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## Design and implementation of a parent guide for coaching teen drivers

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### Abstract

**Introduction:** Teens beginning to drive independently are at significant increased risk of motor-vehicle crashes relative to their other life stages. There is, however, little guidance for parents as to how best to supervise learning to drive.

**Method:** This study sought to undertake an informed approach to development and implementation of a *Parent Guide*. We included a multi-stage development process, using theory, findings from a Delphi-study of young driver traffic-safety experts, and parent focus groups. This process informed the development of a *Guide* that was then evaluated for feasibility and acceptability, comparing a group that received the *Guide* with a control group of parent and teen dyads. Both members of the dyads were surveyed at baseline, again at the approximate time teens would be licensed to drive independently (post-test), and again three months later.

**Results:** We found no difference in the proportion of teens who became licensed between those given the new *Guide* and control teens (who received the state-developed booklet); that is the *Guide* did not appear to promote or delay licensure. Teens in the *Guide* group reported that their parents were more likely to use the provided resource compared with control teens. Responses indicated that the *Parent Guide* was favorably viewed, that it was easy to use, and that the logging of hours was a useful inclusion. Parents noted that the *Guide* helped them manage their stress, provided strategies to keep calm, and helped with planning practice. In contrast, control parents noted that their booklet helped explain rules. Among licensed teens there was no significant difference in self-reported risky driving at the three-month follow-up. We discuss the challenges in providing motivation for parents to move beyond a set number of practice hours to provide diversity of driving practice.

### Keywords

Supervision; Evaluation; Motor vehicle; Learner driver; Intervention program

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## 1. Introduction

Driving is one of the most complex, dynamic, and potentially harmful tasks in daily life, and learning to drive is a significant event for teens and their parents. For teens, the risk of being fatally or non-fatally injured in a crash is at its highest lifetime level during the early stages of driving independently (Masten & Foss, 2010; Mayhew, Simpson, Groseilliers, & Williams, 2001), with motor-vehicle crashes (MVCs) the leading cause of death for teens (CDC, 2017). Graduated driver licensing (GDL), developed to reduce teen driver crashes, is effective in increasing safety while teens begin driving independently (Shope, Molnar, Elliot, & Waller, 2001). GDL requires that an experienced driver supervise teens' driving during the learner stage, a role usually undertaken by a parent. Appropriate parental involvement potentially enhances GDL's overall effectiveness, yet there has been little evidence-based guidance to help parents supervise their learner teens' practice driving in a way that increases their safety later when they are driving independently without supervision (Curry, Peek-Asa, Hamann, & Mirman, 2015). This paper describes the design, implementation, and process evaluation of a theory-based guide to assist parents with not merely supervising, but effectively coaching, their teens in the learner stage of GDL so that they can be safer when driving independently.

Research indicates that increased parent involvement reduces the teens' MVC risk (Simons-Morton & Ouimet, 2006), but parents vary in their involvement, engagement, interest, and approach to coaching, supervising, and monitoring their teens' driving (Goodwin, Foss, Margolis, & Harrell, 2014; Simons-Morton, Ouimet, & Catalano, 2008). A recent review of parent-directed programs designed to improve teen driver safety suggested that active engagement by parents is a common element in the few effective programs that reduce factors associated with teen driver crash risk (the reviewed programs were focused on both the learning stage and early independent driving stage; Curry et al., 2015). The review further identified two effective programs that focus on parenting behavior in the learner stage. The program reported by Mirman et al. (2014) showed fewer assessment terminations in a practical driving assessment task (errors with the potential to seriously jeopardize safety). Their program involved a website of videos for skill development, and the research team provided a reminder call after three weeks without a login throughout the learner stage.

Another study of a somewhat contact-intensive program that was conducted throughout the learner stage involved a 45-minute session, four phone sessions, a DVD, and a workbook (Peek-Asa et al., 2014). The program sought to provide parents with skills to motivate their teens to make safe driving decisions through motivational interviewing, and to provide information about safety principles (e.g., traffic signals, being a safe passenger, rural driving). The evaluation showed that intervention teens who reported a high frequency of driving-related conversations reported less risky driving compared with control teens who reported few driving-related conversations as measured after 1-month and 6-months of driving independently (Peek-Asa et al., 2014). In contrast to this contact-intensive program, the project reported herein sought to develop a well-researched coaching guide for teens' learner stage of driving that was portable, convenient for parents, and required no research contact.

To date, much of the research on parent programs has focused on the intermediate stage of GDL licensure, for example with programs such as Checkpoints that has provided evidence of change in underlying theoretical constructs (of Protection Motivation Theory, PMT), and has demonstrated reduced teen risky driving behavior, traffic violations, and crash involvement (Simons-Morton, Hartos, Leaf, & Preusser, 2005; Zakrajsek et al., 2013; Zakrajsek, Shope, Ouimet, Wang, & Simons-Morton, 2009). The current project's *Parent Guide* is also based on PMT (Rogers, 1983), focusing particularly on the cognitive processes that motivate health behavior change and on parent-teen communication.

While required supervised practice driving is an effective element of GDL, and is generally accepted by parents and teens (Waller, Olk, & Shope, 2000; Williams, Braitman, & Mccartt, 2011), little information is typically provided about the appropriate focus of this practice driving; therefore often parents and teens focus on the maneuvering skills that are required for passing the road test for the next stage of licensure (Goodwin et al., 2014). One of the few observational studies of the learner stage of driving found that parent supervision primarily focused on routine and unvarying routes of practice, such as to/from school (see Goodwin, Foss, Margolis, & Waller, 2010). Thus, essential experiences of more challenging roadways and complex conditions may not be obtained during the learner stage.

To be effective, intervention development is necessarily an intensive process for complex behaviors such as supervising teen's driving. As described by Campbell et al. (2000), intervention development is iterative and should include rigorous design and the conduct of an exploratory trial of the intervention (prior to large scale randomized control trials and dissemination efforts). They suggest that program development work involve defining components of the intervention for evidence-based practice, and understanding acceptability and feasibility. Issues of acceptability and feasibility include, for example, use and availability of the program, participant satisfaction (a likely precursor to future use and recommendation), as well as program differentiation (that is, the control group receives different experiences from the intervention group). Relevant findings can help refine the program for a large trial and dissemination (Buckley & Sheehan, 2004).

