Journal of Research High School

Vol. 2026 (1) 27 – 39
ISSN 2688-3651 [online]

Novice Drivers and Accidents: A Literature Review

Larissa Peterson[1] *, Whitney Barnes[1]

[1]Saint Edward School, Vero Beach, FL, USA
*Corresponding Author: larissap1@steds.org

Advisor: Whitney Barnes, Saint Edwards, wbarnes@steds.org

Received January 29, 2025; Revised August 18, 2025; Accepted September 27, 2025

Abstract

In crash statistics, novice drivers are overrepresented during their first year behind the wheel. This increased risk has been consistently linked to factors relating to inexperience, such as poor hazard perception, overestimation of abilities, and reduced visual scanning. Through a systematic literature review, this study examines the cognitive, perceptual, and behavioral challenges novice drivers face. Using the Joanna Briggs Institute and PRISMA frameworks, a comprehensive search was conducted across multiple databases to locate studies published between 1994 and 2024. Results indicate that novice drivers have slower reaction times, limited hazard awareness, and a higher tendency to risky behaviors. Effective interventions to reduce these behaviors, including driving simulators, commentary driving, and hazard perception training, were identified as key strategies. These findings support the recommendation that structured and extended training programs are essential to reducing novice driver crash rates and improving safety.

Keywords: Novice drivers, Traffic accident, Risk perception, Visual perception

1. Introduction

Learning to drive is a complex and challenging process involving the use of cognitive and practical skills acquired with experience, that allow drivers to navigate the dynamic and unpredictable road environment. The most common stressful situations that novice and inexperienced drivers often face are challenges on the road. The danger of these unexpected situations is increased by their lack of hazard detection and inability to make fast and precise decisions, due to limitations in visual strategies and cognitive workload.

Research has highlighted the positive correlation between novice drivers and traffic accidents, emphasizing the increased risk of novice drivers, especially during the first months. This overrepresentation of accidents by novice drivers stems from deficiencies associated with these types of drivers: slower response times, inadequate risk perception, and ineffective strategies for handling complex traffic situations.

This study aims to explore the cognitive, perceptual, and behavioral challenges that novice drivers may face during the initial months on the road. Through a comprehensive literature review, this article explores the factors that contribute to difficulties experienced by novice drivers while trying to answer the question: What are the key cognitive, perceptual, and behavioral factors that contribute to the increased crash risk among novice drivers?

This study's hypothesis states that novice drivers' limited ability to perceive and respond to hazards, cognitive and emotional stressors, and external influences increases their chance of being in traffic accidents. Using findings from various studies, this review identifies challenges specific to novice drivers. It discusses traffic safety implications, examining interventions and training programs that can decrease road safety challenges and increase confidence in novice drivers while decreasing rates of traffic accidents. This analysis will provide the foundation to understand the unique needs of novice divers and offer insights on improving safety and reducing accident rates.

Many studies have already focused on comparing experienced and inexperienced drivers (Horswill & Helman,

Vol. 2026 (1) 27 – 39
ISSN 2688-3651 [online]

2003; Crundall et al., 2010; Seacrist et al., 2016; Sagberg & Bjørnskau, 2006). This study explores factors that influence inexperienced drivers' risk perception and ways to improve this decreased perception on the road. This review identifies the challenges novice drivers face by exploring the most significant findings from multiple studies. It discusses their implications for traffic safety and examines principal interventions and training programs designed to decrease these challenges. Due to the extensive literature reviewed many differing descriptions were given for these types of drivers and the following definitions are adopted in this study: Novice drivers refer to individuals who have recently acquired a driver's license and typically have less than one year of independent driving experience (Shope & Bingham, 2008; De Craen et al., 2011). Inexperienced drivers are used interchangeably with novice drivers, particularly when studies refer to limited driving exposure regardless of age (Aga et al., 2021). Young drivers generally denote individuals aged between 16 and 24, a group often overrepresented in crash statistics due to a combination of inexperience and developmental factors (Anderson et al., 2018; NHTSA, 2020). Teenage drivers are a subset of young drivers, usually aged 16 to 19, and often still subject to graduated licensing systems and restrictions (Bazargan & Guzhva, 2011; McCartt et al., 2003). The authors' definitions were respected and used when referring to their specific studies; however, each study focuses its research on young novice drivers. These distinctions aim to ensure conceptual clarity when interpreting and comparing findings across diverse studies.

1.1 Behavioral Inclinations and Risk Perception

Risk perception involves identifying and reacting to potential hazards in a driving environment. However, in this context, it can be defined as the probability of an adverse event, such as injury, illness, or death (Sjoberg et al., 2004). Pidgeon and colleagues (2003, p. 56) state that risk is a situation "where something of human value (including humans themselves) is at stake and where the outcome is uncertain."

While risk is shaped by social, psychological, or cultural factors, it is based on individual experiences and the context in which they are embedded (Sjoberg et al., 2004). Inadequate risk perception, particularly in complex systems, may lead to "errors, incidents, and accidents that are not programmed into the system's functionality" (Leplat, 1987, p. 133). These errors can act as causes of other errors or as consequences of underlying issues.

Risk perception is a critical skill in traffic safety developed through accumulated practice and exposure to diverse situations (Crundall et al., 2010). This skill can also be enhanced through specific training (Wallis & Horswill, 2007) and is associated with accident prevention, as demonstrated in several studies (Alberti et al., 2012; Borowsky et al., 2009; Crundall, 2016; Dekker, 2019; Hosking et al., 2005, 2010; Ivers et al., 2009; McKenna & Crick, 1994; Moral García et al., 2019; Morrison, 1994; Shahar et al., 2010; Walsh, 1988).

One key deficit novice drivers face in risk perceptions is an effect called looming illusion, a distorted perception of approach time which novice drivers exhibit through low accuracy in judging the size and speed of approaching vehicles, leading these drivers to take unsafe overtaking distances often leading to collisions (Horswill et al., 2005).

In their first six months of driving, Novice drivers, particularly teenagers, exhibit lower perception and extended braking times (Braitman et al., 2008; Horswill & Helman, 2003; Ohlhauser et al., 2011; Summala, 2000). This delay stems from slower visual scanning, cognitive processing, and response selection, culminating in riskier driving behaviors (Wilson & Greensmith, 1983; Ivers et al., 2009; Wikman & Nieminen, 1998).

