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Are Millennials Really the "Go-Nowhere" Generation?

Noreen C. McDonald

Problem, research strategy, and findings: News reports and academic articles contend that Millennials (those born in the last two decades of the 20th century) are different from earlier generations in their consumption and travel patterns. This article investigates the travel behavior of young American adults and compares the behavior of Millennials with those of previous generations using data from the 1995, 2001, and 2009 National Household Travel Surveys. The analysis uses descriptive statistics to profile trends and regression models to identify the factors associated with decreased travel by Millennials. In fact, automobility declines for all Americans between 1995 and 2009, but the drops are largest for Millennials and younger members of Generation X starting in the late 1990s. Decreases in driving are not compensated by increases in the use of other modes for travel, nor do decreased trip distances explain the downturn in automobility. Among young adults, lifestyle-related demographic shifts, including decreased employment, explain 10% to 25% of the decrease in driving; Millennial-specific factors such as changing attitudes and use of virtual mobility (online shopping, social media) explain 35% to 50% of the drop in driving; and the general dampening of travel demand that occurred across all age groups accounts for the remaining 40%.
Takeaway for practice: These changes highlight two challenges to planners and policymakers: managing increases in automobility as Millennials age and their economic fortunes improve, and developing improved planning processes that deal robustly with the uncertain future presented by Millennials who may continue to make very different travel choices than comparable people did in the past.

Since the invention of the car, increased rates of automobile travel have been a consistent narrative across the globe. But in recent years this trend has slowed and even reversed, especially among teens and young adults in developed countries. "Millennials"—people born in the last two decades of the 20th century—are less likely to be licensed drivers, and even those with licenses drive less than comparable cohorts a few years ahead. The Millennials have even been dubbed the "go-nowhere" generation (Buchholz & Buchholz, 2012). These patterns have been documented in the United States and across industrialized countries (Kuhnimhof et al., 2012). The shift in the travel of Millennials has been linked to the larger pattern of plateauing travel demand known as *peak travel*. Moreover, early analyses suggest the trends are not simply a byproduct of the Great Recession (Goodwin & Van Dender, 2013; Kuhnimhof, et al., 2012; Metz, 2013; Millard-Ball & Schipper, 2011).

Two theories explain the observed decrease in automobility among 20-somethings today. The first theory emphasizes attitudes; declining driving is evidence that Millennials prefer living in urban areas well served by multiple travel modes and virtual connectivity. The second theory focuses on demographic and economic factors, noting that Millennials have different lifestyles from previous generations as evidenced by their lower rates of employment, marriage, and parenthood.

In this study, I analyze travel patterns in the United States over the past two decades. The results confirm the previously reported declines in auto use but show little evidence of increased use of sustainable travel modes. In the United States, decreases in auto travel have not been compensated by upticks in other modes. If not going nowhere, the Millennials are clearly not going as many places as previous generations. Among young adults, lifestyle-related demographic shifts between Millennials and Generation X (those born in the late 1960s to the late 1970s) account for 10% to 25% of the observed decrease in automobility, while Millennial-specific factors such as differing attitudes to mobility account for 35%

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to 50% of the observed decrease in auto use. The remaining 40% of the decline is linked to the general dampening of auto usage in the late 2000s that affected all Americans.

Millennials are now the largest portion of the U.S. population, numbering 75 million in 2015; their decisions will strongly influence the structure and function of urban regions for decades to come. Recent changes in automobility raise two issues for policymakers and planners. First, the mobility requirements of Millennials will rise as rates of employment, partnering, and parenthood increase. Policymakers must respond with supportive travel demand management strategies that encourage Millennials to either continue or consciously adopt low automobility practices as their travel needs increase. Second, uncertainty over the future trajectory of the travel of Millennials needs to be recognized in the long-range transportation planning process. Practitioners can use scenario planning to understand how transport needs shift if Millennials continue to use automobiles less than previous generations versus rapidly increasing auto usage.

Landscape: Trends in Mobility

A growing academic literature indicates that Millennials have different licensure and travel patterns than previous generations. Transnational comparisons of licensure have found that the proportion of young adults with driver licenses has decreased considerably in the past 25 years, and that the declines may be largest for men (Delbosc & Currie, 2013; Kuhnimhof et al., 2012; Sivak & Schoettle, 2011). U.S. Federal Highway Administration (FHWA) statistics show licensure among 20- to 24-year-olds declined from 87% in 1994 to 78% in 2013, with declines of similar magnitudes for 25- to 35-year-olds (FHWA, 1994, 2015).[1] Reports of declining licensure are not unique to the United States. Sivak and Schoettle (2012) report decreases in Great Britain, Canada, Germany, Norway, Japan, Sweden, and South Korea; Delbosc and Currie (2013) document declines in Australia.

Given these licensure trends, it is not surprising that studies show decreased vehicle usage by young adults across industrialized countries (Blumenberg et al., 2012; Frändberg & Vilhelmson, 2014; Kuhnimhof et al., 2012; Ministry of Infrastructure and the Environment, 2014; Polzin, Chu, and Godfrey, 2014). Kuhnimhof et al. (2012) find that automobility among 20- to 29-year-olds peaked in the early 2000s in the United States, Germany, United Kingdom, Norway, and France, and has been stable in Japan since the mid-1980s. The same study notes evidence of increased multimodality among 20-somethings in Germany and the United Kingdom. Studies have found that declines in automobility are larger for men than women (Kuhnimhof et al., 2012).

Explanations of Changing Mobility Patterns

Why have licensure and automobility decreased across multiple industrialized countries? Two narratives or theories explain these empirical observations (Hopkins & Stephenson, 2014; Ministry of Infrastructure and the Environment, 2014; Polzin et al., 2014). The first narrative focuses on lifestyle differences between today's 20-somethings and previous generations at the same ages. Millennials are more likely to be in school and less likely to be employed, married, or parents (Furstenberg, 2010; Pendall, 2012). For example, 28% of Millennials (aged 18 to 33 in 2014) were married compared with 38% of Generation Xers at the same age in 1998 (Pew Research Center, 2014). Similarly, 30% of male Millennials were unemployed or not in the paid labor force in 2014 compared with 20% for male Generation Xers in 1998 (Pew Research Center, 2014).

