

Article

Teenage and Adult Drivers' Views of a One-Day Car Control Class on a Closed-Road Course

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Abstract: Traffic-related crashes impact drivers of all ages. Post-license driving classes have emerged to equip drivers with higher level skills needed to prevent and avoid emergency situations. A performance driving center offers teenage and adult car control classes designed to address defensive driving skills through both classroom instruction and hands-on practice on a closed-road track. To obtain the views from teenagers and adults, both groups completed a survey immediately after their classes, and the adults completed a phone interview six months later. Results from the teenage and adult survey showed that both groups reported the most important topics learned during the car control class were skid recovery, using the antilock braking system (ABS) and looking where the car should go. Both teenagers and adults reported that they plan to significantly change their driving behaviors, especially those concerning seating, hand and mirror positions. Overall, after the class, the teenagers and adults felt “moderately competent” in their ability to perform the exercises practiced during the class, which increased from the rating of “not competent” prior to the class. The results from the phone interview with the adults suggest that ABS braking was the most important topic six months later. ABS braking was also the single-most reported skill used after the class and the self-identified skill most used to avoid a crash. The phone interview showed that the adults accurately predicted their use of the behaviors (seating position, vision, distractions, etc.) and turned those behaviors taught during the class into habits of their daily driving. Overall, the results from the teenage and adult survey, as well as the phone interview with the adults, suggest that the participants benefitted from the knowledge and skills gained from the one-day car control class.

Keywords: defensive driving; teenage drivers; adult drivers; skid recovery; emergency braking; post-license training

1. Introduction

It is known that there are thousands of traffic-related injuries and fatalities every year worldwide. Post-license advanced driver's training classes have emerged, with the goal of improving the skills needed to prevent and mitigate emergency situations. This study examines participants' attitudes immediately after one such post-license driving class, a one-day car control class (CCC), for teenagers and adults that aims to improve drivers' skills on a closed-road track.

1.1. Driver's Education and Licensing

In the US, an individual must obtain a license to drive independently. Most US states follow a graduated driver licensing (GDL) process, which consists of phases to help learner drivers gain

experience before obtaining their driving independence. The first phase is the pre-driving phase, where individuals must pass a written exam testing the knowledge of laws and policies and a vision screening [1]. Once the written knowledge exam is passed, individuals are granted a learner's permit, where they are able to practice driving when accompanied by an experienced adult driver—typically, a parent. On average, learner drivers with permits are required to show 50 h of documented accompanied driving time, and some states require 10 h of nighttime driving [2]. In some states, learner drivers under the age of 18 wanting to earn a license are required to take a driver's education course, typically comprised of 30 h of classroom instruction and 6 h of behind-the-wheel instruction [1]. After gaining experience during the learner driver phase, individuals then take an on-road test in order to earn a license and drive independently [2]. The on-road test varies by state but often tests the driver's ability to drive with typical street traffic while maintaining appropriate speed and lane positioning. The on-road test usually requires different vehicle maneuvers, like turning left and right, backing up and parking (e.g., [3–6]). When a driver passes the on-road test and is under the age of 18, the driver has earned the ability to drive independently but often has restrictions like a limited number of passengers and/or a curfew [2].

Though there has been steady progress to improve the licensure process in the US, the requirements to gain a license in other countries, especially in Europe, are more stringent. In the majority of European countries, including all countries in the European Union (EU), individuals are not able to operate a motor vehicle independently until one is 18 years of age [7]. In the US, the average age to drive independently is 16 but is dependent on the state of residence, which ranges from 14 [8] to 17 years old [9].

The European Union (EU) has minimum standards for the written and on-road tests needed to obtain a license. However, with driver training and driving schools, the EU has no standards, and the requirements vary greatly by country. European countries are split in regard to their approach to driver's education; some countries require a single learning phase, while others have a two-phase licensing process. The single-phase European model is similar to the GDL in the US, where the driver is required to have classroom and behind-the-wheel instruction before an on-road test, and once the on-road test is passed, the driver can drive independently [10]. The two-phased approach that Sweden, Finland, Austria, Luxembourg and Norway, for example, typically use consists of a first phase similar to the single phase for other EU countries but also includes a second training requirement. The second requirement aims to further improve the driver's skills while addressing the overconfidence that can occur as a result of gaining more advanced skills. The second-phase behind-the-wheel instruction typically focuses on anticipation and accident-avoidance techniques in environments where loss of control is likely—for example, when experiencing a skid on ice [11].

One of the biggest differences between driver's education in the US versus European countries is the permit or practice phase before obtaining a license. In the US, the majority of the practice a driver gains is from a nonprofessional experienced driver—typically, a parent. In many EU countries, this practice is with a professional driving school, accompanied by a professional instructor [12]. Since European countries usually require one to drive with a professional instructor, the number of hours for behind-the-wheel instruction is two to three times higher than the US requirement [2,10].

1.2. Crash Statistics

In 2017, there were 34,247 police-reported motor vehicle fatal crashes, 1,889,000 crashes that resulted in injury and 4,530,000 crashes that caused property damage only. The fatality rates are higher for males than females in every age category. Across drivers' age groups, the distribution of fatality rates resembles a "U", with the highest rates for younger and older drivers. Drivers between the ages of 21–24 have the highest fatality rate [13].

The critical reason for almost all crashes (94%) can be attributed to the driver [14]. Driver error is responsible for most crashes and can be broken down into five primary categories: 41% caused by recognition errors (distractions, inattention and visual scanning errors); 33% to decision errors (driving too fast for road conditions, illegal maneuvers and misjudgment of others' actions or speed);

11% to performance errors (overcompensation and lack of control); 7% to nonperformance errors (drowsy or sleep) and 8% to other reasons [14]. The most common error, recognition errors, are typically attributed to distraction or inattention. Teenage drivers, ages 15 to 19, have the fewest number of total drivers yet the highest percentage of distraction or inattention of any age group, attributing to 8% of the fatal crashes in 2017 [15].

For drivers of all ages, 57% of all fatal crashes were single-vehicle crashes in 2017, making single-vehicle crashes the most common fatal crash scenario in the US. Single-vehicle crashes are often attributed to a collision with a fixed object (30%), which includes objects like trees or shrubbery (7.2%) and curbs or ditches (7.1%). Single-vehicle crashes can also result from collisions with a not fixed object, which make up 22% of all fatal collisions, including collisions with pedestrians (16.2%). Another common fatal crash scenario is multiple-vehicle crashes, which involve a collision with another vehicle (39%). The most common areas attributed to fatal multivehicle crashes with another vehicle were collisions at an angle (18.6%), head-on (10.1%) and rear-end (7.2%). Other fatal crashes that do not fit into the previous categories are classified as noncollisions (9%), which are mainly attributed to vehicle rollovers (8.0%) [13].

