

Mari Martin

Mrs. Emily Ford

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Incongruous Daylight Saving Time

When I came back from a business trip to Japan at the beginning of March, I realized that time had changed. I work for a Japanese company, so I had to tell them that time in Indiana had changed. I felt that the time change made it inconvenient to deal with them. Around the same time, my father-in-law had a difficult time adjusting his wristwatch forward an hour, since he is not good at technology. He is in good shape but it still bothers him to do small things like this. I can imagine there are thousands of people who are in the same situation. But is all this effort worth it? Are there any serious problems that have not been considered? Is it really necessary to change our clocks twice a year? All kinds of questions occurred to me because I come from Japan where we do not have this system of Daylight Saving Time (DST).

When discussing DST in Indiana, it is inseparable from the time zone issue because of the geographical conditions of Indiana. The time zone issue has been argued as long as the issue of DST. Whether adopting Central Time or Eastern Time, it will make an hour of difference to Indiana. The hours of daylight shift throughout the year and vary depending on locations. For the purposes of this essay, in order to prevent confusion, only the matter of DST will be addressed. To select a time zone is a totally different issue from DST, since I have determined to argue about changing clock time twice a year.

Currently, DST is implemented on the second Sunday in March at 2:00 a.m., when the time is set an hour forward, and concludes on the first Sunday in November at 2:00 a.m., when the time is set an hour back in the US, except Hawaii and Arizona.

The historical background of DST goes back to more than two hundred years ago. According to David Prerau, who has been called the world's foremost authority on DST, Benjamin Franklin is the one that came up with the idea to “change the hours of human activity to make the best use of daylight” in 1784 (xiv-v). But back then, there were no regulations how to implement it. Prerau also notes that William Willett, a British builder, started a campaign to use DST with the pamphlet, *The Waste of Daylight* in 1907. The following year, one of the members of Parliament in Britain had learned of Willett’s idea and tried to pass the bill called Pearce’s Daylight Saving Bill, but it never passed during Willett’s life time (Prerau 3,9,24).

DST took effect actually on April 6, 1916, in Germany during World War I for the first time. This time-adaptation aimed to use daylight efficiently and to save fuel for the war effort. Soon after, this idea was introduced in Britain, and eventually brought to America. In America, DST started on March 31, 1918, then was repealed on October 27, 1918, because it was determined that it was no longer needed since the war had ended.

It came back on February 9, 1942, again to save vital energy resources for World War II, then was repealed on September 30, 1945, with end of the war. Prerau mentions in his book that DST was widely acknowledged as “War Time” (148). This War Time caused many problems, such as farmers having to milk their cows before sunrise, school children having to wait for a school bus in the dark with great risk of accidents, and the increasing number of traffic accidents (153-4).

In this way, it was implemented mainly during war time in the US. Prerau also mentioned in his book that even though DST had been repealed, approximately 40% of Americans continued to observe it as a matter of municipality, county or state choice (157). So, non-uniform time zones existed all over the US and it can be easily imagined that this resulted in chaos.

Under such circumstances, in March 1949, Indiana banned the use of DST. In 1973, the first prolonged peacetime energy shortage occurred due to the Arab Oil Embargo against the US. To resolve the problem, according to Prerau, DST came back immediately because it did not cost much when compared to other energy conservation options (189-90). Still, Indiana did not observe DST. In 2005, the Indiana legislature approved DST with support from the state Chamber of Commerce and former Governor Mitch Daniels. Finally, in March 2006, Indiana residents started to follow the ritual of the “time trips” twice a year.

What is the recent purpose of observing Daylight Saving Time? As outlined above, the purpose of DST was basically to save energy during the war. Although we are no longer at war, all of the states, except Arizona and Hawaii, have implemented DST. Why is that? The Department of Transportation is in charge of this business under the Uniform Time Act. According to the Department of Transportation, DST is observed for three main reasons: it saves energy, saves lives and prevents traffic injuries, and reduces crime (“Daylight Saving Time”).