This theory suggests that mobility and licensure have declined among 20-somethings because students, the unemployed, or childless individuals have lesser travel needs. A corollary of this explanation is that as individuals become employed, partnered, and have children, their travel needs will increase, but at a later age than previous generations. As a recent report from the Dutch government notes, the phenomenon is "not car-less, but car-later" (Ministry of Infrastructure and the Environment, 2014).

A second—or alternative—narrative is that the Millennial generation has different mobility and residential preferences and attitudes than previous generations. Newspaper articles, as well as industry and advocacy group reports, suggest that young adults favor living in major cities where cars are less necessary because destinations are accessible by transit, walking, and bicycling (Buchholz & Buchholz, 2012; Florida, 2010; Kalita & Whelan, 2011; Thompson & Weissmann, 2012; Toppo & Overberg, 2013). Unlike previous generations of young adults, cars may no longer be the singular symbol of freedom. Smartphones arguably provide as much—if not more—freedom than the car, offering instantaneous access to information, family, friends, and other contacts (Lyons, 2015; Thompson & Weissmann, 2012). Lyons (2015) and van Wee (2015) argue that technology may be reshaping transport needs, and that these changes are only becoming apparent with Millennials, who are digital natives.

In the United States, graduated driver licensing (GDL) laws have been identified as a potential cause of declining licensure because they limit when teens can drive and with

whom (Master, Foss, & Marshall, 2011; McCartt, Teoh, Fields, Braitman, & Hellinga, 2010). Nearly all states implemented GDL programs between 1996 and 2006, overlapping the period of declining licensure (Williams, McCartt, & Sims, 2015). However, surveys of unlicensed young adults have identified the financial costs of licensure and auto ownership as well as satisfaction with modal alternatives to the car as explanations for decreasing licensure rather than administrative burdens associated with GDL (Tefft, Williams, & Grabowski, 2014; Williams, 2011). Similarly, analyses by Blumenberg and colleagues (2012) suggest that GDL affects when teens are licensed and how much they drive as teens, but the effects attenuate with increasing age.

Measuring Shifts in Millennial Mobility

In this study, I attempt to measure the shifts in automobility among the Millennial generation in the United States and assess which of the narratives or theories described here explains the observed travel patterns. I evaluate changes in automobility by calculating average daily auto trips and auto miles using nationally representative travel behavior data from the U.S. Department of Transportation's National Household Travel Survey (NHTS) from 1995, 2001, and 2009.[2] Further details on the survey are available in the Technical Appendix.

I define Millennials as those born between 1979 and 1990; in 2009, these individuals were between 19 and 30 years old. Within this cohort of 20-somethings, I separately analyze the behavior of younger (19–24) and older (25–30) Millennials because the two groups are likely to be in different life stages. To separate cohort-specific effects from period effects that affect all ages, I compare the behavior of Millennials to that of Generation Xers (born between 1967 and 1978) who were aged 31 to 36 (younger Gen X) and 37 to 42 (older Gen X) in 2009. I include individuals in the analysis if they are between the ages of 19 and 42; provide complete information on trip distance, purpose, mode, and licensure; and are not traveling out of the country or local area on the survey day. I exclude from the analysis individuals whose total daily auto mileage was above the 99th percentile (approximately 300 miles per day) because the mean can be skewed upwards by the inclusion of extreme high values, thus making comparisons unreliable. The final sample sizes are 31,490 in 1995, 41,902 in 2001, and 47,805 in 2009 (see the Technical Appendix for detailed description of inclusion criteria). I use survey weights to calculate average values to adjust for non-response and produce nationally representative statistics.

As described above, there are two major theories to explain the observed decreases in the travel behavior of Millennials compared with older generations. The key difference between these narratives is their prediction of how a Millennial would travel compared with a comparably situated Gen Xer at the same age. The first explanation suggests that individuals facing similar circumstances would have similar travel patterns in either generation. In contrast, the second explanation suggests that Millennials would travel less than comparably situated members of Gen X due to differing attitudes and preferences.

I exploit these different predictions to test which of the two theories explains observed behavior using descriptive statistics to analyze whether changes in demographic and economic factors explain observed travel changes. For example, if the decrease in household formation among Millennials explains changes in travel behavior, then auto travel for Millennials that had formed their own households (in 2009) would be similar to auto travel for Gen Xers that had formed their own households when they were 19 to 30 years old (in 1995). Because secular trends or macroeconomic shocks such as the Great Recession affect trip making, I compare the changes between 1995 and 2009 among 19- to 30-year-olds with those experienced by older age groups.

I use regression models, which are fully described in the Technical Appendix, to confirm the results of the descriptive analysis and assess the relative contribution of three factors to changes in automobility: 1) demographic shifts related to lifestyle changes across generations; 2) changes over time that affected all age groups (e.g., increases in the cost of driving); and 3) changes over time that affected only younger generations (e.g., differential uptake of online interaction and changing attitudes to mobility).

Travel Trends: Decreasing Licensure and Automobility

As Table 1 shows, Millennials in 2009 have lower levels of licensure and automobility than members of Gen X at the same age. Changes in licensure are most apparent among older Millennials aged 25 to 30, who are five percentage points less likely to report being drivers than the same age group in 1995.[3] Other age groupings do not show large shifts in licensure. Automobile travel as both driver and passenger declines across all age groups from 1995 to 2009, but the decreases are largest for 19- to 36-year-olds.

Table 1. Driver status, auto trips, and auto mileage by age group and survey year.

