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ARTICLE

National Young-Driver Survey: Teen Perspective and Experience With Factors That Affect Driving Safety

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What's Known on This Subject

Motor vehicle crashes are the leading cause of fatality and acquired disability in adolescents, and young inexperienced drivers are overrepresented in crashes. The perspective of teens on motor vehicle crash risk has not been explored previously.

What This Study Adds

This research adds to the efforts to change adolescents' driving behavior by providing a better understanding of their attitudes and beliefs. It also offers insight into the exposures that shape their attitudes, which can help adults promote messages relevant to the social atmosphere and environmental settings of adolescents.

ABSTRACT

BACKGROUND. Motor vehicle crashes are the leading cause of fatality and acquired disability in adolescents. Young, inexperienced drivers are overrepresented in crashes.

OBJECTIVE. Our goal was to explore the adolescent perspective on driving safety to provide a better understanding of factors that influence safety and teenagers' exposure to driving hazards.

METHODS. Adolescents generated, prioritized, and explained their viewpoint by using the teen-centered method. These viewpoints were obtained from a school-based nationally representative survey of 9th-, 10th-, and 11th-graders (N = 5665) from 68 high schools, conducted in spring 2006, that included teen-generated items. The main outcome measures were rating of risk and prevalence of witnessing driving hazards.

RESULTS. Drinking while driving was ranked as the greatest hazard (87% of the respondents reported that it made a lot of difference), although only 12% witnessed it often. Ranked next as dangers while driving were text-messaging, racing, impairment from marijuana, and road rage. Sixty percent viewed inexperience as a significant hazard, although only 15% reported seeing it often. Cell phone use was viewed as a significant hazard by 28%, although 57% witnessed it frequently. Only 10% viewed peer passengers as hazardous, but 64% frequently observed them. Distracting peer behaviors, among other distractions, were viewed as more dangerous. Subpopulations varied in the degree they perceived hazards. For example, black and Hispanic adolescents viewed substance use while driving as less hazardous than did white adolescents but witnessed it more frequently.

CONCLUSIONS. Adolescents generally understand the danger of intoxicated driving. However, some groups need to better recognize this hazard. Distractions take teenagers' focus off the road, but not all are viewed as hazardous. Although inexperience is the key factor that interacts with other conditions to cause crashes, adolescents do not recognize what merits experience. Future research is needed to explore how to help teens become safer drivers and how to make clinicians, families, and communities more effective in setting, promoting, and monitoring safety standards.

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Key Words
adolescent, driving safety, motor vehicle crashes, traffic accidents, survey, qualitative research, teen drivers, automobile driving, adolescent behavior, risk-taking, safety, alcohol driving, United States

Abbreviations
GDL—graduated driver licensing
TCM—teen-centered method
NYDS—National Young Driver Survey
CI—confidence interval
RR—relative risk

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TEENAGED DRIVERS ARE overrepresented in motor vehicle crashes, and crashes are the leading cause of fatality and acquired disability in adolescents.[1] The majority of these crashes are caused by driver error that is primarily related to inexperience,[2] although speed-related factors[2] and alcohol use[3] contribute heavily. Low use of safety restraints, which contributes to the high rate of fatalities,[4–8] compounds these problems.

Between 1995 and 2005, the number of drivers aged 15 to 20 years who were involved in motor vehicle fatalities[3] was reduced modestly. This was achieved, in part, by delaying licensure through graduated driver licensing (GDL)

TABLE 1 **The TCM**

Stage	Method	Objective	No. of Focus Groups	No. of Teens	Female, %	White (Non-Hispanic), %	Black (Non-Hispanic), %	Hispanic, %	Other Race or Ethnicity, %
1	Exploratory focus groups	To generate ideas	31	193	61	46	35	18	2
2	Nominal group technique	To generate and prioritize ideas; highest responses earn inclusion in survey	14	90	61	48	25	12	16
3	School-based survey	To gain the views and experiences of a nationally representative sample to allow subgroup analyses	NA	5665	49	62	16	16	6
4	Explanatory focus groups	To add meaning and context to ideas	30	160	68	51	19	25	6

NA indicates not applicable.

laws and to reducing teenaged drinking and driving.[1,3,9–16] These results point to the importance of sound policy as a foundation for teen-driver safety. Recent research has suggested that parents can play an important role in enhancing and reinforcing that policy through their teens' licensure process[17,18] and could play a larger role in monitoring them after licensure.[19,20]

Driver education and training initiatives have largely been unsuccessful in reducing crashes that involve teenaged drivers.[21,22] This may be due, in part, to a lack of effective content on specific challenges for novice teenaged drivers, such as detection and appropriate response to hazards and appropriate speed adjustment for driving conditions.[23–25] Other issues that need more attention are substance use (in addition to alcohol)[17,26,27]; distractions[28,29] (including teen passengers)[30–34]; text-messaging or talking on a hand-held telephone while driving[35–39]; inexperience[40–43]; and fatigue.[44–46]

Driver education and training also may not be optimally effective, because they are largely designed without teen input. Little is known of what teenagers perceive as driving dangers, factors to enhance safety, or ways to present interventions that resonate with youths.[44,47–52] To effectively influence teenaged drivers' safety, we must understand risk and safety from their viewpoint.

Our specific aims for this study were to explore teen perspectives regarding risk and safety, both as a driver and as a teen-driven passenger. By focusing on the teen perspective, we hoped to better understand the factors that influence driving safety. To achieve this goal we used the teen-centered method (TCM),[53–56] a research approach that facilitates adolescents to generate, prioritize, and explain their views. This method allows them to describe a wide array of perceived safety factors and then report how frequently they witnessed them. In this article we have focused on the results of a nationally representative survey that included previously well-researched items along with items of greatest concern to the teenaged informants. We report the survey results by describing the teens' perceived driving safety factors and offer an overview of their exposure to those factors. We also introduce how subpopulations differ in risk, safety perceptions, and reported exposures.

METHODS

Teen-Centered Method

The TCM is a mixed qualitative-quantitative method that reveals the adolescent viewpoint. By doing so, it illuminates topics that adult experts may miss.[57] The method is described briefly in Table 1. The hierarchical design has 2 initial qualitative stages to generate and prioritize ideas for stage 3 survey inclusion, from which more rigorous prioritization and subgroup analyses can be performed. A final qualitative stage adds depth and context to survey results.