We sought to develop a convenient teen driving coaching guide for parents that included the motivation, basic tools, exercises, and approaches necessary to teach essential safe driving skills to their teen drivers during the supervised practice driving required by GDL. Design decisions reflected the research findings that effective programs need to be user-friendly, theory-based, and contain appropriate and relevant content. The aim of our research was centered on the program design process, that is, to (i) develop an evidence-based coaching guide for parents of teen learner drivers, and (ii) evaluate the process and implementation of the coaching guide so that future research could test efficacy.

## 2. Method

All study procedures were approved and conducted in compliance with the guidelines of the University of Michigan Institutional Review Board for Human Subjects. We begin by describing development of the *Guide*, followed by procedures for the process and implementation evaluation.

## 2.1. Development of the Parent Guide for coaching teen drivers theory

The parent coaching guide was developed according to PMT (Rogers, 1983) as it has been applied in the context of parenting programs for teen driver safety: the effective Checkpoints program (see Simons-Morton et al., 2005). According to PMT, potential health risks arise from both environmental and individual factors (Rogers, 1983). The awareness of potential risk results in concern over potential health outcomes (e.g., teens' crash-related injury), which initiates risk appraisal and coping appraisal. Risk appraisal is the evaluation of the health threat and its intrinsic and extrinsic rewards, severity, and likelihood of occurring. Coping appraisal is the evaluation of one's ability to avert the health threat (i.e., self-efficacy and response efficacy), balanced by the cost of protective action (i.e., response cost). These two appraisals provide motivation, increase intentions, and promote protective action. According to the theory, a parent is motivated through realizing that their teen's crash risk is sufficient to warrant action and that parental action can reduce that risk. Action is taken when there is a realistic appreciation of potential injury outcomes, their likelihood and potential severity, and when the coping action is sufficiently simple that parents feel confident they can perform it effectively.

The *Parent Guide for Coaching Teen Drivers* was developed to address both risk appraisal and coping appraisal. Regarding risk appraisal, the threat of MVCs for all young novice drivers is provided. Coping appraisal is addressed by the provision of reminders, suggestions, practical checklists, the benefits of suggestions, and the message that parents play a critical role in protecting their teens. Tips are provided to address efficacy and the ease of implementation.

**2.1.1. Driving Skills Selection for the Parent Guide**—We developed the *Parent Guide* content incorporating feedback from 12 driving safety experts using a modified Delphi method. The Delphi exercise had three rounds. Round 1 sought to identify essential driving skills and objectives for the *Guide*. The following two rounds involved more detailed definitions, and an ongoing focus on skills that parents should practice with their teen during the learner stage, that is, skills that were not necessarily taught in driver education and skills that would be very important for newly licensed teen drivers. After the skills were carefully described, experts rated their priority and then elaborated on them. Table 1 provides the essential skills that were ranked by at least half the respondents as a priority.

During the first round of the Delphi process, several skills were identified (Table 1). In addition, they considered formatting, including terminology and literacy (making it suitable for a diverse mix of parents), for example "... avoid... jargon and use simple English, at a relatively basic reading level." Experts suggested that the design consider building skills (ensuring that skills could be appropriately built upon), and that guidelines and example scenarios be presented, "...guidelines as to what should be actively practiced in each situation." Some experts highlighted the need to focus on what could be practiced, "...focus only on what parents should and could help teens practice." Overall length was important, as was the balance of length and focus, for example, "I worry that if parents try to teach everything and give everything equal weight, their teen drivers won't know where it is most important to focus."

**2.1.2. User input for the Parent Guide**—We sought to present material in a user-friendly manner so to further develop the content and format of the *Parent Guide*, we conducted three focus groups comprised of 21 parents of teens at three different stages of licensure: (i) new learner drivers, those teens who only recently obtained a learner permit; (ii) experienced learner drivers, those teens nearing the end of the learner supervised driving stage; and (iii) new independent drivers, those teens who had recently completed the learner stage and were now licensed to drive independently. The parent focus groups were conducted after the experts' modified Delphi input, and parents were asked to reflect on a detailed draft of the content material developed.

Parents provided feedback and input regarding design/format, potential driving skills, motivation issues, and communication with teens (see Table 2). Parents suggested that the *Guide* include brief summations (e.g., checklists), be at an appropriate literacy level, be of minimal length, cover the appropriate driving skills, and cover issues around communicating.

**2.1.3. Final draft of the Parent Guide for coaching teen drivers**—Following input from the experts and parents, a draft guide in a 5½ by 8½ inch spiral-bound booklet with a soft cover and index tabs was assembled and reviewed independently by parents of teens. Minor revisions based on their comments were made. The final 72-page booklet was attractive, colorful, not text-heavy and included photographs, graphics, and user-friendly formatting. Three practice driving principles were emphasized consistently throughout – (a) Start with the simplest, safest conditions, (b) Progress slowly from easier to more challenging driving conditions, and (c) Practice the same driving skills repeatedly and with focus. The Parent Guide for Coaching Teen Drivers includes an introduction (teen driving facts, why and how to use the *Guide*) and motivation strategies throughout (as per PMT). Separate sections address communication and coaching tips (including communication between parents, and receiving feedback from teens), and recognizing hazards, and reacting safely. Graphic representations of the practice principles are provided via two charts displaying driving that is low-risk to high-risk in various conditions and settings. Skill development guidance is given for empty parking lots, residential streets, business streets, downtown/city streets, freeways, and rural roads. Finally, the *Guide* includes a practice driving log and sample practice drives for the various road types.

## 2.2. Procedure for evaluation of the Parent Guide for coaching teen drivers

### 2.2.1. Participants

**2.2.1.1. Eligibility and inclusion.:** Michigan dyads of teens at the learner stage and their parents were recruited. Michigan requires teens complete the first (Segment 1) of two driver education courses to obtain a Level 1 (learner) driver license, which allows driving only with an accompanying licensed adult. Teens must hold the Level 1 license for at least six months, during which they are required to complete at least 50 h of supervised driving (10 of which must be at night). Teens under 18 years can obtain a Level 1 license from age 14 years, 9 months. Teens must be 16 years or older, complete a second segment of driver education, and pass a driving skill test to obtain a Level 2 license allowing for independent, unsupervised driving (with night and passenger restrictions). Dyads needed to understand

and speak English and agree to complete the state-required supervised driving hours within eight months of enrollment into the study (about 1.5 h of supervised driving per week). Parent inclusion criteria were: living with the teen, being the primary supervisor, and having access to a vehicle for supervised driving. Teens had to hold a Level 1 license, but not yet have had more than 4 h of supervised driving.