Age, years	1995	2001	2009	Change (09:95)	*t*	*p* value
Driver						
19–24	0.88	0.87	0.87	–0.01	–0.72	0.470
25–30	0.93	0.93	0.88	–0.05	–4.96	<0.001
31–36	0.95	0.95	0.93	–0.01	–2.02	0.043
37–42	0.95	0.96	0.95	0.00	–0.15	0.882
Number of daily auto trips						
19–24	4.0	3.7	3.2	–0.9	–9.20	<0.001
25–30	4.2	3.8	3.2	–1.0	–10.86	<0.001
31–36	4.4	4.0	3.6	–0.8	–10.49	<0.001
37–42	4.5	4.4	3.8	–0.7	–8.44	<0.001
Daily auto miles traveled						
19–24	37.1	35.4	29.9	–7.3	–5.24	<0.001
25–30	39.6	36.8	31.8	–7.7	–4.70	<0.001
31–36	39.2	39.6	33.1	–6.2	–5.12	<0.001
37–42	38.5	40.6	35.6	–2.9	–2.80	0.005

These data confirm previous research on Millennial travel that show evidence of declining automobility. However, this analysis finds that auto mileage peaked in 1995 for 19- to 30-year-olds, which is earlier than indicated by previous studies (Kuhnimhof et al. 2012). This means that younger members of Gen X also exhibited declining automobility when they were in their twenties. Contrary to most reports, the decrease in automobility is not exclusive to the Millennial generation.

Decreased auto mileage, however, results from making fewer trips rather than traveling shorter distances on each trip. Average auto trip lengths are steady or even modestly increasing from 1995 to 2009. For example, the average auto trip made by 25- to 30-year-olds is 9.4 miles in 1995 and increases to 10.0 miles in 2009. As Table 2 shows, the decrease in automobility results from declines in three trip purposes: work, personal business, and social and recreation trips. Miles traveled by auto for personal business decrease by 45% among 19- to 24-year-olds, 30% for 25- to 30-year-olds, and 25% for 31- to 36-year-olds. Work mileage decreases by 15% to 25% for 19- to 36-year-olds but only 8% for 37- to 42-year-olds.

Table 2. Daily auto mileage by trip purpose and age group.

Age, years	1995	2001	2009	Change (09:95)	*t*	*p* value
Work						
19–24	11.5	12.2	9.6	–1.9	–2.95	0.003
25–30	16.4	13.9	12.3	–4.1	–4.71	<0.001
31–36	15.3	14.9	13.0	–2.3	–3.53	<0.001
37–42	16.0	15.3	14.7	–1.3	–1.77	0.076
Social/recreation						
19–24	12.0	10.5	8.9	–3.1	–3.35	0.001
25–30	10.0	9.1	8.1	–1.9	–1.81	0.070
31–36	9.2	8.6	7.7	–1.6	–2.33	0.020
37–42	8.0	9.5	7.9	–0.1	–0.15	0.879
Personal business						
19–24	7.5	5.9	4.1	–3.4	–6.50	<0.001
25–30	7.7	7.8	5.4	–2.4	–4.45	<0.001
31–36	9.1	8.9	6.8	–2.3	–3.83	<0.001
37–42	8.7	9.3	6.9	–1.8	–4.43	<0.001
Shopping						
19–24	3.9	4.2	4.2	0.3	0.75	0.451
25–30	4.9	5.0	4.9	0.0	–0.02	0.981
31–36	5.6	5.9	5.5	–0.1	–0.28	0.781
37–42	5.2	5.5	5.1	–0.1	–0.28	0.776
School/church						
19–24	3.5	3.4	4.1	0.6	1.20	0.232
25–30	1.5	1.4	1.5	0.0	0.18	0.854
31–36	1.0	1.4	1.0	0.0	0.07	0.946
37–42	1.2	1.4	1.4	0.2	0.85	0.393
Other						
19–24	0.4	0.5	0.7	0.3	1.29	0.198
25–30	0.3	0.9	1.0	0.8	2.32	0.021
31–36	0.3	0.9	1.1	0.8	2.24	0.025
37–42	0.3	0.9	1.0	0.7	3.43	0.001

Increasing Multimodality?

A common explanation for shifts in Millennial travel is that today's young adults prefer urban areas with travel options that reduce their reliance on the auto. While auto use decreased sharply, there is little evidence of increased use of other modes. As Table 3 illustrates, average daily transit trips increase very modestly with less than 0.05 trips per day from 1995 to 2009 for all age groups. There is a modest increase in reported walking and bicycling for young adults as well as older Americans. However, increases in walking likely reflect changes to the survey methodology between 1995 and 2001 designed to elicit reports of more pedestrian trips (which had been overlooked or forgotten previously) rather than a behaviorally significant change (FHWA, 2011). Focusing on changes between 2001 and 2009 (to minimize the impact of

Table 3. Non-auto daily trips by age group and survey year.

Age, years	1995	2001	2009	Change (09:95)	*t*	*p* value
Transit						
19–24	0.10	0.11	0.11	0.01	0.78	0.435
25–30	0.09	0.10	0.10	0.01	0.58	0.559
31–36	0.07	0.07	0.11	0.04	2.72	0.007
37–42	0.08	0.07	0.09	0.01	0.41	0.684
Walk/bike						
19–24	0.25	0.35	0.35	0.10	3.47	0.001
25–30	0.24	0.40	0.48	0.24	6.98	<0.001
31–36	0.21	0.37	0.53	0.32	9.05	<0.001
37–42	0.19	0.32	0.43	0.24	10.06	<0.001
Other						
19–24	0.02	0.02	0.04	0.01	1.27	0.204
25–30	0.02	0.01	0.01	–0.01	–0.91	0.363
31–36	0.02	0.01	0.03	0.01	0.93	0.352
37–42	0.02	0.02	0.02	0.00	0.39	0.693

changes in survey methodology), the observed increase is approximately 0.1 walking and bicycling trips per day.

What Factors Explain the Observed Decreases in Automobility?

Our analysis demonstrates that both of the theories about the causes of the decline in driving among Millennials are true: Declining travel is due to changing attitudes and perspectives about driving as well as lifestyle changes such as increased schooling, decreased employment, and delay in marriage and childbearing.

Lifestyle-Related Demographic Shifts

Twenty-somethings today are different from those in 1995. As Table 4 shows, among 25- to 30-year-olds, the proportion with college degrees increases by 4 percentage points, employment declines by 9 points, household formation declines by 16 points, and living in urban areas increases by 9 points between 1995 and 2009. These shifts are linked to decreased automobility because there has been growth in groups who travel less. Unemployed individuals drive less than those who are employed; people in urban areas drive less than those in rural areas; and people living with parents drive less than those that have formed their own households. However, shifts are not limited to 20-somethings. As Table 4 shows, there are significant changes in demographic characteristics across all age groups.