When it comes to teenage drivers, though they only account for 5% [16] of the total licensed drivers in the US, they are associated with a disproportionate number of traffic-related injuries and fatalities. In 2017, drivers between the ages of 16–20 had the highest injury rate and second-highest fatality rate of any other age group [13]. Driver error is the most common cause for teenagers being involved in crashes [17]. The most common crash scenarios associated with teenage drivers involve vehicles running off the road, on straight and curved roads, rear-end crashes and turning into the path of an oncoming vehicle [18].

Traffic-related deaths and injuries are a large issue in the US but, also, worldwide. There are many differences in how driver training is enforced, which shows when comparing the traffic-related death rates. When compared to other high-income countries, the US has one of the highest death rates due to vehicle crashes, 12.4 per 100,000 population. Many of the high-income European countries (2.7 to 9.7 per 100,000 population), Canada (5.8 per 100,000 population) and Australia (5.6 per 100,000 population) have much lower death rates compared to the US [19].

1.3. Post-License Driving Programs in the US

Due to the high number of crashes in the US, as well as the differences in driver's education programs between the US and European countries, many post-license driving programs have emerged. The programs vary drastically, ranging from new driver safety courses to performance driving courses on racetracks. Though these courses serve different customers, there is a common goal to improve drivers' skills behind-the-wheel in a controlled environment. Typically, the aim of the programs for new drivers focus more on safety than the adult programs, which are often designed to address performance driving.

Many of the post-license driving programs are focused on young drivers' safety due to the high crash rates associated with new drivers. The aim of many of the post-license programs is to give young drivers behind-the-wheel experience in a controlled environment to enable teenagers to learn how to use the vehicle's safety systems, as well as the dangers of distracted driving. The programs for young drivers are offered by nonprofits (e.g., <https://www.guardyourlifechallenge.com/> and <https://putonthebrakes.org/>), foundations (e.g., <http://www.southmetrofoundation.org/136/Teen-Crash-Avoidance-Skills>), private driving companies (e.g., <https://www.drivesafer.com/courses/drive-safer-basic-car-control-and-defensive-driving-course/> and <http://www.birperformance.com/streetsmarts/>), police or sheriff's departments (e.g., <https://www.flsheriffs.org/law-enforcement-programs/our-programs/teen-driver-challenge>), automotive manufacturers (e.g., <https://www.drivingskillsforlife.com/>), etc.

In terms of adult programs, safety is still a priority, but there is typically a focus on performance driving that is not seen in the programs aimed at young drivers. Many of the adult programs address accident-avoidance skills like skid control and braking using the antilock braking system

(ABS) but, also, the basics of racing and often take place at racetracks (e.g., <http://www.raceschool.com>, <https://midohio.com/mid-ohio-courses>, <https://www.amgacademy.com>, <https://bondurant.com>, <https://www.skipbarber.com> and <https://racenow.com>). The adult programs also offer other advanced driving courses to cater to those individuals focused solely on racing or the racing experience. Unlike the teenage classes, most of the available programs are offered by private driving or racing companies rather than foundations or police/sheriff's departments.

Even though post-license driving programs go beyond basic topics covered in driver's education, there are a limited number of studies investigating this topic.

1.4. Car Control Classes (CCC)

The car control classes (CCC) offered allow drivers of all ages to practice defensive driving skills through a variety of exercises on a closed-road course (<https://bmwperformancecenter.com/>). Separate teenage and adult CCC focus on teaching students the skills to increase their ability to control the vehicle by gaining both classroom and behind-the wheel experience on a closed-road course. One and two-day entry-level classes are offered, where the two-day classes provide more practice. The focus of this research is exclusively on the one-day CCC. Each CCC is an eight-h day, with a maximum of 16 students and three instructors per class. The CCC begins with classroom instruction that lasts approximately 90 min. The classroom experience begins with instructor introductions, including their professional driving experiences and credentials. Then, the lead instructor provides information on proper seat and mirror adjustments, as well as proper outward vision when driving, which includes how far to look ahead, where to look when turning and where to look during obstacle avoidance. Next, the instructor provides an overview of the morning driving exercises. Then, the instructor explains the underlying vehicle dynamics associated with each exercise—for example, the forces the vehicle will experience during that exercise and how the vehicle reacts to the driver's actions.

The morning on-track instruction lasts approximately two hours; see Figure 1 for the track. While the order of the exercises differs between the teenage and adult classes, the overall purpose is identical (see Table 1). During the on-track instruction, the students receive continuous feedback from the instructor either over a two-way radio when the instructor is observing while standing next to the track or from the passenger's seat when the instructor is in the vehicle. In many exercises, the instructors provide feedback after the students make errors to help the students understand the difference between feeling the incorrect and correct actions.

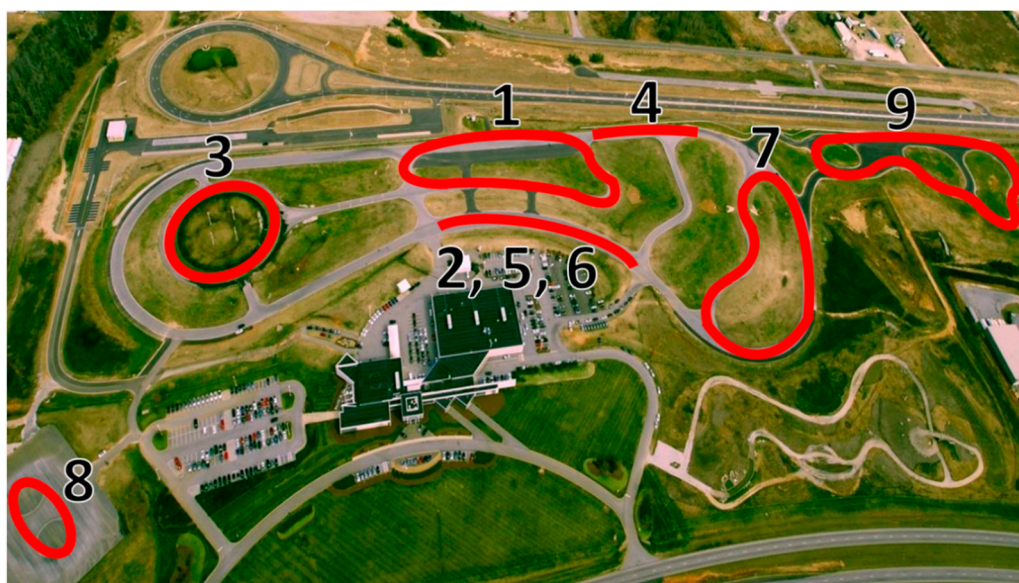


Figure 1. Locations of exercises on the closed-road track. The numbers correspond with the exercises described in Table 1.