A driver's inability to recognize risks contributes to accidents, especially in situations requiring sudden braking or avoiding cyclists on the road (Horswill & Helman, 2003; Sagberg & Bjørnskau, 2006), something that novice drivers are especially vulnerable to due to their limited experience handling these scenarios.

When focusing on the factors influencing risk perception and accident severity, Xiao et al. (2021) used a bivariate random effects probit model to analyze factors influencing accident severity among novice drivers. Key determinants included accident type, the presence of pedestrians and motorcyclists, and vehicle type. Accidents involving pedestrians and motorcyclists increased injury severity due to novice drivers' difficulty managing complex traffic conditions.

Cognitive load, the amount of information that can simultaneously be stored, impacts reaction times in novice drivers (Summala, 2000).

Crundall et al. (2010) highlighted that newly licensed drivers are more likely to be involved in traffic accidents,

Vol. 2026 (1) 27 – 39
ISSN 2688-3651 [online]

especially in their first year of driving. This is linked to a gap in hazard perception skills directly correlated with accident records. The study suggests that commentary-driven training can reduce this gap in driving skills, improving hazard perception and mitigating accident risks.

One study identifies three main factors contributing to accidents among inexperienced drivers: a) failure to detect another vehicle or traffic signals, often involving a lack of careful observation, distraction, or inattention; b) speeding; c) loss of vehicle control or skidding on slippery roads; and d) accident circumstances: crashes involving newly licensed drivers were primarily caused by running off the road, rear-ending another vehicle, or colliding with a vehicle that had the right of way (Braitman et al., 2008).

However, drastic reductions in accident risk are observed after the first six months of driving experience among novice teenage drivers (Shope & Bingham, 2008). Furthermore, extended driving practice among teenaged novices contributes to fewer accidents (Gregersen et al., 2000). The learning processes of adolescent novice drivers are inferred through the measurement of performance over time during critical phases where learning is expected to occur. Nevertheless, performance improvements were the same for inexperienced and experienced drivers over six months of testing involving motorcycle-related events (Shope & Bingham, 2008). Shope and Bingham(2008) present a model identifying the factors affecting teen driving behavior (Figure 1). The model is structured into sevenmain categories: Driving ability, developmental factors, behavioral factors, personality traits, demographic factors, perceived environment, and driving environment. These factors contribute to the increased risk of accidents among adolescent drivers. For example, inexperience, impulsivity, and sensation-seeking are common characteristics among teenage drivers, while elements such as parental and community norms can act as protective factors to prevent accidents.

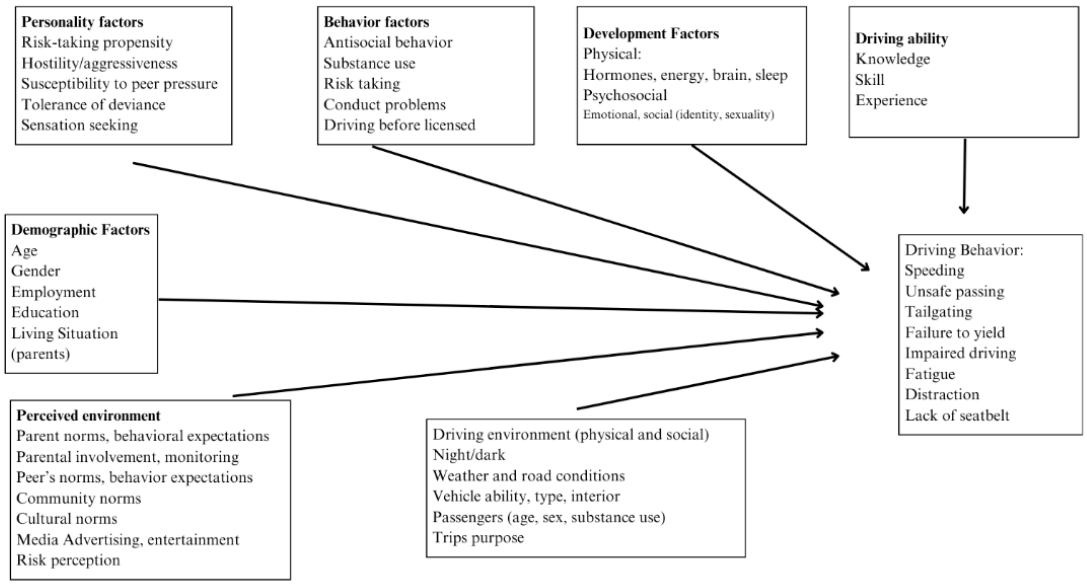

Figure 1: Factors that affect teen driving behavior (Shope and Bingham, 2008, p. 266).

In addition, a lack of novice skills contributes to the higher severity of collisions due to a lack of practice on the road and a reduced ability to anticipate and respond to a risky situation. (Seacrist et al., 2016). Inexperienced drivers exhibited a significantly higher accident rate, particularly in rear-end collisions—30.0 per million miles driven for adolescents (Seacrist et al., 2016)—due to difficulties anticipating hazardous situations.

Novice drivers also demonstrate an inability to evaluate risks precisely, indicating that less experienced drivers, particularly young and adolescent drivers, tend to underestimate the risks associated with specific driving situations, such as driving in adverse conditions (e.g., snow or heavy traffic) while overestimating their driving abilities. This pattern is also evident in scenarios involving alcohol consumption (De Craen et al., 2011; Farrow & Brissing, 1990), where overconfidence contributes to a heightened risk of accidents.

Overestimating diverse ability is a manifestation of the inexperience of a driver and a lack of realistic knowledge about driving capabilities and challenges associated with driving, along with difficulty assessing the impact and threat

Vol. 2026 (1) 27 – 39
ISSN 2688-3651 [online]

of distractions on the road, leading to a distinct difference between a driver's perception and performance (Horrey et al., 2008, 2009). The discrepancy in ability to perform often leads to reckless behavior that increases the chance of an accident (Borowsky, 2009; Mayhew & Simpson, 1995). The role of optimism, also referred to as self-enhancement bias, is a key reason novice drivers overestimate their driving abilities (Borowsky, 2009).

