Changing Automobility: Is it Real?

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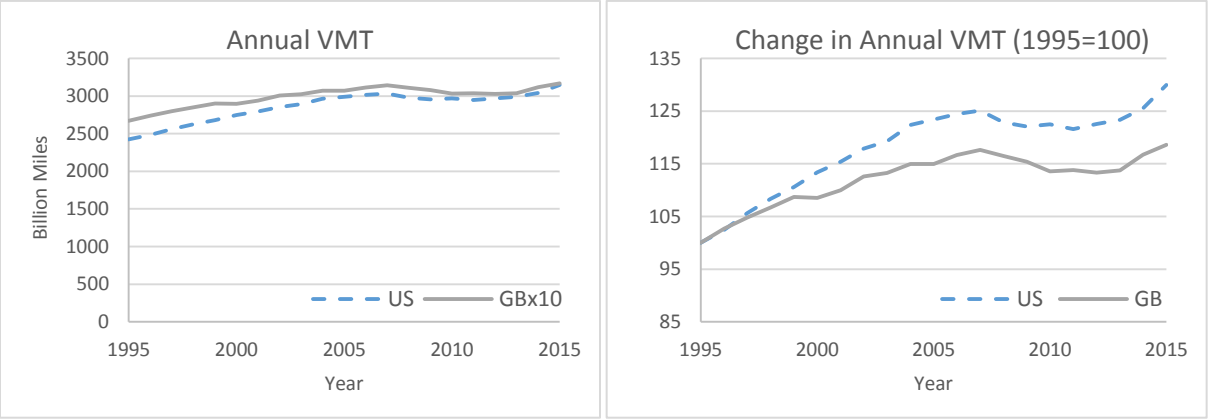
Planning for transport infrastructure requires estimates of future travel demand. For many decades, steady growth in travel led policymakers and planners to focus on how to provide sufficient transport supply to avoid congestion. However, over the past twenty years trends have caused many in industrialized countries to ask if we are experiencing shifts in travel behavior that require new ways of thinking about travel demand and infrastructure investment.

Is Auto Use Declining?

The short answer is yes. Government traffic count data from the US and UK show that aggregate annual VMT dropped year on year starting in 2007 (Figure 1). This trend continued until 2013. In the US and UK, aggregate road travel has now exceeded pre-global financial crisis levels.

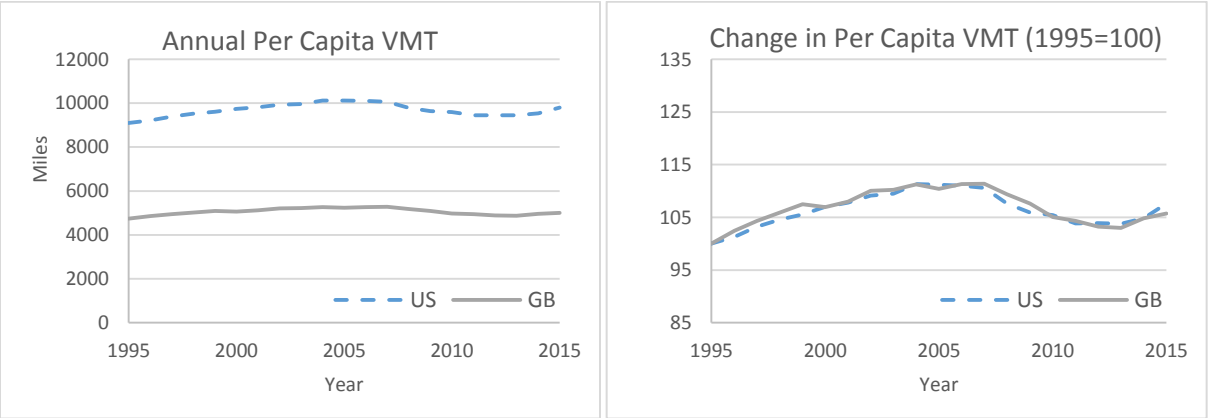
Figure 1: Aggregate Vehicle Miles of Travel (All Sources), United States and Great Britain



Source: Traffic Volume Trends, FHWA; Table TRA0101, UK Department for Transport

Aggregate trends are sensitive to population growth. Per capita VMT estimates from traffic count data show driving peaking in 2004, dropping through 2013, and, more recently, growing (Figure 2).