**2.2.1.2. Recruitment.:** Recruitment fliers provided brief study and contact information. They were distributed to parents of age-eligible teens and placed on community noticeboards around Southeast Michigan (including electronic noticeboards within the University). Distribution primarily occurred through 13 Segment 1 driver education providers with 36 classroom locations as this allowed the most targeted access to teens preparing to obtain a Level 1 license. One of the participating driver education providers was among the largest in the state and provided Segment 1 to approximately 47% of the teens from the study area who obtained a Level 1 license during the recruitment period. Flyers were also distributed via other community organizations (e.g., Chambers of Commerce, libraries, YMCAs, community parks and recreation departments, churches, 4-H groups, and local businesses) and snowball methods (of contacted parents and teens). When parents contacted the study team, they were screened for eligibility, enrolled, and given an appointment to meet with a research assistant.

**2.2.2. Group allocation—**Randomization to groups was stratified by teens' sex, and the assignment was done in blocks of 10 within each sex cell to equalize the sample size within each group over time. Parents and teens were not made aware of their allocation. At recruitment (prior to randomization), parents were also invited to be part of a sub-study involving a G-force triggered recording device mounted inside a vehicle's windshield (sub-study to be described and reported elsewhere; n = 15).

**2.2.3. Control group material—**The control group was provided with the 27-page booklet from the Michigan Department of State (MDOS), *Michigan's Graduated Driver Licensing: A Guide for Parents*, which was available to everyone at state driver licensing offices. The MDOS booklet describes Michigan's GDL requirements and has brief information on coaching teen drivers, auto insurance, choosing a vehicle for teen drivers, and the zero tolerance and minor in possession laws.

**2.2.4. Data collection—**Data were collected from parents and teens separately at three time-points: (a) baseline, prior to beginning supervised driving practice; (b) posttest, approximately at the end of the supervised driving stage (ideally about eight-months after baseline); and (c) three months after the posttest (ideally to reflect teens' first three months of driving independently on a Level 2 license). Baseline data collection began in July 2014 and ended in May 2016.

After providing consent and assent, parents and teens each completed baseline surveys using an iPad Mini, in the presence of a research assistant. At this appointment, they were provided with a guide (*Parent Guide* or MDOS booklet), with no further instruction. Dyads were contacted after approximately seven months to check on their supervised driving progress and determine a possible supervised driving completion and licensing date. The

study team then contacted the dyad within a month of the estimated completion date. Parents and teens were separately emailed a link, username, and password to their online posttest surveys. The same process was undertaken three-months later. Parents and teens who did not complete their surveys within one week of being notified were contacted again, with at least three attempts made to contact participants by email and/or phone before they were considered lost to follow-up. Parents and teens were compensated for their participation, each paid \$15 at their completed posttest, and \$15 at their completed three-month follow-up surveys.

**2.2.5. Measures**—We used a number of posttest measures to assess implementation. Teens in both groups recorded yes/no as to whether their parent used the provided booklet (our *Parent Guide* or the MDOS booklet), and then rated the frequency with which they used the booklet (Likert-type scale, 1 to 4, Never to Often). Also at posttest, *Parent Guide* parents were asked how much of the booklet they read (Likert-type scale 1–5, None to All), and the time-period during which they used the booklet the most often (multiple options: within the first 10 h of supervision, early [11–20 h], in the middle [21–30 h], late [31–40 h], near the end [41–50 h], or never). They were asked how often they and their teen went over the *Parent Guide* together (Likert-type scale, 1–5, Never to All the time), and if they would recommend the *Parent Guide* to other families (yes/no). Finally, parents were asked to comment on the Guide/booklet: what they liked most/least, what they found most/least helpful, and what they would change. Further, they described any other booklets or resources they used through the supervision stage.

Parents and teens were asked about their experience with supervised driving and to comment on what they liked most and least about supervised driving. Teens were asked to comment on what they found most and least helpful, and what they wished there was more and less of throughout supervised practice. At the three-month follow-up, parents were asked what they wished they had worked on more, and what they were glad they worked on during their teens' supervised practice driving, as well as what parents still found helpful from the *Parent Guide*.

**2.2.5.1. Preliminary outcomes:** The primary outcome variable was teens' risky driving behavior (TRDB) assessed by self-report at the three-month follow-up survey. This 20-item measure (Donovan, 1993) has good predictive and construct validity (this study Cronbach's  $\alpha = 0.89$ ) and assesses driving practices in areas such as speeding, improper passing, close following, and control signal violations. At baseline, before beginning supervised practice, parents and teens provided information on their perceived risk of teens' driving in 15 different situations (e.g., in rural areas, in busy traffic). Participants rated how risky each scenario was on a Likert-type scale, from 1 to 5, low risk to high risk (Cronbach's alpha = 0.88 and 0.90 for parents and teens, respectively). The perceived risk scale was calculated as an average of these 15 items.

### 2.3. Data analysis

Group comparison on study variables were undertaken using two sample t-tests or chi-squared tests using both teen and parent data (95% confidence testing). This included a test

of baseline differences: between intervention and control groups (randomization check); those lost to follow-up compared with those retained; and those who obtained a license at follow-up compared with those who had not (the latter two undertaken overall and separately for intervention and control groups).

Process evaluation data were primarily qualitative and we identified main themes by reviewing the data within responses to particular questions, identifying subthemes of frequently reported responses and attaching a subtheme to the text where it was repeatedly identified. Through an iterative process, we thus attached textual labels of sub-themes to participant responses to questions. That is, when a sub-theme was noted, a textual label was attached and on reappearance the label was again attached. Sub-theme content identification continued with refining codes to form more well-defined categories or content within the broad framework of each question. We identified subthemes and calculated the frequency of appearance (reported as percentages within groups). We also provided some descriptive calculations of responses to items examining the use of the booklets (on a Likert-type scale), and used *t*-tests to compare mean responses of the *Parent Guide* and control groups to the item asking about frequency of use.