Table 1. Teenage and adult car control class (CCC) exercises, exercise description and exercise purpose. ABS: antilock braking system. The exercise numbers correspond to Figure 1's track locations.

Teen	Adult	Exercise	Description	Purpose
X	X	(1) Warm-up slalom	Weave through cones in a slalom pattern	Importance of vision and steering technique, introduction to the vehicle
X	X	(2) ABS braking	Activate ABS at varying speeds (30–55 mph) in a corner	Skills needed for a panic stop, brake and steer, proper vision
X	X	(3) Skid pad	Experience understeer and oversteer with and without stability control	Identify understeer/oversteer and make the proper corrections
X	X	(4) Lane change	Experience an abrupt lane change with ABS stop	Rapid steering needed in an emergency situation
X	X	(5) Handling course	Weave through cones in a slalom pattern, turn and return through with ABS stop	Feel the traction limits while accelerating, braking and cornering
X		(6) Challenge course	Obstacle course with braking, accelerating, lane change, slalom and wet turnaround	Combine skills taught, challenge drivers' judgment
	X	(7) Autocross	Combine multiple skills like cornering, braking and vision on a curvy track with inclines/declines and slalom	Feel handling limits of the car, steering technique, largest radius with the least amount of steering, proper vision
	X	(8) Rat race	Retain control on wet circular track without stability control, race other drivers	Feel traction limits, steering with little traction, braking and accelerating affects traction, pressure of competition
	X	(9) Timed runs	Combine multiple skills like cornering, accelerating and braking on a curvy track while being timed	Combine skills taught, challenge drivers with time pressure

The afternoon session begins in the classroom for approximately 30 min, where the lead instructor provides an overview of the afternoon exercises (see Table 1). Then, the students return to the closed road course for the on-track instruction. The class concludes with a high-level recap of the day.

Many of the teenagers' and adults' exercises overlap, with the exception of exercises that involve competition. The teenagers purposely do not compete with one another. The adults are given the option to compete to simulate added stress (and, for some, excitement).

In a previous study, teenage drivers' views of a post-license half-day driving program, Guard Your Life Challenge program, were evaluated [20]. Guard Your Life takes place at the BMW Performance Center but focuses on three exercises, which include ABS braking, skid pad and a distraction task (not part of the CCC). Surveys immediately after the program demonstrated that teenage drivers benefited from the knowledge gained from the in-class and on-road exercises. A follow-up phone interview three months later suggests that the teenage drivers used the skills from the program on the road, and the teenagers felt they avoided crashes by utilizing the skills taught in the program. The CCC is a full-day class, where drivers experience a larger number and more diverse exercises compared to Guard Your Life. The performance driving center has received anecdotal feedback from students from the CCC, but no formal evaluation has been conducted. This study's purpose is to gain an understanding of teenagers' and adults' views of the CCC.

2. Methods

2.1. Participants

Participants were recruited from the teenage or adult one-day car control classes over a 5-month period. For the teenagers, 80 participated, including 54 males, 25 females and 1 individual who did not

identify their gender. The teenagers ranged in age between 15 to 18 years, with a mean age of 16 years ($SD = 0.94$). There were 30 teenagers with permits and 50 with either a restricted or a full license.

For the adults, 177 participated, including 137 males and 39 females. Ages ranged between 18 to 80 years, with a mean age of 51.6 years ($SD = 16.2$). There were 21 participants between the ages of 18 to 29, 20 participants between the ages of 30 to 39, 33 participants between the ages of 40 to 49, 35 participants between the ages of 50 to 59, 45 participants between the ages of 60 to 69 and 21 participants between the ages of 70 to 80.

All participants had the option to volunteer to be included in a follow-up phone interview approximately six months after the class. Unfortunately, very few teenagers volunteered, and as a result, no follow-up phone interview data are presented for the teens. For the adults, 64, including 46 males and 18 females with a mean age of 51.5 years ($SD = 16.4$) participated in the phone interview.

2.2. Procedure

All subjects read the consent form and provided their written approval prior to participating in the study. Since some of the participants were teenagers, participants under the age of 18 years had written permission from a parent. The study was conducted in accordance with the Declaration of Helsinki; the protocol was approved by the Ethics Committee at Clemson University (IRB2015-258).

Both the survey and the phone interview each took between 10 and 15 min to complete. The survey took place immediately after the CCC was over, while the phone interviews took place approximately six months after the class. The questions on the survey targeted the students' experience throughout the classroom and on-track instruction; the phone interview targeted the students' reflections on the class, as well as behaviors or skills used while driving since the class (see Table 2). Additional sections of the survey and phone interview asked participants to use a numeric scale to respond to a list of various topics (see the Rating Sections below).

2.3. Survey Rating Sections

The survey and phone interview included questions that asked participants to use a numeric scale to rate a given topic.

2.3.1. Frequency Exhibiting Behaviors from the Class

The first rating section on the teenage survey, adult survey and adult phone interview aimed to gauge how frequently the participants exhibited 17 behaviors taught during the classroom and behind-the-wheel instruction. Some examples included holding the steering wheel at 9 o'clock and 3 o'clock, not driving distracted and looking where you want the car to go. A 1–5 scale was used, where 1 was never, 2 was almost never, 3 was sometimes, 4 was almost always and 5 was always, to describe how often they exhibited the behaviors. Participants could respond not sure (NS) if they were unsure.

2.3.2. Competency Level for On-Track Exercises

The other rating section on the teenage and adult survey asked the participants to rate their competency to perform the seven exercises they experienced during the on-track instruction. Participants were asked to rate their competency level prior to the class and, then, their competency level immediately after the class. Participants used a 1–6 scale, where 1 was not competent to perform without extensive further training, 2 was not competent to perform without moderate further training, 3 was not competent to perform without brief further training, 4 was minimally competent to perform without further training, 5 was moderately competent to perform without further training and 6 was fully competent to perform without further training.

Table 2. Survey and follow-up phone interview questions. The words in parentheses were used for the follow-up phone interview.

Teenage Survey	Adult Survey	Adult Phone Interview	Questions
X	X	X	What is your age?
X	X	X	What is your gender?
X	X	X	What are the top three (five) things you got out of (remembered from) the class?
X	X	X	What is the most important or interesting thing you learned (during the driving portion)?
X	X	X	Describe the class in 3 words.
X	X	X	Would you recommend the class to your friends and family?
X	X		What was the hardest part about the class?
X	X		What did you enjoy most about the class?
		X	Have you used any of the skills you learned in the class?
		X	Did using these skills help you to avoid a crash?
		X	Have you been in a crash since you took the class?
		X	Do you think you have changed any of your driving behaviors?

