A Online Appendix

A.1 Construction of panel dataset

In this Appendix we describe the process by which we form a balanced county-by-bimonthly period using the NCANDS Child Files for 2006 to 2018. The NCANDS Child File for a given year includes case-level data on all cases that received a disposition from a child protection services (CPS) agency in the federal fiscal year. A case represents a child-report pair.

We first identify the 426 counties that are unmasked in all 13 Child Files from 2006 to 2018. We then remove cases from the counties that are not continuously unmasked in the Child Files between 2006 and 2018, cases from Puerto Rico (due to data quality concerns), cases for which county of report is masked or missing including child fatalities, and cases with a report year earlier than 2006 or later than 2016. The next step involves identifying cases that appear in multiple Child Files. For these cases, we follow the recommendation in the NCANDS User's Guide to keep only the instance in the most recent fiscal year. Finally, we remove cases in which the child's age is above 17.[26].

The next step in constructing the panel involves appending together all of the relevant Child Files. This results in a data set of 26,307,725 child maltreatment cases reported to CPS agencies between 2006 and 2016, which represents 15,251,185 unique children. As a final step before forming the panel we remove cases for which the maltreatment type was listed as "no alleged maltreatment" (about 12%). This value identifies cases in which a child receives a CPS response but was not the subject of a maltreatment allegation and is used in states that require all children in a household to receive a CPS response if any child in the household is the subject of a CPS response. Within this case-level sample, the median child age is seven; about a third of cases are associated with children age four or younger.

We construct maltreatment outcomes at the child-level (as opposed to the case- or report-level). To do so we collapse the data to create a count of the number of unique children (e.g., with at least one allegation, with at least one substantiated allegation, etc.) in the county and bimonthly period. We then divide the resulting counts by the number of days in the bimonthly period and scale by annual child population in the county measured in thousands from SEER. The resulting balanced county-by-bimonthly period panel contains 112,464 observations, which represents 426 unique counties and 264 unique bimonthly reporting periods during the 11-year sample period.

About 7% of cases (prior to collapsing) have missing values for report source and less than a half percent of cases have missing values for maltreatment type. We assign the following

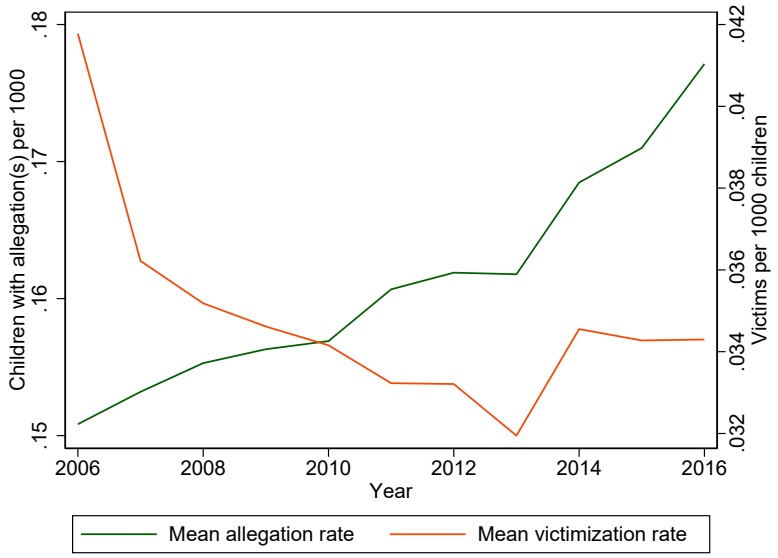
[26]Prior to this final restriction, less than one percent of cases have missing values for child age

report sources to the "professional reporter" category: social services personnel; medical personnel; mental health personnel; legal, law enforcement, and criminal justice personnel; education personnel; child daycare provider. The following report sources are categorized as "non-professional reporters": substitute care provider, alleged victim, parent, other relative, friends/neighbors, alleged perpetrator, anonymous reporter, other, unknown or missing.

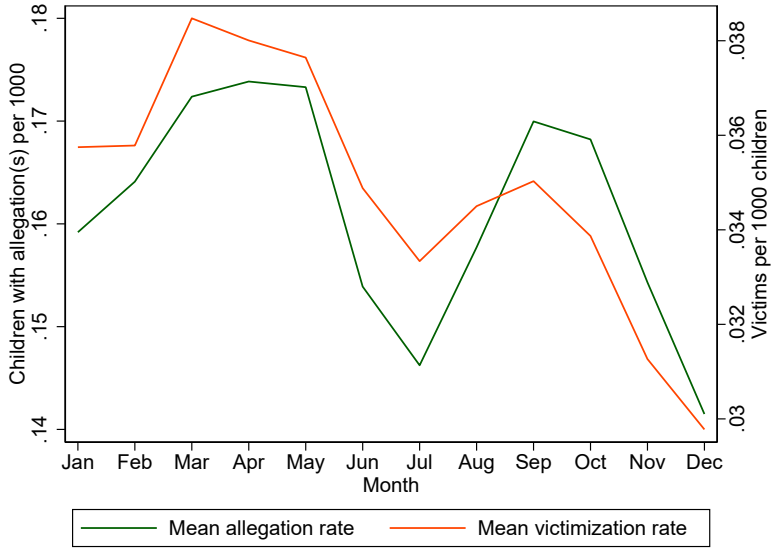
Finally, we drop two counties that do not belong to the contiguous United States as we do not have weather data for them. Thus, we obtain a balanced panel of 424 counties in 42 states.