We tested for between group differences in the follow-up TRDB scores. Between group differences were tested using two sample *t*-tests. To determine whether baseline perceived risk modified potential treatment effects, we used linear regression and tested for a significant interaction between treatment group and baseline perceived risk. This was done separately for parent-reported perceived risk, and teen-reported perceived risk.

### 3. Results

There were 186 dyads (teen and parent) enrolled. At the first follow-up, 156 parents and 152 teens responded, and at the second follow-up 135 parents and 129 teens responded. There were no significant differences between those retained and those lost to follow-up on study variables at baseline.

#### 3.1. Participant characteristics

Enrolled teens were: 110 females, 59%, M age = 14.94, S.D. = 0.57. Enrolled parents were 87% mothers, and 92% White, 6% Black, and 1% Hispanic. 79% were married and 16% were divorced. 97% reported some education after high school, and 69% reported annual household incomes greater than \$70,000. There were no significant differences between the *Parent Guide* and control group participants at baseline on study variables.

#### 3.2. Licensing

There was no statistically significant difference between the *Parent Guide* and control groups on reports of teens obtaining their Level 2 license to drive independently (or baseline differences associated with being licensed/not). Overall, 69% of teens completing the three-month survey had obtained their Level 2 license by the end of the study funding period (70% in the *Parent Guide* group vs. 69% in the control group).



### 3.3. Process evaluation

We compared the groups' responses regarding the use (yes/no) of the *Parent Guide* booklet vs. the 'treatment as usual,' the MDOS booklet provided to the control group. Significantly more teens reported that their parents used the *Parent Guide* than the MDOS booklet (65% vs. 44%,  $p = 0.01$ ). Teens in the *Parent Guide* group trended toward reporting their parents used the *Parent Guide* more frequently than control parents used the MDOS booklet [ $M = 2.56$  (S.D. = 1.15) vs  $M = 2.23$  (S.D. = 1.04),  $p = 0.06$ ]. There were no significant differences in parents' reports on these measures. Within the *Parent Guide* group, we found that parents most often used the booklet early in the supervised driving process - in the first 10 h (56% reported use), while 37% reported using it the most when supervising practice driving hours 10–20, 30% in hours 20–30, 14% in hours 30–40, and 16% in hours 40–50 (23% reported no use). Few parents in either the control or the *Parent Guide* groups reported using material other than what they were given, with less than five parents reporting specific online searches, Googling questions, using alternative MDOS material, or using material from their teen's driving school.

Parents described what they liked most and least (Table 3) and what they found most and least helpful about the booklet provided (*Parent Guide* vs. MDOS Booklet). Themes from the *Parent Guide* participants were identified according to themes that fit *Guide* principles: gaining diverse practice, starting simple and progressing to increasingly complex situations, and parent-teen communication. Parents recognized the need to plan ahead and consider different conditions in which to increase driving complexity. Communication was important as were big picture considerations, in that they identified the practice driving stage as a time to bond or interact with their child. Parents provided general, overall feedback that the *Guide* was a positive tool or they reflected on a sense of responsibility, for example, "It gave me a few helpful pointers that I wouldn't have thought about on my own." A consistent positive theme related to the availability of a practice log (*Parent Guide* group only). Many parents reported recording teen's practice hours. These themes were not evident in the control group who identified issues around the layout and traffic and GDL rules as primary reflections on the MDOS booklet.

Another focus of feedback about the *Guide* related to specific suggestions provided, for example, on the appropriateness of modeling - one parent described what they liked most about the *Guide* was, "the initial suggestion to drive the route together first and to talk him thru it before driving it a second time together." There were parents, however, who did not support practice in different scenarios, reporting that "(it) wasn't actually practical - most practice drives were running errands, doing things we would normally already be doing." Finally, the formatting and layout of the *Parent Guide* was well received. The most frequent response to what was most helpful about the *Guide* was that it was easy to read and well formatted, including specific examples, "the tabbed sections (were helpful)."

In addition, we examined the frequency of program features that were described as being liked most or most helpful by the two groups. Primarily the *Parent Guide* group valued learning about practicing with increasing difficulty (18%), recording hours with the log (11%), and communication skills (9%) whereas of these, only communication was reported in the control group (2%). The control group most commonly reported liking most about the

MDOS booklet that they could read about traffic and/or GDL rules (16%) and receive facts/information (9%), where reading about rules and valuing facts was not reported as being liked most by four *Parent Guide* parents. Communication tips were reported by 9% of the *Parent Guide* group and 2% of the control group; the value of a practice log of hours was reported by 11% of *Parent Guide* participants and none of the control parents.

**3.3.1. Supervised driving**—Parents and teens were asked what they liked most and least about supervised practice driving (Tables 4 & 5). In describing what they liked least about supervision, several commented on stress - it was, “nerve racking,” “(that they) get stressed out easily,” and “initially the lack of control, couldn’t reach the pedals to assist if necessary.” Generally, they felt the *Parent Guide* provided helpful tips in this regard, for example, “The most important advice was to keep calm and not yell when things got dicey.” Control group parents and teens noted the stress, but rarely identified solutions (other than with time driving skills improved). Parents provided descriptions at the three-month follow-up of what they wished they had done more or less of during supervised driving practice with their teen. Most commonly parents again focused on communication issues, but *Parent Guide* participants suggested that they could have provided further evaluation of their teens’ driving skills.

#### 3.4. Preliminary outcome evaluation

Among the 186 study teens, 118 (55 *Parent Guide*; 61 control) had primary outcome (teen risk driving behavior: TRDB) data at the three-month follow-up. The mean TRDB score in the *Parent Guide* group was 1.32 (SD = 0.29), and the mean TRDB score in the control group was 1.34 (SD = 0.36), not a significant difference. While examining baseline parental perceived teen risk as a potential effect modifier of TRDB, we found a negative main effect for *Parent Guide* group membership ( $b = -0.87$ ;  $p = 0.02$ ), and a positive interaction between *Parent Guide* group membership and baseline parental perceived teen risk ( $b = 0.24$ ;  $p = 0.02$ ), suggesting that receiving the *Parent Guide* may be more effective among teens whose parents have less risky perceptions of teen driving when the supervised practice period began. There was no significant interaction between treatment group membership and teen-reported perceived risk.