2.4. Data Organization and Analysis

After the data were compiled, all of the responses for each question were sorted by grouping similar responses to form categories. For example, the ABS braking category represents responses like braking hard and stomping on the brakes. After the categories were finalized, the number of responses were counted, and the categories were compared.

For the two rating sections, paired sample *t*-tests were used to compare prior to after the class ratings for the teenage and adult groups. When the question included both survey and phone interview responses, a one-way analysis of variance was used to compare between prior, after and 6 months after the class ratings. Once differences were found, Games-Howell was used for post-hoc comparison. Though the teenage and adult CCC overlap, they are not the same class; as a result, ratings from the teenagers and adults were not compared.

3. Results

3.1. Top Things from the Class

On the teenage and adult surveys, participants described the top three things they got out of the class, and on the adult phone interview, they were asked to describe the top five things they remembered from the class; see Table 3. The teenage survey responses indicated that 72 of the 80 teenagers responded to this question, for a total of 213 responses. The top three things the teenagers took from the class were skid control (18.8%), ABS braking (15%) and where to look when driving (9.4%). For the adult survey, 148 of the 177 adults responded, for a total of 402 responses. These responses were similar to the teenage survey responses, where the adult survey's top three categories were ABS braking

(17.2%), skid control (13.2%) and where to look (9.5%). For the adult phone interview responses, all 64 adult phone interview participants responded to this question, for a total of 303 responses. The top categories from the top five things remembered from the class were ABS braking (14.2%), skid control (13.5%), the instructors (9.2%), mirror adjustment (5.9%) and driving the vehicles (5.3%).

Table 3. Results for the top things from the CCC for the teenage survey, adult survey and adult phone interview. TR equals the total number of responses for a group.

Topics	Teenage Survey (N = 72 of 80, TR = 213)	Adult Survey (N = 148 of 177, TR = 402)	Adult Phone Interview (N = 64 of 64, TR = 303)
Skid control	18.8%	13.2%	13.5%
ABS braking	15.0%	17.2%	14.2%
Where to look	9.4%	9.5%	3.3%
Safety	4.7%	4.0%	1.0%
Fun	4.2%	7.0%	2.3%
Mirror adjustment	1.9%	2.7%	5.9%
Driving vehicles	1.9%	1.2%	5.3%
Instructors	0.0%	0.0%	9.2%

3.2. Most Important/Interesting Thing Learned

Participants from both surveys and the phone interview were asked what was the most important or interesting thing that they learned from the class. This was typically one of the most important things from the class (reported in Section 3.1). During the phone interview, participants were asked to respond to this question specifically in terms of the experience on the track, unlike in the survey, which was more general. Of the 80 teenage survey participants, 73 provided responses. Their top three response categories were skid control or correction (34.2%), look where you want to go (17.8%) and emergency lane change (13.7%). For the adult survey participants, 146 of 177 provided responses; the most common response categories were skid control (19.2%), ABS braking (12.3%) and looking where you want to go (12.3%). Of the 64 phone interview participants, 63 responded to this question. The top response categories for this question were ABS braking (23.4%); skid control or correction (19.2%) and three differences for the third spot, including emergency lane change (12.5%), controlling the car in different situations (12.5%) and the capability of the car (12.5%).

3.3. Describe the Class in Three Words

The teenage survey, adult survey and adult phone interview participants were asked to describe the class in three words. Of the 80 teenage survey participants, 72 gave responses, for a total of 210 responses for this question. The teenagers' top three words were fun (25.7%), educational (13.8%) and exciting (11%). For the adult survey, 149 of the 177 adults gave responses, for a total of 417 responses. The adult survey responses were consistent with the teenagers, where the top three responses were fun (25.9%), exciting (11%) and educational (9.4%). All 64 of the adult phone survey participants responded to this question, resulting in 190 responses. Two of the adult's phone interview responses were similar to the teenage and adult surveys, where the top three responses were fun (16.3%) and exciting (8.4%), in addition to informative (8.4%).

3.4. Hardest Part of the Class

The teenage and adult survey participants were asked what the hardest part of the class was. For the teenagers, 73 of the 80 participants gave responses, and the most common response categories were emergency lane change (52.8%) and skid recovery (25%). Of the 177 adult participants, 143 gave responses for this question. The most common responses for the adult survey overlapped with

the teenage survey responses, where the adults identified skid recovery (34.3%) as the hardest and emergency lane change (18.9%) as the second-hardest part of the class. There was a large gap between the top two response categories and the other categories for both the teenage and adult surveys.

3.5. *Most Enjoyable Part of the Class*

The teenage and adult surveys asked what the most enjoyable part of the class was. Seventy-two of the 80 teenager survey participants responded to this question. Many of the teenagers either responded with “everything” or listed multiple exercises from the class, which were combined into the everything/multiple exercises category. The most common response categories for the teenage survey were everything/multiple topics (19.4%), skid pad (19.4%) and handling exercise (18.1%). For the adults, 152 of the 177 participants gave responses, where the top response categories were timed laps (27.6%), instructors (10.5%) and everything/multiple (10.5%).

3.6. *Frequency Exhibiting Driving Behavior*

Throughout the teenage and adult CCC, participants were taught proper behaviors needed for driving, including topics like seating position, where to look, distractions, braking behavior, etc. Participants were provided with the list of behaviors taught in the class and asked to rate their frequency of the behaviors using the 1–5 scale, where 1 was never and 5 was always. Teenager survey participants were asked to rate their frequency of the behaviors prior to the class and after the class; see Table 4. The results from the repeated measures analysis of variance showed that there were significant differences between the teenagers prior and after the rating on all behaviors. The results showed that there were significant increases in the frequency the participants expected to exhibit the behaviors taught in the class from prior to the class to after the class.

The results of the analyses of variance for the 17 different behaviors for the adults show that all were significant, with the exception of wearing the seatbelt snugly (see Table 5). The rating scores for wearing the seatbelt snugly were not significantly different from prior, after or six months after but were near 5, so participants were already wearing their seatbelt snugly prior to and after the class.

The Games-Howell post-hoc comparisons reveal where the differences between the prior, after and six months after the class were showed a general trend. The ratings given for prior to the class for all behaviors were significantly lower than the ratings given for after and six months after the class. There were few significant differences between the after and six months ratings, indicating that the frequency that the participants exhibited the behaviors from the class did not differ.

3.7. *Competency Performing Class Exercises*

The teenage and adult CCC offer a variety of exercises that target different skills. Many of these exercises overlap between the teenage and adult classes, but they are slightly changed for the appropriate group. The teenagers and adults were asked to rate their competency to perform the exercises from the class, both prior to the class and after on the survey. Participants were to respond using the 1–6 scale, where 1 was not competent to perform without extensive further training and 6 was fully competent to perform without further training. The results from the repeated measures analysis for the teenagers showed that there were significant increases in the competency ratings from prior to the class to after the class (see Table 6). Similarly, the results from the repeated measures analysis for the adults showed that there were significant increases in competency ratings from the prior rating to the after rating.

