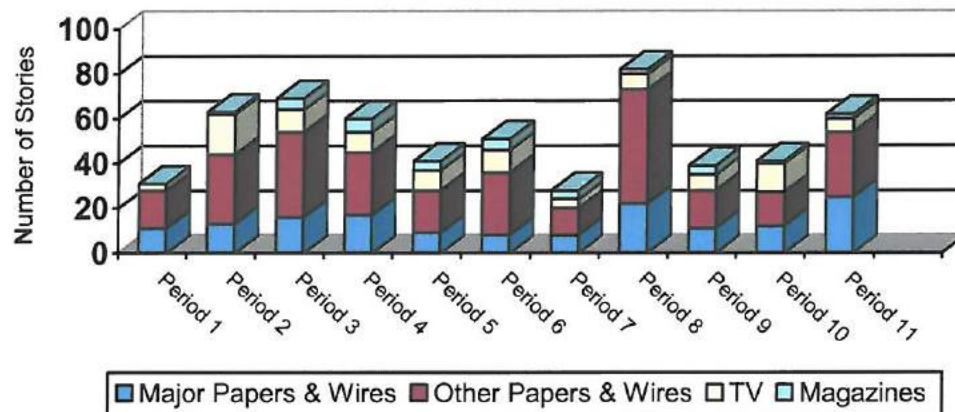


Amount and Distribution of Research Coverage

Of the 120 outlets we selected for analysis, 63 had coverage that appeared within our sample months and addressed health concerns surrounding sugar and/or HFCS. The other outlets had mentions of sugar or HFCS that did not connect to health concerns or effects.

Overall we coded 567 stories across all time periods and outlets. As can be seen in Figure 1, coverage varied across time and by type of media outlet.

Figure 1
Amount of Coverage by Media Type and Time Period



Six major sources of print coverage in the study – *Associated Press*, *New York Times*, *USA Today*, *Wall Street Journal*, *Washington Post* and *Huffington Post* -- accounted for just over a quarter of total coverage (27% or 152 stories). The other 44 newspapers and wire services accounted for precisely half of the coverage (50% or 285 stories). Television accounted for one-sixth of the coverage (17% or 96 stories), while the magazines supplied the remaining six percent (34 stories).

Coverage of the Research

While the coverage did ebb and flow over time, those shifts appeared unconnected to the research we were tracking. Only 22 stories mentioned any of the research presentation tracked in this analysis. Debates over soda taxes, bans on oversized sodas, the release of popular books, and other events were far bigger drivers of coverage than research presentations, despite the fact that we built our sample around the latter events.

Among the research presentations we tracked, the 2004 Bray, Nielsen and Popkin piece that kicked off the HFCS controversy a decade ago received by far the most attention with 11 mentions. Thus, the initial burst of publicity generated by the initial

appearance of this scientific controversy accounted for as much coverage as the ten later research presentations combined. In addition, this paper reaped the benefits of its longevity, being cited in later sample periods as well as in the immediate aftermath of its appearance.

It was not until 2013 that another study in our sample was mentioned in more than three news stories. This was the *JAMA* article by Page et al., which used fMRI data to assess the effects of glucose and fructose on cerebral blood flow. It generated six mentions, presumably aided by the visibility of the journal in which it appeared. Science reporters regularly follow releases from a few major journals of record such as *JAMA*, whose prestige signals newsworthiness to journalists. In addition, fMRI is a “hot” new research technique whose application to research on food “addiction” has caught the attention of the popular press.

Apart from the 2010 Bocarsly et al. study of HFCS and obesity in rats, which was cited three times, no other research presentation was mentioned more than once. Single mentions went to the 2012 study of global diabetes rates and HFCS consumption and the 2013 Bravo et al. study comparing the effects of sucrose and HFCS on weight. The latter was the only research covered in the media that questioned or refuted the presence of adverse health effects from HFCS.

The paucity of attention given to these research presentations belied our initial intention to pinpoint the rise and fall of coverage in the aftermath of each event. Whatever the dynamics of news coverage relating to heavily covered studies, they proved irrelevant to the research we examined. Nor did we find any relationship between the nature of the research event (either positing or questioning a relationship between sweeteners and health risks) and the overall amount of coverage during a given sample period.

However, it is worth noting that, during the ten study periods following the 2004 release of the pioneering *AJCN* article, there were ten mentions (91%) of the five research presentations that indicted HFCS for having adverse health effects, compared to one mention (9%) of the five research presentations that questioned such effects.

This pattern of findings suggests that research which initiates a scientific controversy with implications for the public health may draw the media’s attention, but follow-up research presentations have a much harder time generating any further news coverage. And in the case of the HFCS controversy, the coverage that did appear focused almost entirely on research that posited a health threat unique to this sweetener, to the exclusion of research that called that threat into question.

The Sweetener Debate

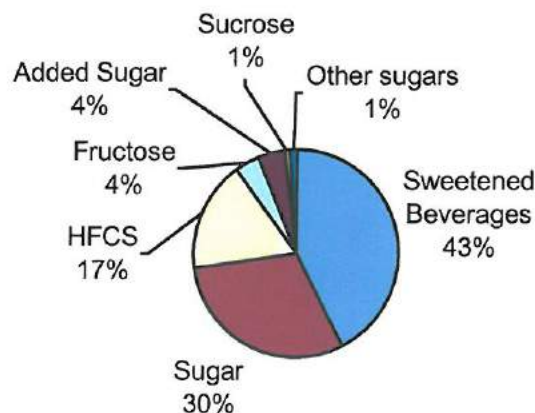
Although there was little coverage of the particular research events that formed the basis of our sampling strategy, there was no lack of news coverage of the health effects of nutritive sweeteners during the periods we examined. Driven by public concern over widespread obesity, this has been a long-running health story that continued throughout the past decade.