The theory of self-enhancement bias is further supported by De Craen et al. (2011) findings revealing that inexperience is associated with high self-assessment of driving skills, which increases the risk of accidents, suggesting that novice drivers may fail to adjust their risk perceptions and abilities based on the reality of driving. While novice drivers may not be as optimistic when comparing their abilities to those of more experienced drivers, they tend to overestimate their skills in objective evaluations, such as those conducted by professional examiners (De Craen et al., 2011).

One of the most significant models of novice driver accidents was proposed by Deery (1999), who proposed a model detailing the development of perceptual and cognitive skills essential for safe driving among novices. The model is based on four elements: hazard perception, risk perception, driving skill, and risk tolerance. First, novices often have less efficient scanning strategies and focus more on stationary than moving objects on the road. Second, risk perception is characterized by novices underestimating risks and overestimating their ability to handle them. Third, driving skills. Novice drivers have slower reaction times, compromising safety in critical situations, and finally, higher risk tolerance. Novice drivers often engage in behaviors like speeding or tailgating.

These four interactions shape how novice drivers act in traffic situations, and over time, as drivers gain experience, they can improve their ability to avoid or learn these practices.

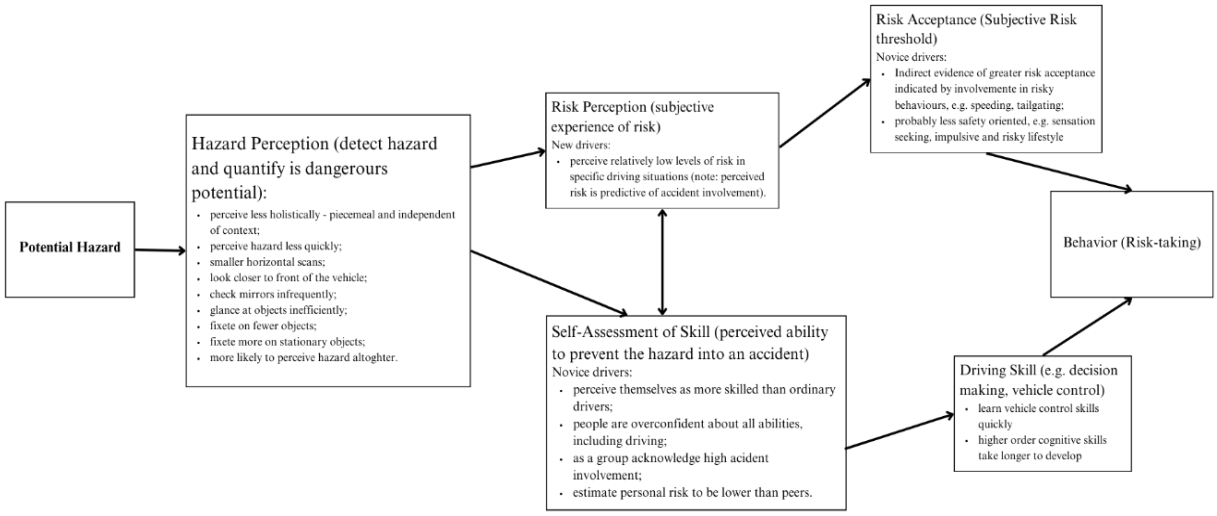

Figure 2: Young driver accident involvement model (Deery,1999, p.227).

1.2 Cognitive and Mental Challenges

As consistently highlighted in the research, young drivers are more involved in road accidents than other demographic groups. Traffic accidents and driver experience studies have found a strong connection between inexperienced driving and fatality rates. For example, drivers with less than five years of experience are more likely to cause fatal accidents than those with more than five years of experience. This relationship highlights the danger of limited practical driving experience while on the road, which can sometimes lead to severe accidents (Aga et al., 2021). These findings align with earlier reports of higher mortality rates in accidents involving less experienced drivers.

An essential factor contributing to this issue is how young drivers perceive and interpret their surroundings. The driving environment is complex and stressful, demanding rapid identification and processing of a constant flood of information given by the surroundings. These demands are challenging for novice drivers because they do not have their cognitive skills developed enough to navigate these complex scenarios effectively, leading to slower recognition

Vol. 2026 (1) 27 – 39
ISSN 2688-3651 [online]

of potential hazards and, in some cases, underestimating the risks involved and leading to accidents (Aga et al., 2021).

Another essential element of a safe driver is the visual scanning strategy. Novice drivers often exhibit unstructured scanning patterns, paying less attention to critical areas such as mirrors or points further ahead on the road and distributing visual attention broadly but inefficiently, impairing the ability to anticipate and respond to hazards.

Mental cognitive ability is another factor that needs to be considered when driving. Research indicates that novice drivers face higher cognitive demands because they are not yet second nature, and many of the processes essential for safe driving require full attention. This lack of familiarity can result in difficulties managing multiple tasks, such as monitoring traffic, maintaining vehicle control, and reacting to unexpected environmental changes. (De Craen et al., 2011).

Visual ability is one of the most important skills for ensuring traffic safety. It involves identifying important elements in a driving environment and interpreting that information to prevent accidents. Inexperienced driving influences a driver's visual strategies, such as how they distribute their attention and perceive risks on the road.

Novice drivers exhibit significant deficiencies in hazard detection. Research indicates that these drivers have a more limited visual field, reduced ability to identify peripheral targets, and difficulty recognizing potentially hazardous situations (Crundall et al., 1999, 2002). Additionally, this group tends to visually ignore areas of high-risk potential, according to Pollatsek et al. (2006).

Familiarity with a route also plays an important role in accidents. When navigating unfamiliar routes, novice drivers display widespread visual patterns and a higher cognitive workload, which results in excessive focus on the frontal field of vision, limiting their ability to perceive hazards in the surrounding environment (Underwood et al., 2003). However, regardless of the type of road, novice drivers tend to focus on areas closer to the vehicle, with fewer glances at mirrors and more significant variability in gaze duration, compromising efficiency and increasing accident risk (Wikman & Nieminen, 1998).

Moreover, in more complex scenarios, inexperienced drivers demonstrate longer and less adaptive eye fixations, focusing on less critical elements, such as lane markers, instead of essential areas like rearview mirrors and blind spots (Underwood et al., 2003; Alberti, 2014). Recent studies using driving simulators reinforce this evidence, showing that novice drivers take longer to identify hazards and sometimes fail to recognize them entirely, especially when partially obscured (Crundall et al., 2012).