Table 4. Teenager survey participants' average rating of the frequency to exhibit behaviors prior to the class and directly after the class. The asterisk designates significant differences ($p < 0.05$).

Behaviors—Teenagers	Mean Prior	Mean After	F	Degrees of Freedom	η_p^2
Hold the steering wheel at 9 o'clock and 3 o'clock so that you can turn the steering wheel 180 degrees	3.04	4.53	122.85 *	(1, 74)	0.624
Left foot on the dead/rest pedal	3.82	4.59	36.09 *	(1, 75)	0.325
Adjust distance to pedals so that with the brake pedal fully depressed you still have a bend in both legs	3.84	4.87	46.73 *	(1, 73)	0.390
Adjust the seat height for proper outward vision (eyes are at the center height of the windshield or a hand width between the top of your head and the roof)	3.74	4.87	62.55 *	(1, 75)	0.455
Position the back of the seat so you are sitting up straight	4.24	4.80	29.12 *	(1, 75)	0.280
Position the seat close enough to where your hands can drape over the top of the steering wheel without your shoulders pulling away from the seat	3.64	4.79	51.47 *	(1, 69)	0.427
Adjust the head restraint so that, if you draw a line from your eyes through your ears, the part of your head touching the headrest lines up with the center of the headrest	3.09	4.39	67.63 *	(1, 69)	0.495
Align the top curve of the steering wheel with the curve of the dashboard for a good view of the speedometer and gauges	3.49	4.46	46.97 *	(1, 70)	0.402
Adjust the mirrors to eliminate blind spots	3.49	4.81	68.55 *	(1, 73)	0.484
Keeping your eyes up to see far enough ahead	3.36	4.83	117.60 *	(1, 76)	0.607
Look where you want the car to go	3.19	4.86	154.42 *	(1, 76)	0.670
Turn your head to look where you want to go before you turn	3.56	4.80	99.13 *	(1, 76)	0.566
Not driving distracted	4.33	4.70	18.34 *	(1, 69)	0.210
Wear your seatbelt snugly	4.70	4.89	10.04 *	(1, 69)	0.127
Use the brake pedal more proactively, especially in emergency situations	4.09	4.72	31.83 *	(1, 68)	0.319
Not panicking when you are in an emergency	3.47	4.47	55.86 *	(1, 68)	0.451
Understanding the impact your driving can have on yourself and others	4.34	4.89	30.05 *	(1, 69)	0.303

Table 5. Adult survey and phone interview participants' average ratings of the frequency to exhibit behaviors prior to the class, directly after the class and, for the adults, 6 months after the class. The asterisk designates significant differences ($p < 0.05$).

Behaviors—Adults	Survey		Interview Mean 6 Months	ANOVA Results			Post-Hoc Comparisons		
	Mean Prior	Mean After		F	Degrees of Freedom	η^2	Prior to After	Prior to 6 Months	After to 6 Months
Hold the steering wheel at 9 o'clock and 3 o'clock so that you can turn the steering wheel 180 degrees	2.83	4.25	4.63	119.84 *	(2, 367)	0.395	−1.42 *	−1.80 *	−0.38 *
Left foot on the dead/rest pedal	3.87	4.47	4.47	15.32 *	(2, 372)	0.076	−0.61 *	−0.60 *	0.01
Adjust distance to pedals so that, with the brake pedal fully depressed, you still have a bend in both legs	3.54	4.74	4.52	60.04 *	(2, 370)	0.245	−1.20 *	−0.97 *	0.22
Adjust the seat height for proper outward vision (eyes are at the center height of the windshield or a hand width between the top of your head and the roof)	3.67	4.72	4.68	54.85 *	(2, 366)	0.231	−1.06 *	−1.05 *	0.04
Position the back of the seat so you are sitting up straight	3.89	4.63	4.44	27.05 *	(2, 368)	0.128	−0.75 *	−0.55 *	0.20
Position the seat close enough to where your hands can drape over the top of the steering wheel without your shoulders pulling away from the seat	3.56	4.69	4.47	49.63 *	(2, 364)	0.214	−1.13 *	−0.91 *	0.22
Adjust the head restraint so that, if you draw a line from your eyes through your ears, the part of your head touching the headrest lines up with the center of the headrest	3.26	4.49	4.29	42.64 *	(2, 353)	0.195	−1.23 *	−1.02 *	0.21
Align the top curve of the steering wheel with the curve of the dashboard for a good view of the speedometer and gauges	3.80	4.59	4.30	20.45 *	(2, 363)	0.101	−0.80 *	−0.50 *	0.30
Adjust the mirrors to eliminate blind spots	3.46	4.78	4.70	73.85 *	(2, 365)	0.288	−1.32 *	−1.25 *	0.07
Keeping your eyes up to see far enough ahead	3.60	4.76	4.72	94.18 *	(2, 364)	0.341	−1.16 *	−1.12 *	0.04
Look where you want the car to go	3.25	4.74	4.69	144.75 *	(2, 364)	0.443	−1.49 *	−1.43 *	0.05
Turn your head to look where you want to go before you turn	3.36	4.68	4.46	87.04 *	(2, 364)	0.325	−1.32 *	−1.10 *	0.22
Not drive distracted	3.62	4.33	4.13	21.48 *	(2, 349)	0.110	−0.72 *	−0.51 *	0.21
Wear your seatbelt snugly	4.78	4.87	4.78	1.11	(2, 349)	0.006	—	—	—
Use the brake pedal more proactively, especially in an emergency	3.68	4.73	4.47	66.38 *	(2, 341)	0.280	−1.05 *	−0.79 *	0.26
Not panicking when you are in an emergency situation	3.68	4.52	4.48	38.10 *	(2, 326)	0.189	−0.84 *	−0.80 *	0.04
Understanding the impact your driving can have on yourself and others	4.14	4.74	4.44	20.27 *	(2, 345)	0.105	−0.61 *	−0.30 *	0.31 *

Table 6. Teenage and adult survey participants' average ratings of their competency to perform the class exercises prior to and directly after the class. The asterisk designates significant differences ($p < 0.05$).