Saving energy is the one of the main purposes to observe DST. According to the Department of Energy, DST reduces energy consumption by less than 0.5%, and then only during the extension weeks of DST. It results in 0.03% reduction throughout the

year (“Extended Daylight Saving Time Saves Energy, Says DOE”). On the other hand, in Indiana, Kotchen and Grant’s study shows that implementing DST actually increases energy consumption by approximately 1%, increasing Indiana residents’ electricity bills by \$9 million, or \$3.29 per household. This is caused by the tradeoff between reducing demand for lighting and increasing demand for heating and cooling (4). Since our lifestyles have changed, we use electricity constantly no matter whether there is daylight or not. The effective use of daylight is not corresponded for saving energy. I totally agree with Kotchen and Grant’s idea that “continued reliance on Benjamin Franklin’s old argument alone is now misleading” (23). The effect of DST has shown to be slight in saving energy throughout the year, therefore, saving energy depends on the area of the country being considered. But in Indiana, it is not happening.

To save lives and prevent traffic injuries is one of the aims of DST. The Department of Transportation claims that “people travel to and from school and work and complete errands during the daylight” (“Daylight Saving Time”). But in Indiana, because it is on the far west edge of the Eastern Time Zone, when we implement DST, we lose our morning daylight which is when most people go to work or school. In fact, Gaski indicates that traffic accidents increased 7% which was attributable to DST (par. 8-10). While gaining daylight for evening, we are losing morning daylight. This leads to an increased accident rate.

Reducing crime is listed as another reason for implementing DST. According to the US Law Enforcement Assistance Administration, crime is reduced during DST periods when compared with standard time periods. The crime rate is reduced 10-13% (Douma). Focusing on Indiana, it is difficult to conclude whether the rate is reduced or

not because evidence is limited, since Indiana only started DST in 2006, which is too short time a period. Although Gaski notes that recent evidence shows a possible link to increasing assaults and abductions at or before sunrise in Indiana (par. 5-2). Although it is also true that evening daylight can reduce crime rates, morning darkness seems to increase the crime rate as well as the number of traffic accidents.

As described above, the advantages of observing DST cannot be supported. Accidents and crimes are caused by complex factors. Therefore, to verify the changes in accident and crime rates due to implementation of DST is difficult. Even though there is not much evidence to indicate that DST is efficiently working for its original purposes, the DST bills have passed Congress until now. Why is that?

There are more business reasons than the stated original purposes to continue observing DST. According to Prerau, extra daylight helps people to go out and spend money after work. Fast-food companies, such as McDonald's and Hardee's, claim increased sales during DST. Also barbecue makers, charcoal companies, sporting goods manufactures, nurseries, and amusement parks, along with "eight thousand companies with annual sales of over 100 billion" expected to make even more money during DST. Candy makers were especially interested in extending DST. They want extra daylight for Halloween (206-7). Also, Gaski suggests that the reason Indiana joined DST was in order to keep "seasonal alignment and work-day consistency with most of the rest of the country" (par. 2-1). From here, the deviation of the reasons for the enforcement of DST in Indiana is observed. DST is no longer used for its original purposes. It contradicts their purposes and outcomes.

Meanwhile, there is some evidence of side effects linked to DST.

The enforcement of DST results in students being put at risk. School children have to wait for the school bus before sunrise, when it is still dark on the street for part of the school year in Indiana. For instance, on the day before DST is adopted in March, sunrise time is approximately 7 a.m. (Eastern Time) in Fort Wayne. The day DST begins, sunrise time moves forward to 8 a.m. When the school bus picks children up it is still dark in March. The same situation occurs in September and October at the end of DST. This is possibly linked to traffic accidents, assaults, and abductions involving school children. The most recent case which might be linked to DST was on March 11, 2013, according to *The Indy Channel*. A student from Columbus, Indiana, was struck by a school bus in the morning before sunrise. It was the day right after DST started. Those accidents which occur in the morning before sunrise may be difficult to link directly to DST. Even though Gaski shows a study that indicates “significant positive impact on child traffic deaths.... [the] finding may properly be regarded as tentative and a preliminary baseline, but also troubling” (par. 7-1).

