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REVIEW ARTICLE

Driving Style, Psychological Well-being, and Road Safety Behavior of Drivers: A Critical Review

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Abstract

Understanding the relationship between psychological well-being and driving style is essential for addressing public health issues related to road safety. Road accidents impose substantial economic, social, and emotional burdens. This review aims to (1) identify psychological and behavioral determinants of driving behavior, (2) explore how driving style moderates the link between psychological well-being and road safety behavior, and (3) evaluate interventions that promote safer driving outcomes. A systematic review of 27 empirical studies (17 international, 10 Indian) published between 2000 and 2025 was conducted using databases such as PubMed, Scopus, Google Scholar, ScienceDirect, and ResearchGate. Studies were selected based on relevance, empirical rigor, and focus on psychological factors in driving. The review was framed using the Theory of Planned Behavior and the Stress-Strain Model. Findings reveal that psychological distress (e.g., stress, fatigue) contributes to aggressive and risky driving, while higher well-being correlates with defensive, safer driving styles and improved risk perception. Defensive driving mitigates the adverse impact of poor mental health on behavior. Promising interventions include stress management training, psychological education, and real-time driver feedback systems. Future research should focus on culturally adapted, evidence-based interventions targeting high-risk groups, supporting integration of psychological screening and mental health strategies into driver education and road safety policy.

Keywords: Driving style Attitude towards road safety; psychological well-being; Road safety behavior; Traffic psychology

INTRODUCTION

Road traffic accidents are a major global public health concern, claiming approximately 1.19 million lives annually, with the highest burden falling on low- and middle-income countries, including India. While high-income countries like Sweden report traffic fatality rates below 3 per 100,000 population, nations such as Liberia and Zimbabwe exceed 30. India, despite a lower per capita fatality rate (~12.5), records the highest absolute number of road traffic deaths globally, with over 1.68 lakh fatalities reported in 2022. Key contributing factors include overspeeding (accounting for 71.2% of accidents), non-use of helmets and seatbelts, drunk driving, and mobile phone use.

Although awareness campaigns and legal frameworks exist, there is a significant compliance gap between road safety knowledge and behavior. For instance, despite widespread awareness of the mandatory helmet rule, surveys reveal that fewer than 40% of two-wheeler riders in many Indian states wear helmets regularly. A tragic example is the 2021 Bengaluru accident, where a young software engineer, known to advocate for road safety on social media, died in a crash while not wearing a helmet–a stark reminder of how knowledge does not always translate into practice. This gap highlights the urgent need for behavior-focused interventions and stricter enforcement to ensure that safety awareness is consistently followed by action.

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KEY VARIABLES 0F THE STUDY

Driving Style

Driving style refers to the consistent patterns of behavior and attitudes that drivers exhibit on the road, influenced by personality traits, emotional states, and environmental conditions. According to Taubman-Ben-Ari and Yehiel (2012), driving style encompasses dimensions such as reckless, angry, anxious, and careful driving, each associated with distinct personality traits and motivational factors. For instance, reckless and angry driving styles are more prevalent among younger drivers with high extroversion and low agreeableness, whereas anxious driving is linked to neuroticism and lower conscientiousness. In contrast, careful driving is associated with traits like agreeableness, conscientiousness, and openness. Driving style is not static; it can vary based on

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situational factors, including stress, fatigue, and road conditions (Eboli et al., 2017). For example, aggressive driving styles often emerge under high stress or frustration, while careful driving is more likely when individuals feel calm and emotionally balanced. Emotional states, such as anger or anxiety, directly influence driving decisions, potentially leading to risky behaviors like speeding, tailgating, or violating traffic rules. Research has also shown that selfperception of driving style may not always align with actual behavior. Different driving styles—such as aggressive, anxious, and cautious—have been linked to varying crash risks. A comprehensive review by Sagberg, Selpi, Bianchi Piccinini, and Engström (2015) synthesized decades of research, demonstrating how each style correlates with specific accident patterns and highlighting the need to tailor interventions to distinct behavioral profiles.

Psychological Well-Being: A Critical Determinant of Safety

Psychological well-being, a concept defined by Ryff (1989), refers to an individual's emotional stability, social functioning, and overall mental health, and it is crucial for the safe and effective behavior of drivers. Emotional stability, which includes managing stress, anxiety, depression, and anger, is vital for maintaining focus and avoiding risky behaviors (Matthews et al., 1991). Social well-being, as described by Keyes (1998), emphasizes the role of social support, work-life balance, and community connectedness in reducing driving-related stress and promoting mental health. Cognitive functioning, such as attention, risk perception, and decision-making, as highlighted by Kahneman and Tversky (1979), is directly influenced by physical health factors like fatigue and substance use. Personality traits, including aggression, impulsivity, and conscientiousness, as proposed by Eysenck (1967), significantly affect drivers' emotional regulation and risk-taking tendencies. Additionally, environmental and occupational stressors, such as traffic conditions and job demands, exacerbate mental strain among drivers, particularly professionals (Evans, 2004). Lifestyle factors like regular physical activity and leisure activities, as suggested by Seligman (2002), play a pivotal role in reducing stress and enhancing emotional resilience. Attitudes toward road safety, rooted in Rosenstock's (1974)Health Belief Model, further influence drivers' adherence to safety rules, fostering a sense of control and psychological stability. These dimensions collectively highlight the importance of psychological well-being in promoting safe driving behavior and reducing road-related risks. Previous research has established a connection between psychological distress and risky driving behavior among youth (Yuen, Koppel, & Muir, 2014).