1.3 Training Interventions and Outcomes

Despite these challenges, research has shown that training interventions can significantly improve hazard perception and reduce crash risk. Improving risk perception and hazard awareness in novice divers is critical in reducing the possibility of an accident. Such skills can be enhanced through training and continuous driving practice, allowing driver perception to improve and reduce accident frequency (Sagberg & Bjørnskau, 2006; Shope & Bingham, 2008; Spolander, 1983a).

As drivers gain experience, the number of accidents they are involved in tends to decrease, especially during the initial months of driving, a period allowing safety improvements as drivers develop the essential skills that allow them to handle traffic situations. However, novice drivers are disproportionately involved in accidents during the first year of obtaining their license, with a notable reduction in risk as they accumulate experience.

Although driving experience significantly impacts reducing accident risk, particularly during the early years of driving, this reduction is not linear. The learning curve is steeper during the initial phase and is more pronounced among younger drivers (16–19 years old) than older novice drivers (Mayhew et al., 2003). Therefore, some solutions to improve driving early on are paramount to improving driving conditions overall. Programs for young drivers to achieve higher performance driving can incorporate simulation models to provide a safe and controlled environment where novice drivers can actively identify potential risks, such as hidden or abrupt hazards. Commentary driving, where learners verbalize their observations and planned actions, has proven effective in fostering proactive scanning and quicker reaction times. Additionally, video-based training modules demonstrating experienced drivers' scanning patterns could help novices develop more effective visual search strategies. These tailored approaches could mitigate the limitations in peripheral vision and attention distribution often observed in less experienced drivers and ultimately

Vol. 2026 (1) 27 – 39
ISSN 2688-3651 [online]

reduce accident liability during this high-risk phase (Crundall et al., 2014, 2016; Crundall & Underwood, 1999).

Skills acquired and refined through driving practice are primarily linked to improved risk perception (Horswill & Helman, 2003) and the automatization of driving tasks (Hajiseyedjavadi et al., 2017). These improvements affect specific types of collisions, such as single-vehicle accidents, off-road crashes (Mayhew et al., 2003), and the ability to handle the vehicle during interactions with other road users (Bjørnskau & Sagberg, 2005) and under varying climatic conditions and times of day (Cooper et al., 1995).

Thus, the drastic reduction in accidents observed shortly after obtaining a license cannot be solely attributed to age or motivational changes but is closely tied to acquiring essential driving skills (Sagberg, 1998; Gregersen et al., 2000; Mayhew et al., 2003).

Automating driving skills, developed through practice, allows drivers to become more proficient by reducing the need for conscious focus on essential tasks. This process frees cognitive resources for risk perception, enabling drivers to respond more effectively and safely to changing traffic conditions (Sagberg & Bjørnskau, 2006). It also facilitates more complex interactions with other road users (Berg, 2006).

In alignment with these findings, Gregersen and Bjurulf (1996) concluded that most accident risks among novice drivers are related to skill deficiencies rather than attitudes or other behavioral factors. There was an emphasis on young drivers' behavior resulting from complex interactions between learning, individual conditions, and social influences.

Based on an extensive literature review, the authors proposed a theoretical model positioning driving practice as central to skill development and accident reduction (Figure 3).

The model identifies three main processes contributing to accidents among young and inexperienced drivers: The Learning Process: This is divided into three phases: (a) initial driver training for obtaining a license; (b) long-term experience, where traffic feedback influences risk assessment and motivation for driving; and (c) gradual automatization of behaviors and reduction of mental workload during the learning period.

Individual Conditions: These include skills, knowledge, risk perception, and risk evaluation by young drivers. The model also suggests that many young drivers overestimate their driving abilities, leading to risky behaviors, particularly among young males.

Social Influences: Young drivers' driving behavior is shaped by social factors, including group norms, peer expectations, and pressure from friends. These influences affect their motivation to drive safely or recklessly and are linked to lifestyle, which also impacts accident risk (Gregersen & Bjurulf, 1996).

Although novice drivers quickly acquire basic vehicle control skills, such as handling and understanding traffic laws, they take considerably longer to develop the perceptual and cognitive skills necessary to interact safely with the road environment (Deery, 1999). These findings suggest that experience, even when acquired in a simulator, can improve a driver's ability to perceive and react to hazards, reducing accident likelihood. Conversely, a lack of experience extends beyond executing driving maneuvers and includes deficiencies in recognizing and responding to risks—a skill that can be developed through appropriate training (Alberti et al., 2012).

Risk perception improves significantly with driving experience but can be enhanced more effectively through targeted training programs (McKenna & Crick, 1994). Research demonstrates that exposing drivers to risk perception training programs reduces reaction times to potentially dangerous road situations. This suggests that relying only on practical experience to develop risk perception is slow and often inefficient. Educational interventions can accelerate the development of critical skills needed to avoid accidents, especially among novice drivers.

While analyzing common collision accidents among novice drivers, it was discovered that the characteristics of the accidents were associated with drowsiness at the wheel, driving under the influence of alcohol (Mitchell et al., 2015), and speeding. (Blackman et al., 2010; Mitchell et al., 2015; Moral García et al, 2019) Significant factors in the causes of accidents among drivers with less than three years of experience in urban areas were identified. Driving under the influence of alcohol is, among these factors, the leading cause of accidents with severe and fatal injuries in this group (Mitchell et al., 2015).

Lastly, the Zero-Risk Theory proposed by Summala (1988) states that inexperienced drivers face high levels of uncertainty in traffic situations. Over time, as more practice and experience are gained, these emotions dissipate as drivers automate fundamental driving tasks. As drivers acquire more skills, they can develop perception and motor

Vol. 2026 (1) 27 – 39
ISSN 2688-3651 [online]

skills that provide confidence and ease of driving. As these skills improve, drivers build mental models of traffic systems and can execute tasks more intuitively with increased confidence. However, such an adaptation can also lead to the neglect of multiple risks in traffic. Therefore, promoting the driver's awareness of all risks on the road from the start of their driving experience is necessary for balancing confidence on the road with understanding and cautiousness of traffic dangers, reducing the probability of risky behaviors from the development of early drivers, and automation driving skills. (Alberti et al., 2012; Alberti, 2014).