Exercises	Teenage Survey					Adult Survey				
	Prior	After	F	Degrees of Freedom	η_p^2	Prior	After	F	Degrees of Freedom	η_p^2
Accurately driving through the slalom course	3.03	5.44	280.860 *	(1, 69)	0.014	3.33	5.14	343.973 *	141	0.007
Stomping on the brakes to feel the ABS activate	3.23	5.63	186.968 *	(1, 69)	0.014	3.64	5.42	270.669 *	143	0.007
Understand how the ABS allows you to steer and brake simultaneously	2.84	5.53	297.552 *	(1, 69)	0.014	3.45	5.34	325.167 *	142	0.007
Controlling a skid	2.07	4.92	357.708 *	(1, 69)	0.014	3.02	4.89	391.048 *	144	0.007
Identifying understeer (front tires have lost grip) and correcting for it	2.04	5.01	453.956 *	(1, 69)	0.014	2.91	4.86	372.224 *	143	0.007
Identifying oversteer (rear tires have lost grip) and correcting for it	2.11	5.01	337.658 *	(1, 69)	0.014	2.93	4.85	366.047 *	143	0.007
Making an emergency lane change	2.07	4.81	379.070 *	(1, 69)	0.014	3.03	4.90	419.646 *	143	0.007
Completing the handling course	2.86	5.32	305.725 *	(1, 68)	0.014	2.96	4.98	400.477 *	140	0.007
Completing the challenge course	2.45	5.09	339.962 *	(1, 68)	0.014	-	-	-	-	-
Completing the autocross course	-	-	-	-	-	3.00	5.01	373.496 *	142	0.007
Completing the timed lap	-	-	-	-	-	3.00	4.88	319.118 *	136	0.007

3.8. Skills Used After the Class

The adults who participated in the phone interview were asked if they used any of the skills they learned in the class. All 64 participants provided a response for this question. Within six months of the class, 77% of the participants reported using the skills they learned. Those individuals who reported using the skills were asked a follow-up question to describe which skills they used. A total of 49 participants gave responses for this question, where the most common response categories were multiple skills (34.7%), ABS braking (22.4%), seating/hand/mirror positions (20.4%) and where they look (14.3%).

Forty-nine of the participants that said they used the skills taught in the class were also asked if using any of these skills helped them to avoid a crash. Of the 48 participants that responded, 23% indicated that the skills helped them avoid a crash. The participants that said the skills helped them avoid a crash were then asked which skills they used. The majority of participants used ABS braking (81.8%) to avoid a crash. The other common responses were skid recovery (9.1%) and braking and steering (9.1%). Four of the participants who responded “yes” did not give a skill but, rather, provided responses like “maybe” and “not yet”; therefore, their “yes” was not included in the crash response percentages.

3.9. Behaviors Changed After the Class

The adult phone interview asked if they changed any of their driving behaviors as a result of taking the class. All 64 participants gave a yes/no response, and 95% responded with “yes”, they changed their behavior. Those who responded “yes” were asked a follow-up question, where 61 participants gave a specific behavior, with some of the most common response categories being seating/hand/mirror positions (26.6%), where they sit in combination with where they look (21.3%), where they look (16.4%), following the distance (8.2%) and where they sit in combination with braking (6.6%).

3.10. Class Recommendation

The last item on the teenage survey, adult survey and adult phone interview asked if the individual would recommend the class to others. A total of 154 teenagers responded, with 100% responding “yes” to recommending the class. For the adult survey participants, 72 gave responses, with 99.4% responding “yes”. Finally, 61 of the adult phone survey participants responded, and 93.8% said “yes”, they would recommend the class to others.

4. Discussion

Car control classes (CCC) offered at a performance driving center provide drivers classroom and on-track instruction that focuses on practicing defensive driving skills on a closed-road course. The students gain exposure to the correct seating position, mirror placement and where to look, as well as the vehicle’s behavior, throughout the exercises experienced during the on-track instruction. The on-track instruction consists of multiple exercises, each focusing on different maneuvers (e.g., emergency lane change) and utilizing various vehicle safety systems (e.g., ABS and stability control). The goal of this study was to gain an understanding of teenagers’ and adults’ views of the CCC. Teenage and adult participants completed a survey after the class to document their immediate perspective of the course, and a subset of the adults completed a six-month follow-up phone interview.

The results from the teenage survey showed that the top three things the teenagers took away from the class were skid recovery, ABS braking and looking where you want the car to go. Teenagers thought skid control, looking where you want the car to go and the lane change were the most important or interesting topics they learned about, even though the lane change and skid recovery were rated as the hardest parts of the class. The teenagers reported enjoying everything or multiple topics, as well as the skid pad and handling exercises. Interestingly, the teenagers thought that the skid recovery and lane change exercises were the most important, hardest and most enjoyable. There were significant

increases in the frequency of the predicted use of the behaviors taught in the class, from sometimes to almost always. There were also significant increases in the competency, where teenagers, on average, reported feeling moderately competent to perform the exercises after the class. Overall, the teenagers reported learning and improving their driving skills as a result of the class.

The adult survey results also showed the top three things the adults got out of the class were skid recovery, ABS braking and looking where they want the car to go. The most important things the adults reported learning were skid recovery, ABS braking and looking where they want to go. The skid recovery and lane change were reported as the hardest parts of the class. The adults reported that they enjoyed everything or multiple parts of the class, the instructors and the competitions they experienced during the timed laps. There were significant increases in most of the adults' frequency to exhibit certain behaviors from prior to after the class, from sometimes to almost always. There were also significant increases in the adults' competency rating from prior to after the class, where the adults, on average, reported feeling moderately competent to perform the exercises after the class.

The phone interview conducted six months after the participants took the CCC targeted the participants' experiences with the skills and behaviors taught during the classroom and behind-the-wheel instruction. Participants reported the top things they took away from the class were skid recovery, ABS braking and interacting with the instructors. The most important topics they reported learning about were ABS braking, skid control, lane change, controlling the car in different situations and the capability of the car. The results also showed significant increases in the frequency of use of the majority of the behaviors from the class, from prior to the class to six months after. There were also not many significant differences between the frequency of use of the behaviors rated after the class on the survey and six months after the class, indicating that the adults accurately predicted their use of the behaviors and turned those behaviors into habits.

The majority of the participants reported using the skills taught during the CCC in the previous six months. The most-used skills that participants reported were ABS braking, looking where they want to go, seating position and mirror position. The skill used most to avoid a crash was ABS.

Almost every adult phone interview participant reported changing their behaviors as a result of the class, and the behaviors they reported overlapped with the skills they reported using, like the seating position, where to look, mirror position, etc. The difference from the reported skills used to the reported behaviors changed in terms of braking shifted focus from activating ABS to increasing their following distance and using the brake more proactively. These results showed that the adult phone interview participants gained knowledge from both the classroom and behind-the-wheel instruction.

