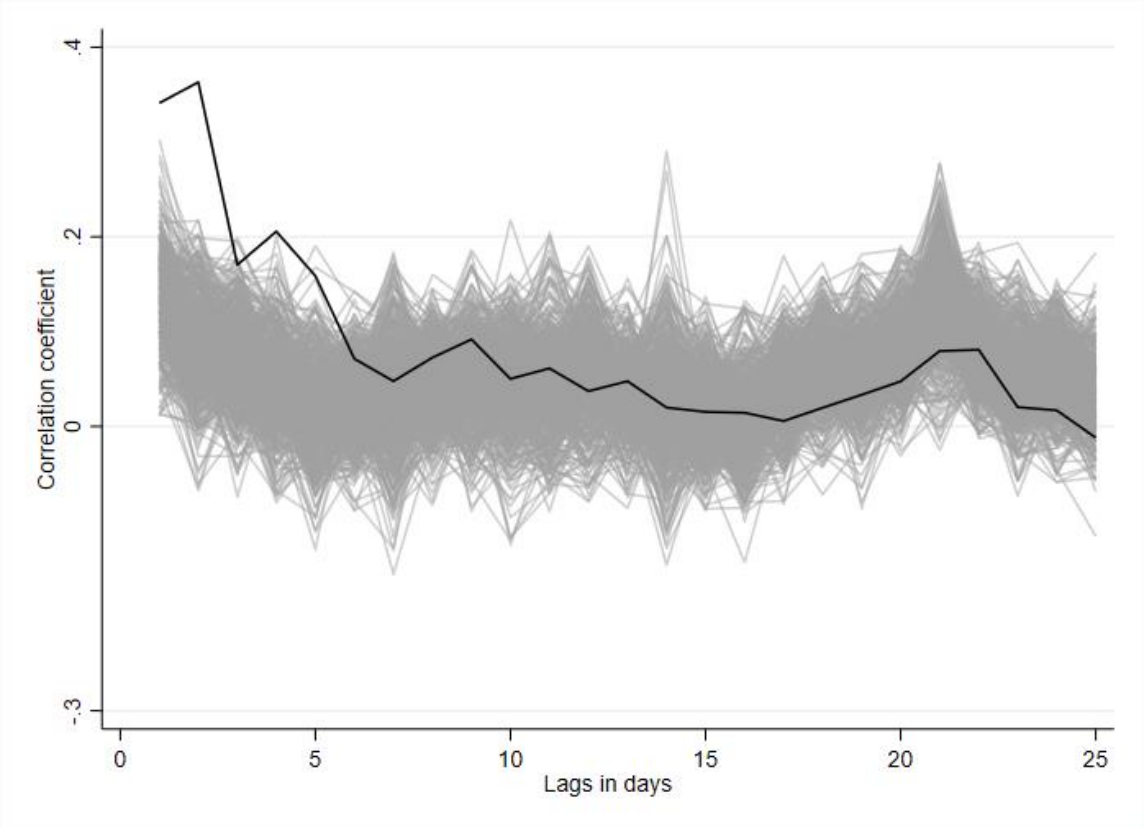
Supplementary figure 3: Hazard ratio's from a Cox proportional model using time to withdrawal in the cold pressor test as survival time. Only participants with an acclimatization time (time between physical examination and the cold pressor test) >60 min are included. January 2016 was used as the reference.



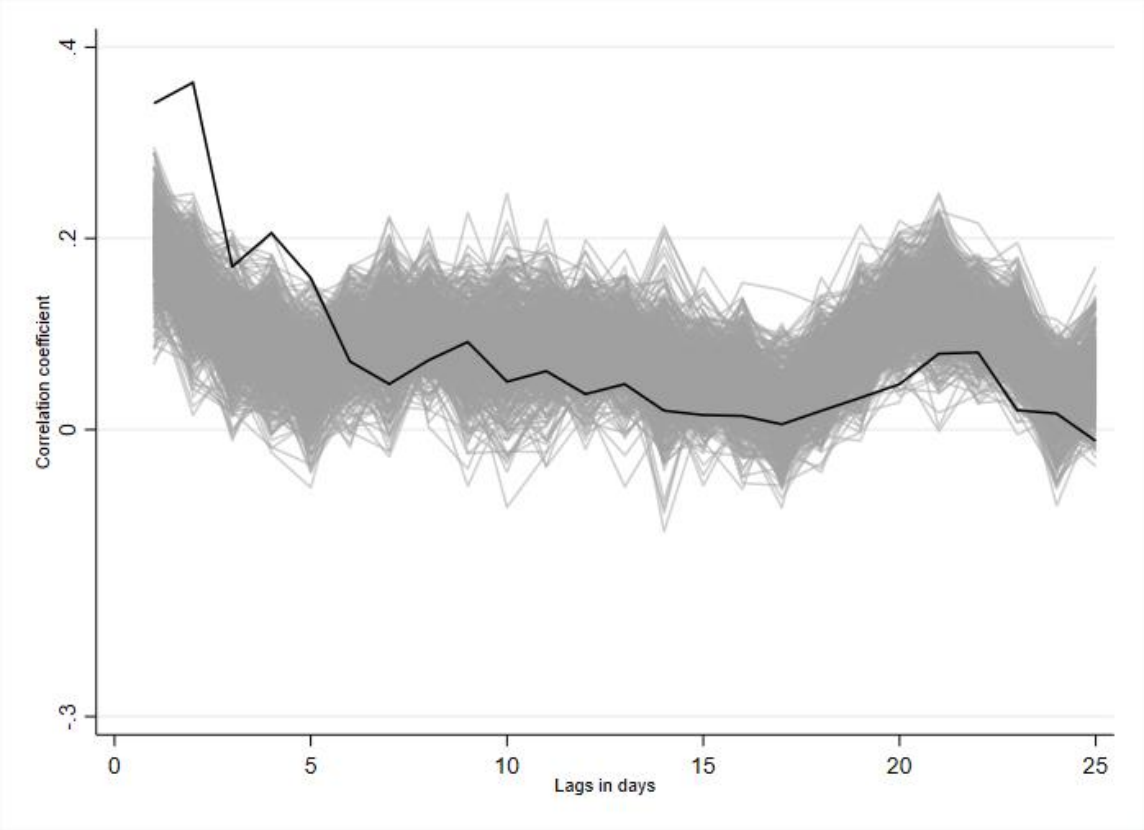
Supplementary figure 4: Autocorrelation for 7 different weekly averages of cold pain tolerance after removal of seasonality