Further research reveals that DST causes cardiovascular health problems like myocardial infarction, which is a heart attack. According to *The New England Journal of Medicine*, changing clocks forward by an hour in spring leads to an increased incidence of acute myocardial infarction during the first 3 week-days after the transition to DST. The study shows that “[t]he incidence ratio for the first week after the spring shift, calculated as the incidence for all 7 days divided by the mean of the weekly incidences 2 weeks before and 2 weeks after, was 1.051” (Janszky and Ljung). In other words, there is high risk for acute myocardial infarction for the first three days after DST is adopted. In

contrast to this, there are no significant effects from DST in the fall time. Thus, our bodies are affected only by the spring forward time.

Also, DST is linked to increasing numbers of workplace injuries and injuries of greater severity. A study from Michigan State University shows that the number of injuries on the Monday after the time shift result in a 5.7% increase over a typical Monday, and the loss of 67.6% more work days because of injuries (Barnes and Wagner). This means that at least some of the injuries were so severe that employees could not work. Therefore, DST's effect on injuries is significant.

The negative health effects and injuries resulting from DST are connected to sleep deprivation caused by changing the clocks. A study in *The New England Journal of Medicine* shows that this transition of time tends to “disrupt chronobiologic rhythms and influence the duration and quality of sleep” (Janszky and Ljung). Also, another study indicates that people lose 40 minutes of sleep after time moves forward an hour in the spring. Sleep deprivation affects a part of the brain called the prefrontal cortex which controls temporary memory, categorised thinking tasks, emotional responses and attention (Sharpe). I was convinced of this by the following description of DST's decisive impact on the body by Bora Zivkovic, who is a chronobiologist:

Every cell in our bodies contains a biological clock which coordinates the events in those cells—for example, when gene transcription turns on and off, or when specific proteins are made. When we are exposed to a light-dark cycle that is different from what we experienced the previous days, some types of cells synchronize to the new environmental cycle faster than the others. Cells in our eyes, for example, may adjust in about a day, while

cells in our brains take a couple of days. Cells in the digestive system and liver may take weeks. So, for weeks after the DST clock change, our bodies are like a clock shop in which each timepiece cuckoos at a different time of day—a cacophony of confusing signals (par. 11).

It not only bothers people a lot, but it is a serious problem. Our health is at risk!

The effects of DST have gone beyond the intended goals of the Department of Transportation, which were focused on commercial development. Creating more business should not be a reason for implementing DST. According to Gaski, the Department of Transportation recognizes that “safety is the number one priority of the Department and we are committed to improving safety of school children” (par. 11-1). The Department of Transportation must reconsider what is important to protect either businesses or people's health and safety. Thus, because DST doesn't save energy and actually creates problems in Indiana, we should get rid of DST, and let schools, businesses, and organizations adjust their own schedules individually if necessary.

This proposal may negatively impact some businesses. For example, for states which on Eastern Time have adopted DST, it might prove inconvenient that Indiana businesses open an hour later than businesses on Eastern Daylight Time (EDT). For someone on EDT, it may be necessary to wait an hour to before contacting business associates in Indiana. If the head office on EDT, then the Indiana branch would not be synchronized with their office hours. If this situation leads to loss of business, then the Indiana office could adjust its office hours to be sure to keep their profit. Businesses should be flexible about maintaining their profits. To take the action to change their business hours should be the company's decision.

Someone might suggest that Indiana should adopt Central Time, which would automatically put Indiana one hour behind Eastern Time even during DST. But to change the time zone is an even more difficult issue. It affects all businesses in Indiana, even those which do not benefit from DST. Also, DST is a state matter. Each state can exempt itself from observing DST by state law. Therefore, the decision is in each state's hands. Like Arizona, Indiana could opt out of DST.