A.2 Additional figures and tables

Figure A1: Temporal Variation in Child Maltreatment, Age 0-17



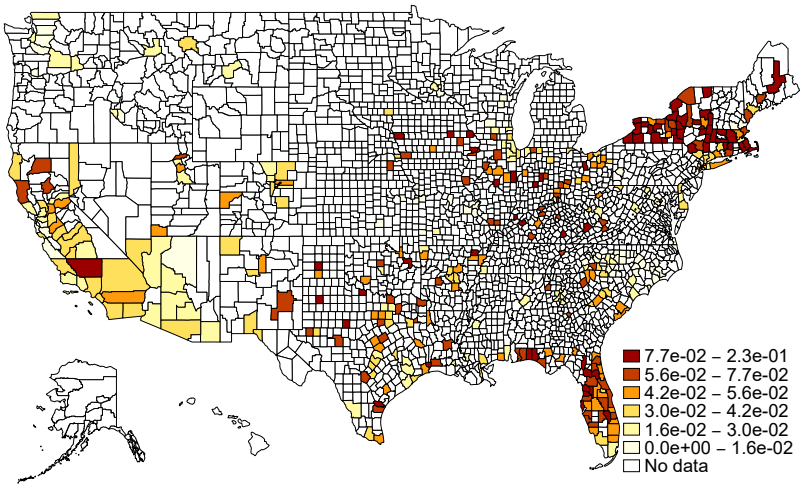
(a) Annual variation



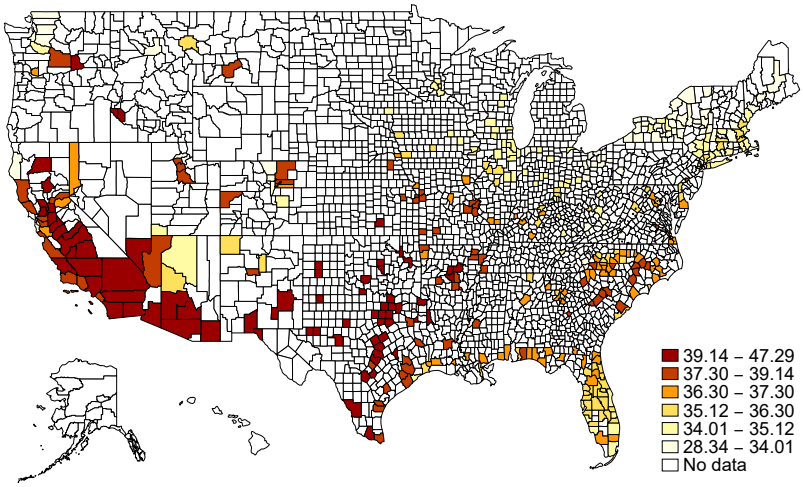
(b) Monthly

NOTES: This figure plots the annual (panel (a)) and monthly (panel (b)) means of the daily average allegation (left y-axis) and victimization (right y-axis) rates in the bimonthly period for the sample period, 2006 to 2016. The daily average allegation rate measures the average number of children per 1,000 with at least one maltreatment allegation in each day during the bimonthly reporting period. The daily average victimization rate measures the average number of children per 1,000 with at least one substantiated maltreatment allegation in each day during the bimonthly reporting period.

Figure A2: Spatial Variation in Child Maltreatment (Age 0-4) and Temperature



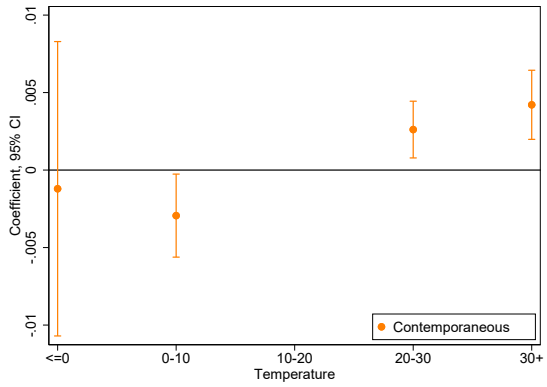
(a) Median victimization rate



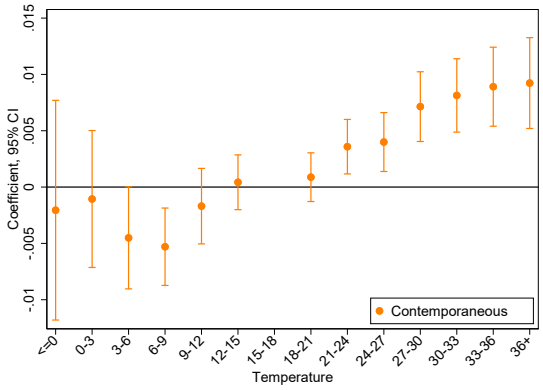
(b) Average temperature

NOTES: This figure depicts spatial variation in victimization rates and temperatures. Panel (a) plots the median of the daily average victimization rates for young children in the bimonthly period for the sample period, 2006 to 2016. The daily average victimization rate measures the average number of children age 0-4 per 1,000 with at least one substantiated maltreatment allegation in each day during the bimonthly reporting period. Panel (b) shows the maximum yearly temperature recorded in each county averaged over the years in our sample: 2006-2016.

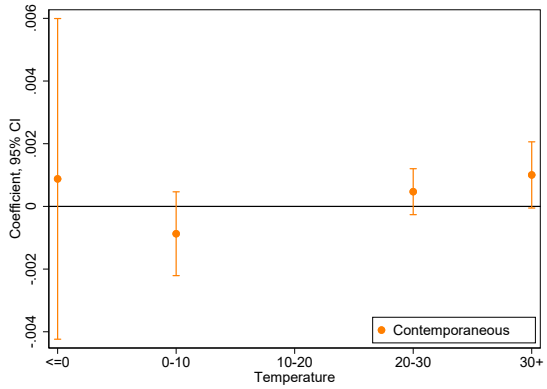
Figure A3: Relationship between Temperature and Maltreatment of Young Children, Alternative Temperature Bins