Study Design: Qualitative Stages

The 443 youth who participated in the qualitative stages served as informants to develop the survey (stages 1 and 2) or explain its results (stage 4). Participants in stages 1 and 2 generated items for the National Young Driver Survey (NYDS) by responding to the question, "What makes a difference in whether teenagers are safe in cars?" Stage 1 focus groups used an open-ended format to elicit a range of ideas and foster in-depth discussion. In contrast, stage 2 used nominal group technique to produce >100 different ideas. A tightly controlled process, nominal group technique allows participants to independently generate and rank ideas because biases imposed by dominant thinkers in less-structured focus groups are limited. Only the highest ranked safety-related factors were included in the survey because of length limitations.

To achieve a broad representation of teen opinions, a 3-tiered approach was used to select schools with varied exposures to protective laws, potential risks, and driving environments for the focus groups. First, state-based teen-driver mortality rates for 2003–2004 were used to sort states into groups (sources: Fatality Analysis Reporting System and 2000 US Census). Second, states were sorted according to policies that affect driving outcomes, including GDL and seat belt laws (source: Insurance Institute for Highway Safety). Third, within policy subgroups, states were sorted according to demographic profiles, including population density, race/ethnicity, and poverty indicators (sources: 2000 US Census and

2003–2004 Public Elementary/Secondary School Universe Survey).

Experienced focus-group moderators conducted all qualitative sessions (stages 1, 2, and 4). Each moderator received 16 hours of training on adolescent group dynamics and how to limit adult biases. The study protocol was approved by the institutional review board of the Children's Hospital of Philadelphia. Parental consent was required, and adolescents actively assented to participation. Participating class teachers received $50 for classroom use.

Survey Study Design

The stage 3 NYDS was conducted in spring 2006 with a nationally representative sample of 5665 9th-, 10th-, and 11th-graders who were attending the 19 873 US public high schools. The NYDS was designed to gather data on perceptions, attitudes, and experiences that are likely to affect driving safety. Measures from previously validated surveys were incorporated into this survey, including demographic measures that are thought to correlate with driving safety (eg, age, gender, race, population density), social or behavioral measures that may influence safety (eg, self-reported school performance, substance use, seatbelt use), and driving experience, including crash history. The teen-generated safety-related items from stages 1 and 2 were included in 2 major survey sections, which are the focus of this article.

The first teen-generated section explored attitudes by asking respondents how much of a difference each of 25 safety-related factors made "in whether or not teens are safe in cars" on a 3-point scale ("no difference," "some difference," or "a lot of difference"). The second section asked how often they were exposed to 32 safety-related factors. Exposures were determined by asking how often they see the different factors, with possible answers of "rarely or never," "sometimes or occasionally," and "often or always." The second section was able to include 7 additional teen-generated items, because pilot testing demonstrated that it was quicker for respondents to report how often they witnessed the factors than it was to rate the degree to which each factor influenced safety. To avoid asking respondents to self-report antisocial or potentially illegal behaviors, we asked how often they witnessed or observed the factors. Some research has suggested that teenagers' reports of witnessed behaviors can serve as a limited proxy measure of personal behavior.[58,59]

Although all students could complete a majority of the survey, a section regarding driver training, behavior, and crash history was completed only by teens who were learning to drive or driving on their own. The survey was a paper-and-pencil questionnaire, administered with an optically scannable answer sheet. It was written at a 4th- to 5th-grade reading level. A 3- vs 5-point Likert scale was used when applicable for easier readability. Pilot testing in 5 high schools in Illinois and Pennsylvania revealed that it was easy to comprehend and could be completed in 20 minutes. The institutional review boards of the Children's Hospital of Philadelphia and Macro International, Inc, the survey contractor, approved the survey protocol.

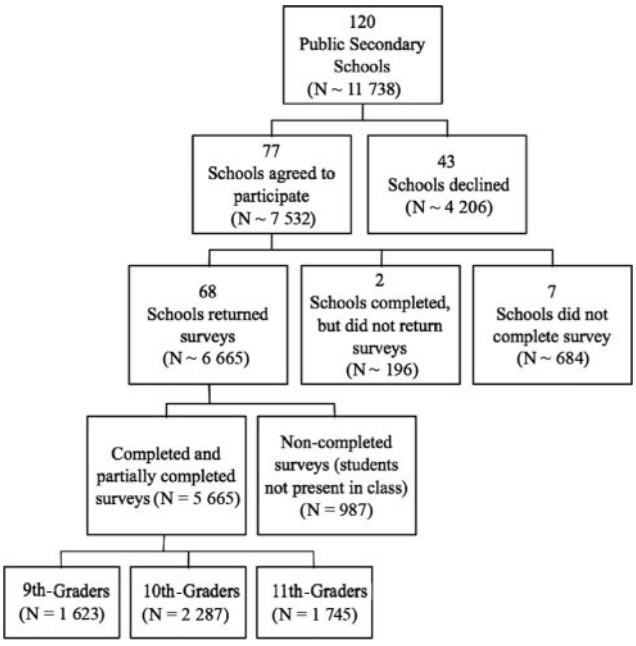

FIGURE 1
Flowchart of survey participants.

Data Sources and Study Population

A 2-stage sample design was used. First, a stratified sample of schools was drawn with probability proportional to size. Schools were stratified as "urban" or "rural" on the basis of whether their zip code was above or below the nation's median population density with 60 sampled from each stratum. Of the 120 schools sampled, 68 returned completed surveys, yielding a school-level response rate of 57% (see Fig 1 for details). Responding and nonresponding schools were compared by using χ^2 tests with respect to geographic region and population density and nonparametric Wilcoxon rank tests with respect to the number of 9th- to 11th-graders, race/ethnicity, and proportion of students in poverty. No statistically significant differences were found at the $\alpha = .05$ level.

At the second stage, one 9th-grade, two 10th-grade, and one 11th-grade class in each school were selected randomly from a list of sections of a required subject. Students were included regardless of driving experience. Class size averaged 21 students. When classes tended to be smaller, additional classes were selected to reach the targeted sample size of ~80 students per school. Tenth-graders were oversampled to provide more information about early drivers, because many teens begin driving in this grade. All 6665 students in the sampled classes were eligible to participate, and 5665 did so, yielding a student-level response rate of 85%.

The selection of a nearly constant number of students at a given grade level across schools, coupled with probability-proportional-to-size selection of schools, generated an approximately self-weighting sample of students

within each grade. To account for 10th-grade class oversampling and differing response rates among schools, weights equal to the inverse of the probability of inclusion were constructed. Thus, a student with a 1-in-200 probability of selection was weighted to represent 200 students, whereas a student with a 1-in-1000 probability of selection was weighted to represent 1000 students. These weights were further adjusted by poststratification, so the distribution of gender, age, and race/ethnicity in the sample matched known distributions for all schools in the sampling frame. When the data are weighted, the sample is representative of all 10.6 million public high school students in 9th to 11th grades.