## 4. Discussion

We developed and implemented a *Parent Guide for Coaching Teen Drivers* to provide important guidance for parents supervising their teens’ practice driving. The *Guide’s* ultimate goal was to enhance teen drivers’ safety, particularly their early independent driving, when they are at the highest risk of MVCs (CDC, 2017). The theory-based *Guide* included feedback from experts and end-users and was intended to motivate parents to supervise practice that moved from simple to complex over time. We found that the *Parent Guide* was accepted and used by many study participants, and it was used significantly more often than control participants used the *State’s* guide. Of note, we did not find a significant difference between the *Parent Guide* and the control conditions in the number of teens who became licensed to drive independently, suggesting that the *Guide* did not promote or delay licensing.

Parents provided positive comments about key aspects of the *Parent Guide*, including highlighting our aims around practicing, starting slow, and progressing with skill development, while maintaining good communication. Further, these features were the most frequently described as ‘most liked’ or ‘most helpful.’ Parents described as positive the presentation of components of progressive practice (including on multiple road types and conditions, progressing with skill development/noticing improvement), considerations of positive feedback, and communication skills. These themes were not evident in the control group members who typically reported that they liked issues of layout, rules, and the reporting of information in the MDOS Booklet. *Parent Guide* teens reported that they did get to practice, but that their practice needed diversity and to a lesser extent, this was also reported by control group teens. They identified positives in communication and getting advice from their parent, however they recalled being stressed when they observed stress in their parents. In contrast, the control group teens also identified stress and that their parents would help them but did not describe positive communication such as positive reinforcement, opportunity to ask questions, or clear feedback. Understanding features of the *Parent Guide* that resonated with parents may represent focal points for future guides or the foundation from which to develop resources.

This study adds to research on the few parent-directed programs that focus on reducing teen MVC risk through behavioral approaches during the learner license stage (e.g., Mirman et al., 2014; Peek-Asa et al., 2014). Most GDL programs include a minimum number of hours for supervised practice driving, and parents provide the majority of supervision in the teens’ learner stage (Bates, Watson, & King, 2014), however there is little information available for parents about effective ways to provide such supervision in order to promote teens’ subsequent driving safety. The learner stage of driving is among the safest periods, but the MVC risk evident early in independent driving suggests that the learner stage is not providing the necessary experience and practice for relevant skill development among novice teen drivers.

It has been suggested that diversity of practice may lead to better breadth of experience before independent driving (e.g., Goodwin et al., 2014). We found that a key theme from parents in the *Parent Guide* group was general support of the need to plan diversity in practice despite some parents describing drives as merely convenient regular trips (e.g., to and from band practice). Future efforts need to provide better motivation for greater diversity of practice particularly as practice was desired by teens. While future research may benefit from greater understanding of the kinds of practice that are associated with later safe driving, we need to better understand parent motivation in relation to such practice and skill development. Thus research might benefit from focusing on promoting parent motivation as an initial starting point and drawing on psychological theories of motivation to encourage variation in practice. Further we found that parents reported stress and desire for safety when beginning supervision and potential research might explore these areas as motivating factors.

It was encouraging that many *Parent Guide* participants valued the provided chart that indicated increasingly risky driving scenarios and that they said it gave them ideas they would not have thought of to enable progression of practice - in particular, identifying situations that were not intuitive about the difficulty of various driving situations. Further,

we saw from the qualitative descriptions few such experiences in the control group. At the same time the comments about what parents didn't like/found least helpful still showed challenges in connecting with parents, even those parents who were likely motivated and engaged enough to join a research study.

At the three-month follow-up, the self-reported risky driving behavior of teens in the *Parent Guide* group was compared with that of the control group who received the MDOS booklet of general information. There was no overall significant group difference, however, an effect of less risky driving behavior was reported among *Parent Guide* teens whose parents at baseline had rated teen driving as likely to be less risky compared with the control group. Given the small number of parents rating driving as low risk, caution is needed in interpreting this finding. Such parents were those who were less likely to report crash risk for teens in scenarios such as driving in bad road conditions (slick, wet), after dark, on freeways or expressways, when exceeding the speed limit, or in bad weather (raining, snowing). Findings perhaps suggest that parents who initially identified fewer risks with teen driving benefited from the *Guide*. More research is needed to understand risk perception and how to better tailor information for individual families. Further findings suggest that initial perceptions of risk may be an important construct on which to focus tailoring.

Overall, while the study showed acceptance and feasibility of the *Parent Guide*, there are limitations to consider before undertaking the next stages of evaluation research: a large RCT for efficacy, and then dissemination. Our sample was relatively small, providing information primarily on feasibility and acceptability of the *Guide*. As similarly found by Peek-Asa et al. (2014), there are challenges with recruiting parents and teens into this type of research study. While parents report feeling stress with regard to practice driving supervision, few seek resources. We undertook an exploratory randomized trial that was able to provide preliminary data on efficacy, however a larger sample and a longer follow-up period would enable an understanding of factors that might moderate efficacy and provide valuable data about options for tailoring future programs. Our sample was somewhat homogenous of White, college-educated, married mothers and their teens and such participants may have different motivations, experiences, and options related to driving and supervision than other parents. We recruited from a wide selection of venues that provide Driver's Ed in Southeast Michigan, a component that is compulsory to Michigan licensing for those younger than 18 years. Further, we used self-report data that may have potential for social desirability bias although such bias is typically not well supported with driver behavior surveys (e.g., Lajunen & Summala, 2003; Sullman & Taylor, 2010), and we do not expect differences in self-report with the random allocation and the same web-based data collection methods applied in both groups. In addition, in our brief follow-up period not all teens had their Level 2 license that would allow them to drive without supervision. Ideally, an outcome evaluation would have at least 12 months of teens' independent driving.

The early period of teens' independent driving is among their lifetime riskiest for crashing. We identified relevant content and developed a parent program for the required supervised driving practice that was perceived as useful, clear, and easy to use. Further we included critical components suggested by teen driving safety experts. The expert panel provided detail with regard to potential areas of focus and they highlighted diversity and breadth of

skills that need to be developed during the learner stage. The *Guide* was acceptable to parents and user-friendly. We found that parents were more likely to use the *Parent Guide* we provided than control parents used a general information booklet distributed by the state. Future research on supervision during teens' learner driver stage is needed both on the skills required, the motivation of parents to supervise practicing such skills, and the motivations of parents to seek out and use available coaching resources. Such a focus moves beyond considering supervision only with regard to a minimum number of hours (Mirman et al., 2014). Future research might also focus on tailoring such information for parents and developing ways in which to cost effectively deliver information that may be easily disseminated.