Table 4. Sociodemographic characteristics by age group and survey year.

Age, years	1995	2001	2009	Change (09:95)	*t*	*p* value
College graduate						
19–24	14%	12%	14%	0	0.23	0.820
25–30	31	35	34	4	2.41	0.016
31–36	31	36	45	13	9.41	<0.001
37–42	32	33	42	11	9.20	<0.001
Employed						
19–24	76	81	70	–6	–3.94	<0.001
25–30	82	85	73	–9	–6.05	<0.001
31–36	84	84	79	–5	–5.12	<0.001
37–42	85	85	81	–4	–4.89	<0.001
Formed household[a]						
19–24	48	48	20	–28	–16.40	<0.001
25–30	84	83	68	–16	–10.23	<0.001
31–36	92	89	85	–7	–7.16	<0.001
37–42	94	92	90	–4	–4.65	<0.001
Parent						
19–24	21	22	14	–7	–4.48	<0.001
25–30	46	50	47	1	0.47	0.642
31–36	67	69	70	3	1.72	0.085
37–42	70	71	72	2	1.64	0.101
Lives in urban area						
19–24	69	82	75	7	4.04	<0.001
25–30	69	82	77	9	5.21	<0.001
31–36	65	79	77	13	9.23	<0.001
37–42	61	78	76	15	11.97	<0.001

Note: a. Defined as not living with parents or other older (non-sibling) relative.

Change Over Time Independent of Demographic Shifts

Demographic shifts related to lifestyle do not fully explain the pattern of decreasing automobility. Auto travel decreases even when controlling for sociodemographic characteristics, and these declines occur across all age groups. Table 5 shows that unemployed 19- to 24-year-olds drove 6.1 fewer miles in 2009 than in 1995; unemployed 37- to 42-year-olds experienced a drop of 2.9 miles during the same period. Patterns are similar by educational attainment. Among 25- to 30-year-olds without a college degree, driving declined by 6.5 miles; for 25- to 30-year-olds with a college degree, it declined by 10.4 miles. As Table 5

Table 5. Daily automobile mileage for comparably situated individuals by survey year and age group.

Age, years	1995	2001	2009	Change (09:95)	*t*	*p* value
High school or some college						
19–24	36.1	34.4	30.1	–6.0	–4.10	<0.001
25–30	37.9	35.8	31.4	–6.5	–2.95	0.003
31–36	38.2	38.8	31.6	–6.6	–4.58	<0.001
37–42	37.1	40.1	33.9	–3.2	–2.45	0.014
College degree						
19–24	44.1	43.0	29.7	–14.4	–3.09	0.002
25–30	43.6	38.8	33.1	–10.4	–4.67	<0.001
31–36	41.7	41.2	35.1	–6.6	–3.34	0.001
37–42	41.8	41.6	38.0	–3.8	–2.23	0.026
Not employed						
19–24	29.8	28.0	23.7	–6.1	–2.65	0.008
25–30	26.2	27.8	22.5	–3.7	–1.29	0.197
31–36	28.6	31.8	23.9	–4.6	–2.06	0.040
37–42	27.4	32.6	24.5	–2.9	–1.44	0.151
Employed						
19–24	39.5	37.2	32.5	–7.0	–4.05	<0.001
25–30	42.4	38.4	35.3	–7.1	–3.81	<0.001
31–36	41.2	41.1	35.5	–5.7	–4.38	<0.001
37–42	40.4	41.9	38.2	–2.2	–1.99	0.047
Living with parents						
19–24	35.9	35.2	29.2	–6.7	–4.57	<0.001
25–30	37.5	36.5	31.3	–6.2	–2.65	0.008
31–36	29.8	31.7	31.1	1.3	0.44	0.659
37–42	27.2	37.5	29.6	2.3	0.67	0.503
Formed household						
19–24	38.4	35.7	32.5	–5.9	–2.04	0.041
25–30	40.0	36.9	32.1	–7.9	–3.66	<0.001
31–36	40.1	40.5	33.4	–6.7	–5.08	<0.001
37–42	39.2	40.8	36.3	–2.9	–2.76	0.006
Rural						
19–24	47.2	44.1	40.3	–6.9	–2.48	0.013
25–30	48.6	47.1	40.6	–8.1	–2.57	0.010
31–36	45.1	51.4	43.5	–1.6	–0.69	0.489
37–42	46.0	50.5	43.6	–2.4	–1.20	0.230
Urban						
19–24	32.6	33.4	26.5	–6.1	–3.85	<0.001
25–30	35.5	34.6	29.2	–6.2	–3.10	0.002
31–36	36.0	36.5	30.0	–6.0	–4.14	<0.001
37–42	33.5	37.8	33.0	–0.4	–0.37	0.709

details, there are consistent drops in automobility across all ages and demographic groups.

While all age groups experience decreased automobility in 2009, the declines among 20-somethings are consistently greater than the declines among the oldest age group, 37- to 42-year-olds. Among employed individuals, the decrease in automobile mileage is 3.2 times greater for 25- to 30-year-olds than for those 37 to 42 years old. In rural areas, the mileage decrease among 25- to 30-year-olds is 3.4 times greater than that for 37- to 42-year-olds. The declines experienced by 37- to 42-year-olds reflect temporal changes that affect all age groups, such as the increased costs of driving from 1995 to 2009 or the advent of online shopping or telework. The larger declines experienced by younger age groups reflect patterns specific to Millennials and younger members of Gen X and could be caused by changing attitudes toward mobility among younger Americans as well as differential substitution of online for physical interaction among digital natives (Lyons, 2015; van Wee, 2015).

Relative Impacts

Regression models allow assessment of competing explanations for the declines in Millennial travel. These models reveal that both demographic shifts and Millennial-specific factors are responsible for the declines in automobility. As Figure 1 shows, demographic shifts related to lifestyle change account for decreases of 1 to 2 miles in daily automobility across all age groups, or 10% to 25% of the overall decline within each age group. Changes over time specific to Millennials and younger Gen Xers are responsible for 2 to nearly 4 miles of the overall decline in automobility, which is approximately 35% to 50% of the total drop. Finally, the general dampening of travel during the late 2000s accounts for a 3.2-mile decline in auto mileage across all age groups. For Millennials, this is approximately 40% of the overall decline in driving. Full details of these calculations are available in the Technical Appendix.