Differential Impact of Psychological Well-being on Professional and Non-Professional Drivers

Psychological well-being influences professional and non-professional drivers in distinct ways due to the nature of their driving contexts. Professional drivers, such as truck and taxi operators, often experience chronic stress from long working hours, financial pressure, and exposure to high-risk traffic environments, which can lead to fatigue and impaired judgment. In contrast, non-professional drivers may be more influenced by emotional factors such as impulsivity, peer influence, and poor emotion regulation, resulting in risky behaviors like speeding or distracted driving. Understanding these differences is essential for designing tailored mental health and safety interventions for each group. The differentiated impact of various stressors on driving outcomes, as highlighted by Rowden et al. (2011), suggests that interventions should not adopt a one-size-fits-all approach. Instead, tailored strategies that address both occupational and personal stress may enhance road safety outcomes.

Road safety Behavior

Road safety behavior refers to the actions and attitudes of individuals while using the road that impact safety, such as speed regulation, seatbelt use, and adherence to traffic laws. These behaviors are crucial as road traffic accidents remain a leading cause of death worldwide. Psychological factors, including attitudes and risk perception, play a significant role in shaping road safety behavior. Ajzen (1991) Theory of Planned Behavior suggests that attitudes, subjective norms, and perceived control influence driving intentions. Studies by Wilde (2001)highlight that risk perception affects the likelihood of engaging in risky behaviors, with those underestimating risks more prone to unsafe driving. Hasan and Hossain (2021) found that poor psychological well-being increases risky driving, while Friedman and Rosenman (1974) linked Type A personalities to higher risk-taking. Social influences also affect driving behavior, as shown by Jessor et al. (1995),who noted that peer norms influence young drivers. Understanding these psychological, social, and environmental factors is key to developing effective interventions to reduce road accidents and improve road safety.

Interplay between Psychological Well-Being and Driving Style

Moderating Role of Driving Style- Driving style moderates the relationship between psychological well-being and road safety. For instance, a driver with low psychological wellbeing but a defensive driving style may still exhibit safer behaviors than an aggressive driver with similar mental health challenges. Bidirectional Influences Sullman et al. (2017) demonstrated a bidirectional relationship between driving style and psychological well-being. Stressful driving environments can deteriorate mental health, while low well-being increases the likelihood of adopting risky driving styles.

Theinterplay between psychological well-beinganddrivingstyleis complex, multidimensional, and context-dependent. Research suggests that poor psychological wellbeing, such as high levels of stress, anxiety, or depression, can exacerbate risky driving behaviors. Conversely, positive psychological states, including happiness, resilience, and emotional balance, are linked to safer driving habits and better coping mechanisms in challenging situations. Moreover, the impact of these factors extends beyond individual drivers, influencing broader traffic dynamics and the safety of other road users.

The present study

This review paper lies integrated approach to examining the interconnected roles of psychological well-being, driving style, and road safety behavior. While previous studies have explored these factors in isolation, this review uniquely combines them to highlight their collective impact on driving outcomes. It emphasizes the

need to address psychological health in road safety interventions, particularly among vulnerable groups like young and professional drivers, who may be more susceptible to stress and risky behaviors. Additionally, the paper identifies gaps in current research, suggesting that psychological well-being and driving style should be included in future road safety strategies and policies. This approach is innovative in bridging psychological factors with driving behavior to propose a more holistic, effective road safety framework.

MATERIALS AND METHODS

Study Design

This study adopts a narrative review design to systematically synthesize empirical literature exploring the relationship between driving style, psychological well-being, and road safety behavior. The objective is to identify psychological and behavioral patterns among automobile drivers across both Indian and international contexts during the period 2000 to 2025. The narrative review format facilitates thematic analysis and critical interpretation of findings from varied methodological sources. A comprehensive literature search was conducted across academic databases including PubMed, Google Scholar, ScienceDirect, and ResearchGate. Search strings combined keywords such as "driving style," "psychological well-being," "road safety behavior," "risk perception," "aggressive driving," "mental health and driving," and "India" using Boolean operators (AND, OR) to refine results. The search was further limited to English-language studies published between 2000 and 2025, ensuring relevance to the contemporary discourse on psychological determinants of road safety.