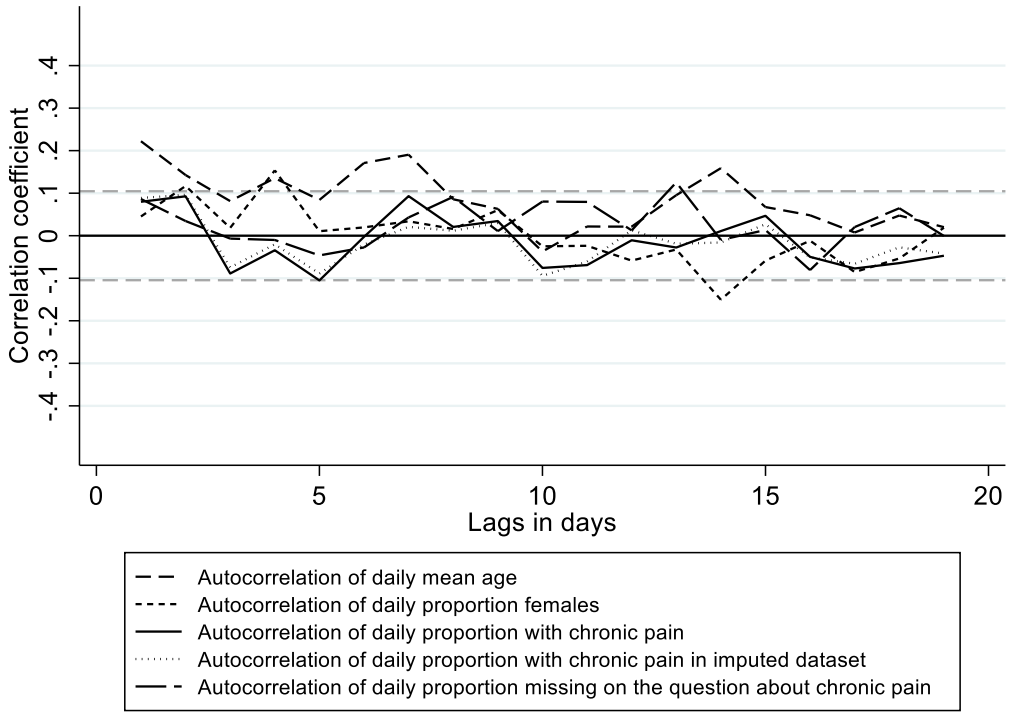
Supplementary figure 5: Autocorrelation for pressure pain tolerance (PPT) and autocorrelation for 500 randomly shuffled copies of PPT with a simulated effect of day of the week on pain tolerance. The size of the effect is two times the observed differences between days of the week in the full dataset



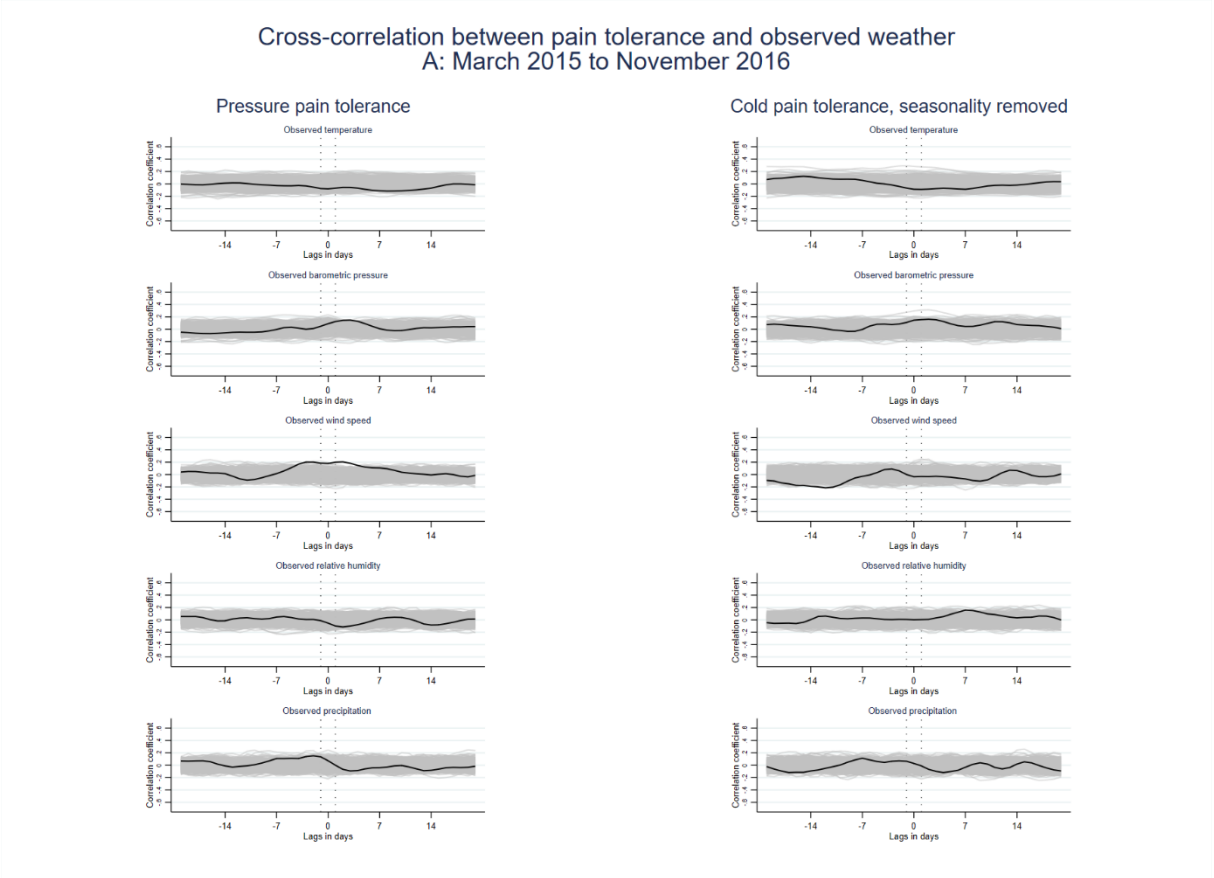
Supplementary figure 6: Autocorrelation for pressure pain tolerance (PPT) and autocorrelation for 500 randomly shuffled copies of PPT with a simulated effect of study technician rotation on pain tolerance. The effect is two times the observed difference between study technicians in the full dataset