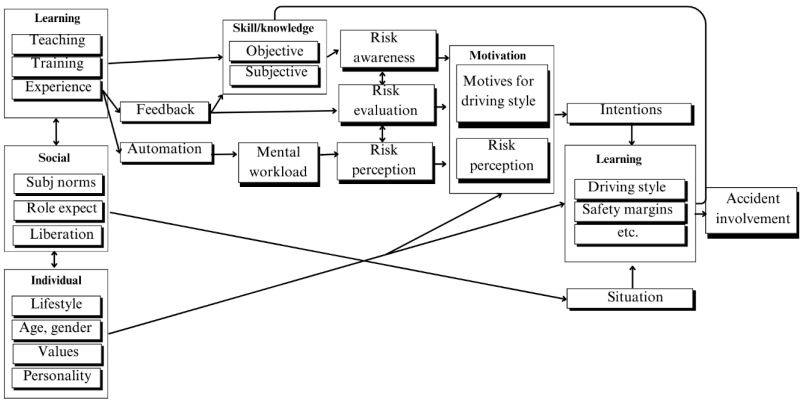

Figure 3: Model of Young Novice Drivers' Involvement in Accidents (Gregersen & Bjurulf, 1996, p.230)

2. Materials and Methods

A review following the methodological framework outlined by the Joanna Briggs Institute (JBI). To ensure rigor, the PRISMA framework (Liberati et al., 2009) was employed to guide the review process, offering a structured and visual representation of the steps involved in the literature review. Between 1994 and 2024, the English language was analyzed. This review followed five key stages: formulation of the research question; identification of relevant studies; comprehensive search for studies within the defined scope; selection and development of the conceptual framework; analysis and synthesis of selected studies; and presentation of results.

The systematic search for this study was conducted across four major bibliographic databases—PsycINFO, Academia, Google Scholar, and EBSCO—spanning from January 2023 to October 2024. It was analyzed as an article in English. All studies relevant to novice drivers were included in this research. Keywords used to perform the search in the online databases were ("novice," OR "inexperience," OR "young,") AND ("driver") AND (Risk perception) AND ("accident").

The studies identified were distributed as follows: PsycINFO (13), Scopus(85), Academia (2941), Google Research (1953), and EBSCO (253). The Prisma (fig.3) shows the identification, screening, eligibility, and inclusion process. For the Inclusion criteria, the following steps were taken:

First, all empirical and theoretical studies or reviews focused on novice or inexperienced drivers were included. Second, these studies were analyzed based on title or abstract, and words such as cognitive, perceptual, behavioral, training, traffic accidents, along with novice, inexperienced, young, or teenage were looked for.

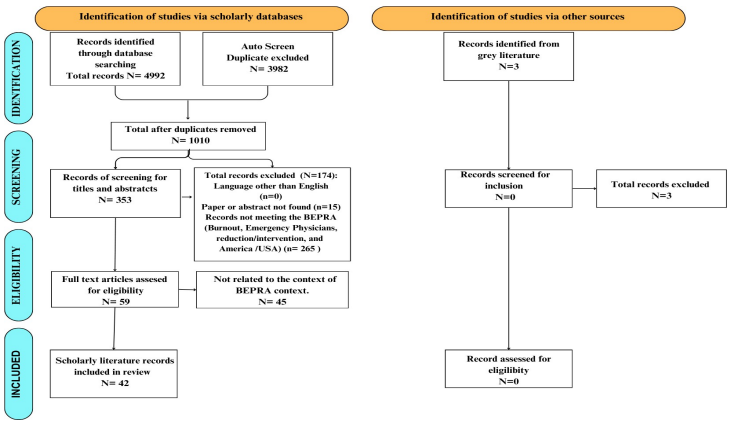

Figure 3: Flow chart according to the PRISMA.

Exclusion criteria: Articles not focused on traffic safety or driving behavior, opinion pieces, editorials, dissertations, or non-peer-reviewed grant literature were not included. Furthermore, studies involving commercial or professional divers only, and studies not providing extractable data or relevant discussion on novice driving risk were excluded.

Vol. 2026 (1) 27 – 39
ISSN 2688-3651 [online]

For the screening process, four procedures occurred: First, all titles and abstracts of the identified studies were initially screened individually. Second, full-text articles were evaluated according to the predefined inclusion and exclusion criteria. Third, duplicate records were removed. Finally, the final studies were synthesized based on their specific insights on general information in terms of author, date, objective, methods, main findings concerning novices, and context investigated.

The PRISMA flow diagram (Figure 3) illustrates the number of studies identified, screened, excluded, and included in the final review.

3. Results

While analyzing the main emerging themes (Table 1), most reviews reveal the relationships between driver experience, risk perception, training, and accident risk.

Studies reveal that inexperience among young drivers contributes to increased accident involvement due to restricted vision and limited hazard detection abilities. Novices often focus on immediate dangers rather than broader awareness of potential hazards. As inexperienced drivers gain more driving experience, they decrease their risk of accidents, especially in the first months of driving, when crash rates decrease dramatically. Inexperience is associated with difficulty predicting hazards and reliance on rigid strategies during hazardous situations. Novice drivers are more likely to overestimate their hazard perception abilities, which can lead to unsafe decisions.

Simulator-based training has been shown to reduce hazard detection response times and improve novice drivers' skills, especially in hazard perception. Training programs are linked to safer driving behaviors, such as maintaining lower speeds in urban zones. Commentary driving training enhances hazard response and reduces accident rates by improving hazard perception and adaptive behaviors. Training efforts reduce reaction times and enable novice drivers to adapt more effectively to risky situations. Extended practices can lead to a 15% reduction in accident risk, with a reduction of up to 40% for those undergoing advanced or prolonged training programs.