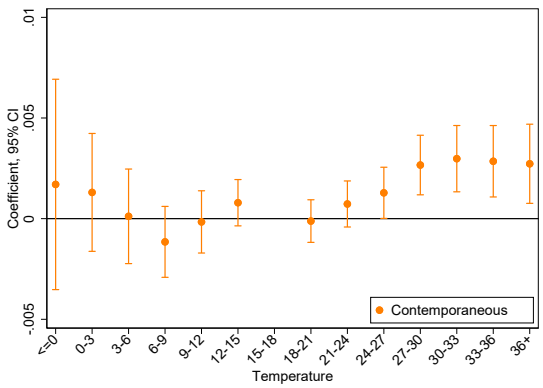
(a) Allegation rate: 10-degree bins



(b) Allegation rate: 3-degree bins



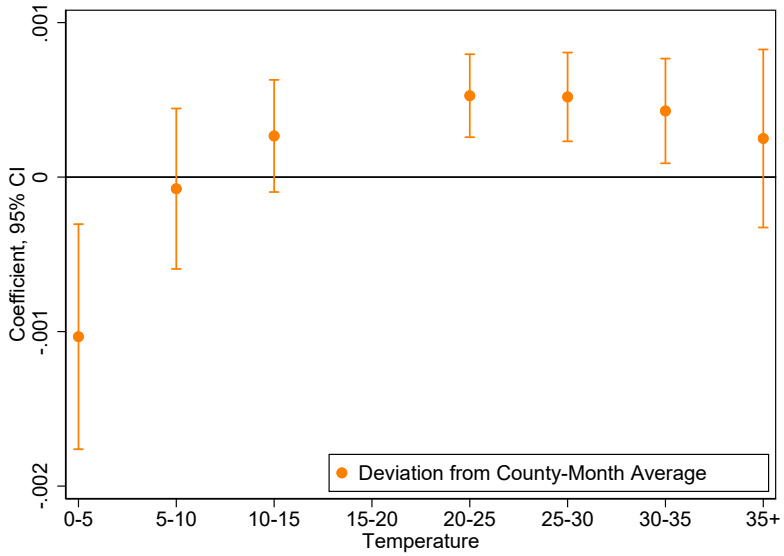
(c) Victimization rate: 10-degree bins



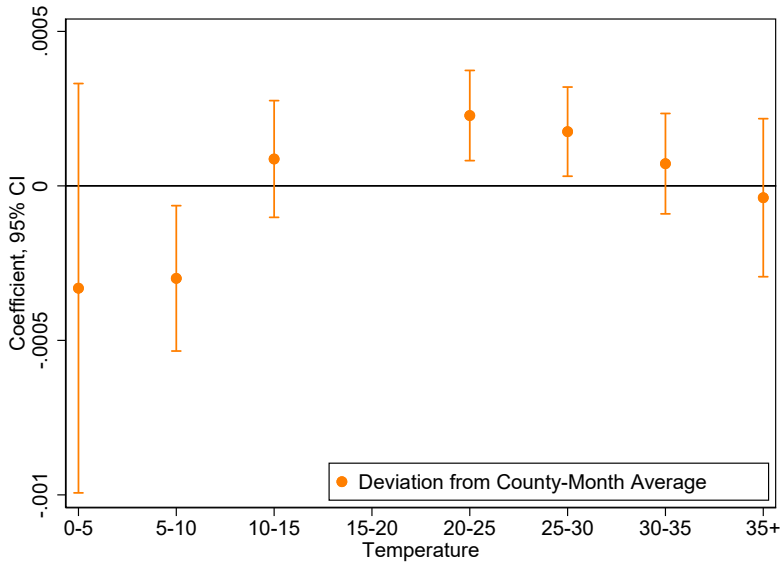
(d) Victimization rate: 3-degree bins

NOTES: This figure plots the estimated coefficients and 95% confidence intervals on the temperature bin variables defined over 10°C (Panels (a) and (c)) and over 3°C (Panels (b) and (d)), respectively. Controls and fixed effects are as described in the main specification. Panels (a) and (b) report results for the allegation rate, the daily average number of children per 1,000 with at least one maltreatment allegation during the bimonthly reporting period. Panels (c) and (d) plot results for the victimization rate, the daily average number of children per 1,000 with at least one substantiated maltreatment allegation during the bimonthly reporting period.

Figure A4: Relationship between Temperature and Maltreatment of Young Children, Deviations from County-Bimonthly Averages