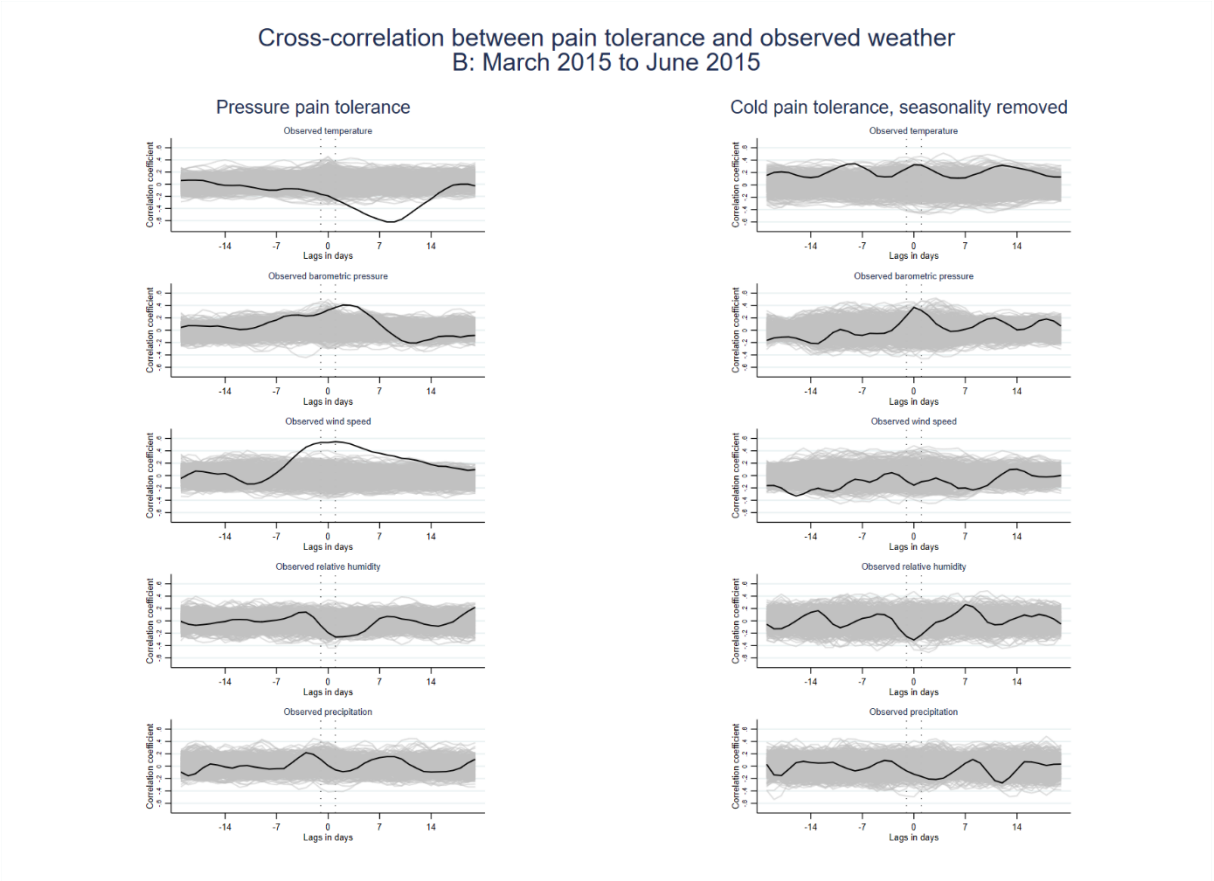
Supplementary figure 7: Autocorrelation for pressure pain tolerance (PPT) and autocorrelation for 500 randomly shuffled copies of PPT with a simulated combined effect of mean age, proportion of females, and study technician rotation on pain tolerance. The effect is two times the observed differences in the full dataset



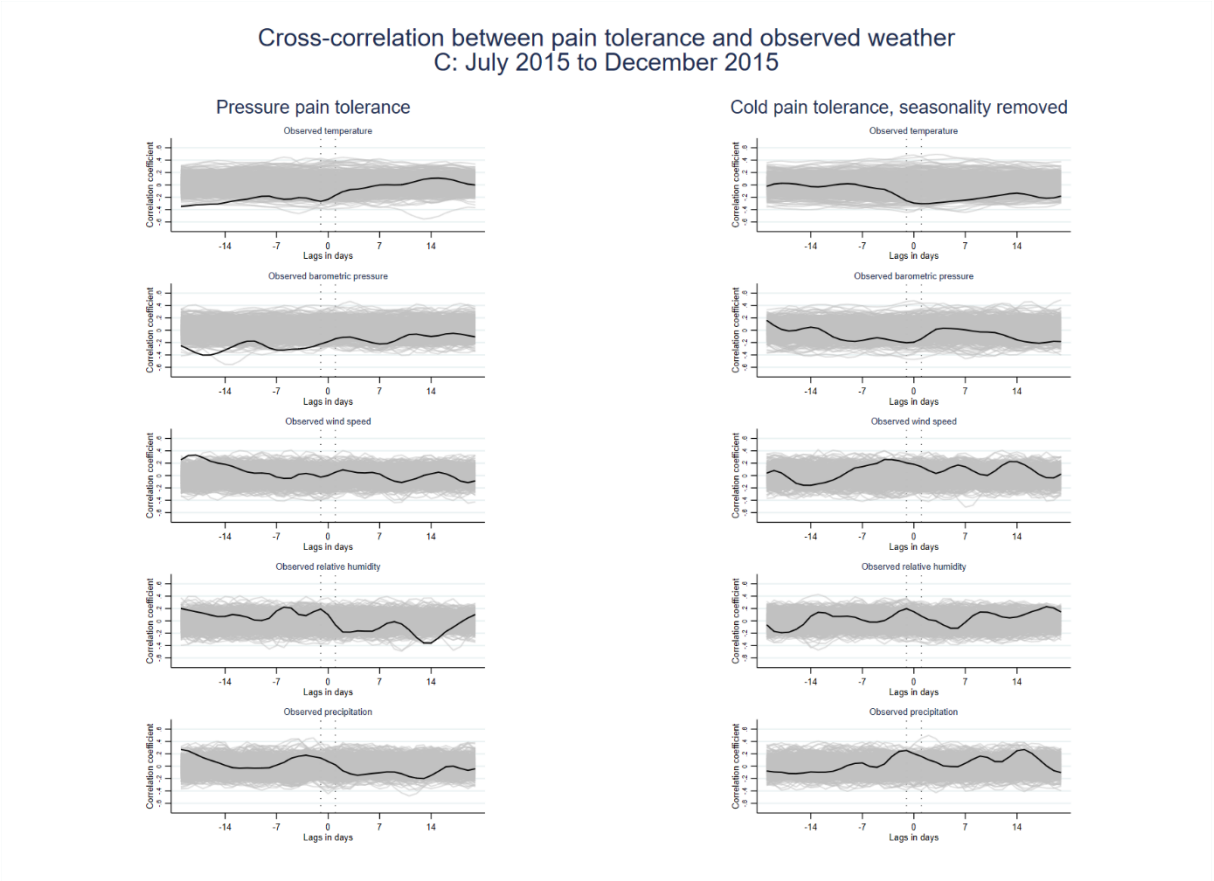
Supplementary figure 8: Autocorrelation for the daily mean age, daily proportion of females, daily proportion of participants reporting chronic pain, daily proportion with chronic pain in an imputed dataset, and the daily proportion missing on the question about chronic pain. Dashed grey lines indicate a significance level of 0.05 for the number of observations in the time series