Table 1. Source Evaluation. The table reports the contributions for the review for the last 20 years, and provides specific insights on general Information in terms of Author, Date, objective: methods, main findings for novices, context investigated

Authors/Year	Objective	Methods	Main Contribution	Context
Aga et al. (2021)	Identify factors associated with fatal accidents.	Poisson regression model.	Young drivers, low experience, and time of accident correlated with higher fatal accidents.	n=3,9 Ethiopia
Alberti et al. (2012)	Effectiveness of a driving simulator.	Training with a simulator	Simulator training reduces hazard detection response.	n=14
Alberti et al. (2014)	Identify how drivers differ in visual fixation dispersion.	Driving simulator to evaluate visual behavior.	Novices exhibit restricted vision.	n=40 UK.
Berg (2006)	Measures to reduce accidents among young drivers.	Literature review (GDE) model.	Inexperience increases accidents for young drivers.	Sweden
Blackman & Haworth (2010)	Explore the attitudes of riders regarding safety and usage motivations.	Qualitative analysis through recorded and transcribed group discussions.	Inexperienced riders adopt less safe practices and are less aware of dangers.	n=23 Australia.
Borowsky et al. (2009)	How drivers classify traffic scenes.	Traffic videos.	Focus on immediate danger.	Israel
Braitman et al. (2008)	Identify factors leading to accidents.	Interviews.	The high risk of accidents decreases over time.	n=89 USA.
Crundall (2014)	Investigate the influence of experience and advanced training.	Simulated scenarios assessing	Training improves safe behaviors	n=49 UK.
Crundall (2016)	Analyze the ability to predict hazards.	Videos..	Inexperienced drivers have difficulty predicting hazards.	Road traffic, UK.
Crundall et al. (2010)	Whether commentary driving training improves hazard perception .	Simulator assessing behavior.	Driving training enhances hazard response and reduces accidents.	n=40 UK
Crundall et al. (2012)	How drivers with varying experience levels respond to hazards.	Simulator with hazard scenarios.	Novices anticipate less hazards.	n=49 UK.

Vol. 2026 (1) 27 – 39
ISSN 2688-3651 [online]

De Craen (2011)	Examine skill overestimation in novice	Questionnaires and on-road driving.	Novice drivers	N=60.
Di Stasi et al. (2011)	Effects of training on risk behavior and mental load.	Eye movement and subjective mental load assessments.	Training improves hazard perception and adaptation to risky situations.	n=17 Spain.
Gregersen et al. (2000)	Assess the effects of reducing the minimum driving practice age from 17.5 to 16 years.	National accident data and questionnaires.	15% reduction in novice accident risks, up to 40% for those with extended practice.	n=243,823 Sweden.
Horswill et al. (2005)	Time-to-arrival perception for motorcycles compared to cars and vans.	Simulated videos.	Less experienced drivers misjudged motorcycle arrival times, leading to unsafe decisions.	Various participants. Multiple countries.
Hosking et al. (2010)	Examine how driving affects hazard perception and visual search patterns.	Simulated scenarios.	Inexperienced drivers have fixed visual search patterns.	n=37 Australia.
Mitchell et al. (2015)	Analyze traffic accidents and propose measures to mitigate risks.	Decision tree data mining (CART).	Speeding is the leading cause of severe injuries among novices.	Spain.
Ohlhauser et al. (2011)	Investigate response times and hazard perception between novices during braking events.	Simulated driving measured perception and response times during braking events.	Simulators help to improve novice drivers' skills.	n=32 Canada.
Sagberg & Bjørnskau (2006)	How driving experience influences risk perception and reaction times.	Video-based risk perception tests with and without secondary tasks.	Experience reduces vulnerability to mental distractions and improves risk perception.	n=?NNorway.
Seacrist, et al. (2016)	Comparing rear-end collision rates and severity between adolescent and adult.	Data from collisions via cameras, accelerometers, and GPS.	Adolescents show significantly higher collision rates.	n=? USA.
Shahar et al. (2010)	Compare hazard perception and response between car drivers and motorcyclists.	Questionnaires on perceived danger and realism and simulator.	Motorcyclists perceive more hazards.	n=? UK.
Shope, & Bingham (2008)	Identify Factors influencing risky driving behavior.	Literature review and conceptual framework development.	Comprehensive framework categories influencing teen driving.	USA.
Xiao & Watson (2017)	How drivers evaluate traffic scenes in terms of difficulty, danger, and control.	Traffic scene videos and rated them using scales.	Difficulty, danger, and lack of control varied with driver experience.	n= 4.055. UK.
Xiao et al. (2021)	Factors influencing injury severity in traffic accidents.	Analyzed accidents using a bivariate probit model.	Novice drivers were impacted by accidents and vehicle types.	n= 1999. USA.

4. Discussion

This literature review shows that the high risk of crashes among novice drivers can not be attributed to one single factor but rather various factors linking cognitive, perceptual, and behavioral skills that need to be developed throughout years of experience. One of the most important factors linked across multiple studies is reduced visual scanning and attention among this group. Novice drivers tend to exhibit narrow or inefficient gaze patterns, which limit their ability to detect hazards in time to avoid them (Crundall et al., 1999; Alberti et al., 2012). These hazard detection deficiencies lead to slower reaction times in complex traffic situations, which is a major contributor to crashes.

Another prominent contributor is the overestimation of driving ability. Many novice drivers, especially teenagers, demonstrate inflated confidence in their skills while simultaneously lacking the judgment necessary to drive safely (De Craen et al., 2011). This cognitive bias can lead to risk-taking behaviors such as speeding, tailgating, and reduced attention on the road. When this is combined with immature hazard perception, such behaviors significantly elevate crash potential.

Cognitive load also plays a crucial role as novice drivers are more likely to become overwhelmed in unfamiliar or high-demand driving situations, and struggle to process excess information and multitask effectively (Aga et al., 2021). This mental overload further undermines their capacity to make quick and safe decisions.

Vol. 2026 (1) 27 – 39
ISSN 2688-3651 [online]

In order to combat the difficulties novice drivers face on the road, evaluated studies emphasize the importance of training programs and reinforce them as the best way to overcome their lack of skill and detect hazardous situations. These drivers' cognitive and visual scanning deficiencies highlight the need for interventions that promote safer driving practices, and by addressing these problems, novice drivers can significantly improve their safety. Furthermore, this review reveals that targets such as hazard perception training, simulator-based instruction, and commentary driving can meaningfully improve performance and have been shown to enhance scanning, reduce reaction time, and strengthen situational awareness (Crundall et al., 2010; Alberti et al., 2014).

All studies reported brought about further clarifications regarding how to improve safety for novice drivers. Despite these insights, several limitations must be considered. First, many studies used simulator-based data, which may not fully replicate the complexity and unpredictability of real-world driving. Second, sample sizes and demographic compositions vary widely, limiting generalizability across populations. Additionally, some studies neglected gender and cultural variability and their effect on driving behavior. Finally, many of the studies were done over a short period of time, preventing conclusions from being made about how driving skills evolve over extended periods or across different driving environments.