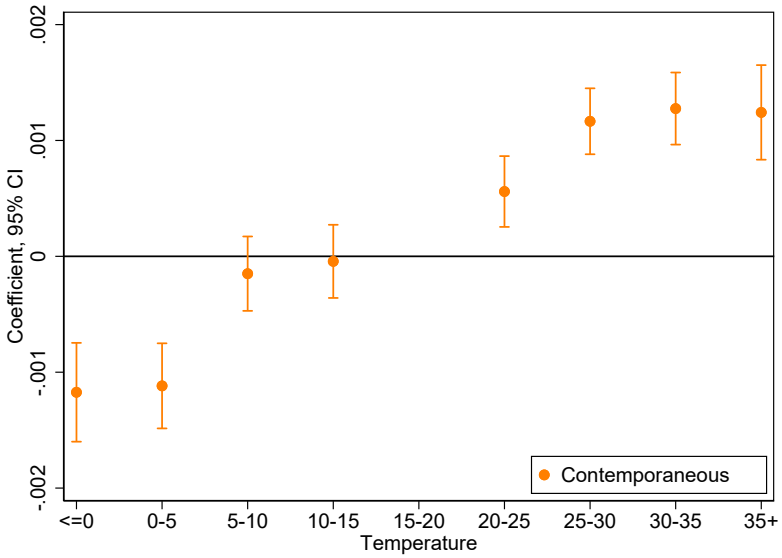
(a) Allegation rate



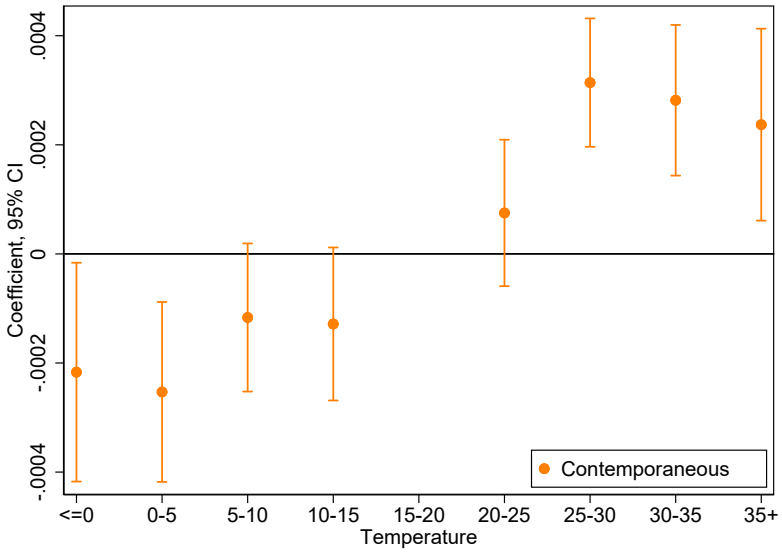
(b) Victimization rate

NOTES: This figure plots the estimated coefficients and 95% confidence intervals on interaction terms of binned "normal" maximum temperatures in a county-period and the contemporaneous deviation of maximum temperature from this "normal". For each county-bimonthly reporting period, the "normal" temperature is the average of the maximum daily temperature at the county and biweekly reporting period across years in our sample period. For each county-period, the contemporaneous deviation is the difference between the actual maximum of the daily maximum temperatures during each reporting period and this "normal" maximum temperature for that county and peariod of the year. Controls and fixed effects are as described in the main specification. Panel (a) reports results for the allegation rate, the daily average number of children per 1,000 with at least one maltreatment allegation during the bimonthly reporting period. Panel (b) plots results for the victimization rate, the daily average number of children per 1,000 with at least one substantiated maltreatment allegation during the bimonthly reporting period.

Figure A5: Relationship between Temperature and Maltreatment of Young Children, Count of Days in Temperature Range



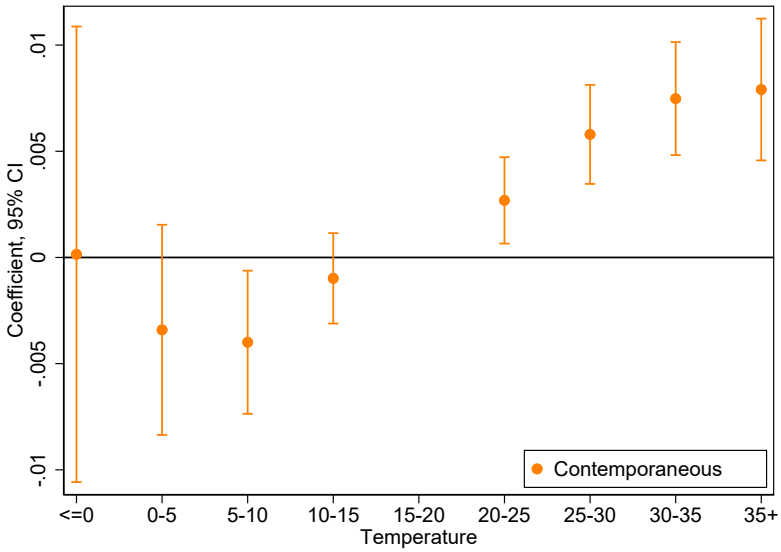
(a) Allegation rate



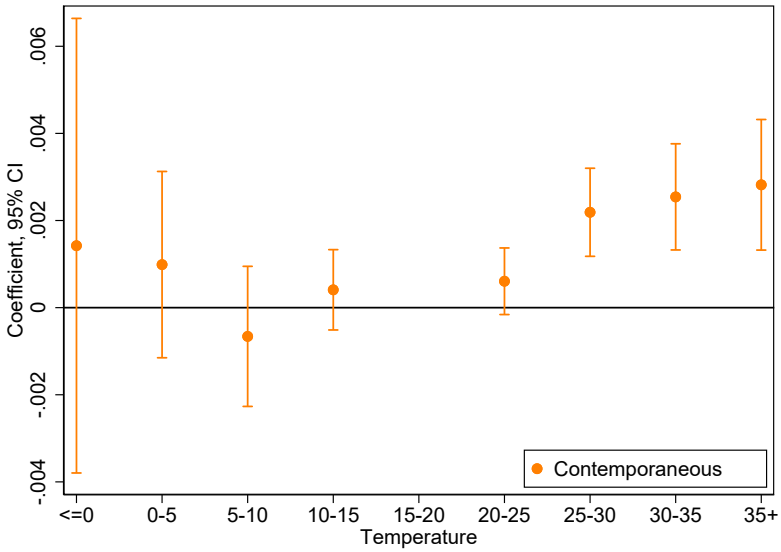
(b) Victimization rate

NOTES: This figure plots the estimated coefficients and 95% confidence intervals on contemporaneous temperature bin variables where each variable measures the number of days during the county-bimonthly reporting period on which the maximum daily temperature is within the respective temperature range. Temperature leads and lags, defined similarly, are included but not reported. Controls and fixed effects are as described in the main specification. Panel (a) reports results for the allegation rate, the daily average number of children per 1,000 with at least one maltreatment allegation during the bimonthly reporting period. Panel (b) plots results for the victimization rate, the daily average number of children per 1,000 with at least one substantiated maltreatment allegation during the bimonthly reporting period.