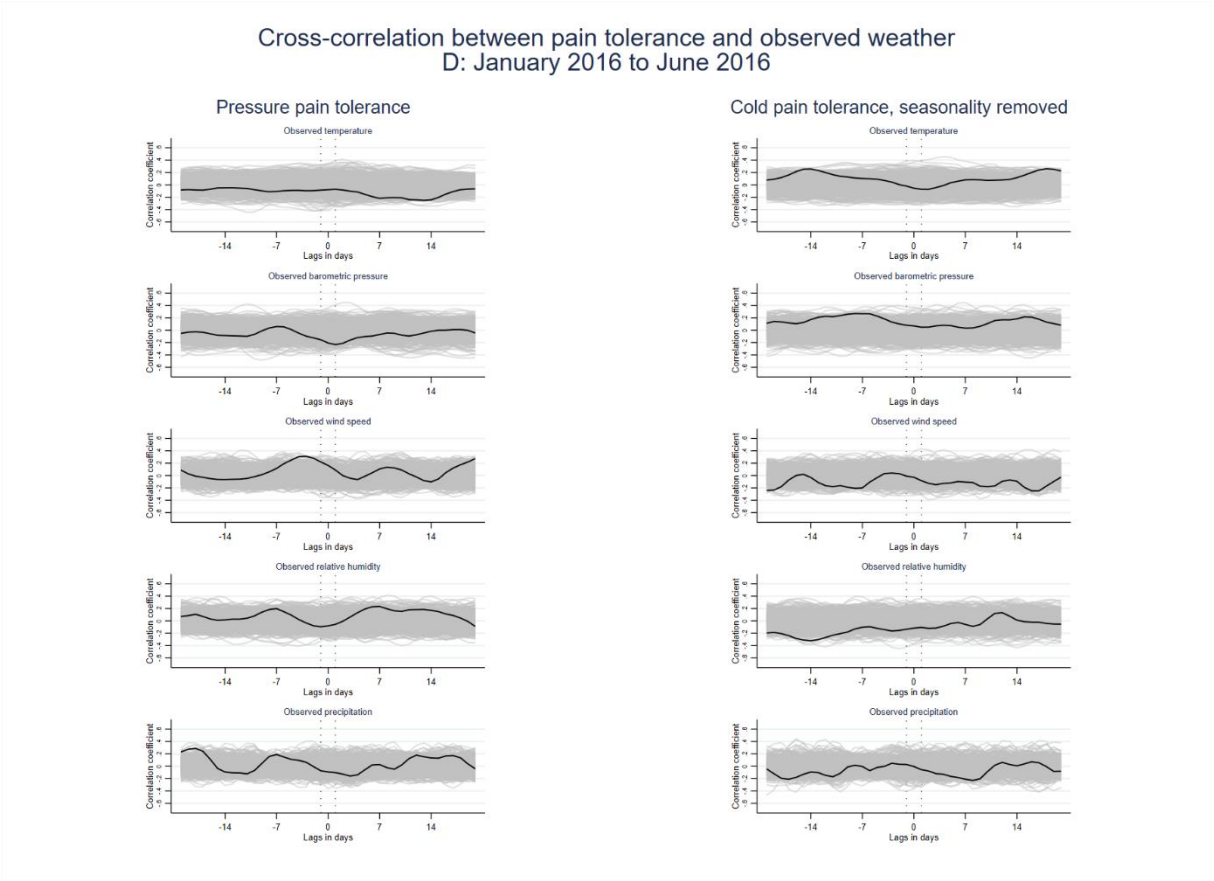
Supplementary figure 9: 3-day moving average of daily mean pressure cuff-algometry values and daily proportion of participants holding their hand in cold water >100s cross-correlated with the 3-day moving averages of observed temperature, barometric pressure, wind speed, relative humidity and precipitation. Dashed lines indicate the 3 days of pain tolerance with which the observed meteorological factors are correlated. Calculated for the whole study period, March 2015 to November 2016



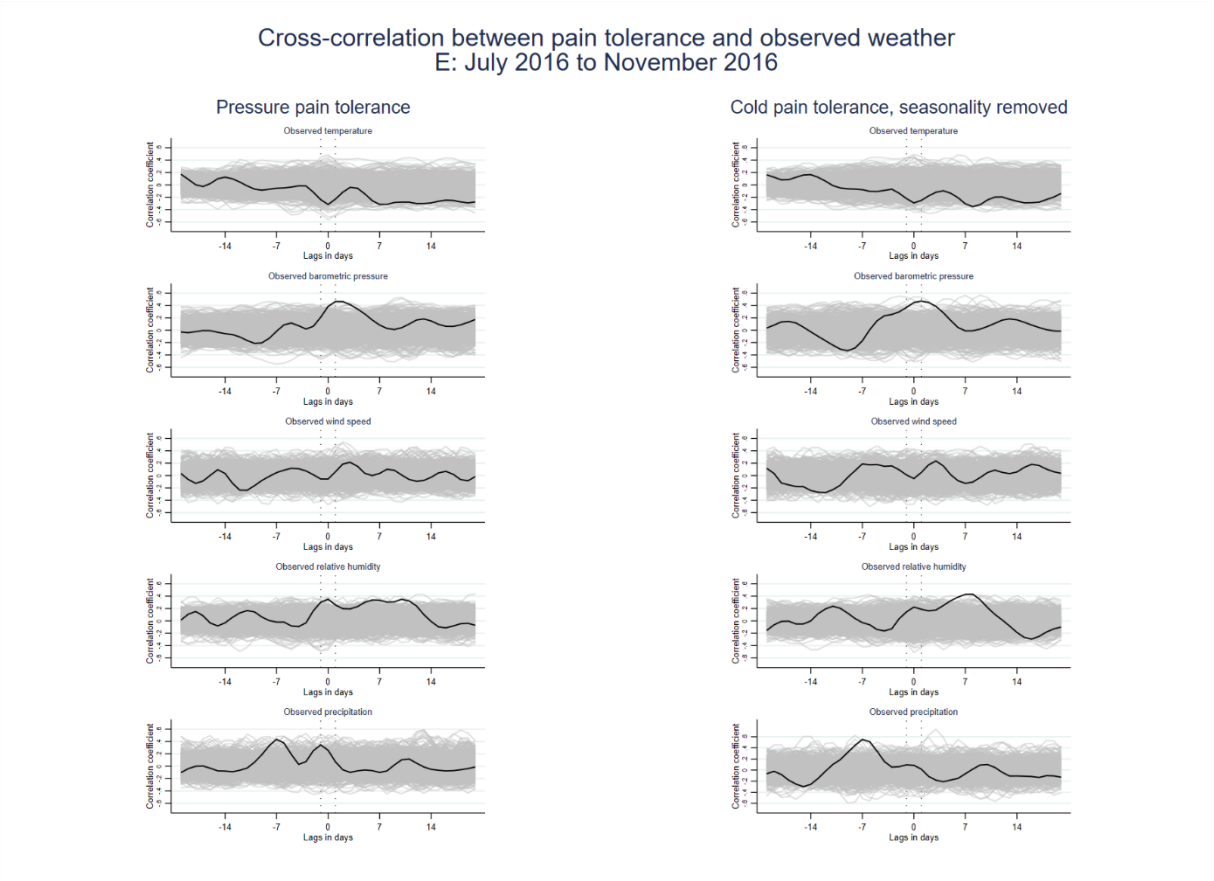
Supplementary figure 10: 3-day moving average of daily mean of pressure cuff-algometry values and daily proportion of participants holding their hand in cold water >100s cross-correlated with the 3-day moving averages of observed temperature, barometric pressure, wind speed, relative humidity and precipitation. Dashed lines indicate the 3 days of pain tolerance with which the observed meteorological factors are correlated. Calculated for the period March 2015 to June 2015