What These Findings Mean for Transport Planning and Policy Making

This analysis provides evidence of a long-term decrease in automobility that started in the late 1990s with younger members of Gen X and has continued with the Millennial generation. The decrease in driving has not been accompanied by an increase in other modes of travel or a decline in average trip length, meaning that younger Americans are increasingly going fewer places. Among young adults, lifestyle shifts such as decreased employment and delayed household formation explain 10% to 25% of declining

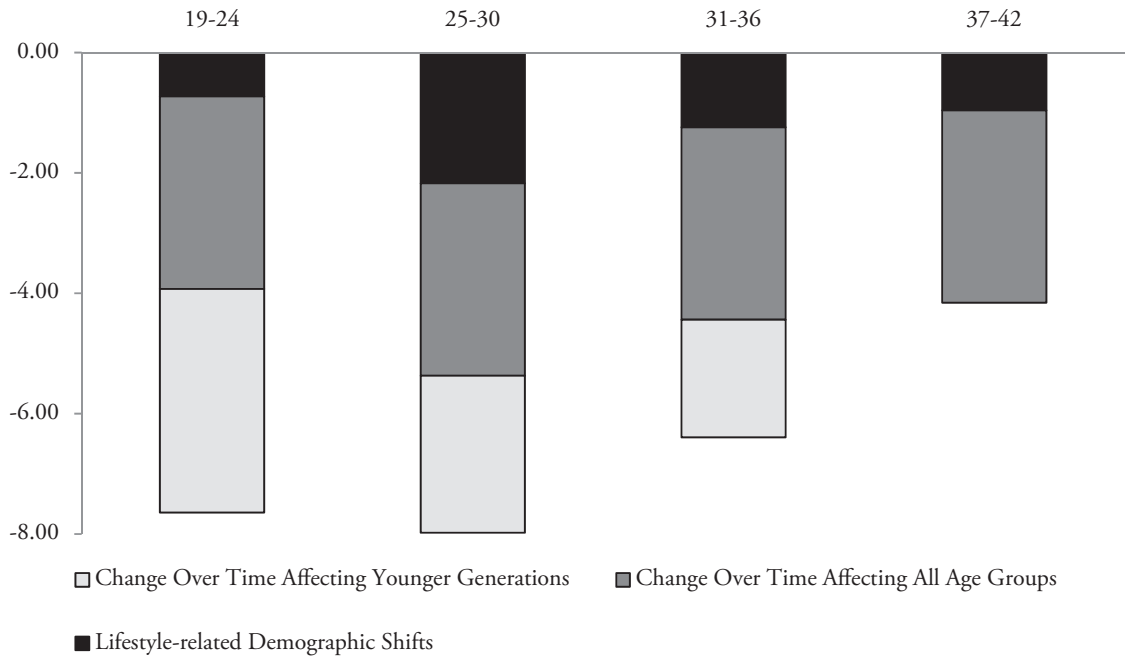

Figure 1. Change in daily automobile mileage from 1995 to 2009 by age group and source of change.

automobility; changes specific to young adults such as increased online interaction and differing attitudes to mobility account for 35% to 50% of the change; and the remaining decrease, 40%, is due to a general decline in travel experienced by all Americans in the late 2000s.

How should planners and policymakers respond to these trends and uncertainty over the future of mobility patterns? Through this analysis I identify two primary challenges for planning practice: 1) encouraging sustainable travel as the mobility needs of Millennials increase, and 2) forecasting long-range travel demand.

Encouraging Sustainable Travel

The downturn in Millennial travel is partially explained by delays in household formation, partnering, and childbirth. But forestalled is not forsworn: In the coming decade, a large number of the 75 million Millennials will reach the life milestones they have delayed (Ministry of Infrastructure and the Environment, 2014). If Millennials look solely to automobiles for their increased mobility needs as they become licensed, have children, and gain employment, there could be sharp increases in traffic volumes and attendant externalities such as congestion and air pollution. Governmental action can influence the modes that Millennials use to meet increased travel needs; there is an opportunity for planners and policymakers to encourage more sustainable travel patterns in the future (Thaler & Sunstein, 2008). In this section, I catalog traditional strategies used to decrease demand for single-occupant vehicles and discusses the potential of newer tools such as person-to-person ridesharing.

Banister (2008) identifies three paths to sustainable mobility: reducing travel needs through technology; encouraging modal shift from cars to travel by foot, bike, and transit; and reducing travel distances through land use strategies. Planners have used many travel demand management (TDM) techniques to reduce automobile reliance (for an overview, see Gärling & Schuitema, 2007; Sammer & Saleh, 2012). As Table 6 shows, technology-enabled TDM strategies have involved employer-based telework or flexible time schemes. Changes in the private sector have also allowed individuals to access goods and services

Table 6. Common travel demand management strategies.

Reducing travel needs through technology	Encouraging modal shift	Reducing travel distances

• Telework
• Flexible work schedules
• Online shopping
• Online personal services, e.g., banking
	• Employer
	  ○ Rideshare
	  ○ Transit passes
	• Pricing
	  ○ Road
	  ○ Parking
	• Infrastructure Improvements
	  ○ Car-sharing
	  ○ Transit
	  ○ Pedestrian
	  ○ Bicycle
		• Compact development
		• Mixed-use
		• Transit-oriented development

virtually through services such as Amazon, Instacart, and online banking. The net impacts of technology on travel are debatable, but these efforts have likely changed the temporal and spatial patterns of passenger and freight travel (Andreev, Salomon, & Pliskin, 2010; Wygonik & Goodchild, 2014; Zhou & Wang, 2014).