Statistical Analysis

To ascertain relative rankings of the factors that affect safety, we calculated the percentage, with 2-sided 95% confidence interval (CI), of responses "this makes a lot of difference . . ." for each item. Likewise, to create rankings of reported exposures, we calculated the percentage and 95% CI of responses "often or always" for each item. We placed items' proportions and CIs in a descending order. To develop statistically different ranks, each mean and CI were compared with the previous ones. If an overlap of CIs occurred, we concluded that the items were similar. When the CIs did not overlap, we concluded that the item represented a new rank.

Between-groups comparison was accomplished by using unadjusted stratum-specific relative risks (RRs) with 95% CI for each safety perception and exposure item according to gender, race, grade (as a proxy for age), school performance, population density, driving status, seat belt use, alcohol consumption, and crash involvement. Population density was defined on the basis of the percentage rural/urban of each zip code; zip codes were classified as rural (0% urban) or nonrural (at least part of the location within an urban area). All analyses used weighted estimators to account for the disproportional probabilities of selection and response. To adjust inference to account for weighting and clustering of subjects according to school, robust (sandwich-type) estimators were employed in all analyses by using SAS-callable SUDAAN: Software for the Statistical Analysis of Correlated Data 9.1 (Research Triangle Institute, Research Triangle Park, NC).

RESULTS

Sample Population

Table 2 shows the characteristics of the 5665 survey participants according to gender, race, grade, academic performance, population density, driving status, seat belt use, alcohol use, and passenger crash history.

TABLE 2 **Baseline Characteristics of Survey Participants ($N = 5665$)**

	Unweighted *n* (Weighted %)
Male gender	2734 (51.0)
Race/ethnicity	
White	3667 (61.8)
Black	761 (15.8)
Hispanic	657 (16.5)
Grade	
9th	1663 (37.7)
10th	2287 (32.8)
11th	1745 (29.4)
Academic performance	
A's and B's	3805 (73.1)
C's	1035 (21.5)
D's and F's	259 (5.4)
Nonrural population density	3229 (77.2)
Learning to drive or driving independently	4252 (74.0)
Wear seat belt	3781 (70.0)
No. of days in past 30 d had at least 1 drink of alcohol	
0	3729 (67.7)
1–5	1223 (23.0)
≥6	543 (9.3)
Crashes as passenger in past 12 mo	1101 (20.2)

Perceptions of How Factors Affect Driving Safety

The adolescent respondents rated each of 25 items most highly prioritized in stage 2 in terms of how much of a difference it made in driving safety. Table 3 lists items in order of the percentage of respondents who reported that each would "make a lot of difference" in driving safety and divides them into statistically significant rankings.

Overall, the teenagers described a variety of factors that they perceived to make a difference in driving safety, including issues that affect the driver's state of mind: substances (marijuana or alcohol use), fatigue, nervousness caused by parental supervision, and emotions (happiness, sadness, or rage). Other factors included distractions, comprising those related to technology (cell phone, text-messaging), entertainment (music, dancing), and passengers. Also mentioned were environmental issues such as poor road conditions, risk behaviors such as speeding or racing, and safety choices such as seat belt use.

All items were highly prioritized by teens in earlier stages to earn inclusion in the survey. Ranks are offered to point out relative importance of items but should not be overinterpreted (ie, an item ranked first is not necessarily much more important than items ranked in the second tier). The adolescent respondents divided the 25 items into 9 distinct ranks, with drinking and driving being considered the most risky. The driver text-messaging and racing other cars shared second rank. The driver smoking marijuana and exhibiting road rage shared third rank. Driver inexperience ranked toward the middle. The driver selecting music or playing it loudly, passengers dancing and singing, and driver cell-phone use were ranked relatively low. Adolescent passengers ranked lowest as a driving safety risk.

Reported Exposures to Safety and Risk Factors

Table 4 reveals the teenagers' exposure to 32 items, inclusive of the previous 25 items. Additional items included the driver eating or smoking cigarettes, engaging in upsetting cell-phone conversations, applying makeup, having younger passengers, and being lost. These items are listed in order of the percentage of respondents who often or always saw these behaviors among teenagers in

TABLE 3 **Teen Perceptions of What Situations Make "a Lot of Difference" in Driving Safety**

	Weighted %	Item Rank
The driver has been drinking alcohol	87	1
The driver is text messaging, playing a video game, or using some other kind of handheld electronic device	79	2
The driver is racing other cars	77	2
The driver has been smoking marijuana (weed/pot)	72	3
The driver is angry enough to have road rage	70	3
The driver pays attention to the passengers because they are acting wild	65	4
Other drivers on the road are driving unsafely	65	4
The car can go really fast, and the driver is testing it out or showing it off	63	4
The passengers in the car are trying to get the driver to speed, drive on the sidewalk, or do donuts, etc	62	4
The driver is inexperienced with driving	60	4
The driver and passengers are not wearing seat belts	54	5
It has been snowing or raining and the roads might be slippery	52	5
The driver is speeding	49	5
The passengers in the car have been smoking marijuana (weed/pot)	48	5
The passengers in the car have been drinking alcohol	47	5
The driver is tired	42	6
The driver is feeling strong emotions like being very upset, stressed, angry, or sad	39	6
The driver is in a hurry	37	6
The driver is talking on a cell phone	28	7
The driver's parents are in the car and make the driver nervous	24	7
The driver and passengers are dancing or singing along to the music	21	7
The driver is feeling strong emotions like being very happy or excited	15	8
The music in the car is very loud	14	8
The driver is selecting music while driving	13	8
There are other teenagers in the car	10	9

Items are worded as they were in the survey, which used the adolescents' precise language.

their communities. They are then divided among statistically significant rankings. The items, as a whole, can be viewed as the teenagers' description of the environmental context within cars, because they describe what teenagers witness. The respondents divided the 32 items into 6 distinct ranks. The adolescents have the highest exposure to teen passengers, speeding, and cell-phone use while driving. Distractions such as smoking, eating, and listening to loud music were also commonly reported. They reported low exposure to inexperienced drivers and substance abuse by drivers or passengers.

Subpopulation Differences

Tables 5 and 6 present selected subgroup analyses for different groups' perceptions of factors that affect safety and exposures, respectively. The RRs and 95% CIs compared with the designated index group are offered when statistical significance was reached. Table 5 displays adolescents' views on each item's effect on safety. A low RR suggests that a subgroup perceived that an issue affects safety less compared with the index group's perception. In the case of risk behaviors, therefore, a low RR may be a cause for concern. In contrast, Table 6 shows reported exposures, and a low RR may be reassuring.