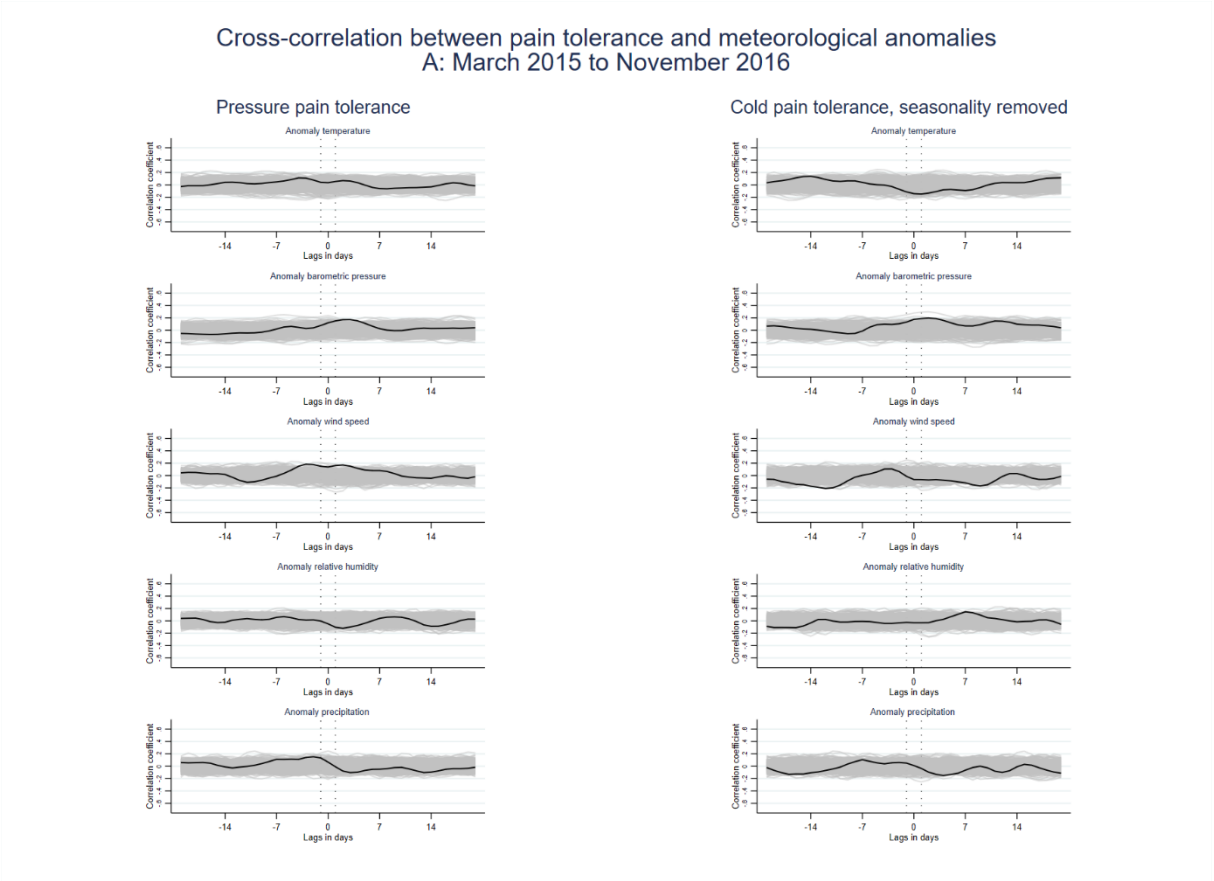
Supplementary figure 11: 3-day moving average of daily mean of pressure cuff-algometry values and daily proportion of participants holding their hand in cold water >100s cross-correlated with the 3-day moving averages of observed temperature, barometric pressure, wind speed, relative humidity and precipitation. Dashed lines indicate the 3 days of pain tolerance with which the observed meteorological factors are correlated. Calculated for the period July 2015 to December 2015



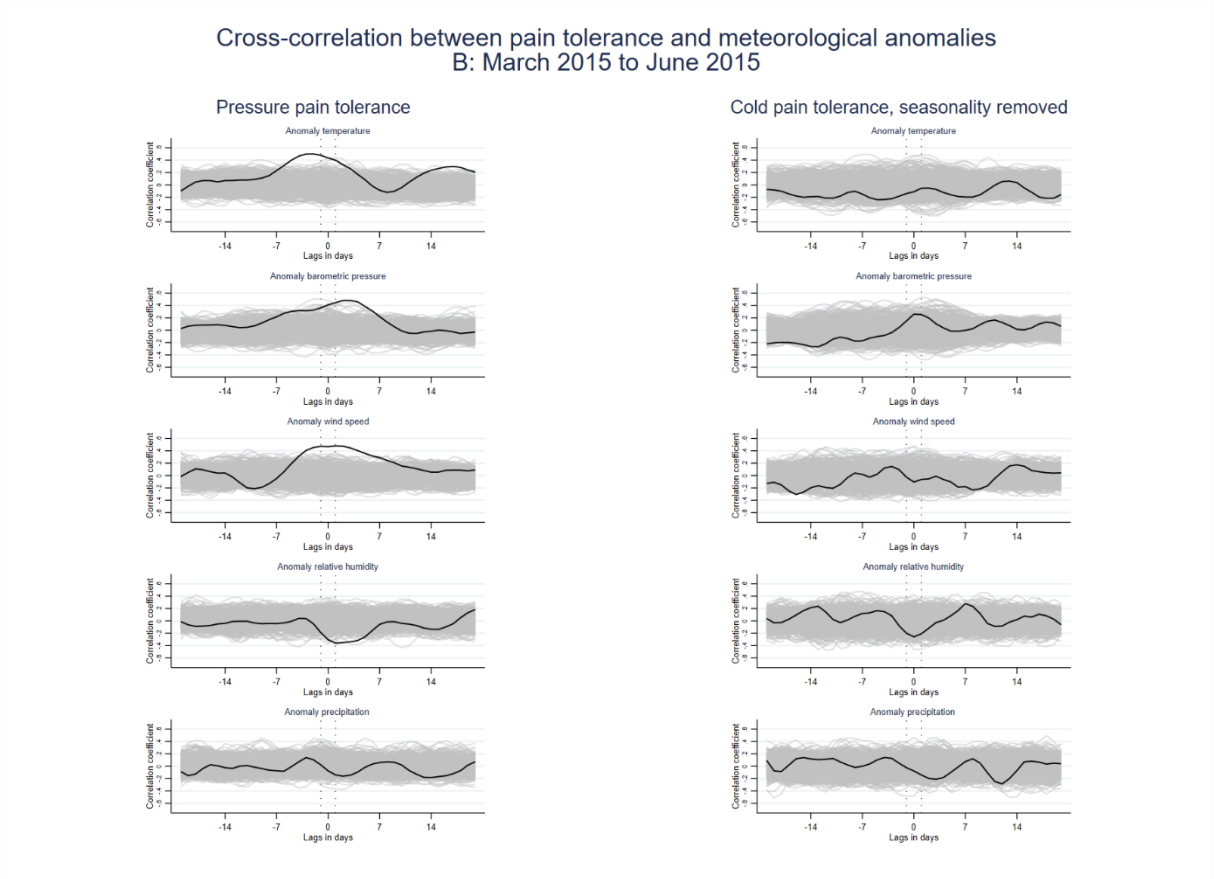
Supplementary figure 12: 3-day moving average of daily mean of pressure cuff-algometry values and daily proportion of participants holding their hand in cold water >100s cross-correlated with the 3-day moving averages of observed temperature, barometric pressure, wind speed, relative humidity and precipitation. Dashed lines indicate the 3 days of pain tolerance with which the observed meteorological factors are correlated. Calculated for the period January 2016 to June 2016



