

Will global warming inflame our tempers?

Two psychologists theorize about the lesser-debated effects of global warming.

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The volume of the global warming debate increased considerably with the Dec. 1 conference on global warming in Kyoto, Japan. But besides the well-known negative consequences of global warming—like rising sea levels, expanding deserts and ruined fishing and farm areas—what about the possible social psychological problems?

A largely ignored negative consequence of global warming is the expected changes in violent crime. Over the last 10 years, research has shown that uncomfortably hot temperatures directly cause increases in aggressive and violent behavior, including violent crime.

Thus, recent improvements in the violent crime rate in the United States may well be lost as global warming occurs. We now know that most violent crimes result from hostile thoughts and angry feelings. People get mad at each other, argue, fight and sometimes kill. Any factor that increases anger or hostility will tend to increase violence.

And consider how many opportunities there are for disagreements and provocations in the United States, a country with 270 million people.

Most such disagreements end without physical violence. That may change, however, as temperatures increase.

Scientific evidence

What is the evidence for this direct link between hot temperature and aggressive behavior? It comes from several very different kinds of studies. Social psychologists have shown in laboratory experiments that simply being in a hot room makes people feel angrier than being in a comfortable room. Aggressive thoughts also increase. Other laboratory research has shown that hot temperatures can, when coupled with provocation, increase a person's willingness to hurt another person. Other research supporting the link between heat and violence shows that regional differences in violent crime rates are related to regional differences in ambient temperature. Many studies—some going back to crime records in several European countries gathered in the last century—show that hotter regions of a country tend to have higher violent crime rates.

Interestingly, nonviolent crimes do not tend to show this same hot region increase in criminality. A study in the April 1996 issue of the *Journal of Personality and Social Psychology*, Vol. 70, No. 4, 740–756 on regional differences in violent crime rates in large U.S. cities ruled out many other potential causes of heat effect on violent crime, such as poverty, population size and regional cultures supportive of violence. The study found that U.S. cities with hotter climates have higher violent crime rates.

Other research has found that hotter days, months and seasons produce higher-than-normal crime rates. The December 1997 issue of the *Journal of Personality and Social Psychology*, Vol. 73, No. 6, 1213–1223 reported on two studies that examined the relation between hotness of year and violent crime rate in the United States from 1950 to 1995. One study found that summer produced more violent crime—murders and assaults—than the other seasons. If high temperature was a direct cause of the summer effect, then years with more hot days (days in which the maximum temperature is at least 90F) would have somewhat larger increases in murder and assault than years with fewer hot days. This prediction was confirmed by the data.

A second study examined the relation between the average temperature for each year and the corresponding murder and assault rate for the same 46-year period. If hot temperatures have a direct effect on violent behavior, then hotter years should (on average) produce higher violent crime rates. This is exactly what happened. The combined murder-and-assault rate was consistently higher in hotter years than in cooler ones. These results occurred even when the data were statistically controlled for the poverty rate, age shifts in the U.S. population and the general upward drift of violent crime during the period.

Looking toward the future

These two studies are particularly relevant to global warming because the data allow us to estimate how much violent crime rates will increase as global warming continues. On average there were 215 murders and assaults per 100,000 people each year from 1950–1995. These studies showed that for every 1 degree Fahrenheit increase in average temperature, the U.S. murder and assault rate per 100,000 people increased about 3.68.

But is it likely that global warming will increase the world's murder and assault rate? In this country, with a population of 270 million people, the 3.68 figure translates into roughly 9,900 more murders and assaults per year in the United States even if global warming increases the average temperature by only 1 degree Fahrenheit. If the increase is 6 degrees Fahrenheit, the United States could expect an additional 59,000 murders and assaults each year.

But even this estimate may be overly optimistic. Just as climatologists estimate a range of global warming possibilities (for example, from 2 degrees Fahrenheit to 6.5 degrees Fahrenheit by the year 2100), U.S. violent crime data also suggest a range of reasonable estimates. The 3.68 figure is the statistically "best" estimate, but the actual figure could reasonably be as high as 5.34. If the actual global warming change is 6 degrees Fahrenheit, this larger rate of increase translates into about 32 more murders and assaults per 100,000 population, or more than 86,000 additional murders and assaults per year.

If global warming progresses as now seems likely, we can expect the recent reductions in the U.S. violent crime rate to disappear, only to be replaced by a steadily climbing rate of violence, along with all the grief, anguish, costs and waste associated with it. Personally, we'd prefer to use less fossil fuel and pay a bit more for cleaner energy and more efficient transportation. How about you?

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