Figure A6: Relationship between Temperature and Maltreatment of Young Children, Alternative Assignment of Weather Variables



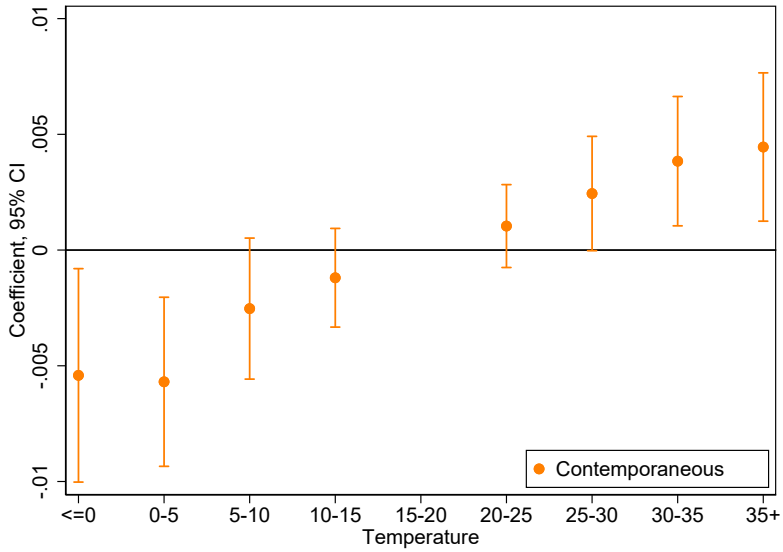
(a) Allegation rate



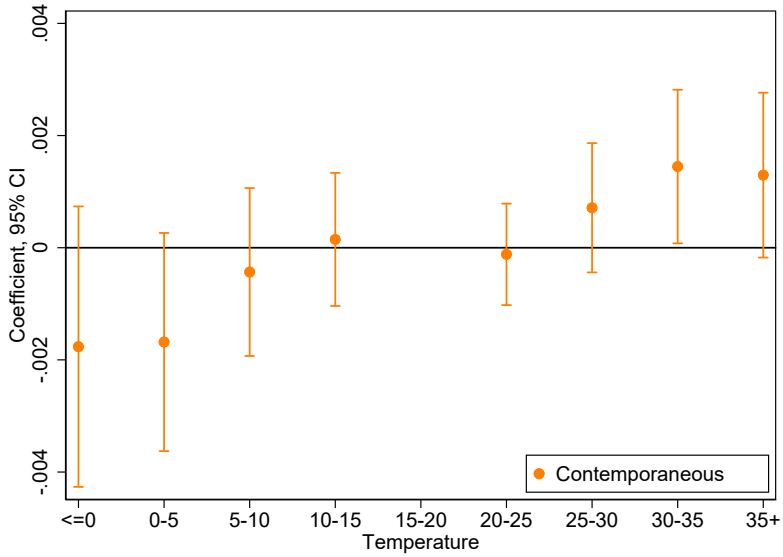
(b) Victimization rate

NOTES: This figure plots the estimated coefficients and 95% confidence intervals on the contemporaneous temperature bin variables. Temperature leads and lags are included but not reported. Controls and fixed effects are as described in the main specification. Panel (a) reports results for the allegation rate, the daily average number of children per 1,000 with at least one maltreatment allegation during the bimonthly reporting period. Panel (b) plots results for the victimization rate, the daily average number of children per 1,000 with at least one substantiated maltreatment allegation during the bimonthly reporting period. Temperature and precipitation measures are assigned to each county by averaging across grid cells that intersect the county polygon and weighing observations by the fraction of county surface they cover.

Figure A7: Relationship between Temperature and Maltreatment of Young Children, Alternative Temperature Data