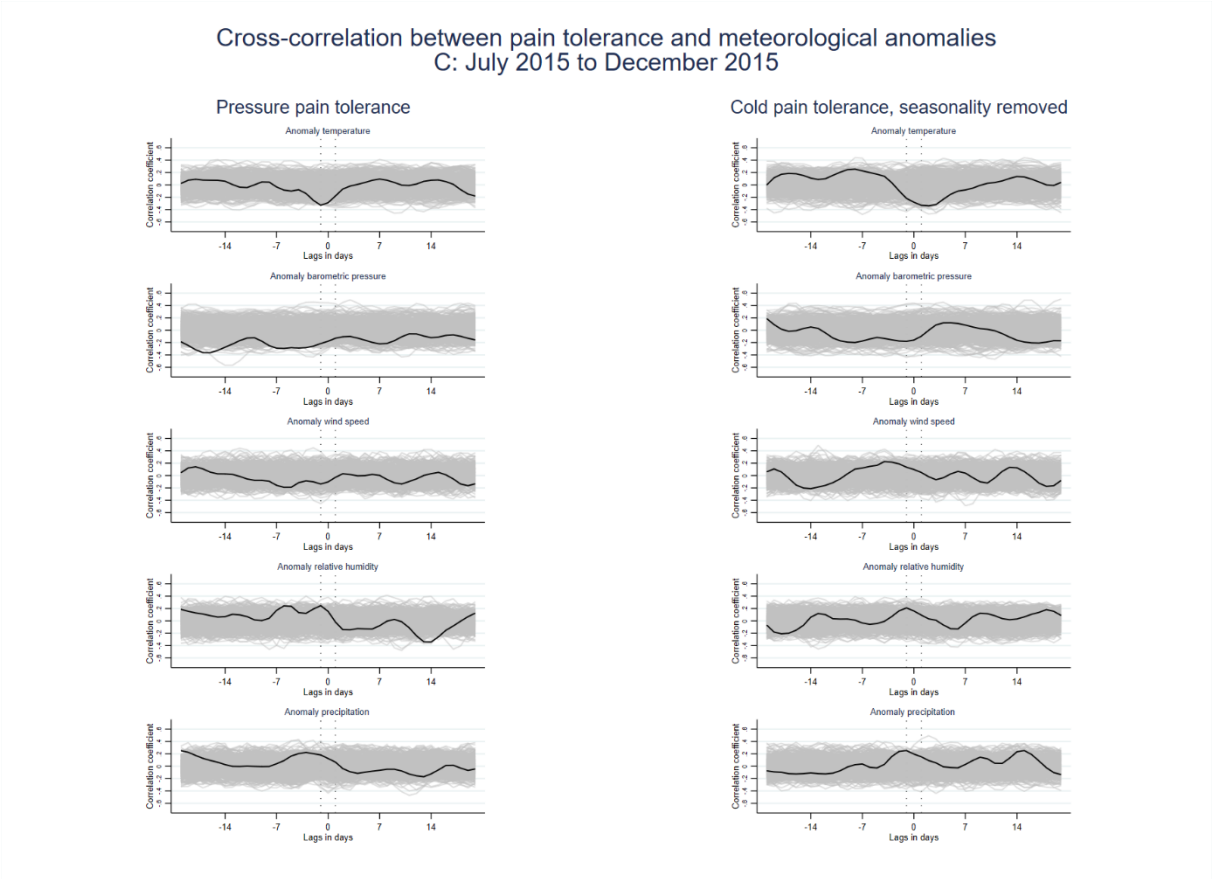
Supplementary figure 13: 3-day moving average of daily mean of pressure cuff-algometry values and daily proportion of participants holding their hand in cold water >100s cross-correlated with the 3-day moving averages of observed temperature, barometric pressure, wind speed, relative humidity and precipitation. Dashed lines indicate the 3 days of pain tolerance with which the observed meteorological factors are correlated. Calculated for the period July 2016 to November 2016



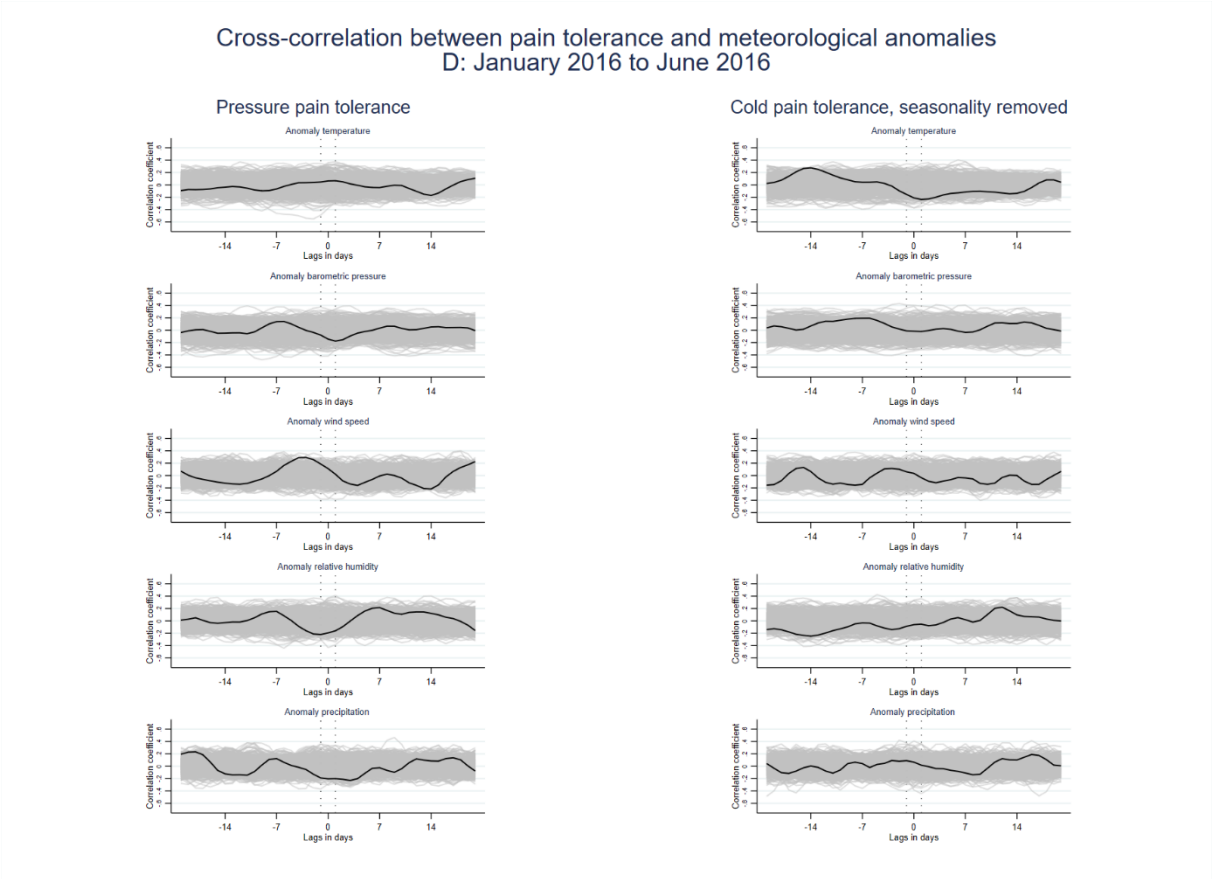
Supplementary figure 14: 3-day moving average of daily mean of pressure cuff-algometry values and daily proportion of participants holding their hand in cold water >100s cross-correlated with the 3-day moving averages of anomaly temperature, barometric pressure, wind speed, relative humidity and precipitation. Dashed lines indicate the 3 days of pain tolerance with which the observed meteorological factors are correlated. Calculated for the whole study period, March 2015 to November 2016



