How do airbags work?

In 1969, *Popular Science* raved about a new-fangled invention called "air pillows," which promised to revolutionize car safety. But these pillows became hotly contested in the two decades that followed. Not because of the science behind them, but because of human psychology: Officials worried that the passive protection offered by these airbags would discourage people from buckling their seatbelts. As late as 1984, *PopSci* reported that airbags were still a rarity on the road: "Most auto makers strongly oppose installing air bags; only Mercedes currently offers one." Today they are ubiquitous, showing up in 190 million vehicles in the U.S..

The idea behind the airbag is to take advantage of the physics of a crash. In the case of a head-on collision, a car usually stops fast. The body of the driver, of course, doesn't. It follows Newton's second law: its momentum continues until an outside force (usually the steering wheel, dash board or windshield) brings it to a stop. An airbag doesn't just soften the blow. It actually lowers the impact by stretching it out over a longer period of time. It also spreads the impact over a larger area of the body. That way, no single area (forehead, chin, neck) bears the brunt of it. That's why airbags inflate and then quickly deflate—to gradually bring the driver's momentum from 60 mph to zero.

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