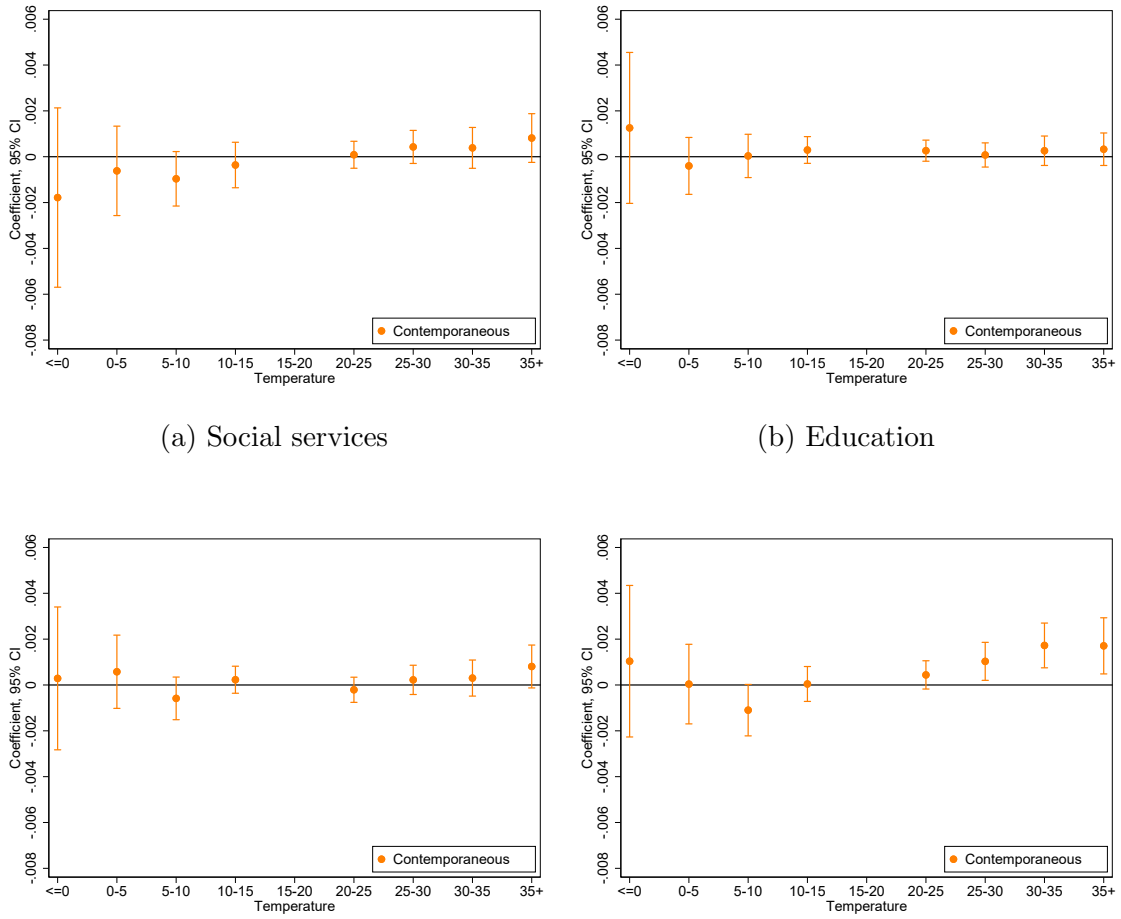
(a) Allegation rate



(b) Victimization rate

NOTES: This figure plots the estimated coefficients and 95% confidence intervals on the temperature bin variables in the main specification where temperature is measured using MODIS data. Panel (a) reports results for the allegation rate, the daily average number of children per 1,000 with at least one maltreatment allegation during the bimonthly reporting period. Panel (b) plots results for the victimization rate, the daily average number of children per 1,000 with at least one substantiated maltreatment allegation during the bimonthly reporting period.

Figure A8: Relationship between Temperature and Allegation Rate for Young Children by Professional Report Source



(a) Social services

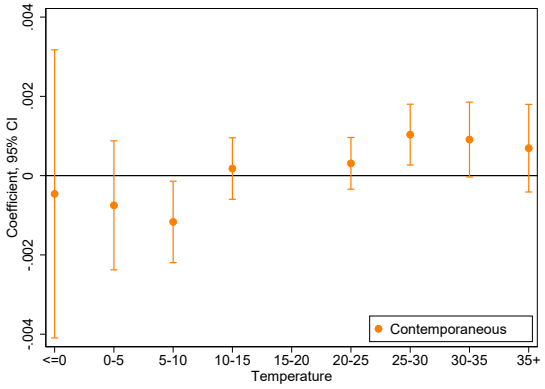
(b) Education

(c) Medical

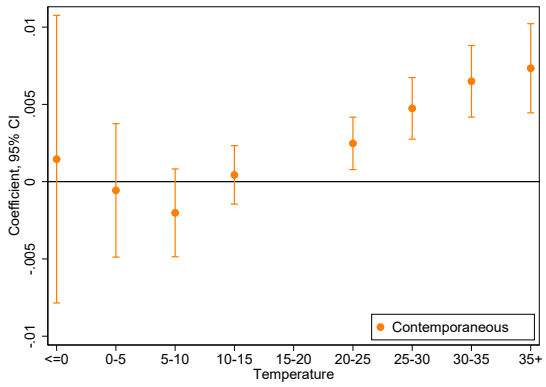
(d) Law enforcement

NOTES: This figure plots the estimated coefficients and 95% confidence intervals on the contemporaneous temperature bin variables. Temperature leads and lags are included but not reported. Controls and fixed effects are as described in the main specification. For each panel, the results show the estimated relationship between temperature and the allegation rate where the rate is calculated using reports from each specific report source. Panel (a) uses reports from social service personnel; panel (b) is restricted to reports from education personnel and daycare providers; panel (c) uses reports from medical and mental health personnel; panel (d) is restricted to reports from legal, law enforcement, and criminal justice personnel. The allegation rate is the daily average number of children per 1,000 with at least one maltreatment allegation during the bimonthly reporting period.

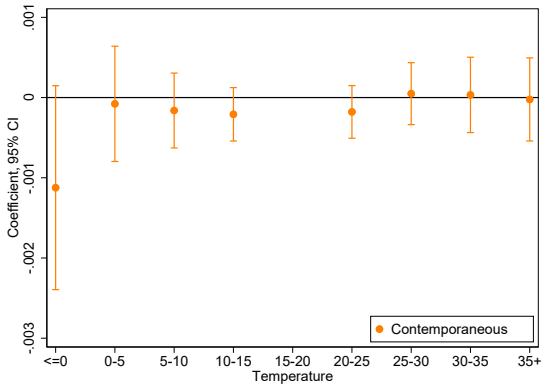
Figure A9: Relationship between Temperature and Allegation Rate for Young Children by Maltreatment Type