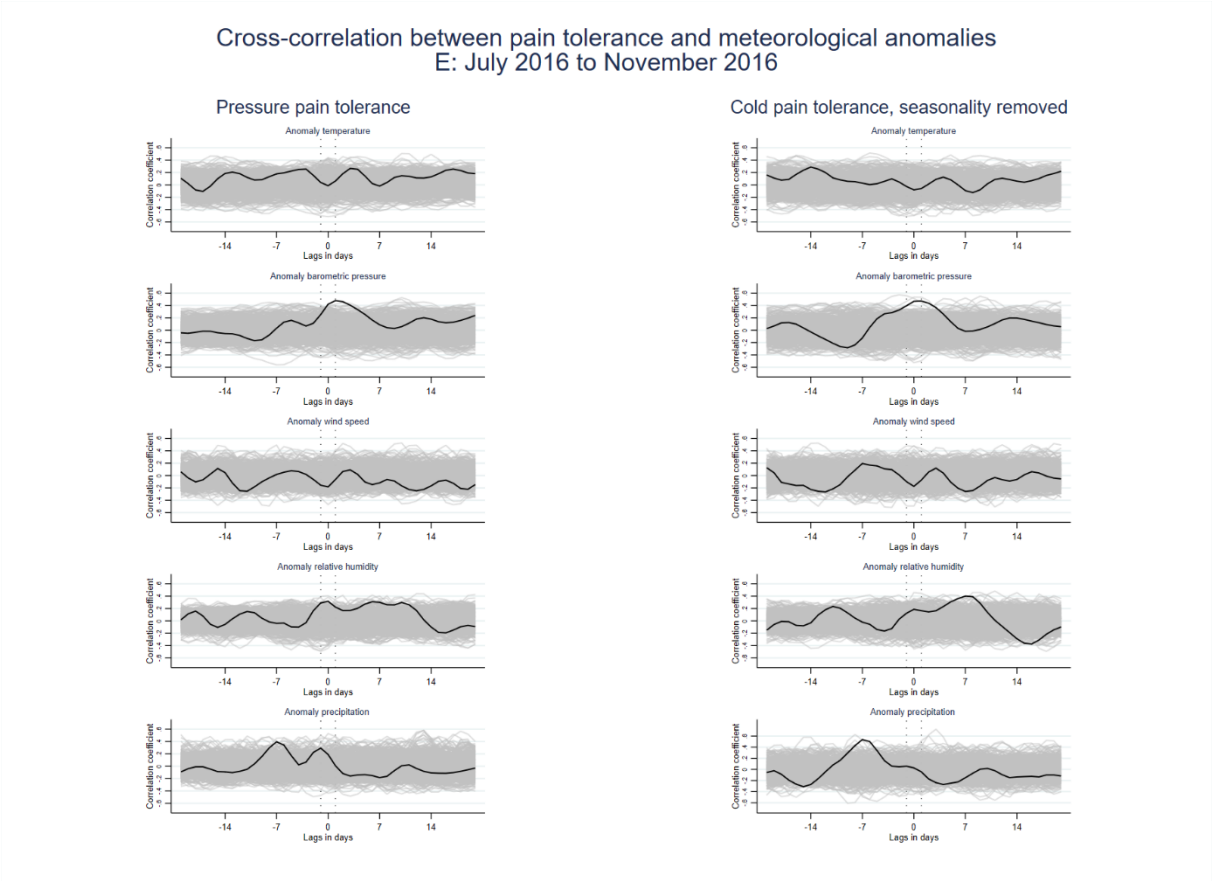
Supplementary figure 15: : 3-day moving average of daily mean of pressure cuff-algometry values and daily proportion of participants holding their hand in cold water >100s cross-correlated with the 3-day moving averages of anomaly temperature, barometric pressure, wind speed, relative humidity and precipitation. Dashed lines indicate the 3 days of pain tolerance with which the observed meteorological factors are correlated. Calculated for the period March 2015 to June 2015



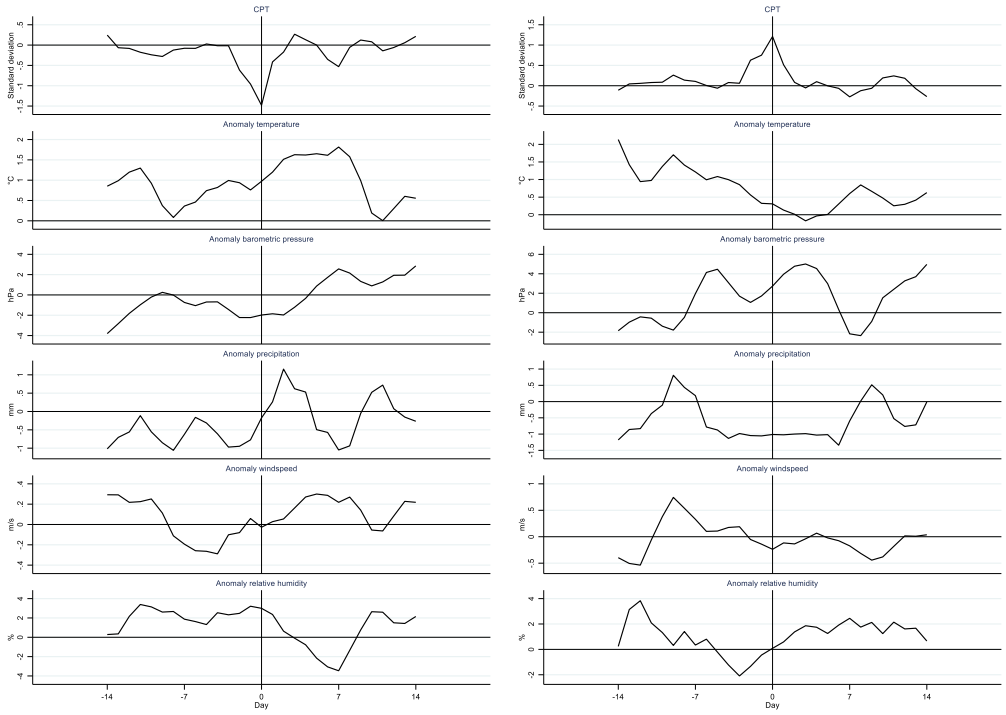
Supplementary figure 16: 3-day moving average of daily mean of pressure cuff-algometry values and daily proportion of participants holding their hand in cold water >100s cross-correlated with the 3-day moving averages of anomaly temperature, barometric pressure, wind speed, relative humidity and precipitation. Dashed lines indicate the 3 days of pain tolerance with which the observed meteorological factors are correlated. Calculated for the period July 2015 to December 2015



Supplementary figure 17: 3-day moving average of daily mean of pressure cuff-algometry values and daily proportion of participants holding their hand in cold water >100s cross-correlated with the 3-day moving averages of anomaly temperature, barometric pressure, wind speed, relative humidity and precipitation. Dashed lines indicate the 3 days of pain tolerance with which the observed meteorological factors are correlated. Calculated for the period January 2016 to June 2016



Supplementary figure 18: 3-day moving average of daily mean of pressure cuff-algometry values and daily proportion of participants holding their hand in cold water >100s cross-correlated with the 3-day moving averages of anomaly temperature, barometric pressure, wind speed, relative humidity and precipitation. Dashed lines indicate the 3 days of pain tolerance with which the observed meteorological factors are correlated. Calculated for the period July 2016 to November 2016