Gender played a role in both how respondents perceived the factors affecting safety and how often they reported witnessing them. It seems to have had a lower effect on safety perceptions, with RRs ranging from 0.83 to 1.20, than it did on exposures, for which the RR had a wider range (0.69–1.44). In general, the girls perceived items as having a greater effect on safety. The boys were less likely to report witnessing passengers dancing and singing in the car (RR: 0.69 [95% CI: 0.62–0.76]) and several other items. They were more likely to have reported seeing drivers smoking marijuana (RR: 1.27 [95% CI: 1.03–1.57]), passengers instigating speeding (RR: 1.40 [95% CI: 1.14–1.71]), and inexperienced drivers (RR: 1.44 [95% CI: 1.23–1.68]).

Race had an effect on how adolescents reported influence on safety for 6 of 25 items (Table 5). Although exposures to 10 of the 32 items differed according to race, the range of RRs was narrow (0.77–1.15) (Table 6). It should be noted that black and Hispanic youth viewed drinking alcohol while driving as being less risky than did white youth. Black youth were exposed to driving under the influence of alcohol and marijuana more than white youth (RR: 1.13 [95% CI: 1.07–1.20]). Both minority groups viewed speeding as a greater threat than did the white adolescents (RRs: 1.26 [95% CI: 1.09–1.46] [black] and 1.34 [95% CI: 1.19–1.51] [Hispanic]), with less reported exposure.

Grade level was used as a proxy measure for age, with the understanding that most 9th-graders are teen-driver passengers and 11th-graders have the most driving experience. Few items about safety perceptions varied according to grade level. An exception was parents making the driver nervous, which 10th-graders (RR: 1.25 [95% CI: 1.08–1.44]), who were likely in their learning period, and 11th-graders (RR: 1.22 [95% CI: 1.01–1.47])

TABLE 4 **Teen Reports of Driving Situations They Witness "Often or Always" With Teen Drivers**

	Weighted %	Item Rank
There are other teenagers in the car	64	1
The driver is speeding	59	1
The driver talks on a cell phone	57	1
The driver selects music while driving	52	2
The driver is in a hurry	51	2
The music in the car is very loud	46	3
The driver is eating	35	4
The driver is smoking or lighting a cigarette	34	4
The driver and passengers are dancing or singing along to the music	33	4
The roads are in bad condition, like potholes or construction	31	4
The driver feels strong emotions like being very happy or excited	25	5
Other drivers on the road are driving unsafely	24	5
It has been snowing or raining and the roads are slippery	23	5
The car is in bad condition	23	5
The driver is upset while talking on a cell phone	22	5
There are loud younger children in the car	22	5
The driver is lost and does not know where to go	21	5
The driver is putting on makeup	21	5
The driver feels strong emotions like being very upset, stressed, angry, or sad	20	5
The driver is tired	20	5
The driver is racing other cars	20	5
The car can go really fast, and the driver is testing it out or showing it off	20	5
The driver uses a handheld electronic device (eg, text messaging, a personal listening device, game)	19	5
The driver has road rage	17	5
The driver has been drinking alcohol	16	5
The driver pays attention to the passengers because they are acting wild	16	5
The driver is inexperienced at driving	15	5
The driver's parents are in the car and are making the driver nervous	15	5
The passengers in the car try to get the driver to speed, drive on the sidewalk, or do donuts, etc	13	6
The driver has been smoking marijuana (weed/pot)	12	6
The passengers in the car have been drinking alcohol	12	6
The passengers in the car have been smoking marijuana (weed/pot)	12	6

Items are worded exactly as they were in the survey. Slight variations from the wording in Table 3 reflect grammatical differences required when asking about perceptions of safety versus reported witnessed behaviors.

saw as more important than did 9th-graders. However, 11th-graders reported witnessing many items more frequently, including intoxicated drivers, road rage, use of handheld devices, and inexperienced drivers. Similarly, drivers reported seeing 20 of 32 items more often.

School performance also affected how groups of students perceived various factors that influence driver safety. The lowest achieving students were far less likely to perceive driving while intoxicated as a safety factor (RR: 0.31 [95% CI: 0.22–0.43]). Similarly, these students viewed smoking marijuana while driving, speeding, racing, and text-messaging as far less dangerous than did the A and B students. For 13 of 32 items, the risk exposures of the lesser achieving students were statistically higher than those of the highest achieving students. The greatest differences were in driver and passenger substance use (cigarettes, alcohol, and marijuana) and in the driver feeling angry or sad.

There were few significant differences in safety perceptions or exposures between rural and nonrural youth. The nonrural teens had lower exposure to intoxicated drivers (RR: 0.73 [95% CI: 0.60–0.90]) and higher exposure to slippery roads (RR: 1.21 [95% CI: 1.01–1.44]) and being lost (RR: 1.20 [95% CI: 1.06–1.36]).

Seat belt use measured whether adolescents adhere to a known safety measure. Those who did not wear seat belts regularly viewed all but 4 of the potential risk situations as less tied to safety. Their risk exposure was dramatically higher, especially for substance use. When compared with those who wore seat belts, the unrestrained were more than twice as likely to witness drivers smoking marijuana at least sometimes (RR: 2.47 [95% CI: 1.91–3.20]) and twice as likely to witness drivers drinking alcohol at least sometimes (RR: 1.99 [95% CI: 1.69–2.33]). Their exposure to intoxicated passengers had similar differences. When compared with seat belt users, non–seat belt users were more likely to report observing passengers encouraging the driver to speed (RR: 1.50 [95% CI: 1.69–2.33]), witnessing drivers racing other cars (RR: 1.49 [95% CI: 1.28–1.74]), or showing off (RR: 1.45 [95% CI: 1.24–1.69]).

Respondents reported whether they were nondrinkers, moderate drinkers (1–5 days of alcohol use in the last month), or heavy drinkers (≥6 days of alcohol use in the last month). The moderate drinkers viewed 19 of 25

TABLE 5 Comparison of Teen Subgroups' Perceptions of Situations That Make "a Lot of Difference" in Driving Safety