Most parents provide supervision of their teens' learning to drive as well as potential boundaries for vehicle access and models of attitudes for safe driving. We need to continue to understand supervision in the learner driver stage as well as the necessary skills and attitudes that promote fewer teen crashes in the subsequent independent driving stage.

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## Biography

**Dr. Lisa Buckley's** research expertise overlies health-behavior-change program development, implementation and evaluation including the translation of theory to evidence-based practice. She has focused on behavior change research in efforts to reduce adolescent and young-adult injury, primarily around the use of alcohol, experience of violence, and road-related risk behaviors. Her work has a focus on promotive factors for wellbeing, particularly through supportive relationships with friends, parents, and in schools.

**Dr. Jean T. Shope** has an extensive background in funded behavioral science research, much of it regarding school health education, adolescent substance use, adolescent driving, at-risk drinking, drink/driving, older drivers, and graduated driver licensing. Dr. Shope has a substantial publication record, and is a sought-after expert, especially in the injury prevention areas of teen and young adult drivers, driver education, and graduated driver licensing. She has worked in the areas of adolescent health promotion and risk reduction for over thirty years, and in the area of adolescent and young adult driving for over twenty years.

**Dr. Jason E. Goldstick's** past research broadly focused on social epidemiology in a variety of settings, including infectious disease, childhood problem behaviors, substance use, and violence. Dr. Goldstick's current work at the University of Michigan Injury Prevention Center involves a variety of injury-related research projects, most related to substance use and/or violence. A recurring theme in his research is the analysis of how contextual information (e.g., spatially/temporally proximate conditions) modulates individual-level outcomes, both in terms of direct effects and how they modify dependencies between variables.

**Ms. Jennifer S. Zakrajsek** has worked on a variety of projects focusing on the prevention of at-risk drinking and alcohol-impaired driving among adolescents and young adults; parent involvement in monitoring the driving of newly licensed teen drivers; unsafe driving maneuvers contributing to crashes between trucks and passenger vehicles; and the evaluation of state motor vehicle laws.

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**Table 1**

Essential driving practice skills as identified by experts.

Skill consideration
<ul style="list-style-type: none"> <li data-bbox="266 369 716 428">• Hazard anticipation, for example,               <ul style="list-style-type: none"> <li data-bbox="354 405 716 428">– anticipating hidden or latent hazards</li> </ul> </li> <li data-bbox="266 443 737 504">• Hazard mitigation, for example,               <ul style="list-style-type: none"> <li data-bbox="354 478 737 504">– the approach and navigation of a curve</li> </ul> </li> <li data-bbox="266 518 984 615">• Speed management, including,               <ul style="list-style-type: none"> <li data-bbox="354 554 935 577">– slowing early and smoothly, cornering, changing lanes, merging</li> <li data-bbox="354 590 984 615">– maintaining a safe following distance and safety space around vehicle</li> </ul> </li> <li data-bbox="266 630 959 835">• Attention to the forward roadway, including,               <ul style="list-style-type: none"> <li data-bbox="354 665 959 688">– eyes ahead and regular scans to left, right, mirrors, and instruments</li> <li data-bbox="354 701 764 724">– no long stares at in- or out-vehicle objects,</li> <li data-bbox="354 737 634 760">– use peripheral vision scan</li> <li data-bbox="354 772 561 795">– blindspot checks</li> <li data-bbox="354 808 683 831">– scan for upcoming intersections</li> </ul> </li> <li data-bbox="266 850 1138 911">• Management of the atmosphere in the vehicle so that it is not distracting or mood altering, including,               <ul style="list-style-type: none"> <li data-bbox="354 886 760 911">– music, passenger interaction and behavior</li> </ul> </li> <li data-bbox="266 926 813 1058">• Driving in a variety of conditions, including,               <ul style="list-style-type: none"> <li data-bbox="354 961 813 984">– rural and urban roads, sealed and unsealed roads</li> <li data-bbox="354 997 776 1020">– daylight and dark, sunrise/sunset, poor light</li> <li data-bbox="354 1033 683 1058">– wet weather, icy/snowy weather</li> </ul> </li> </ul>



**Table 2**

Key themes offered by parents for inclusion in the Parent Guide.

Summary of subthemes	Examples from parents of new teen learners	Examples from parents of experienced teen learners	Examples from parents of newly licensed teen drivers
Theme: design/format			
Checklists of specific skills, rules; easy-to-access format	<ul style="list-style-type: none"> <li>Have do's and don'ts list (Checklist) of specific skills</li> <li>Overview of rules/sections</li> </ul>	<ul style="list-style-type: none"> <li>Perhaps don't need these in every section</li> </ul>	<ul style="list-style-type: none"> <li>Table format is good, simple and easy to use</li> </ul>
Appropriate literacy level for teens and parents; clear wording	<ul style="list-style-type: none"> <li>Have Guide readable for teens too, not just parents</li> </ul>	<ul style="list-style-type: none"> <li>Not specifically mentioned in this group</li> </ul>	<ul style="list-style-type: none"> <li>Keep wording clear, simple</li> <li>'Errors to look for' should be re-worded to 'things teens find challenging'</li> <li>Some parents will take this very literally</li> </ul>
Size, layout (length, spiral binding, not text-heavy, images)	<ul style="list-style-type: none"> <li>Wouldn't want it to be much more than this (example)</li> </ul>	<ul style="list-style-type: none"> <li>Like the spiral-bound idea</li> <li>Keep it small enough to fit in your glove box</li> </ul>	<ul style="list-style-type: none"> <li>Using photos will help parents read this more</li> <li>Don't use many words</li> <li>Have more space</li> <li>Spiral-back is good idea, not rip-out pages</li> </ul>
Theme: teens' skills			
Progression (from Driver Ed, incl. weather conditions), consider comfort, road conditions	<ul style="list-style-type: none"> <li>Consider what was learned in Driver Ed</li> <li>Good idea to mention going back to skills in different weather conditions</li> </ul>	<ul style="list-style-type: none"> <li>You know your teen is ready when you feel comfortable</li> </ul>	<ul style="list-style-type: none"> <li>Structure is reasonable (starting off in parking lot, then residential)</li> </ul>
Specific skills (peripheral vision, yield signs, fatigue, speed, reversing, distraction)	<ul style="list-style-type: none"> <li>Pay attention to periphery</li> <li>Yield signs</li> </ul>	<ul style="list-style-type: none"> <li>Talk about fatigue from driving for long period of time</li> <li>Brake sooner when high speed</li> </ul>	<ul style="list-style-type: none"> <li>Backing up in reverse</li> <li>Maybe add something about turning on radio/windshield wipers (they do this on the driving test)</li> </ul>
Theme: motivation			
Use statistics to build motivation and support parents	<ul style="list-style-type: none"> <li>Use statistics about accident rates and types of accidents</li> </ul>	<ul style="list-style-type: none"> <li>Not specifically mentioned in this group</li> </ul>	<ul style="list-style-type: none"> <li>Statistics back up parents so kids don't think that the parent is just making this stuff up</li> <li>Takes the driving facts out of the parent/teen relationship</li> </ul>
Theme: communication			