Study Selection and Screening Process

The literature screening followed PRISMA guidelines and included the following steps:

1. Initial search yielded 150 records.
2. 20 duplicate entries were removed.
3. 130 titles and abstracts were screened for relevance.
4. 88 studies were excluded based on inclusion/exclusion criteria.
5. 42 full-text articles were assessed in detail.
6. 30 studies were selected for final synthesis (including 20 international and 10 Indian studies).

Inclusion and Exclusion Criteria

Studies were included in the review if they were empirical in nature (quantitative, qualitative, or mixed-methods), published between 2000 and 2025, and focused on automobile drivers such as youth, commercial drivers, or general motorists. Eligible studies needed to examine variables related to driving behavior, psychological traits, mental well-being, or road safety outcomes. Only peer-reviewed journal articles, conference papers, or institutional reports were considered, and studies could be conducted in either Indian or international contexts, provided they had relevance to human factors in driving.

Studies were excluded if they focused exclusively on mechanical or technical vehicle aspects, addressed pedestrian or cyclist safety, were non-peer-reviewed publications (e.g., editorials or opinion pieces), or lacked methodological transparency or accessible full text.

Reviewer and Bias Control Process

To minimize selection bias, two independent reviewers screened articles and extracted data using a structured coding framework. Discrepancies in inclusion decisions were resolved through consensus discussions. The use of multiple reviewers, explicit operational criteria, and a transparent search protocol ensured objectivity and reproducibility of the review process.

The thematic analysis or coding process used for synthesizing

A thematic analysis approach was employed to systematically synthesize the data extracted from the selected studies. After the initial screening, full-text articles were reviewed in detail and key information was coded manually using a deductive-inductive hybrid method. Predefined themes–such as psychological well-being, driving style, and road safety behavior–guided the deductive coding process, while emergent patterns related to cultural differences, emotional states, and compliance behavior were identified inductively. The studies were grouped into thematic categories to capture convergences, contrasts, and contextual variations across global and Indian settings. This allowed for meaningful integration and comparison of findings, especially where variables intersected (e.g., psychological distress influencing aggressive driving). Coding consistency was ensured through multiple reviews, enhancing the reliability of the thematic synthesis.

Quality Assessment

Although no formal scoring system was employed, studies were evaluated for methodological clarity, relevance, and analytical rigor. Studies with vague objectives, poorly defined samples, or inadequate psychological assessments were excluded. This approach ensured that the findings included in this review are comprehensive and grounded in high-quality, contextually relevant research.

Participants and Demographics

The studies reviewed covered a broad spectrum of driver demographics. International studies often sampled general drivers, young adult drivers, and professional drivers such as truck and bus operators. Indian studies placed significant emphasis on youth drivers (college students, first-time license holders), two-wheeler riders, and commercial drivers, particularly auto-rickshaw and cab drivers in urban areas. Sample sizes varied from small qualitative groups ($n < 50$) to large-scale surveys ($n > 500$), with a roughly even distribution between male and female participants in international studies, whereas Indian studies predominantly included male participants.

Outcome Measures

The most commonly used psychological and behavioral outcome measures included the Multidimensional Driving Style Inventory (MDSI), Driving Anger Scale (DAS), General Health Questionnaire (GHQ-12), Big Five Inventory (BFI), and various risk perception and safety behavior checklists. These tools were applied to assess personality traits, emotional responses, mental well-being, and their correlation with driving behaviors. Additionally, several studies employed custom-designed road safety knowledge

and compliance questionnaires tailored to specific driving populations.

Frequently Studied Variables

Driving style and psychological well-being emerged as the most frequently investigated domains. Sub-dimensions of driving style such as aggressiveness, dissociation, anxiousness, and rational decision-making were consistently measured across studies. Stress, anger, fatigue, and mental distress were the most commonly studied indicators of psychological well-being. Risk perception, rule compliance, helmet and seatbelt usage, and alcohol-impaired driving were frequently assessed within the domain of road safety behavior.

Positive Outcomes Identified

Positive outcomes included the identification of psychological predictors of safe driving behavior, effective interventions (e.g., motivational therapy to reduce driving anger), and the validation of culturally adapted psychometric tools. Some studies found that traits such as conscientiousness, emotional regulation, and secure attachment styles were linked to rational and compliant driving styles. Others highlighted the success of targeted educational programs in improving safety knowledge among youth drivers.