There were many similarities between the teenage and adult survey responses. Both teenage and adult survey participants reported that the top things they took from the class were skid control, ABS braking and where to look. The teenagers and adults agreed that skid recovery and looking where they want to go were some of the most important things they learned. Both groups reported that the skid recovery and emergency lane change exercises were the hardest parts of the class. The teenage and adult survey participants both thought skid recovery was one of the most important skills they learned, though it was difficult. The same trend was seen in the teenage and adult responses for the frequency they would exhibit the behaviors taught in the class. Many thought that, prior to the class, they sometimes exhibited those behaviors, but all of the responses increased to almost always. Similarly, teenagers and adults both rated their competency to perform the exercises from the class as not competent prior to the class and, then, as moderately competent on most responses after.

There were also many similarities between the adult survey and phone interview. The majority of the responses for the frequency to exhibit the behaviors from the class followed the same trend as the survey, where the rating after the class was significantly higher than prior. The frequency to exhibit the behaviors in the class responses were mostly significantly higher than the prior to the class rating from the survey. There were not many significant differences between the frequency responses after the class from the survey and six months after on the phone interview. This shows that the adults accurately predicted how frequently they would exhibit the behaviors and actually exhibited the behaviors while

they were driving. The most-used skills that phone interview participants reported were ABS braking, looking where they want the car to go, seating position and mirror position. The skill used most to avoid a crash was ABS braking. These reported uses of these skills overlapped with what the adult survey participants reported as being the most important skills learned from the class.

Though there were many similarities between the teenagers' and adults' survey responses, there were differences. Though both groups reported the same top three items they got out of the class, this was not the case when asked what the most important thing learned was in the class. Both groups agreed on skid recovery and looking where you want the car to go, but the teenagers reported lane change much higher than the adults, who reported ABS braking much higher than the teenagers.

The top two responses for the most enjoyable part of the class from the teenage survey, skid pad and the handling exercise, both involved large steering inputs compared to many of the other exercises. The adults enjoyed the competition aspect of the timed laps and the instructors. Unlike the teenagers, the adult survey participants did not enjoy the hardest-rated exercises.

There were some differences between the adult survey and the phone interview. When asked what was the most important thing they learned, the adult survey participants' response categories of skid control and ABS braking overlapped with the phone interview response categories, but the other top response categories did not. The other most common response category given by the adult survey participants was looking where you want to go, where the other common response categories for the adult phone interview were emergency lane change, controlling the car in different situations and the capability of the car. The adult phone interview responses overlapped with the adult survey responses, but some of the responses were focused on the bigger picture of driving as a whole rather than an individual skill or exercise.

The seating position was one of the most common responses when participants were anticipating what behaviors they would change and behaviors they changed after the class. These results suggest that teenage and adult drivers do not understand how to position themselves properly in a vehicle. This is consistent with observations made by McConomy [21], who showed that many younger and older adults do not position themselves correctly in a vehicle seat in order to have a proper line of sight and the ability to reach the pedals.

One of the biggest differences between the teenagers and adults was the most important thing they reported during the CCC. The teenagers thought skid recovery and emergency lane change were the most important exercises, where the adults thought skid recovery and ABS braking were the most important. Though the teenagers and adults both reported skid recovery as being one of the most important skills taught, the teenagers thought the most important exercises were the hardest to perform, not necessarily what they may use the most. The adults were able to acknowledge that ABS braking was one of the most important skills learned in the class, but it was important because it would be used, not because it was the hardest. This observation by the adults is consistent with common crash scenarios. In 2016, the National Highway Traffic Safety Administration (NHTSA) reported one of the most common fatal crash scenarios was a rear-end collision [22].

According to the adults during the phone survey, ABS braking was the most frequently used skill learned during the class that was applied while driving, as well as the skill used to avoid potential crashes. Interestingly, the phone interview results from the previous study with teenagers in the Guard Your Life program suggested that ABS was the most used skill to avoid a crash [20]. Though adult drivers in the class experienced more exercises than the teenagers in the Guard Your Life program, both teenagers and adults found the ABS task to be applied the most after the course.

The high response rate of ABS on the most important thing learned for the adult survey and phone interview participants suggests that adults did not have prior knowledge of or experience using ABS. This observation is consistent with the results from a phone survey conducted by the NHTSA. The study sought to gain US drivers' knowledge of ABS by asking questions about what ABS was and the purpose of the system. The majority of the participants did not know what ABS

stood for, the advantages of ABS over the standard brake systems and that it is normal for the pedal to vibrate [23].

Even though teenage and adult participants identified that ABS is an important part of the class, there are few studies that focused exclusively on the impact of ABS training. One study investigating ABS training involved the use of a low-cost training method [24], where one group of drivers was given a four-page pamphlet outlining the correct brake activation technique for ABS before stopping quickly in an icy environment. The drivers that read the pamphlet were able to stop an average of 35 feet sooner when traveling in a straight line compared to those who did not read the pamphlet before driving. Another study investigated the effects of ABS training during a two-day post-license training program [25]. During this program, drivers were trained to activate the ABS using a two-phase strategy, where one quickly depresses the brake pedal, then steadily presses the pedal until full depression is reached. When the braking performances of the drivers in the program were compared to drivers without the training, the group without training stopped an average of one car length shorter than the trained group. Individuals in the CCC were simply taught to press the brake pedal as fast and hard as possible to stop in the shortest possible distance. Though the surveys and phone interview results in the present study indicate that both teenagers and adults view the class as helpful in improving their driving skills, the study did not assess if participants were objectively more effective at activating ABS.

5. Conclusions

Car control classes offered to teenagers and adults focus on improving the drivers' knowledge and their ability to control a vehicle through classroom instruction and behind-the-wheel experience on a closed road course. Students in these classes gain knowledge about the proper seating position, proper outward vision, vehicle safety systems and vehicle dynamics in the classroom. Once behind the wheel, students experience various exercises focused on the proper use of vehicle safety systems (e.g., ABS), steering techniques (e.g., lane change) and corrective maneuvers (e.g., skid recovery). This study aimed to gain the views of teenagers and adults that participated in the car control classes. Teenagers and adults participated in a survey directly after the class, and the adults participated in a follow-up phone interview. The results from the teenage and adult surveys showed that both groups reported learning new behaviors and skills as a result of the class. The results from the adult phone interview showed that 95% of the participants reported changing their driving behaviors, and 77% reported using the skills taught during the class. These self-report results suggest that both teenagers and adults benefitted from the car control class.

6. Study Limitations

The surveys and phone interview gave insight into the teenagers' and adults' views of the car control classes, but there were limitations of the study. The surveys and phone interview were all self-reported. There was no performance data collected, so it is unknown how well the teenagers and adults were able to perform each exercise and how their performance affected their driving skills after the class. With the phone interview, it is unknown when in the six-month period the adults used the skills that they reported using. It is also difficult to conclude if the skills the adult participants reported using to avoid a crash were in fact needed to be used due to an emergency situation.