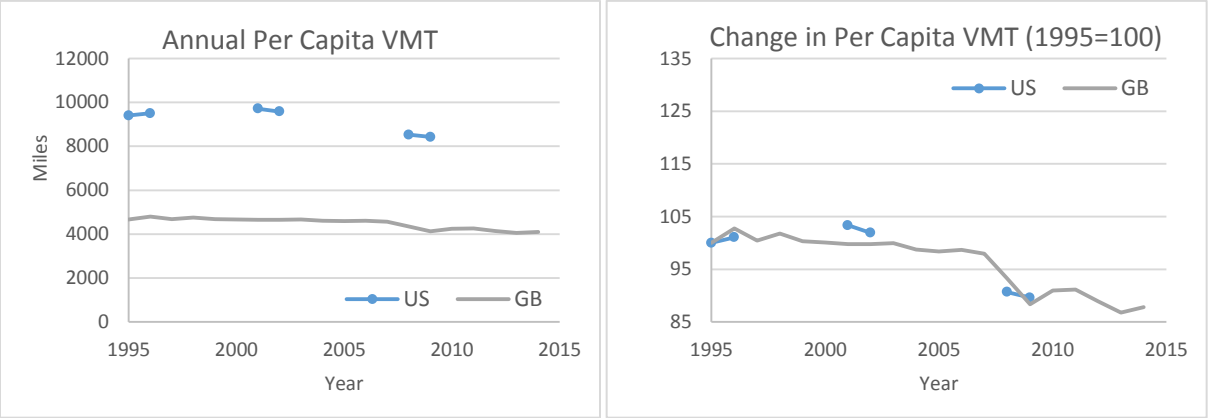
Figure 2: Per Capita Vehicle Miles of Travel (All Sources), United States and Great Britain



Source: Traffic Volume Trends, US FHWA; US Census Bureau; Table TRA0101, UK Department for Transport; UK Office for National Statistics

Government statistics from traffic counts include all types of vehicles and purposes from personal travel to commercial. This is an important because national travel surveys in the US and UK of *personal* travel reveal different patterns than the traffic count data. These sources show that travel was at its highest in the late 1990s and has declined since then. Drops during the GFC were particularly sharp, but these sources reveal stagnant to declining personal travel from 1995 to 2007 – a pattern in contrast to the data in Figure 2 which reflects all vehicles on the road. This suggests sharp increases in light and heavy goods traffic as opposed to personal travel fueled the growth in roadway traffic volumes during the late 1990s and early 2000s and may be an important part of increases in recent years.

Figure 3: Annual Per Capita VMT Ages 16+, Personal Travel, United States and England

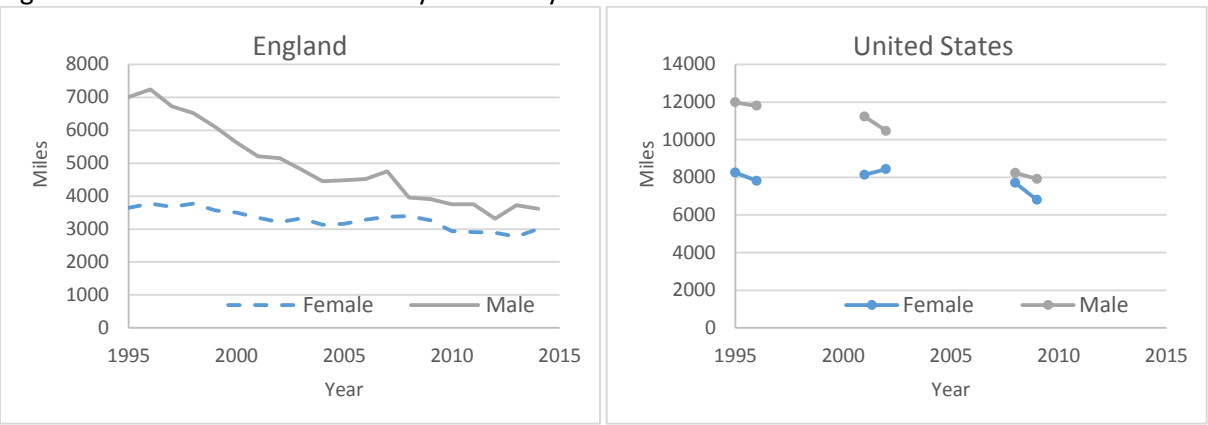


Source: US National Household Survey; UK National Travel Survey
Note: For England data, years prior to 2002 are 3-year averages.