(a) Physical abuse



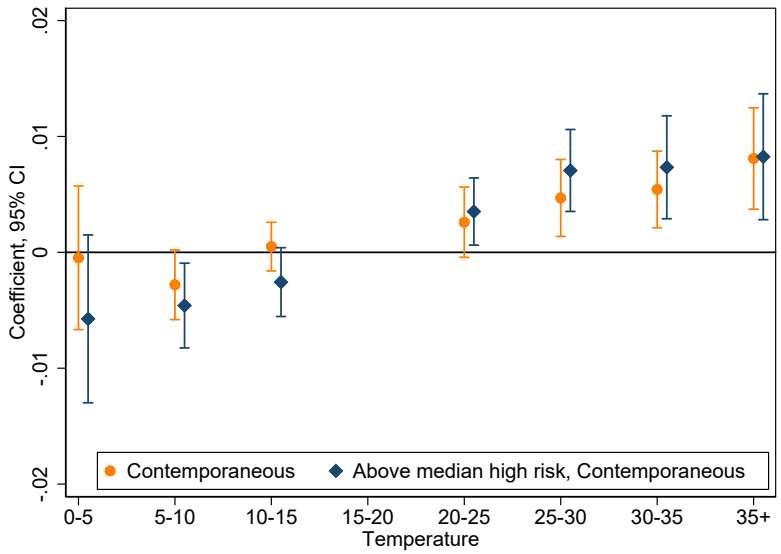
(b) Neglect



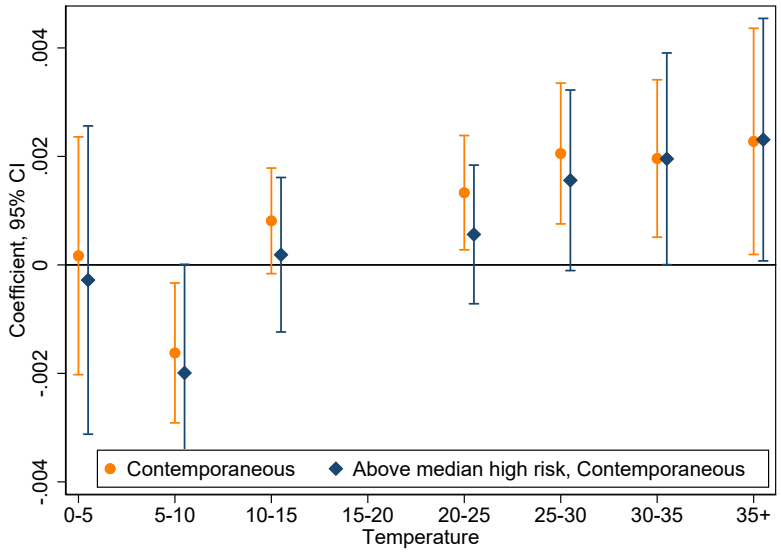
(c) Sexual abuse

NOTES: This figure plots the estimated coefficients and 95% confidence intervals on the contemporaneous temperature bin variables. Temperature leads and lags are included but not reported. Controls and fixed effects are as described in the main specification. For each panel, the results show the estimated relationship between temperature and the allegation rate where the rate is calculated by type of maltreatment. Panel (a) shows results for physical abuse; panel (b) shows results for neglect; panel (c) reports results for sexual abuse. The allegation rate is the daily average number of children per 1,000 with at least one maltreatment allegation during the bimonthly reporting period.

Figure A10: Relationship between Temperature and Maltreatment of Young Children by Occupational Heat Exposure



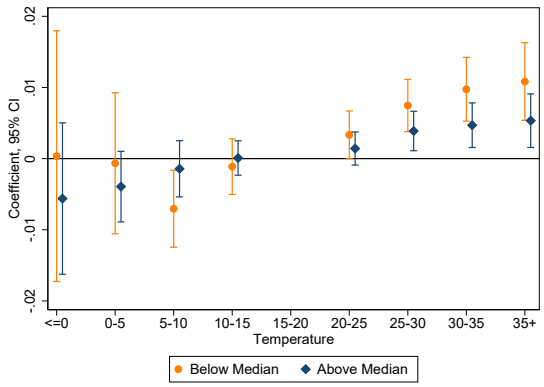
(a) Allegation rate



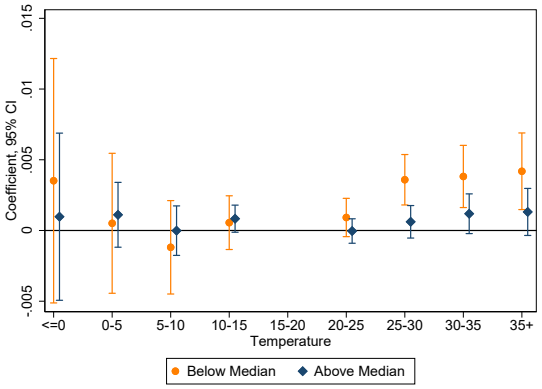
(b) Victimization rate

NOTES: This figure plots the estimated coefficients and 95% confidence intervals on (1) the contemporaneous temperature bin variables, and (2) sums of these estimated coefficients and those on interactions between the contemporaneous temperature bin variables and an indicator for county-level above-median share of employment in high heat exposure industries in 2005. (1) is depicted as orange circles while (2) is denoted with blue diamonds. Temperature leads and lags are included but not reported. Controls and fixed effects are as described in the main specification. Panel (a) reports results for the allegation rate, the daily average number of children per 1,000 with at least one maltreatment allegation during the bimonthly reporting period. Panel (b) plots results for the victimization rate, the daily average number of children per 1,000 with at least one substantiated maltreatment allegation during the bimonthly reporting period.

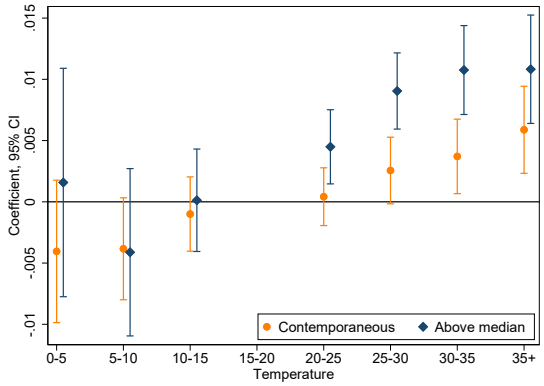
Figure A11: Relationship between Temperature and Maltreatment of Young Children: Heterogeneous Effects