Future research should focus on more diverse samples, observing driving skills in real road environments, and examining how a combination of cognitive and behavioral interventions impacts crash rates over time.

5. Conclusion

This study synthesizes evidence to reinforce the importance of experience and training to decrease the risk of accidents involving novice drivers, suggesting that efforts should prioritize practical training programs to support safer driving behaviors and reduce the overrepresentation of novice drivers in traffic accidents. Ways to achieve this include reintegrating Driver's Education courses in high school curricula nationwide to provide young drivers with consistent foundational training. Additionally, installing driving simulator devices at the Department of Motor ehicles (DMVs) and making their use mandatory before obtaining a license offers an effective way for novice drivers to practice hazard perception in a safe, controlled environment. Furthermore, embedding video-based modules and commentary driving exercises into training programs has improved novice drivers' situational awareness and reaction times.

Improving the ability of these drivers to perceive their skills and difficulties would help them to be better decision-makers and safer drivers. Future efforts should prioritize practical training programs to support safer driving behaviors and reduce the overrepresentation of novice drivers in traffic accidents.

References:

Aga, M. A., Woldeamanuel, B. T., & Tadesse, M. (2021). Statistical modeling of the number of human deaths per road traffic accident in the Oromia region, Ethiopia. *PLoS ONE*, 16(5), 251–492. Available from: https://doi.org/10.1371/journal.pone.0251492. Accessed 30 July. 2024.

Alberti, C. F., et. al. (2012). Using an eye-tracker to assess the effectiveness of a three-dimensional riding simulator in increasing hazard perception. *Cyberpsychology, Behavior, and Social Networking*, 15(5), 274–276. doi: 10.1089/cyber.2010.0610

Alberti, C. F., Shahar, A., & Crundall, D. (2014). Are experienced drivers more likely than novice drivers to benefit from driving simulations with a wide field of view? *Transportation Research Part F: Traffic Psychology and Behaviour*, 27, 124–132. Available from: http://dx.doi.org/10.1016/j.trf.2014.09.011 1369-8478/

Atkinson, K. M., et. al. (2015). Reporting standards for literature searches and report inclusion criteria: Making research syntheses more transparent and easy to replicate. *Research Synthesis Methods*, 6(1), 87–95. doi: 10.1002/jrsm.1127

Berg, H. Y. (2006). Reducing crashes and injuries among young drivers: what kind of prevention should we be focusing on? Injury Prevention, 12,1, i15–i18. Available from: http://injuryprevention.bmj.com/

Vol. 2026 (1) 27 – 39
ISSN 2688-3651 [online]

Blackman, R. A., & Haworth, N. L. (2010). A qualitative exploration of the attitudes and experiences of moped and scooter riders. TRB 89th Annual Meeting Proceedings, Washington, DC, 10–14. Available from: https://www.researchgate.net/publication/258134691. Accessed 10 Nov., 2024.

Borowsky, A., Oron-Gilad, T., & Parmet, Y. (2009). Age and skill differences in classifying hazardous traffic scenes. *Transportation Research Part F: Traffic Psychology and Behaviour*, 12(4), 277–287. doi: 10.1016/j.trf.2009.02.001

Braitman, K. A., et. al. (2008). Crashes of novice teenage drivers: Characteristics and contributing factors. Journal of Safety Research, 39(1), 47–54. doi:10.1016/j.jsr.2007.12.002

Cooper, P. J., Pinili, M., & Chen, W. (1995). An examination of the crash involvement rates of novice drivers aged 16 to 55. *Accident Analysis & Prevention*, 27(1), 89–104. doi: 10.1016/0001-4575(94)00052-n

Crundall, D. (2014). The role of experience and advanced training on performance in a motorcycle simulator. Accident Analysis & Prevention. Available from: https://doi.org/10.1016/j.aap.2014.08.009.

Crundall, D. (2016). Hazard prediction discriminates between novice and experienced drivers. *Accident Analysis & Prevention*, 86, 47–58. doi: 10.1016/j.aap.2015.10.006.

Crundall, D., et. al. (2010). Commentary training improves responsiveness to hazards in a driving simulator. Accident Analysis and Prevention, 42(6), 2117–2124. doi: 10.1016/j.aap.2010.07.001.

Crundall, D., et. al. (2012). Motorcycling experience and hazard perception. *Accident Analysis and Prevention*, 4, 1–XX. doi:10.1016/j.aap.2012.05.021

Crundall, D., et. al. (2012). Some hazards are more attractive than others: Drivers of varying experience respond differently to different types of hazards. *Accident Analysis and Prevention*, 45, 600–609. doi:10.1016/j.aap.2011.09.049

Crundall, D. E., & Underwood, G. (1998). The effects of experience and processing demands on visual information acquisition in drivers. *Ergonomics*, 41(4), 448–458. doi:10.1080/001401398186937

Crundall, D., Underwood, G., & Chapman, P. (1999). Driving experience and the functional field of view. Perception, 28(8), 1075–1087. doi: 10.1068/p281075

Crundall, D., Underwood, G., & Chapman, P. (2002). Attending the peripheral world while driving. *Applied Cognitive Psychology*, 16(4), 459–475. Available from: https://doi.org/10.1002/acp.806. Accessed 06 jul. 2024.

De Craen, S., et. al. (2011). Do young novice drivers overestimate their driving skills more than experienced drivers? Different methods lead to different conclusions. *Accident Analysis and Prevention*, 43(5), 1660–1665. doi: https://doi.org/10.1016/j.aap.2011.03.024

Deery, H. A. (1999). Hazard and risk perception among young novice drivers. *Journal of Safety Research*, 30(4), 225–236. Available from: https://doi.org/10.1016/S0022-4375(99)00018-3. Accessed 30 jul. 2024.