Strategies that seek to shift travelers from cars to other modes range from large-scale improvements in public transit, pedestrian, or bicycle infrastructure to employer-based efforts to organize carpools and offer subsidized transit passes. Some of the most effective modal shift strategies involve increasing the cost of automobile usage through road or parking pricing (Gärling & Schuitema, 2007). Efforts to promote compact, mixed-use development also play a role in TDM by reducing travel distances. These efforts can lower vehicle miles of travel if individuals continue to drive, but also make the use of alternative modes more feasible.

Although planners have decades of experience with traditional TDM measures, technology advances have created new travel options that could serve as TDM tools when paired with complementary policies such as those in Table 6. Person-to-person ridesharing or ride-hailing services, such as Uber, Lyft, and Sidecar, provide just-in-time automobility without the requirement of car ownership and represent a way to accommodate Millennial mobility needs. It may seem paradoxical for planners to embrace strategies that make it easier for people to use cars. However, analyses of car-sharing programs—which also provide automobility without auto ownership—show that travelers increase their use of public transit and travel by foot and bike after joining car-sharing programs as well as reduce their auto ownership (Kent & Dowling, 2013; Martin & Shaheen, 2011; Martin, Shaheen, & Lidicker, 2010).

What is the planners' role in new travel technologies from the private sector? First, there is a need for governmental action to clarify regulations and ensure protections to consumers and drivers, particularly concerning liability (Bond, 2015; Rassman, 2014). Many jurisdictions have begun to regulate emerging shared mobility services, although efforts have been inconsistent and subject to industry lobbying. For example, New York City requires ride-hailing vehicles to have a Taxi and Limousine Commission license and to register their vehicle with the Commission (Lazo, 2015). Washington, DC, and Virginia have imposed insurance requirements and mandated background searches for drivers (Lazo, 2015). California has instituted insurance requirements but recently reversed a recent decision to require vehicles to be registered as commercial vehicles (O'Connor, 2015).

Second, planners can monitor private-sector efforts to launch ridesharing services. In a limited number of markets, Uber, Lyft, and Sidecar offer real-time carpooling that promises lower fares to consumers willing to share their ride with others. Ridesharing, as opposed to ride-hailing, which more closely resembles taxi service, may be more in line with TDM goals of reducing vehicle miles of travel. This service could allow ridesharing to serve as an important complement to transit in urban areas and provide mobility options to Millennials as their travel needs shifts.

Forecasting Travel Demand

The future trajectory of the travel of Millennials is highly uncertain. This analysis shows that the travel of Millennials is not tracking with that of previous generations due to differing lifestyles, attitudes, and preferences. Will these trends continue as Lyons (2015) and van Wee (2015) suggest, or will low gas prices and an improved economy lead to an increase in automobility among Millennials? The answer is unknown, and will ultimately depend on actions planners take to encourage sustainable travel combined with economic forces beyond their control.

Yet, all metro areas routinely make precise predictions about the future mobility of Millennials as part of their long-range transport planning process. In America, metropolitan regions estimate travel demand 20 to 40 years in the future, largely presuming current patterns will continue (Bartholomew & Ewing, 2008; Transportation Research Board, 2007, 2012). Regional planning agencies use these projections to assess how proposed transport investments will affect future congestion levels. Travel forecasts can therefore influence the selection of billions of dollars in transportation projects. If forecasts substantially over- or underestimate the travel needs of Millennials, the resulting transport infrastructure investments may not meet regional needs. Failure to address uncertainty may also lead to increasing challenges to transport plans by the public and judiciary. For example, a federal court recently ruled that the North Carolina Department of Transportation had failed to meet National Environmental Policy Act requirements because they did not consider uncertainty in growth forecasts (*Catawba Riverkeeper Foundation v. NC Dept. of Transportation*, 2015).

Planners concerned about uncertainty with Millennial travel can use two strategies: Improve travel demand models and adopt a scenario planning approach to consider how different trajectories for the travel of Millennials could influence infrastructure needs. Improvements in travel demand models could better represent the lifestyle choices of Millennials such as delayed licensure, employment, marriage, and parenting. Activity-based models, which can include a rich set of demographic variables, could allow modelers to better capture differences between generations (Pendyala et al., 2012). While many metro areas such as

New York use activity-based models, many continue to use trip-based approaches, which limit the modelers' ability to understand the travel impacts of demographic shifts.

Scenario planning allows planners to better understand the impact of Millennial preferences and changing economic conditions. For example, will Millennials choose to stay in central urban locations or move to suburban areas as they form households and have children? Will technology, such as improvements in online shopping and services, lead to increased or decreased trip making? How will travel behavior shift if gas prices are high (or low)? This approach to uncertainty is common in military and private-sector forecasting (Bartholomew, 2007; Chakraborty, Kaza, Knaap, & Deal, 2011) and is increasingly recognized as a crucial piece of transport and land use planning (Chakraborty et al., 2011; Chakraborty & McMillan, 2015; Zapata & Kaza, 2015).

Conclusion

Millennials and younger members of Generation X exhibit lower levels of automobility than do previous generations. Decreased driving results from making fewer trips rather than increased usage of alternative modes or shorter travel distances. Taken together, these trends lend credence to the idea that Millennials are increasingly "going nowhere." Previous work asserts that declining automobility results from either lifestyle-related demographic shifts between Millennials and Gen X or differing attitudes to mobility and residential location among Millennials. This analysis shows that the decreases in mobility result from both factors along with a general dampening of travel demand in the late 2000s.

These trends have two implications for planners and policymakers. First, while the travel of Millennials is low now, it is likely to increase as Millennials age and pass through life milestones they have delayed. Government policies will help shape the form of that new mobility. Existing travel demand management strategies along with newer ride-hailing and ridesharing apps provide a complementary set of strategies to allow Millennials to meet their mobility needs without dramatic increases in automobility. Second, the rapid changes in travel over the past 20 years highlight uncertainty about the trajectory of Millennial travel. Long-range transport plans need to reflect this uncertainty by considering future scenarios where Millennials maintain their lower levels of automobility versus returning to the patterns of earlier generations. Failure to consider these radically different futures diminishes planners' ability to make transport infrastructure investments.

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Notes

1. Curry, Kim, and Pfeiffer (2014) have questioned the quality of the FHWA licensure data and shown differences in estimates of licensed young adults between FHWA estimates and New Jersey administrative data. However, data from large-scale public health surveys also show similar declines in licensure as the FHWA data (Shults & Williams, 2013).