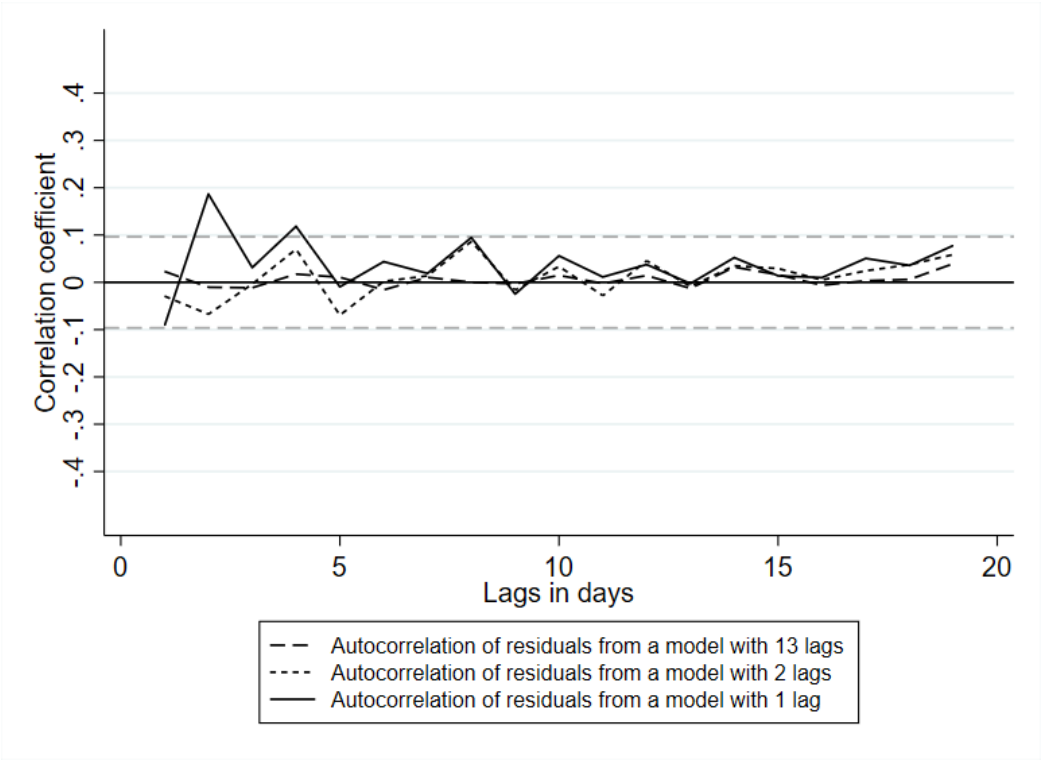
Supplementary figure 19: Mean of 3-day moving averages of cold pain tolerance (CPT) after removal of seasonal variation and meteorological anomalies at local minima and maxima of CPT, which were below 10th or above the 90th percentile, and in the 14 days before and after

Supplementary table 1 Estimated mean lifetime in days and 95% confidence interval (CI) for the autocorrelation of pressure pain tolerance (PPT) and weather anomalies using a generalized linear model with gamma distribution and log-link function

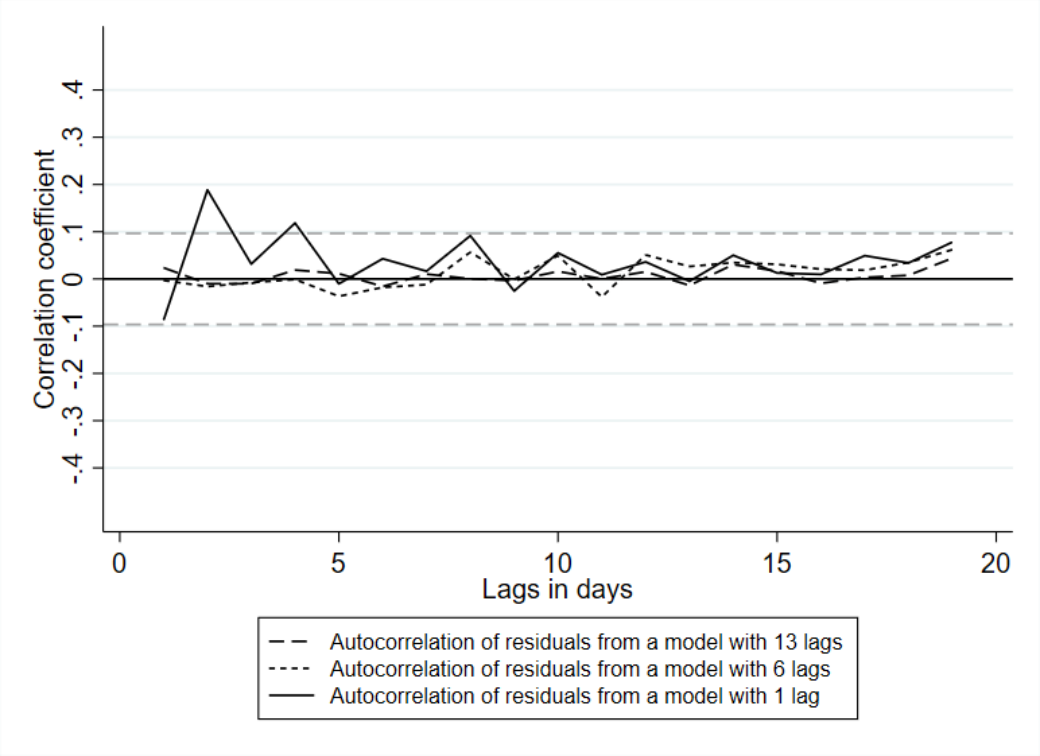
	Mean lifetime in days	95% CI	
		Lower	Upper
PPT	5.1	4.0	7.2
Anomaly temperature	2.9	2.8	3.2
Anomaly barometric pressure	6.2	5.5	7.2
Anomaly relative humidity	3.8	3.5	4.3
Anomaly precipitation	2.6	1.9	4.0

Supplementary Table 2: Granger causality test of meteorological anomalies and observed temperature and barometric pressure on pressure pain tolerance. The different number of lags in the vector autoregressive models are chosen based on either the likelihood ratio test (LR), Akaike Information Criteria (AIC), or Bayesian Information Criterion (BIC), resulting in 6 different models. The p-value indicates if adding the variable(s) to the model increases the predictive skill of the model.

	Models chosen with LR		Models chosen with AIC		Models chosen with BIC	
	Number of lags	p	Number of lags	p	Number of lags	p
Anomalies						
Temperature		0.260		0.009		0.820
Barometric pressure	13	0.009	2	0.736	1	0.891
All variables		0.007		0.020		0.963
Observed						
Temperature		0.175		0.062	1	0.233
Barometric pressure	13	0.010	6	0.017		0.826
All variables		0.006		0.003		0.489



Supplementary figure 20 Autocorrelation of the residuals of pressure pain tolerance from three different vector autoregressive models fitted to pressure pain tolerance, anomaly temperature and anomaly barometric pressure..



Supplementary figure 21 Autocorrelation of the residuals of pressure pain tolerance from three different vector autoregressive models fitted to pressure pain tolerance, observed temperature and observed barometric pressure.