	Gender, Male (vs Female)	Race (vs White)		Grade (vs 9th)		Grades (vs A's and B's)		Population Density, Nonrural (vs Rural)	Drives, No (vs Yes)	Wears Seatbelt, No (vs Yes)	Days Alcohol Use in Past 30 d (vs 0 d)		Crash as Passenger in Past 12 mo, Yes (vs No)[a]
		Black	Hispanic	10th	11th	C's	D's and F's				1–5	≥6	
Driver has been drinking alcohol	0.93 (0.90–0.96)	0.61 (0.48–0.78)	0.73 (0.53–0.99)	—	—	0.67 (0.52–0.86)	0.31 (0.22–0.43)	—	1.06 (1.03–1.09)	0.83 (0.80–0.87)	0.67 (0.53–0.86)	0.26 (0.20–0.33)	0.88 (0.85–0.92)
Driver text-messaging	0.94 (0.90–0.97)	—	—	—	—	0.80 (0.64–0.99)	0.49 (0.39–0.62)	—	1.05 (1.02–1.09)	0.82 (0.78–0.86)	0.72 (0.60–0.86)	0.38 (0.31–0.45)	0.90 (0.86–0.95)
Driver racing other cars	0.91 (0.88–0.94)	—	—	—	—	0.81 (0.68–0.97)	0.48 (0.39–0.58)	—	1.09 (1.04–1.13)	0.77 (0.72–0.82)	0.70 (0.59–0.83)	0.40 (0.34–0.48)	0.88 (0.83–0.94)
Driver has been smoking marijuana	0.91 (0.85–0.96)	—	—	—	—	0.65 (0.58–0.74)	0.50 (0.41–0.62)	—	—	0.77 (0.73–0.82)	0.54 (0.47–0.61)	0.34 (0.29–0.39)	0.83 (0.77–0.90)
Driver has road rage	0.93 (0.89–0.97)	—	—	—	0.94 (0.89–0.99)	—	—	—	—	0.82 (0.76–0.87)	0.77 (0.68–0.87)	0.51 (0.45–0.57)	0.89 (0.84–0.95)
Driver pays attention to passengers acting wild	0.87 (0.83–0.92)	—	—	—	—	—	0.74 (0.58–0.93)	—	—	0.86 (0.82–0.91)	0.76 (0.68–0.84)	0.52 (0.46–0.58)	0.90 (0.84–0.97)
Other drivers driving unsafely	0.90 (0.85–0.96)	—	—	—	—	—	—	—	—	0.75 (0.70–0.80)	—	0.70 (0.61–0.81)	0.92 (0.86–0.99)
Driver testing/showing off speed	0.84 (0.79–0.89)	—	—	—	—	0.85 (0.76–0.96)	0.63 (0.51–0.77)	—	—	0.76 (0.70–0.81)	0.76 (0.67–0.86)	0.54 (0.48–0.62)	0.84 (0.76–0.92)
Passengers try to get driver to speed, etc	0.88 (0.83–0.93)	—	1.30 (1.16–1.45)	—	—	—	0.70 (0.57–0.86)	—	—	0.79 (0.73–0.85)	0.81 (0.73–0.90)	0.57 (0.49–0.65)	—
Driver inexperienced at driving	0.88 (0.83–0.93)	—	—	—	—	—	—	—	1.09 (1.02–1.16)	0.88 (0.82–0.94)	—	0.75 (0.62–0.89)	—
No one wearing seat belts	0.84 (0.80–0.88)	—	—	—	—	0.77 (0.70–0.85)	0.70 (0.59–0.82)	1.10 (1.01–1.21)	—	0.52 (0.46–0.58)	0.76 (0.69–0.84)	0.65 (0.59–0.73)	0.86 (0.77–0.96)
Snowing or raining and roads slippery	0.83 (0.78–0.88)	—	—	1.11 (1.03–1.21)	1.13 (1.03–1.24)	—	—	—	0.90 (0.83–0.98)	—	—	0.83 (0.74–0.93)	—
Driver speeding	0.84 (0.78–0.89)	1.26 (1.09–1.46)	1.34 (1.19–1.51)	—	0.86 (0.77–0.97)	—	—	—	1.23 (1.14–1.32)	0.70 (0.63–0.77)	0.78 (0.73–0.83)	0.69 (0.61–0.78)	0.86 (0.80–0.94)
Passengers have been smoking marijuana	0.89 (0.83–0.96)	—	—	—	—	0.92 (0.85–0.99)	0.73 (0.63–0.85)	0.90 (0.83–0.98)	—	0.75 (0.69–0.82)	0.72 (0.67–0.77)	0.60 (0.55–0.65)	0.86 (0.77–0.96)
Passengers have been drinking alcohol	0.90 (0.84–0.96)	1.10 (1.02–1.20)	1.22 (1.10–1.34)	—	—	0.89 (0.80–0.98)	0.82 (0.74–0.92)	—	—	0.78 (0.71–0.86)	0.80 (0.74–0.88)	0.70 (0.64–0.76)	0.85 (0.78–0.93)
Driver tired	—	1.23 (1.12–1.36)	—	—	—	—	—	0.87 (0.80–0.95)	0.78 (0.72–0.86)	0.84 (0.75–0.93)	0.92 (0.86–0.99)	0.83 (0.76–0.91)	—
Driver feels strong emotion, sad/angry	—	—	—	—	—	—	—	—	0.77 (0.67–0.89)	0.87 (0.77–0.97)	—	0.89 (0.80–0.98)	—
Driver in a hurry	0.85 (0.78–0.93)	—	—	—	—	—	—	—	—	0.84 (0.74–0.94)	0.89 (0.84–0.94)	0.79 (0.72–0.86)	—
Driver talking on cell phone	—	—	—	—	—	—	—	—	1.17 (1.03–1.33)	0.66 (0.59–0.74)	0.92 (0.88–0.97)	0.89 (0.85–0.94)	—
Driver's parents in car making driver nervous	0.84 (0.74–0.95)	—	—	1.25 (1.08–1.44)	1.22 (1.01–1.47)	1.09 (1.02–1.17)	—	—	0.68 (0.58–0.79)	1.26 (1.07–1.48)	—	—	—
Driver and passengers dancing/singing	—	—	—	—	—	—	—	—	—	0.81 (0.69–0.94)	0.89 (0.86–0.92)	0.90 (0.85–0.95)	—
Driver feels strong emotion, happy/excited	1.20 (1.02–1.42)	—	—	—	—	—	—	—	0.63 (0.50–0.80)	—	—	—	—
Music in car very loud	—	1.10 (1.05–1.15)	—	—	—	—	—	—	—	0.81 (0.67–0.98)	0.92 (0.90–0.95)	0.94 (0.91–0.98)	—
Driver selects music while driving	—	—	—	—	—	—	—	—	—	—	0.94 (0.91–0.97)	0.95 (0.90–0.99)	—
Other teens in car	—	—	—	—	—	—	—	0.80 (0.65–0.99)	0.75 (0.59–0.97)	—	0.97 (0.94–0.99)	—	—

All values shown are RRs (95% CIs); only significant values are shown. The items' wording has been shortened (see Table 3 for wording used in the survey). — indicates nonsignificant values.

[a] Passenger as opposed to personal crash history was explored here, because 36% of the respondents were not drivers.