2. Prior to 2001, the surveys were known as the National Personal Transportation Survey.

3. The NHTS asks, "Are you a driver?" and does not ask about specific licensure status.

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Technical Appendix

This appendix provides detailed descriptions of the data and analytic approaches.

Data

The U.S. Department of Transportation's National Household Travel Survey (NHTS) provides nationally representative estimates of travel behavior. This cross-sectional survey occurs every six to eight years and asks members of selected households to report all trips on a designated survey day. This analysis compares travel behavior across the 1995, 2001, and 2009 surveys. These surveys are chosen because the changes in the sampling methodology are relatively minor. Between the 1990 and 1995 surveys, the survey switched to a travel diary format (Federal Highway Administration, 2011). This change increased reporting of trips (previous surveys were thought to severely undercount trips), but also required a two-stage data collection process that may have depressed response rates. This makes it difficult to compare travel behavior between the 1990 and later surveys.

Survey response rates for the NHTS have declined over time. The 1995 response rate is 34.3% (Federal Highway Administration, 1997); the 2001 response rate is 34.1% (Federal Highway Administration, 2004); and for 2009, it is 19.8% (Federal Highway Administration, 2011). The survey weights adjust for nonresponse, but it is a concern that response rates have dropped over time. Another issue is that the NHTS from 1995 to 2009 used a list-assisted, random-digit-dialing telephone number sample. This approach does not adequately account for cellphone-only households (while a cellphone-only sample was collected for internal research purposes, it was not made available upon request). Younger adults are much more likely to have cellphones only, and there may be differences in travel behavior between those with and without landlines.

Sample Size. As noted in the main study, individuals are excluded from the analysis if they were out of town on the travel day or if they did not provide complete information about their trips. Table A-1 details the exclusion criteria and resulting sample size. The sample size for regression models is smaller because individuals can only be included in the models if there is non-missing data available for all variables included in the analysis.

Variables. The NHTS data includes standard demographic variables such as age, race, sex, and education. I constructed two variables that the literature suggests influence travel behavior: indicators of household formation and parenthood. Individuals are defined as having formed their own household if they do not live with parents or older

Table A-1. Sample size.

	1995	2001	2009
Initial sample, 19- to 42-year-olds	35,124	45,382	54,276
Missing mode	2,315	282	399
Missing trip purpose	96	479	2070
Missing trip length	1,371	1,476	2,212
Missing licensure	0	6	22
Traveling out of country or town	104	1,499	1,490
Auto miles >99th percentile	493	685	779
Final sample for descriptive statistics	31,490	41,902	48,705
Final sample for regression models	26,193	39,405	46,442

relatives such as grandparents. In most studies, indicators of parenthood are generally simple constructions of whether there is a child under the age of 18 in the household. However, the phenomenon of "boomerang" young adults returning to their parents' homes means that many 20-somethings move back to homes where they have siblings under the age of 18. The travel behavior impacts of a sibling versus one's own child are likely significant. Therefore, the analysis includes an indicator of whether the respondent had their own child under the age of 18 in the household.

Methods

The models test for three sources of variation in daily automobile travel: sociodemographic shifts reflecting lifestyle changes across generations, changes in travel experienced by all age groups, and changes in travel experienced only by younger generations. The influence of changing sociodemographics are tested through the inclusion of individual and household characteristics such as age, sex, race, employment, licensure, vehicle ownership, and household location. Changes in travel behavior over time that affected all age groups equally are accounted for through indicator variables for the survey year. Such universal changes in automobility could be the result of exogenous shifts that affected all Americans, such as the costs of driving between 1995 and 2009, or societal shifts, such as the advent of the Internet. The models test whether Millennials and younger Gen Xers experienced a larger change in travel than did other age groups by including an interaction between survey year and age group. The interaction terms allow us to test whether younger generations—specifically Millennials and younger Gen Xers—experienced differential decreases in auto use. The causes of this change could be differing attitudes or a sharper change in travel needs from the rise of the Internet.

I modeled daily automobile mileage using linear regression models and the number of daily auto trips using a zero-inflated negative binomial model. The negative binomial approach models the probability of making no trips as a function of being licensed and having vehicles in the households. Models are not weighted: In cases where factors used in the development of weights are directly included in the models, it is preferable to report coefficients estimated on unweighted data (Winship & Radbill, 1994). As a check, models with and without survey weights were estimated and similar results were found. Model R^2 values are generally low, but omnibus tests show that the included variables explain significant variation in measures of automobility and are therefore useful in exploring the factors affecting auto travel.

Model Results

The regression models reveal strong linkages between demographic characteristics and automobility and confirm that all individuals experienced a decrease in auto travel in 2009 as expected from the descriptive statistics (Table A-2). Examination of the interaction effects between age and survey year show that Millennials and younger Gen Xers traveled less in 2009 than would have been expected given their demographic patterns and the overall decrease in automobility. Specifically, the models show that Millennials aged 19 to 24 in 2009 traveled 3.7 fewer miles and made fewer auto trips. Similarly, Millennials aged 25 to 30 in 2009 traveled 2.6 fewer miles in private vehicles. Younger members of Generation X traveled 2.0 fewer miles than older members. These declines (and their statistical significance) show that decreases in Millennial travel cannot be fully explained by the structural changes in their economic and demographic characteristics or by the general effects of the economic downturn and rising transport costs experienced by all Americans in 2009.

Assessing Relative Causes of Decline in Automobility. Using repeated cross-sections to assess change over time presents difficulties in disentangling period and cohort effects. I address this issue by using the models to quantify the impact of three factors on automobility: changing lifestyles, changes affecting all age groups, and changes affecting only younger generations. To do this, daily automobile mileage was predicted using the regression model from Table A-2. For 2009, predicted values are estimated under three conditions; for 1995, a baseline estimate of auto mileage is presented to calculate changes between 1995 and 2009 (Table A-3):

- **Lifestyle-Related Demographic Shifts Only, 2009**: Predictions of what average mileage would have been if the only changes between 1995 and 2009 were lifestyle-related demographic shifts. Mileage is estimated by setting coefficients on survey year and the age–year interaction to zero and predicting auto use for all 2009 respondents. Survey weights are used in calculation of the average predicted auto mileages.
- **Sociodemographic Shifts + Changes Over Time Affecting All Age Groups, 2009**: The models reveal that all age groups traveled less in 2009. Predictions of auto mileage with only sociodemographic shifts and generic time changes are estimated by setting coefficients on the age–year interaction to zero. Survey weights are used in calculation of the predicted auto mileages.