It Looks Like Demand Is Increasing Again, Do We Really Need to Worry About Changing Behavior?
I would argue the answer is yes. First, the data for the past 15 to 20 years show that patterns for personal travel and freight are potentially running in opposite directions. This is concerning because we expend more effort understanding and modeling personal travel. But economic restructuring, particularly new patterns of distribution, warehousing, and shopping has and will continue to reshape travel so these differences are more likely to increase than decrease.

Second, analyses of change in personal travel have revealed sharp gender and generational differences. Understanding these changes is critical to developing robust strategies for estimating demand and planning long-term infrastructure. In short, the decreases in driving are most apparent among young men. 18 to 30 year olds males in the England in 2014 drove half as many miles annually as their predecessors in 1995 (Figure 4). Mileage dropped for women (as well as older generations), but the declines were substantially smaller in percentage and absolute terms.

Figure 4: Personal Travel for 18-30 year olds by Sex



Source: US National Household Survey; UK National Travel Survey

What explains the declines in driving?

Much ink has been spilled on this question, but there is not agreement among researchers. Being simplistic, I see two major strands of work. The first focuses on economic explanations for changing automobility including the global financial crisis and its attendant decreases in employment and wages, increased personal debt (particularly student debt in the US), and petrol prices. The tag line for this set of analyses has been 'It's the economy, stupid.' In other words, drops in driving are behavioral blips that will return to normal once the economy recovers, particularly if gas prices remain low.

The second set of work (which is where I would situate myself) acknowledges the importance of economic factors but argues they do not fully explain observed declines. My work and others has shown that after accounting for economic and demographic variables, young adults still experienced larger declines in travel than older groups. Identifying factors contributing to declines has been difficult but the answers range from residential location, gender roles, congestion, and mobility preferences.

Related to both approaches has been general acknowledgement of lifestage delay – that is the idea that what it means to be a young adult continues to evolve and is now quite different than it was 20 years ago. Age at first marriage and first child continue to increase (as they have been doing since World War II) (Vespa 2017). Young adults are also more likely to be enrolled in higher education and more likely to be living at home than predecessors (Vespa 2017). These demographic changes are quite important because how much we travel is determined by what we need to do. For example, parents engage in additional travel to get their children to activities and destinations.

The next three sections very briefly summarize some of the key findings behind each perspective.

It's the Economy, Stupid

Analyses by Manville, et al (2017) and Bastian, et al (2016) show strong historical links between GDP and VMT. Bastian, et al (2016) show that simple models using only per capita GDP and petrol prices do a good job of predicting VKT per capita using country-level data from the US, UK, France and Sweden among others. Manville et al (2017) show that since 1995 VMT has been better correlated with median household income as opposed to per capita GDP. Their explanation is that increases in GDP have been increasingly benefitting a small share of the population due to income inequality and that therefore

these recent increases in GDP have not led to increased travel. Blumenberg, et al (2016) use US travel survey data to conclude that employment is the most critical factor in daily travel.

Taken together this literature presents a compelling portrait of the importance of economic variables on travel behavior and on the differences in studying aggregate versus individual behavior. Most studies of individuals, such as Blumenberg, et al (2016) or McDonald (2015) fail to include petrol prices; aggregate studies cannot provide insights into behavioral heterogeneity. These analyses also point to the difficulties of using travel survey data to study change over time. For example, Blumenberg, et al (2016) conclude that "declining employment contributed significantly to the decline in youth travel." While there is clearly a relationship, the individual-level models available to the researchers do not allow estimation of the effects of changes in the unemployment rates on driving.

It's the Millennials, But Don't Worry They'll Start Acting 'Normal'

Several studies acknowledge large changes in the behavior of young adults as reflected in lower licensure, auto ownership, and driving (McDonald, 2015; Blumenberg, et al, 2016; Delbosc and Currie, 2013; Kuhnimhof, et al, 2013). Long-term demographic trends around delays in attaining lifestage milestones such as employment, establishing a household, partnering, and raising children mean that the lifestage of young adults is different from those a generation ago. Having children or being employed often require certain types of travel such as commuting and escorting children. If fewer young adults have these characteristics, it is unsurprising that their travel is lower.