TABLE 6 **Comparison of Teen Subgroups' Perceptions of Driving Situations They See "Often or Always" With Teen Drivers**

	Gender, Male (vs Female)	Race (vs White)		Grade (vs 9th)		Grades (vs A's and B's)		Population Density, Nonrural (vs Rural)	Drives, No (vs Yes)	Wear Seatbelt, No (vs Yes)	Days of Alcohol Use in Past 30 d (vs 0 d)		Passenger in Crash in Past 12 mo, Yes (vs No)[a]
		Black	Hispanic	10th	11th	C's	D's and F's				1–5 d	≥6 d	
Other teens in car	0.79 (0.75–0.84)	0.79 (0.68–0.93)	0.80 (0.70–0.90)	—	1.13 (1.04–1.23)	0.89 (0.80–0.99)	0.77 (0.65–0.90)	—	0.91 (0.85–0.98)	—	1.20 (1.05–1.37)	—	—
Driver speeding	0.90 (0.85–0.95)	0.77 (0.69–0.87)	0.81 (0.71–0.93)	1.14 (1.05–1.23)	1.28 (1.20–1.37)	—	—	—	0.82 (0.77–0.88)	—	1.28 (1.12–1.46)	—	1.08 (1.02–1.15)
Driver talking on cell phone	0.80 (0.76–0.85)	—	—	—	1.10 (1.03–1.18)	—	—	—	—	—	—	—	—
Driver selects music while driving	0.86 (0.80–0.93)	0.85 (0.75–0.95)	0.82 (0.75–0.91)	—	1.16 (1.07–1.25)	—	—	0.90 (0.82–0.99)	0.88 (0.80–0.96)	—	1.14 (1.04–1.25)	—	—
Driver in a hurry	0.87 (0.82–0.92)	0.88 (0.81–0.95)	0.85 (0.76–0.94)	—	1.15 (1.05–1.25)	—	—	—	0.92 (0.85–0.98)	—	1.16 (1.05–1.29)	—	1.12 (1.05–1.20)
Music in car very loud	0.82 (0.78–0.88)	—	—	—	—	—	—	—	0.90 (0.83–0.99)	1.17 (1.07–1.27)	1.20 (1.10–1.31)	1.29 (1.11–1.49)	1.15 (1.07–1.23)
Driver eating	0.79 (0.73–0.85)	1.14 (1.03–1.26)	0.91 (0.85–0.98)	—	—	—	—	0.83 (0.74–0.94)	0.81 (0.71–0.93)	1.17 (1.05–1.30)	1.09 (1.03–1.15)	1.19 (1.06–1.33)	—
Driver smoking/lighting a cigarette	0.89 (0.81–0.98)	—	—	—	1.16 (1.03–1.31)	1.18 (1.10–1.25)	1.29 (1.06–1.58)	—	0.86 (0.75–0.98)	1.25 (1.12–1.39)	1.18 (1.11–1.26)	1.34 (1.18–1.53)	1.27 (1.14–1.42)
Driver and passengers dancing/singing	0.69 (0.62–0.76)	1.15 (1.06–1.26)	—	—	—	—	—	—	0.84 (0.77–0.92)	1.26 (1.13–1.40)	1.11 (1.03–1.19)	1.26 (1.14–1.39)	1.13 (1.01–1.26)
Roads in bad condition	0.88 (0.81–0.96)	—	—	1.23 (1.07–1.41)	1.34 (1.20–1.50)	—	—	—	0.80 (0.68–0.93)	—	—	1.15 (1.03–1.27)	—
Driver feels strong emotion, happy/excited	0.84 (0.75–0.94)	—	—	—	—	—	—	—	0.85 (0.74–0.97)	1.27 (1.13–1.42)	—	—	1.25 (1.08–1.45)
Other drivers driving unsafely	—	—	—	—	1.21 (1.06–1.38)	—	—	—	—	—	—	1.17 (1.09–1.26)	1.27 (1.11–1.47)
Snowing or raining and roads slippery	—	—	—	—	1.25 (1.08–1.45)	—	—	1.21 (1.01–1.44)	—	—	—	1.14 (1.04–1.24)	—
Car in bad condition	1.18 (1.04–1.35)	—	—	—	—	1.12 (1.04–1.20)	—	—	—	1.20 (1.06–1.36)	1.04 (1.01–1.08)	1.11 (1.03–1.20)	—
Driver upset on cell phone	—	—	—	—	—	—	—	—	—	1.22 (1.10–1.36)	—	—	1.30 (1.13–1.49)
Loud younger kids in car	—	1.12 (1.04–1.21)	1.10 (1.01–1.19)	0.80 (0.67–0.94)	0.78 (0.66–0.92)	—	1.12 (1.01–1.24)	—	—	1.26 (1.10–1.44)	—	—	1.20 (1.03–1.39)
Driver lost	0.82 (0.73–0.93)	—	—	—	—	—	—	1.20 (1.06–1.36)	—	—	—	1.15 (1.07–1.23)	1.20 (1.01–1.41)
Driver putting on makeup	0.83 (0.73–0.95)	—	—	—	—	—	1.12 (1.03–1.23)	—	—	—	—	1.18 (1.10–1.26)	—
Driver feels strong emotion, sad/angry	—	—	—	—	—	—	1.24 (1.12–1.38)	—	—	1.41 (1.25–1.59)	1.08 (1.02–1.13)	1.15 (1.06–1.25)	1.43 (1.19–1.71)
Driver tired	—	—	—	—	—	1.06 (1.02–1.10)	1.17 (1.07–1.27)	—	—	1.22 (1.05–1.42)	1.06 (1.02–1.10)	1.11 (1.02–1.20)	1.31 (1.09–1.58)
Driver racing other cars	—	1.10 (1.03–1.17)	1.11 (1.03–1.20)	—	1.53 (1.27–1.85)	1.16 (1.09–1.24)	1.16 (1.05–1.29)	—	0.69 (0.57–0.83)	1.49 (1.28–1.74)	1.11 (1.07–1.16)	1.20 (1.10–1.32)	1.31 (1.10–1.57)
Driver testing/showing off speed	—	—	—	—	1.27 (1.08–1.50)	1.06 (1.01–1.12)	—	—	0.85 (0.73–0.99)	1.45 (1.24–1.69)	1.07 (1.02–1.12)	1.24 (1.15–1.34)	1.22 (1.04–1.43)
Driver text-messaging	—	—	—	1.29 (1.04–1.60)	1.50 (1.21–1.87)	—	—	—	0.75 (0.60–0.93)	1.29 (1.10–1.51)	—	1.16 (1.07–1.25)	—
Driver has road rage	0.81 (0.69–0.95)	—	—	—	1.38 (1.15–1.66)	—	1.12 (1.01–1.23)	—	0.69 (0.57–0.83)	1.32 (1.11–1.58)	—	1.19 (1.11–1.27)	1.57 (1.34–1.85)
Driver has been drinking alcohol	—	1.13 (1.07–1.20)	—	—	—	1.09 (1.04–1.13)	1.22 (1.11–1.34)	0.73 (0.60–0.90)	0.72 (0.61–0.85)	1.99 (1.69–2.33)	1.08 (1.05–1.12)	1.32 (1.22–1.44)	1.44 (1.21–1.72)
Driver pays attention to passengers acting wild	—	—	—	—	—	—	1.13 (1.03–1.24)	0.78 (0.64–0.95)	—	1.40 (1.20–1.64)	—	1.21 (1.14–1.29)	1.34 (1.06–1.69)
Driver inexperienced at driving	1.44 (1.23–1.68)	—	—	—	1.31 (1.03–1.65)	—	—	—	—	—	—	1.14 (1.06–1.22)	1.25 (1.02–1.52)
Driver's parents in car making driver nervous	—	—	—	—	—	—	—	—	0.78 (0.63–0.98)	1.23 (1.05–1.45)	—	1.12 (1.06–1.18)	—
Passengers try to get driver to speed, etc	1.40 (1.14–1.71)	—	—	—	—	1.06 (1.02–1.10)	1.18 (1.07–1.30)	—	0.64 (0.52–0.79)	1.50 (1.24–1.80)	1.05 (1.01–1.08)	1.23 (1.14–1.33)	1.49 (1.17–1.91)
Driver has been smoking marijuana	1.27 (1.03–1.57)	1.13 (1.06–1.21)	—	—	1.69 (1.34–2.13)	1.12 (1.06–1.19)	1.28 (1.14–1.43)	—	0.56 (0.44–0.71)	2.47 (1.91–3.20)	1.11 (1.07–1.14)	1.43 (1.28–1.60)	1.64 (1.33–2.03)
Passengers have been drinking alcohol	—	—	—	—	1.38 (1.13–1.69)	1.08 (1.04–1.11)	1.21 (1.11–1.31)	—	0.69 (0.56–0.85)	2.39 (2.03–2.81)	1.08 (1.05–1.11)	1.38 (1.26–1.51)	1.42 (1.13–1.78)
Passengers have been smoking marijuana	—	—	—	—	1.48 (1.20–1.82)	1.10 (1.06–1.15)	1.28 (1.14–1.44)	—	0.69 (0.54–0.90)	2.22 (1.83–2.69)	1.11 (1.07–1.16)	1.51 (1.38–1.66)	1.74 (1.36–2.22)