To repeal DST in Indiana, people need to take action individually or through an organization. Write letters to describe our inconveniences and to provide evidence of the downside of DST to local papers, congressional representatives, or US Senators. Sign petitions for repealing DST. Fort Wayne is located in the third Congressional district of Indiana. We can email to our representative Marlin A. Stutzman through the following address <http://stutzman.house.gov/contacts/new>. It is just as time-consuming and takes just as much effort to repeal DST as to observe DST. We have to express our public opinion and deliver democracy in action.

Getting rid of DST brings more benefits than disadvantages. According to Fort Wayne Community School, students attend school 180 days throughout the year ("Fort Wayne Community Schools: 2013-14 Calendar"). By getting rid of DST, Indiana school children will get significant benefits. Assuming the time the school bus comes to pick up students is 7:30 a.m., the numbers of days when the school bus comes before sunrise will be reduced from 96 to 53 in Fort Wayne. In contrast to this, Chicago, New York, and Los Angeles do not have sunrise after 7:30 a.m. throughout the year (Fig. 1). We can reduce the chance of accidents due to darkness when they go to school. Furthermore, it is possible to reduce school costs. Gaski indicates that Indiana spends \$56 million on school

delay costs annually due to snow or fog. An hour school delay costs about \$10 per student (par. 9-6). If school starts an hour later, those costs can be reduced.

In the end, the Department of Transportation’s purposes are out of date and do not suit society anymore, especially in Indiana. DST does not achieve its purpose, so it seems pointless to execute DST. The reason to implement DST by the Department of Transportation and Indiana state seems that is focused on commercial development. Our lifestyle has become diverse and changed compare to two hundred or one hundred years ago. We constantly consume electricity, gas, and oils day and night. If energy saving is required as a nation policy, the Department of Energy should be devised for other than DST. All evidence suggests that DST is not good for human beings and causes serious problems of various kinds. It is a not natural thing to change the clock. The Department of Transportation should leave our clocks alone.

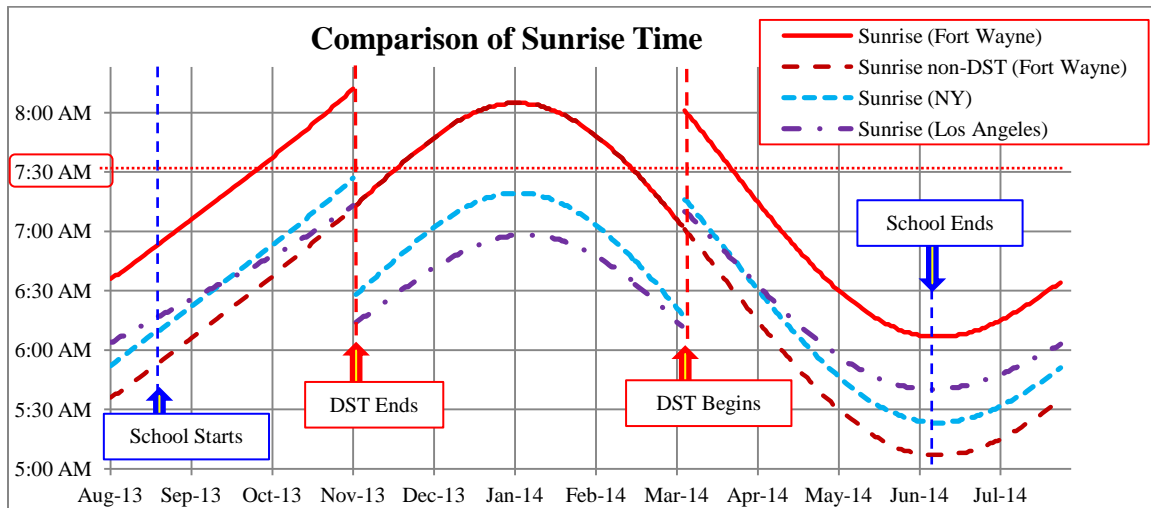


Figure 1. Comparison of Sunrise Time: Fort Wayne, New York, and Los Angeles (“Sunrise and sunset in Fort Wayne”)

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