Researchers have shown that the travel behavior of millennials becomes more like that of previous generations over time. A Dutch report aptly captured this sentiment stating "It's not car now, it's car later" (Ministry of Infrastructure and Environment, 2014). Garikapati, et al (2016) studied US millennials and found that as they age, their travel begins to resemble that of previous generations though they continue to drive less than previous cohorts. Yet I'm not sure that this convergence to the travel of previous generations suggests what many of its authors conclude, i.e. that observed decrease in travel are a blip. Almost by definition auto use is likely to rise for millennials because as they age their incomes are rising, albeit slowly, they are forming households and becoming parents. In auto-oriented societies, these activities are hard to accomplish without driving more.

To me the real question is how tomorrow's twenty-something will behave. We have 50 years of data showing delays in lifestage attainment among young adults coupled with employment forecasts that are less than sanguine about the employment prospects of young adults (Vespa, 2017; Kalleberg, 2011). Given this, I suspect that future young adults will continue to exhibit lower levels of automobility than their counterparts in the 1990s. I suspect that the auto travel of young adults, particularly males, will remain diminished into the future and that this has important implications for infrastructure and social policy.

It's All of These Things, Plus Other Things We Should Think About More

As I noted earlier, I think the explanations of declining automobility are complex and that economic and demographic changes alone do not explain everything – though they are really important. My own work showed that roughly half of the decrease in Millennial travel is explained by traditional economic and demographic variables (McDonald, 2015) – a result replicated by a recent NCHRP study of youth mobility (RSG, Inc, et al, 2017). What other factors might have contributed to the observed declines in millennial driving? The list is long. First we have factors which affect our need to travel. The advent of the internet has reorganized how most of us shop, work, and interact. Despite these large changes, it has been difficult to determine whether the internet acts as a complement or substitute. For example,

working remotely eliminates the commute but appears to increase local travel (Kim, et al, 2015). The nature of these relationships in young adults is not clear.

Second, we have many changes which affect the cost and availability of different modes. These changes range from changing congestion levels to drivers licensing regulations to taxation of company cars. In the UK, changes in company car taxation have made companies less likely to provide this perk (Le Vine, et al, 2013). In practice, this has likely raised the costs of driving for individuals working in sectors that previously provided this benefit. Increasing congestion in many metropolitan areas may also be linked to increases in the costs of driving (due to increased travel times) or changes in residential location patterns. Vij, et al (2017) investigated the effects of changing levels of service and concluded that in the San Francisco Bay Area worsening congestion did not contribute significantly to shifts away from driving. However, the issue has not been thoroughly investigated. Graduated Driver License programs in the US have increased the requirements for those under 18 to receive a license and may be linked to lower levels of licensure as adults. Studies in the US have not found a connection between GDL and decreased driving (Blumenberg, et al, 2016).

The third factor that has been identified as contributing to decreased driving are changing attitudes to travel generally and cars in particular. Some posit that the car is no longer a status symbol having been replaced by smartphones. Evaluating this is difficult, but recent work by RSG, Inc et al (2016) shows lower auto orientation among Millennials compared to older adults. Vij, et al (2017) looked at changing travel behavior in the San Francisco Bay Area and found shifting modal preferences to be the most credible explanation of change over time.

Finally, the topic of constrained purchasing power due to debt or high housing costs has been identified as a possible cause of declining mobility. The logic is that high debt levels mean that millennials – even at comparable incomes – have less money available than previous generations. Manville et al (2017) cite a 200% increase in per capita student debt from 2004 to 2013. This same logic could apply to housing costs. While many millennials have boomeranged back to their parents (Vespa, 2017), those that have established households in metropolitan areas have faced rising rents (Dewan, 2014). While this is an economic variable, it is one missing from most travel surveys and analyses.

Conclusion

Tripmaking has changed in the past twenty years in ways that challenge our current models of transport infrastructure planning. We have observed decreases in personal travel, particularly those of young men, and divergence between personal and all other sources of travel. Changes in the economy and lifestyles are responsible for some of these declines, and there are good reasons to expect many of those trends to continue. But these factors do not fully explain observed changes nor the gendered structure of the change in travel.

Acknowledging the multiple influences on behavior is important because we stand at a time where technology shows the potential to reshape aspects of what we do (work, shop, connect) and how we travel. In cities, individuals already have access to on-demand private transit options at price points competitive with auto ownership. In the future, automated vehicles promise a new set of travel alternatives. This unknown future is now within our planning horizon and challenges us to think carefully about how to estimate demand and uncertainty.

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