All values shown are RRs (95% CIs); only significant values are shown. The items' wording has been shortened (see Table 4 for wording used in the survey). — indicates nonsignificant values.

[a] Passenger as opposed to personal crash history was explored here, because 36% of the respondents were not drivers.

items as impacting less on safety, and the heavy drinkers viewed 22 items likewise. The greatest difference between the groups was in how they assessed the risk of substance use while driving. When compared with nondrinkers, heavy drinkers reported lower perceived risk associated with driver alcohol use (RR: 0.26 [95% CI: 0.20–0.33]) and marijuana use (RR: 0.34 [95% CI: 0.29–0.39]). The heavy drinkers viewed road rage as less dangerous (RR: 0.51 [95% CI: 0.45–0.57]) compared with nondrinkers. Heavy drinkers reported increased exposure to 24 of 32 items, with the greatest differences related to substance use, suggesting that at-risk health behaviors tend to cluster.

Respondents who had been a passenger in a crash in the last year viewed 12 of 25 items as having a moderately lower (RRs ranged from 0.83 to 0.92) impact on safety. Conversely, they reported greater exposure to 22 of the 32 items. The most notable differences included exposure to substances, road rage, passengers acting wildly or goading the driver to speed, and the driver having strong negative emotions.

DISCUSSION

The NYDS offers an opportunity for a nationally representative cross-section of teenagers to share their perspectives on factors that affect driving safety and report their exposure to driving safety hazards. They recognized many previously researched hazards, including substance use and distractions, but did not appreciate how distractions interplay with inexperience. The breadth of these teen-generated survey items adds to known risk and protective factors. These items also offer a better grasp of the environmental context in cars and the social atmosphere in which teenagers make driving decisions. For example, although distractions are known to contribute to crashes, this research reveals new ones not previously considered by adult investigators and allowed teenagers to rate their relative importance and observed frequency. In addition, the survey explored subgroup differences, positioning policy makers and educators to target interventions more effectively.

A great deal of previous research has shown the major contributing factors to adolescent crashes and public health efforts and laws have contributed to mitigating these factors.[60] Implementing alcohol-related (such as minimum legal drinking age and lowered blood-alcohol limits for youth)[3,61] and GDL[62] laws and having teenagers recognize the extreme danger of driving while intoxicated have contributed substantially to decrease teen crashes.[61,63,64] However, other areas need much further progress. A first step is to gain a deeper understanding of what affects adolescents' safety within cars and a more accurate understanding of their exposure to risky situations. Our research has begun to achieve this and identified some specific target factors and teen subgroups.

Much of our data substantiate existing knowledge while offering insights into how varied factors may affect safety. For example, although distractions have long been known to increase crash risk,[65] we now better understand their nature, ranging from peer interactions to communication technologies. In other cases, the data reveal important gaps in teenagers' understanding of safety issues. For example, although inexperience plays a primary role in crashes,[40,66] the informants seem to underplay its importance and prevalence. In other cases, the data reveal discordant views among adolescent subgroups with implications for how to target intervention strategies.

The NYDS demonstrates that, in general, America's adolescents understand the hazard of driving while intoxicated. They view it as the greatest danger, and exposure is infrequent. In fact, substance use is not the leading cause of crashes among teenagers.[2] Among the youngest drivers (16- to 17-year-olds), substances were involved in 15% of fatal crashes.[1,3] The impact of substance use increases among 21- to 30-year-old drivers, when drinking may increase and other factors such as inexperience and vulnerability to distractions may lessen.[1]

The downward trend of teens driving under the influence[1,3] is likely related to minimum legal drinking age laws accompanied by public health awareness campaigns that also offer alternatives (eg, designated drivers).[67,68] However, our data reveal that certain subgroups are either not receiving or rejecting the message. Fewer minority youths recognized substance use as an important driving hazard and reported increased exposures to it. It is unlikely that culture is the driving force behind these racial differences. Future work should disentangle race from socioeconomic and other factors. Nevertheless, public health interventions often focus on racial or ethnic groups, and our data suggest that these groups merit targeted efforts. We also need to better affect attitudinal and behavioral changes in our risk-taking and scholastically underperforming youth.