In order to capture the contours of the debate over HFCS and other caloric sweeteners, our content analysis separately examined each sentence in every story for any opinions or arguments on the health effects of nutritive sweeteners. When such opinions were found, researchers identified the sweetener under discussion as well as purported health effects and whether the comment supported or rejected such health claims. This section of the report first provides a general sketch of the media debate over caloric sweeteners and then delves deeper into the detailed pros and cons that were covered.

Dimensions of the Debate

As our analysis parsed each sentence looking for opinions on HFCS and other sweeteners, we identified 1,512 statements that assessed the health effects of one or more caloric sweeteners. There are numerous sweeteners in use in the American food industry. Media coverage reflects some of that diversity as well as journalists' desire for shorthand references in these debates. Because of this dynamic, the most common reference to caloric sweeteners in the stories we examined was "sweetened beverages" (see Figure 2).

Figure 2
Sweeteners Identified in Media Coverage



This broad reference was used 639 times or 42 percent of all opinions. This was followed by 456 references to "sugar" without specification (30 percent of the total).

Most often these references were seen in comments like “Americans eat too much sugar.” This is the journalistic term of choice for sucrose, and we follow that convention in this analysis. (Sucrose was mentioned by name in only one percent of the statements we analyzed.

Mentions of HFCS were found 256 times (17 percent of mentions). Specific references to fructose appeared 68 times. The phrase “added sugar” appeared 63 times while sucrose was specified 20 times. References to glucose and other specific sugars account for the remainder.

The problem with this classification, although it captures the media’s usage, is that all the terms are not commensurable. Specifically, all the terms save one refer to food ingredients. The exception is sweetened beverages, which are products that contain sweeteners as ingredients. By far the most frequently consumed sweetened beverages are sodas or soft drinks, and HFCS is the principal nutritive sweetener in sodas sold in the United States. So opinions about the health effects of soda are often unacknowledged opinions about the health effects of HFCS.

As a result of this complication, one could consider HFCS as constituting only about one-sixth of the debate over sweeteners, or (in combination with references to sweetened beverages) as accounting for three-fifths of the debate. Therefore, in comparing arguments about the health effects of various types of sweeteners, we treat references to HFCS and sweetened beverages separately, so that readers have the means to decide for themselves whether to consider them apart or in combination.

There were differences in the ways different types of media outlets used these terms can be seen in Table 2.

Table 2
Sweetener References by Media Type

| <i>Sweetener</i> | <i>Major Papers</i> (% of references) | <i>Other Papers</i> (% of references) | <i>TV</i> (% of references) | <i>Magazines</i> (% of references) |
|---------------------|--|--|--------------------------------|---------------------------------------|
| Sweetened beverages | 51% | 43% | 30% | 31% |
| Sugar | 22% | 32% | 35% | 37% |
| unspecified | | | | |
| HFCS | 19% | 16% | 20% | 10% |
| Fructose | 2% | 4% | 11% | 3% |
| Added Sugar | 5% | 3% | 3% | 15% |
| All others | 1% | 2% | 4% | 4% |
| <i>Total</i> | 100% | 100% | 100% | 100% |

There was little difference in the proportion of opinions about HFCS, suggesting that conclusions about the debate over its effects were generalized across media boundaries. Specifically, opinions were about equally common in major papers and on TV (19 and 20

percent respectively), with the smaller papers focusing only slightly less on this substance (16%) Magazines were least likely to reference HFCS (10 percent of arguments).

The consistency in the amount of attention given to HFCS did not extend to other sweeteners. For example, major newspapers were the most likely to use the term “sweetened beverages” (51%) in opinions about sweeteners, while TV news was the least likely to use the term at 30 percent of opinions. Magazines were most likely to contain unspecified references to sugar (37%), compared to just over one in five arguments in major papers (22%).

There were many different health effects linked to caloric sweeteners, ranging from weight gain and obesity to type II diabetes and from heart disease to dental cavities and depression. The most common concerns expressed were general unspecified health concerns (702 mentions or 46 percent of mentions). These included general admonitions like “it’s bad for you” or “to stay healthy avoid HFCS”. Following these general assertions were claims relating to the role of sweeteners in weight gain or obesity. Obesity was mentioned 278 times while concerns about weight gain appeared 227 times. These two concerns combined account for one third of the debate (33 percent).

Beyond these top three categories, attention to health effects fell off sharply. The effects of caloric sweeteners on Type II diabetes was found in 85 arguments (six percent), and concerns over heart disease appeared in 79 arguments (five percent). This was followed by an emerging concern that HFCS could interfere with the body’s hormones that help regulate feelings of satiety (32 mentions or two percent). Rounding out the top ten health concerns in the debate were claims of sugar addiction (26 mentions), tooth decay (16 mentions), cravings (16 mentions) and sugar’s effects on hyperactivity (15 mentions).

There were noticeable differences in which health concerns dominated in different types of media. Unspecified harms accounted for more than half (59%) of the debate in magazine coverage and just over half (51%) in secondary newspapers. In major newspapers unspecified harms accounted for just 36% of assertions, while concerns about weight and obesity took the lead role (48% combined). In magazine pages, concerns about weight and obesity accounted for only 16 percent of the debate. Discussions of diabetes reflected smaller differences across media types, accounting for nine percent of the debate in magazine coverage, versus a low of five percent in secondary papers. Heart disease and cardiovascular problems accounted for 10 percent of the debate on TV, but only three percent in the major papers.

Having identified the overall dimensions of the debate over the health effects of sweeteners, we now apply our analysis to the health effects of specific sweeteners. We begin with a portrait of the debate over HFCS, followed by similar depictions of other frequently debated categories of sweeteners. These include sweetened beverages, fructose, and unspecified sugars.