Summary of subthemes	Examples from parents of new teen learners	Examples from parents of experienced teen learners	Examples from parents of newly licensed teen drivers
Feedback – giving (positive, post-drive timing, limited quantity)	<ul style="list-style-type: none"> <li>Compliment teen when something is done right</li> <li>Teens need praise as well as constructive criticism</li> </ul>	<ul style="list-style-type: none"> <li>Talk to teens about not taking any commands that are emotionally charged personally</li> </ul>	<ul style="list-style-type: none"> <li>Teens may have difficulty listening to feedback while driving</li> <li>Wait until driving was over to give feedback</li> <li>Limit the number of things that need improvement</li> </ul>
Receiving feedback	<ul style="list-style-type: none"> <li>It's okay if teen critiques parent's driving, too</li> </ul>	Not specifically mentioned in this group	Not specifically mentioned in this group
Plans, expectations (developed before the drive)	<ul style="list-style-type: none"> <li>Not specifically mentioned in this group</li> </ul>	<ul style="list-style-type: none"> <li>Talk about expectations and directions before you start the car</li> <li>Plan out the drive before you leave the house</li> </ul>	<ul style="list-style-type: none"> <li>Have a route in mind before you leave</li> </ul>

**Table 3** Parents' response to their booklet with regard to what was liked and helpful (Parent Guide vs. MDOS Booklet).

Theme	What liked most/least in guide/booklet	What most/least helpful in guide/booklet	What still helpful at 3 months
Parent guide group			
Practice (incl. planned drives incl. for different conditions; gained experience in different conditions; noticed improvement)	<p><i>Most...</i></p> <ul style="list-style-type: none"> <li>Advice on different types of driving; I liked the suggested practice drives and the information about what conditions are best/worse for new drivers. The recommendation to set up Drive Plans ahead of the drives. The idea to make sure to spread hours across different drives.</li> <li>It gave good tips as to how to approach the driving and what lessons to add as experience increased.</li> <li>I looked for unique driving opportunities using the chart you provided. I wouldn't necessarily have thought of some of them.</li> </ul> <p><i>Least...</i></p> <ul style="list-style-type: none"> <li>It was tough to follow all of its practices when you have been driving for a long time, it was hard to teach what comes second nature to you.</li> <li>I needed more room in the logging area. I wanted to include time of day, weather, and I jotted notes on the sides if there was something I wanted to discuss later. My child would not react well to me giving him suggestions while driving.</li> </ul>	<p><i>Most...</i></p> <ul style="list-style-type: none"> <li>The ideas about building in complexity and ideas for places to practice things.</li> <li>It had a section which showed how to slowly increase difficulty of driving situations that was not intuitive, for example I thought rural driving would be low risk, but the booklet indicated it was higher risk than I thought.</li> <li>The parts that helped plan out routes for different experience levels.</li> <li>It helped me prepare her for unexpected traffic situations and give her scenarios of each. It also emphasized good habits.</li> </ul> <p><i>Least...</i></p> <ul style="list-style-type: none"> <li>Each task was broken down to too basic elements. The elements should be grouped together. The book is as if the student hasn't had any training from Drivers Ed.</li> <li>Suggestions for practice drives.</li> </ul>	<ul style="list-style-type: none"> <li>Discussing routes.</li> <li>Driving as often as possible with him.</li> <li>Eliminate distractions, go over route directions and tough spots before the trip starts; How often to evaluate her driving.</li> <li>Thinking about the levels of risk/difficulty of different driving situations.</li> </ul>
Positive feedback	<ul style="list-style-type: none"> <li>Good info on how to not react to their driving.</li> <li>Tips for encouragement and criticism.</li> <li>Communication and coaching segments.</li> <li>I was calmer than I thought I'd be.</li> </ul>	<ul style="list-style-type: none"> <li>Parental guidance to teach positive behaviors.</li> <li>Communication and Coaching section.</li> <li>How to approach subjects without seeming critical.</li> </ul>	<ul style="list-style-type: none"> <li>Open communication.</li> <li>The overall idea of remaining calm and doing things incrementally.</li> <li>Ways to talk to your teen.</li> </ul>
Relationship building	<ul style="list-style-type: none"> <li>Time with my teenager and watching her make progress.</li> <li>Spending quality time with my daughter.</li> <li>Spending the time with my teen.</li> </ul>	<p>–</p>	
Control group			
Layout	<p><i>Most...</i></p> <ul style="list-style-type: none"> <li>Diagrams are helpful</li> </ul>	<p><i>Most...</i></p> <ul style="list-style-type: none"> <li>Illustrations to support the written material.</li> </ul>	<p>–</p>