Table A-2. Regression models for auto mileage and auto trips.

	Daily automobile mileage			Daily auto trips		
	Coeff	**Std error**	***p* value**	**Coeff**	**Std error**	***p* value**
Age, years						
19–24	3.317	0.844	<0.001	–0.011	0.012	0.388
25–30	2.579	0.740	<0.001	–0.054	0.010	<0.001
31–36	0.993	0.672	0.140	–0.035	0.009	<0.001
37–42	[ref]			[ref]		
Survey year						
1995	[ref]			[ref]		
2001	0.337	0.636	0.596	–0.072	0.009	<0.001
2009	–3.198	0.606	<0.001	–0.175	0.009	<0.001
Age × year						
19–24 × 2001	–1.282	1.030	0.213	–0.061	0.015	<0.001
19–24 × 2009	–3.718	0.979	<0.001	–0.074	0.015	<0.001
25–30 × 2001	–1.658	0.937	0.077	–0.031	0.013	0.021
25–30 × 2009	–2.607	0.903	0.004	–0.024	0.013	0.078
31–36 × 2001	–1.400	0.862	0.104	–0.019	0.012	0.124
31–36 × 2009	–1.954	0.820	0.017	–0.011	0.012	0.371
Male	–2.177	0.937	0.020	–0.015	0.028	0.600
Race/ethnicity						
Non-Hispanic White	[ref]			[ref]		
Non-Hispanic Black	0.292	0.538	0.587	0.006	0.009	0.530
Non-Hispanic Asian	–2.818	0.573	<0.001	–0.075	0.011	<0.001
Hispanic	0.497	0.453	0.272	–0.007	0.007	0.358
Multiracial	–0.067	0.731	0.926	–0.017	0.012	0.154
Employment status						
Not in paid labor force	[ref]			[ref]		
Part time	3.433	0.404	<0.001	0.050	0.007	<0.001
Full time	5.941	0.315	<0.001	–0.027	0.005	<0.001
Driver	14.137	0.638	<0.001	0.359	0.019	<0.001
Driver × male	3.250	0.960	0.001	–0.032	0.028	0.256
Urban area	–7.994	0.311	<0.001	0.067	0.005	<0.001
Population density (10,000 people per square mile)	–4.653	0.202	<0.001	–0.034	0.005	<0.001
Population density squared	0.191	0.013	<0.001	–0.002	0.000	<0.001
Vehicles per drivers in household	5.167	0.313	<0.001	0.017	0.005	<0.001
Presence of own children	–0.881	0.365	0.016	0.163	0.006	<0.001
Presence of own children × male	4.785	0.520	<0.001	–0.074	0.008	<0.001
Formed household	1.103	0.370	0.003	0.022	0.006	<0.001
Household income (2009$, 1,000s)	0.080	0.004	<0.001	0.001	0.00006	<0.001
Weekend	0.676	0.299	0.024	–0.062	0.004	<0.001
Constant	7.368	2.983	0.014	1.212	0.056	<0.001
				Inflation Model (Prob Y = 0)		
Vehicles per driver				–1.531	0.046	<0.001
Driver				–2.071	0.038	<0.001
Constant				1.226	0.053	<0.001
Ln (Alpha)				–2.272	0.016	<0.001
N		112,040			112,040	
Adjusted R^2		0.06				
Pr (all coefficients = 0)		<0.001			<0.001	

Notes: Models also adjusted for state of residence. These coefficients are available upon request from the author.
[ref] = reference category.

Table A-3. Predicted daily automobile mileage by age group.

	1995	2009		
Age, years	Base	Sociodemographic shifts only	+ Change over time affecting all age groups	+ Change over time affecting younger generations
19–24	37.9	37.2	34.0	30.3
25–30	39.7	37.5	34.3	31.7
31–36	40.3	39.0	35.8	33.9
37–42	40.3	39.4	36.2	36.2

Table A-4. Decomposition of declines in daily auto mileage by age group and source.

Age, years	Total decrease in daily auto mileage	Sociodemographic shifts only	Change over time affecting all age groups	Change over time affecting younger generations
19–24	–7.6	–0.7	–3.2	–3.7
25–30	–8.0	–2.2	–3.2	–2.6
31–36	–6.4	–1.2	–3.2	–2.0
37–42	–4.2	–1.0	–3.2	0.0

- **Sociodemographic Shifts + Changes Over Time Affecting All Age Groups + Changes Over Time Affecting Younger Generations, 2009**: Models with age group–specific declines in mobility are calculated by running the full model. Survey weights are used in calculation of the predicted auto mileages. Modest differences between these values and the 2009 data presented in Table 1 are due to the smaller sample used in the regression models.
- **Base, 1995:** The baseline daily auto mileage for 1995 is computed by averaging the model predicted values for respondents in 1995 (survey weights are applied). Modest differences in the 1995 average values presented here and with those in Table 1 are due to the smaller sample used in the regression models.

From the predicted mileages, I decompose the decline in automobility from 1995 to 2009 into three sources: lifestyle-related demographic shifts, general changes over time affecting all ages, and Millennial-specific changes (Table A-4). Sociodemographic shifts explain a 1- to 2-mile decrease across all age groups. Millennials aged 25 to 30 in 2009 show the largest decline due to demographic changes: 2.17 miles, or 27% of the overall decrease for that age group. The general dampening of travel between 1995 and 2009 accounts for a 3.20-mile decrease across all age groups; for younger Americans, this amounts to 40% to 50% of their overall decrease in auto mileage. Millennials and young members of Generation X also exhibit a 2- to nearly 4-mile decrease in auto mileage that represents approximately 35% to 50% of the overall decrease.

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