Our data reveal a striking lack of awareness of how inexperience among adolescent drivers affects safety. Although 60% believed that inexperience heavily influences safety, only 15% reported exposure to inexperienced drivers in a sample that solely included passengers and young drivers, nearly all of whom would be considered inexperienced by experts. Therefore, an initial step is to understand how teenagers judge "experience." Our qualitative data suggest that it is simply determined by driver licensure, not by miles driven or exposure to difficult driving circumstances. The second step is to make adolescents aware of how inexperience affects safety.

Inexperience is heavily mitigated during the learner period when a parent is present.[69,70] A teen's risk is at its lifetime highest level on the first day of independent driving. This risk continues to be disproportionately high for the first 6 months of independent driving and does not reach adult levels until the age of 25 years.[71] The steep decline that begins after the first month of driving demonstrates that inexperience contributes most heavily to crashes. Developmental factors, including cognitive immaturity, emotional liability, and risk taking, also affect crash rates.[72] However, if these developmental factors were the primary forces contributing to crashes, a much slower decline in crash rates would be expected.[72] GDL laws exist largely to limit exposure to risky situations (peers, nighttime driving) during the earliest phases of independent driving while young drivers gain experience.[30]

To help adolescents become more receptive and adherent to GDL laws, we must make them aware that these laws exist to protect young, inexperienced drivers. Distractions take the highest toll on inexperienced drivers who need to give their full attention to the road. Anything that diminishes their cognitive capabilities, including substances, fatigue, and emotional reactions, must be avoided.

Because of substantial increased crash risk, many GDL laws limit teenaged passengers until drivers gain experience.[33] At first glance, adolescents do not seem to recognize passengers as a problem; only 10% believed that other teens in the car contribute substantially to danger, although 64% saw teen passengers often. However, a closer look reveals clear distinctions on how they view peers' presence in cars as a potential hazard. Although peer presence was perceived as low risk, the perceived danger increased incrementally in the following order: if they "dance and sing," are intoxicated, encourage speeding, or "act wild." These insights provide important information on how teen passengers may increase crash risk. For these perceptions to be confirmed, however, actual crash data must be analyzed.

Similarly, teenagers perceive a hierarchy of increasing danger for other behaviors. For example they do not view cell phones as dangerous, but they considered use that triggers emotional responses to be dangerous and text-messaging to be hazardous. The hierarchies our informants offered suggest that adult researchers may have lumped conditions together too casually and could better reach teenagers by addressing the nuances they perceive. Nevertheless, higher level risks (eg, passengers acting wild) cannot occur if lower risk conditions are not allowed (eg, no teen passengers during early independent driving).

It is notable that some factors deemed most dangerous by teenagers (eg, drinking) are rarely seen, whereas others perceived as relatively benign (eg, teen passengers and cell-phone use) are commonly encountered. Possibly, frequently seen issues are judged as low risk precisely because, although often witnessed, they are rarely associated with an untoward event. Common exposure could lead to extinction of safety messages when dire predicted consequences do not materialize[73,74] and even change youths' perceptions about riskiness. This poses the challenge of creating education strategies that acknowledge adolescents' real-life experiences while helping them to recognize increased risks. In addition, it challenges us to explore whether the highest yield in behavioral change would come from reducing community exposures (eg, prevalence of impaired driving) versus addressing adolescents' beliefs and attitudes.

Adults may be better poised to reach teenagers with messages they view as reliable and authentic when equipped with a clear understanding of how adolescents perceive safety and risk. Adolescent input can ensure that programs or interventions resonate with youths. Antitobacco efforts serve as a clear example of how adolescents can shape an effective campaign. The "Truth" campaign was a national tobacco countermarketing strategy formulated by youth under adult facilitation. Its success stands in contrast to other antismoking efforts that backfired by highlighting the riskiness of smoking or labeling it as an adult-only behavior.[75,76] Our study elucidates the adolescent perspective and, therefore, may allow adults to more effectively address driving safety.

Clinicians are ideally positioned to deliver prevention messages. The American Academy of Pediatrics' policy statement on teen drivers suggested how pediatricians can work with adolescent patients, parents, communities, and legislators to address driving safety.[72] These suggestions included screening for and treating conditions known to increase risk (eg, attention-deficit/hyperactivity disorder), guiding teens away from risky conditions, encouraging seatbelt use, and implementation of restrictions by parents and communities on young drivers while they gain experience. The authors suggested that pediatricians should introduce families to a parent-teen agreement, a tool that helps parents restrict challenging driving exposures until adolescents gain experience and demonstrate responsibility.[72]

LIMITATIONS

The major limitations of these data are that they rely on perceptions and that both safety perceptions and exposures are self-reported. It is not an observational study in which behaviors were closely monitored or an intervention-design study that recorded outcomes. Although adolescents' perceptions of safety factors are illuminating, we cannot say with certainty that addressing these factors would enhance safety. Future research will need to develop and test interventions that respond to the issues raised here by teenagers. Moreover, to afford teens greater comfort in reporting antisocial behavior, we chose to have them report what they saw in their community. Therefore, it is important to interpret the exposure data as how many times teens report seeing a behavior "often" rather than as a percentage of youth who exhibit the behavior. Finally, the safety factors reported here were generated by participants using the TCM. Qualitative research holds the potential for imposed investigator bias. However, the careful selection criteria here limited that potential, and the population-based sample validated the ideas across a larger sample.

CONCLUSIONS

Adolescents have offered a glimpse into their perceptions of the environment within cars that affects driver and passenger safety. We learn from the perceptions they shared, the experiences they reported witnessing, and their omissions. It is clear that many, but not all, recognized some of the most important risk factors such as driving while intoxicated. However, this critical message needs to be relayed more effectively to some groups, particularly minority populations. These youth offered a rich description of the distractions that take their focus off the road and described the perceived degree with which they affect safety. Although inexperience is the known factor interacting with other risk

factors and conditions to create crashes, teenagers do not recognize what merits "experience."

This research adds important data to the efforts to change adolescent driving behavior, because it provides a better understanding of their attitudes and beliefs. In addition, it offers insight into the exposures that shape their attitudes. Adults may be better positioned to reach adolescents with health-promoting messages when equipped with an understanding of the social atmosphere and environmental settings that contribute to their perceptions of safety and risk. Future research is needed to explore how to make clinicians, families, and communities more effective in conveying safety messages, setting safety standards, and monitoring those standards. In parallel, we must learn how to make teenagers receptive to these messages and to offer them the knowledge and skills to become safer drivers.

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