Theme	What liked most/least in guide/booklet	What most/least helpful in guide/booklet	What still helpful at 3 months
	<ul style="list-style-type: none"> <li>• Easy to read</li> <li>• Easy to understand</li> </ul> <p><i>Least...</i></p> <ul style="list-style-type: none"> <li>• Redundant</li> <li>• Not enough space</li> <li>• It was too simplistic</li> </ul>	<ul style="list-style-type: none"> <li>• Very clear sections re: level 1-2-3/[of GDL] easy to refer to</li> <li>• Had a summary of things you should know about getting a license.</li> </ul> <p><i>Least...</i></p> <ul style="list-style-type: none"> <li>• It was not set up in a way a teen and parent would use it together. Very "government" looking. Needs chapters, not page after page. A flow chart at the very last page of the book should have been at the beginning</li> <li>• Small print</li> </ul>	
Rules/licensing stages	<ul style="list-style-type: none"> <li>• Had a good summary of various laws. Also good that it was free.</li> <li>• Easy access to the traffic rules</li> <li>• GDL breakdown</li> <li>• Informative</li> </ul>	<p><i>Most...</i></p> <ul style="list-style-type: none"> <li>• The schedules for the different licensing levels</li> <li>• explanation of different stages of license</li> <li>• The information it provided about the process</li> </ul> <p><i>Least...</i></p> <ul style="list-style-type: none"> <li>• Some areas were vague.</li> <li>• Lack of information that could have been helpful for bringing further understanding of driving and caution for my teen.</li> <li>• It was more reference than advice</li> </ul>	<ul style="list-style-type: none"> <li>• Rules for the teen</li> <li>• A written reference</li> <li>• Rules on restrictions</li> </ul>

Note. Many control group parents reported 'nothing', or 'nothing I can remember' with regard to the booklet being unhelpful or not liked.

**Table 4**

Supervision (liked most/least) among parents.

Group:	Parent guide group		Control group	
	Themes:	Practice	Positive feedback	Practice
Quotes:	<i>Most...</i>	<i>Most...</i>	<i>Most...</i>	<i>Most...</i>
	<ul style="list-style-type: none"> <li>The time we truly had to talk about his skills; Watching my son improve.</li> <li>Seeing my daughter's skills improve and noting that she has a lot of common sense and patience.</li> <li>The chance to observe and coach for extended time.</li> <li>At least he was practicing.</li> <li>The opportunity to practice real driving scenarios.</li> </ul>	<ul style="list-style-type: none"> <li>Teen actually appreciated me not getting angry at her mistakes.</li> <li>Talking about how to deal with different situations.</li> <li>Teen taking offense at driving suggestions even though put in as nice terms as possible to avoid offense.</li> <li>My teen sometimes felt I should stop instructing him.</li> <li>Constructive feedback had to be carefully worded or she would get defensive.</li> </ul>	<ul style="list-style-type: none"> <li>My son's actions on following the rules and laws</li> <li>It gave me the opportunity to see my child become comfortable and improve on items such as parking, lane changing, stopping, etc.</li> <li>I got more comfortable as time went on</li> <li>Watching my teen improve</li> <li>Scheduling it</li> <li>All the hours</li> </ul>	<ul style="list-style-type: none"> <li>Being able to explain the road rules to my daughter</li> <li>Praising him - he's a good driver</li> <li>Being able to give positive feedback</li> <li>Child getting defensive about suggestions</li> <li>Teen being cranky when I corrected her</li> </ul>
	<i>Least...</i>	<i>Least...</i>	<i>Least...</i>	<i>Least...</i>
	<ul style="list-style-type: none"> <li>Teen's reluctance to drive.</li> <li>Driving in the snow and ice.</li> <li>Merging onto the highway, early first 10hof supervised driving were a little scary.</li> <li>Need more of it.</li> <li>That my son was not really willing to practice more on highways.</li> </ul>			

**Table 5**

Summary of themes related to teens' perceptions of supervised driving practice.

Subtheme/theme	Example quote
Parent guide group	
Theme: practice	
Received practice	<ul style="list-style-type: none"> <li>• I got practice</li> <li>• I think overall it [supervision] was helpful. I think that I had plenty of experience.</li> </ul>
Diversity (e.g., in weather, trip length, time of day, road type, trip purpose)	<ul style="list-style-type: none"> <li>• Learning how to drive in the snow [was helpful].</li> <li>• I [wished for less] short driving</li> <li>• Took me on longer drives [wished more].</li> <li>• (I) need(ed) to have a specific amount of hours of night-time driving</li> <li>• Residential driving [wasn't helpful]</li> <li>• [wished for] more highway driving</li> <li>• I wish we did more parking practice</li> <li>• [It wasn't helpful to have] limits on where I was going, to store or to pick up stuff</li> </ul>
Identifying improvement	<ul style="list-style-type: none"> <li>• It helped me better know and understand when and if I had made a mistake. I would be much more careful when I drove.</li> </ul>
Theme: communication	
Positive reinforcement	<ul style="list-style-type: none"> <li>• Directions and reinforcement that I'm not a terrible driver</li> </ul>
Advice	<ul style="list-style-type: none"> <li>• I liked the advice that my mom gave me, especially in stressful situations</li> </ul>
Asking questions	<ul style="list-style-type: none"> <li>• Being able to ask many questions [was helpful]</li> </ul>
Clear feedback	<ul style="list-style-type: none"> <li>• When my parents weren't clear on what I should do [it wasn't helpful]</li> </ul>
Stress	<ul style="list-style-type: none"> <li>• When a parent freaks out while I am driving; Stressed parent next to me [wasn't helpful]</li> </ul>
Relationship building	<ul style="list-style-type: none"> <li>• Going places with my mom</li> </ul>
Theme: other	
Wanting to do well, distracted supervisor, feeling safe, overall positive	<ul style="list-style-type: none"> <li>• The stress of doing well</li> <li>• I didn't like how my mom would go on her phone, even if it was just for a second. It made me scared</li> <li>• Feeling safer</li> <li>• Honestly I think they did a great job</li> </ul>
Control group	
Supervisor availability	<ul style="list-style-type: none"> <li>• They can help me</li> <li>• I know my parents would help me if I needed it</li> <li>• Parents have a lot of experience</li> </ul>

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<b>Subtheme/theme</b>	<b>Example quote</b>
Stressful communication	<ul style="list-style-type: none"><li>• All the stress</li><li>• Nagging</li><li>• Yelling</li></ul>
Silence (needed)	<ul style="list-style-type: none"><li>• Be quiet</li><li>• More no talking/no directions driving</li><li>• Less talking all at once</li></ul>
More practice	<ul style="list-style-type: none"><li>• (in) bad weather</li><li>• (less in) residential areas</li><li>• (in) 5-lane highways</li></ul>

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