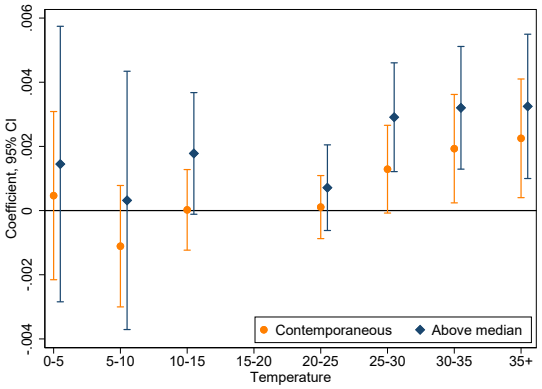
(a) Median HH income, Allegation rate



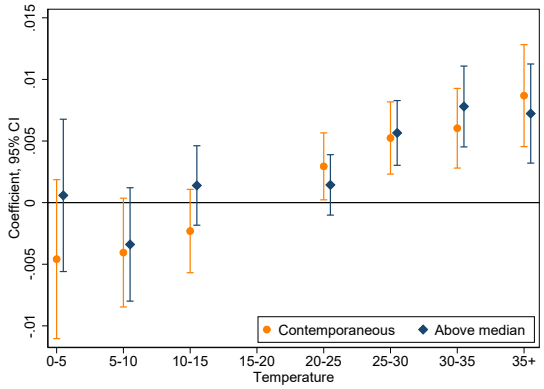
(b) Median HH income, Victimization rate



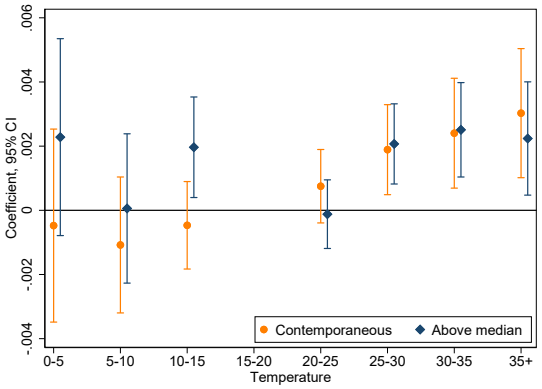
(c) % children in poverty, Allegation rate



(d) % children in poverty, Victimization rate



(e) Unemployment rate, Allegation rate



(f) Unemployment rate, Victimization rate

NOTES: This Figure plots the estimated coefficients and 95% confidence intervals on on (1) the contemporaneous temperature bin variables, and (2) sums of these estimated coefficients and those on interactions between the contemporaneous temperature bin variables and an indicator for county-level above-median values of three control variables in 2006, median household income, share of children in poverty, and unemployment rate. (1) is depicted as orange circles while (2) is denoted with blue diamonds. Temperature leads and lags are included. Controls and fixed effects are as described in the main specification. Panels (a), (c), and (e) show the estimated relationship between temperature and the allegation rate, while Panels (b), (d), and (f) focus on the victimization rate.

Table A1: Summary Statistics for Outcome Measures

	Mean (Standard deviation)
Panel A: Allegation rate measures	
Allegation rate	0.208 (0.127)
Allegation rate, professional source	0.102 (0.071)
Allegation rate, non-professional source	0.107 (0.084)
Allegation rate, educational source	0.013 (0.017)
Allegation rate, medical source	0.026 (0.024)
Allegation rate, social services source	0.023 (0.027)
Allegation rate, law enforcement source	0.040 (0.038)
Allegation rate, prior victim	0.044 (0.054)
Allegation rate, not prior victim	0.153 (0.105)
Panel B: Victimization rate measures	
Victimization rate	0.052 (0.048)
Victimization rate, professional source	0.036 (0.035)
Victimization rate, non-professional source	0.016 (0.022)
Victimization rate, educational source	0.002 (0.006)
Victimization rate, medical source	0.009 (0.012)
Victimization rate, social services source	0.008 (0.013)
Victimization rate, law enforcement source	0.018 (0.021)
Victimization rate, prior victim	0.014 (0.022)
Victimization rate, not prior victim	0.035 (0.035)

NOTES: Table reports means and standard deviations for outcome measures based on the balanced panel sample of 111,936 observations, which represents 424 unique counties for 264 bimonthly periods. The mean and standard deviation for the substantiation rate are 0.255 and 0.156, respectively. See text at beginning of appendix for information on construction of measures and missing values.

Table A2: Results for Control Variables in Main Specifications

	Allegation rate	Victimization rate	Mean (Standard deviation)
Share of children in poverty	0.0926	0.00277	0.210
	(0.0324)	(0.0166)	(0.074)
Median household income (1,000 2016 USD)	-0.000634	-0.000661	55.079
	(0.000273)	(0.000151)	(13.115)
Share Black	0.398	0.0842	0.120
	(0.201)	(0.105)	(0.120)
Share Hispanic	-0.644	-0.182	0.141
	(0.135)	(0.0851)	(0.156)
Share other race	-0.870	-0.139	0.045
	(0.231)	(0.104)	(0.052)
Unemployment rate	0.000598	0.000222	6.837
	(0.00124)	(0.000575)	(2.722)
Average daily precipitation over reporting period (in decimeters)			
Contemporaneous	-0.0510	-0.0157	0.029
	(0.00766)	(0.00341)	(0.030)
Lag 1	0.00534	0.00106	0.029
	(0.00703)	(0.00359)	(0.030)
Lag 2	0.00368	-0.000559	0.029
	(0.00697)	(0.00310)	(0.030)
Lead 1	0.00773	-0.000617	0.029
	(0.00838)	(0.00359)	(0.030)
Lead 2	0.00217	0.000111	0.029
	(0.00703)	(0.00353)	(0.030)

NOTES: First two columns of the table report the estimated coefficients and standard errors associated with control variables for the two main outcome variables: allegation rate and victimization rate. Fixed effects are as described in the main specification. The final column reports sample means and standard deviations. Socioeconomic controls are annual county-level measures. Sample size is 111,936. which represents 424 unique counties for 264 bimonthly periods.