7. Future Research

Future research should strive to evaluate the effectiveness of the program from an objective perspective in addition to the survey data gathered during this study. Future research should address the effects of teaching teenagers and adults about stability control and ABS but, also, how understanding these systems affects driving behaviors. Though the participants in this study ranged in ages from 18 to 80, many of the participants fell between the age range of 40 and 70 years. Future research should consider recruiting participants in specific age groups to explore potential differences.

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References

1. NHTS Administration. *Novice Teen Driver Education and Training Administrative Standards (NTDETAS) 2017 Revision*; National Highway Traffic Safety Administration: Washington, DC, USA, 2017.
2. Fisher, D.L.; Caird, J.; Horrey, W.; Trick, L. (Eds.) *Handbook of Teen and Novice Drivers: Research, Practice, Policy, and Directions*; CRC Press: Boca Raton, FL, USA, 2016.
3. Florida Department of Highway Safety and Motor Vehicles. *The Official Florida Driver License Handbook*; Florida Department of Highway Safety and Motor Vehicles: Tallahassee, FL, USA, 2018. Available online: <https://www3.flhsmv.gov/handbooks/englishdriverhandbook.pdf> (accessed on 19 June 2020).
4. Georgia Department of Driver Services. *2018–2019 Drivers Manual*; Georgia Department of Driver Services: Conyers, GA, USA, 2018. Available online: <http://www.eregulations.com/wp-content/uploads/2018/07/18GADM-LR.pdf> (accessed on 19 June 2020).
5. State of California Department of Motor Vehicles. *Preparing for Your Driving Test (FFDL 22)*; State of California Department of Motor Vehicles: Sacramento, CA, USA, 2017. Available online: https://www.dmv.ca.gov/portal/dmv/detail/pubs/brochures/fast_facts/ffdl22 (accessed on 19 June 2020).
6. Texas Department of Public Safety. *Texas Driver Handbook*; Texas Department of Public Safety: Austin, TX, USA, 2017. Available online: <https://www.dps.texas.gov/internetforms/Forms/DL-7.pdf> (accessed on 19 June 2020).
7. European Union. Getting a Driving Licence in the EU. Europa.edu. 2019. Available online: https://europa.eu/youreurope/citizens/vehicles/driving-licence/get-driving-licence/index_en.htm (accessed on 28 July 2020).
8. South Dakota Department of Public Safety. *Driver License Manual*; South Dakota Department of Public Safety: Pierre, SD, USA, 2018. Available online: <https://dps.sd.gov/application/files/7315/4871/9000/SouthDakotaDriverManual2018.pdf> (accessed on 19 June 2020).
9. New Jersey Motor Vehicle Commission. *The New Jersey Driver Manual*; New Jersey Motor Vehicle Commission: Trenton, NJ, USA, 2019. Available online: <https://www.state.nj.us/mvc/about/manuals.htm> (accessed on 19 June 2020).
10. Twisk, D.A.; Stacey, C. Trends in young driver risk and countermeasures in European countries. *J. Saf. Res.* **2007**, *38*, 245–257. [CrossRef] [PubMed]
11. Washington, S.; Cole, R.J.; Herbel, S.B. European advanced driver training programs: Reasons for optimism. *IATSS Res.* **2011**, *34*, 72–79. [CrossRef]
12. Keskinen, E.; Hernetkoski, K. Driver Education and Training. In *Handbook of Traffic Psychology*; Academic Press: Waltham, MA, USA, 2011; pp. 403–422.
13. NHTS Administration. *Traffic Safety Facts 2017 a Compilation of Motor Vehicle Crash Data*; Report No. DOT HS 812 806; National Highway Traffic Safety Administration's National Center for Statistics and Analysis: Washington, DC, USA, 2019.
14. Singh, S. *Critical Reasons for Crashes Investigated in the National Motor Vehicle Crash Causation Survey*; Report No. DOT HS 812 506; National Highway Traffic Safety Administration: Washington, DC, USA, 2018.
15. NHTS Administration. *Distracted Driving in Fatal Crashes, 2017*; Report No. DOT HS 812 700; National Highway Traffic Safety Administration's National Center for Statistics and Analysis: Washington, DC, USA, 2019.
16. NHTS Administration. *Young Drivers: 2016 Data*; Report No. DOT HS 812 498; National Highway Traffic Safety Administration's National Center for Statistics and Analysis: Washington, DC, USA, 2018.
17. Curry, A.E.; Hafetz, J.; Kallan, M.J.; Winston, F.K.; Durbin, D.R. Prevalence of teen driver errors leading to serious motor vehicle crashes. *Accid. Anal. Prev.* **2011**, *43*, 1285–1290. [CrossRef] [PubMed]

18. McDonald, C.C.; Curry, A.E.; Kandadai, V.; Sommers, M.S.; Winston, F.K. Comparison of teen and adult driver crash scenarios in a nationally representative sample of serious crashes. *Accid. Anal. Prev.* **2014**, *72*, 302–308. [[CrossRef](#)] [[PubMed](#)]
19. World Health Organization. *Global Status Report on Road Safety 2018*; Report No. WHO/NMH/NVI/18.20; World Health Organization: Geneva, Switzerland, 2018.
20. Mims, L.; Brooks, J.O.; Jenkins, C.; Schwambach, B.; Gubitosa, D. Teen drivers' views of a classroom and closed-road post-license driving program, Guard Your Life. *Safety* **2020**, in press.
21. McConomy, S.K. Measurement of Older and Younger Drivers' Selected Seat Position within their Personal Vehicles to Influence Recommended Practices for Meeting Safety Needs of Drivers. *All Diss.* **2015**, 1803. Available online: https://tigerprints.clemson.edu/all_dissertations/1803 (accessed on 22 July 2020).
22. NHTS Administration. *Traffic Safety Facts 2016 a Compilation of Motor Vehicle Crash Data*; Report No. DOT HS 812 554; National Highway Traffic Safety Administration's National Center for Statistics and Analysis: Washington, DC, USA, 2018.
23. Mazzae, E.N.; Garrott, W.R.; Snyder, A. *NHTSA Light Vehicle Antilock Brake System Research Program Task 2: National Telephone Survey of Driver Experiences and Expectations Regarding Conventional Brakes Versus ABS*; Report No. DOT HS 809 429; National Highway Traffic Safety Administration: Washington, DC, USA, 2001.
24. Mollenhauer, M.A.; Dingus, T.A.; Carney, C.; Hankey, J.M.; Jahns, S. Anti-lock brake systems: An assessment of training on driver effectiveness. *Accid. Anal. Prev.* **1997**, *29*, 97–108. [[CrossRef](#)]
25. Petersen, A.; Barrett, R.; Morrison, S. Driver-training and emergency brake performance in cars with antilock braking systems. *Saf. Sci.* **2006**, *44*, 905–917. [[CrossRef](#)]

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