Di Stasi, L. L., et. al. (2011). Behavioral and eye-movement measures to track improvements in driving skills of vulnerable road users: First-time motorcycle riders. *Transportation Research Part F: Traffic Psychology and Behaviour*, 14(1), 26–35. doi: 10.1016/j.trf.2010.09.003

Gregersen, N. P., & Bjurulf, P. (1996). Young novice drivers: Towards a model of their accident involvement. *Accident Analysis & Prevention*, 28(2), 229–241. doi: 10.1016/0001-4575(95)00063-1

Gregersen, N. P., Nyberg, A., & Berg, H.-Y. (2000). Sixteen-year age limit for learner drivers in Sweden—An evaluation of safety effects. *Accident Analysis & Prevention*, 32(1), 25–35. doi: 10.1016/s0001-4575(99)00045-7

Vol. 2026 (1) 27 – 39
ISSN 2688-3651 [online]

Horswill, M. S., et. al. (2005). Motorcycle accident risk could be inflated by a time to arrival illusion. *Optometry and Vision Science*, 82(8), 740–746. doi: 10.1097/01.opx.0000175563.21423.50

Horswill, M. S., & Helman, S. (2003). A behavioral comparison between motorcyclists and a matched group of non-motorcycling car drivers: Factors influencing accident risk. *Accident Analysis and Prevention*, 35(4), 589–597. Available from: https://doi.org/10.1016/S0001-4575(02)00039-8 . Accessed 10 Nov. 2024.

Horswill, M. S., & McKenna, F. P. (2004). Drivers' hazard perception ability: Situation awareness on the road. In S. Banbury & S. Tremblay (Eds.), A cognitive approach to situation awareness (pp. 155–175). Aldershot, UK: Ashgate. Available from: https://www.researchgate.net/publication/271767714_Drivers'_hazard_perception_ability_Situation_awareness_on_the_road. Accessed: 2 Dec., 2024.

Hosking, S. G., Liu, C. C., & Bayly, M. (2010). The visual search patterns and hazard responses of experienced and inexperienced motorcycle riders. *Accident Analysis and Prevention*, 42(1), 196–202. doi:10.1016/j.aap.2009.07.023

Liberati, A., et. al. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: Explanation and elaboration. BMJ, 339, b2700. https://doi.org/10.1136/bmj.b2700

Mayhew, D. R., Simpson, H. M., & Pak, A. (2003). Changes in collision rates among novice drivers during the first months of driving. *Accident Analysis & Prevention*, 35(5), 683–691. doi:10.1016/S0001-4575(02)00047-7

McKenna, F. P., & Crick, J. L. (1994). Hazard perception in drivers: A methodology for testing and training (Transport and Road Research Laboratory Report 313). Crowthorne: Transport and Road Research Laboratory. doi: 10.13140/RG.2.1.3873.7766

Mitchell, R., et. al. (2015). Comparison of novice and full-licensed driver common crash types in New South Wales, Australia, 2001–2011. Accident Analysis & Prevention, 81, 204–210. doi:10.1016/j.aap.2015.04.039

Ohlhauser, A. D., Milloy, S., & Caird, J. K. (2011). Driver responses to motorcycle and lead vehicle braking events: The effects of motorcycling experience and novice versus experienced drivers. *Transportation Research Part F: Psychology and Behavior*, 14(6), 472–483. doi:10.1016/j.trf.2011.08.003

Peters, M. D. J., Godfrey, C. M., Khalil, H., McInerney, P., Parker, D., & Soares, C. B. (2015). Guidance for conducting systematic scoping reviews. *International Journal of Evidence-Based Healthcare*, 13(3), 141–146. https://doi.org/10.1097/XEB.0000000000000050

Pidgeon, N., Kasperson, R. E., & Slovic, P. (Eds.). (2003). The social amplification of risk. Cambridge University Press. doi: 10.1017/CBO9780511550461

Sagberg, F., & Bjørnskau, T. (2006). Hazard perception and driving experience among novice drivers. *Accident Analysis & Prevention*, 38(2), 407–414. doi:10.1016/j.aap.2005.10.014

Seacrist, T., et. al. (2016). Comparison of crash rates and rear-end striking crashes among novice teens and experienced adults using the SHRP2 Naturalistic Driving Study. *Traffic Injury Prevention*, 17(sup1), 48–52. doi:10.1080/15389588.2016.1188384

Sjøberg, L., Moen, B.-E., & Rundmo, T. (2004). An evaluation of the psychometric paradigm in risk perception research (Rotunde publikasjoner No. 84). Norwegian University of Science and Technology, Department of Psychology.

Shahar, A., et. al. (2010). Motorcyclists' and car drivers' responses to hazards. *Transportation Research Part F: Traffic Psychology and Behaviour*, 13(4), 243–254. doi: https://doi.org/10.1016/j.trf.2010.04.008

Shope, J., & Bingham, C. (2008). Teen driving: motor-vehicle crashes and factors that contribute. *American Journal of Preventive Medicine*, 35(3), 261-271. doi: 10.1016/j.amepre.2008.06.022

Vol. 2026 (1) 27 – 39
ISSN 2688-3651 [online]

Summala, H. (1988). Risk control is not risk adjustment: The zero-risk theory of driver behaviour and its implications. *Ergonomics*, 31, 491–50. doi: 10.1080/00140138808966694.

Summala, H. (2000). Brake reaction times and driver behavior analysis. *Transportation Human Factors*, 2(3), 217–226. doi:10.1207/STHF0203_2

Summala, H., Lamble, D., & Laakso, M. (1998). Driving experience and perception of the lead car's braking when looking at in-car targets. Accident Analysis and Prevention, 30(4), 401–407. Available from: https://doi.org/10.1016/S0001-4575(98)00005-0 . Accessed 10 Nov. 2024.

Underwood, G., et. al. (2003). Visual attention while driving: Sequences of eye fixations made by experienced and novice drivers. *Ergonomics*, 46(6), 629–646. doi:10.1080/0014013031000090116

Wikman, A. S., Nieminen, T., & Summala, H. (1998). Driving experience and time-sharing during in-car tasks on roads of different width. *Ergonomics*, 41 (3), 358–372. doi: 10.1080/001401398187080

Xiao, Y., & Watson, M. (2017). Guidance on conducting a systematic literature review. *Journal of Planning Education and Research*, 39(1), 93–112. doi:10.1177/0739456X17723971 . Accessed 10 Nov., 2024.

Xiao, D., et. al. (2021). Insights on crash injury severity control from novice and experienced drivers: A bivariate random-effects probit analysis. Discrete Dynamics in Nature and Society, 2021, Article 1–13. doi: 10.1155/2021/6675785