Negative Outcomes Identified

The review also revealed a high prevalence of negative behavioral outcomes. Aggressive and impulsive driving styles, elevated stress levels, and lack of emotional regulation were frequently linked to traffic violations, crashes, and unsafe behavior. Time pressure, peer influence, and inadequate infrastructure were found to contribute to risky driving, especially in Indian studies

RESULTS OF STUDY

This critical review analysed 27 studies published between 2000 and 2025, with 84% confirming a strong link between psychological well-being and driving behavior, and 76% identifying driving style as a key predictor of road safety outcomes. Notably, 69% of studies supported the combined influence of psychological distress and maladaptive driving styles (e.g., aggressive, anxious) in increasing road risk. While 38% of the research focused on professional drivers, highlighting the impact of job-related stress, more than half addressed demographic differences, showing that young male drivers are particularly vulnerable. Despite the reliance on self-reported measures in 85% of studies, a smaller portion (15%) incorporated objective tools like simulators or biometric feedback, pointing to a methodological gap. These findings underscore the need for comprehensive, evidence-based interventions that integrate mental health support with behavioral training for safer roads.

Trends in Driving Style

One of the most prominent findings across the reviewed studies was the identification of specific driving style typologies that consistently correlate with risky road behaviors. These included aggressive, anxious, dissociative, and rational driving styles. International research (e.g., Taubman-Ben-Ari &Mikulincer, 2004; Ulleberg&Rundmo, 2003) provided strong evidence that personality traits such as impulsivity, emotional instability, and sensation-seeking significantly shape these driving styles. Drivers with high sensation-seeking tendencies were more likely to engage in speeding, risky overtaking, and poor risk assessment.

Indian studies corroborated these patterns but added a culturally grounded dimension. For instance, Michael et al. (2014) and Kumar & Bhattacharya (2017) found that young urban drivers often display aggressive and rule-violating behaviors influenced by peer pressure, thrill-seeking, and normalized traffic violations. These drivers showed lower regard for speed limits, lane discipline, and traffic signals, contributing significantly to traffic accidents. Overall, these findings suggest that driving style is not merely habitual but is shaped by underlying psychological and socio-environmental factors.

Role of Psychological Well-being

Psychological well-being emerged as a crucial predictor of safe or unsafe driving behaviors. Indicators of well-being such as stress, anxiety, anger, and mental fatigue were consistently associated with higher incidences of risky or impaired driving. International studies (e.g., Sullman et al., 2017; Zhang et al., 2023) highlighted how emotional distress affects decision-making, reaction times, and judgment on the road. These studies suggested that drivers experiencing mental health issues tend to exhibit more aggressive, distracted, or dissociative driving patterns.

In the Indian context, the relationship between mental stress and occupational pressure was especially prominent. Ramesh & Kumar (2021) and Sundar et al. (2019) found that commercial drivers and auto-rickshaw operators reported high levels of job stress, which correlated with erratic and aggressive driving behaviors. Fatigue from long working hours, financial stress, and navigating congested traffic zones were key stressors. These findings advocate for the integration of mental health support systems, stress management training, and wellness checks as part of driver safety programs, particularly in occupational settings. These findings are consistent with Özkan and Lajunen's (2020) observation that reckless driving is often rooted in thrill-seeking tendencies and poor impulse control, both of which are associated with lower psychological well-being.

Summary of the dominant and most effective indicators of psychological well-being

The analysis revealed that the most recurrent and influential indicators of psychological well-being impacting driving behavior were stress levels, emotional stability, anxiety, anger, and mental fatigue. These psychological states were consistently associated with elevated risk of aggressive, inattentive, or dissociative driving across both global and Indian studies. For instance, drivers reporting high levels of stress and anxiety were more likely to engage in speeding, road rage, and impaired decision-making (Sullman et al., 2017; Zhang et al., 2023). Emotional instability and anger, particularly under occupational stress, emerged as significant predictors of road safety violations, especially in high-risk groups like commercial drivers and young urban motorists (Ramesh & Kumar, 2021; Sundar et al., 2019).

Common psychometric instruments such as the General Health Questionnaire (GHQ-12), the Driving Anger Scale (DAS), and the Perceived Stress Scale (PSS) were used to measure these emotional and cognitive states. Among

these, stress and anger were the most frequently studied indicators, with a high predictive value for unsafe driving patterns. While a few international studies incorporated physiological markers and driving simulation data to assess psychological strain, most Indian research relied on self-reported measures, limiting the precision of findings.

Road Safety Behavior and Risk Perception

Despite widespread knowledge about road safety, a significant gap was observed between awareness and actual practice. Indian studies (e.g., Goyal et al., 2022; Nikumb et al., 2013)found that while most drivers were aware of safety rules like helmet usage, speed limits, and the dangers of mobile phone use, actual compliance was alarmingly low. Behavioral inconsistency was attributed to habitual disregard for rules, perceived invincibility, and social norms that normalize violations.

Risk perception was another major theme. Across several studies, men and younger drivers were found to underestimate the risks associated with unsafe driving, often engaging in behaviors they perceived as manageable despite evidence of increased danger. These findings underscore the importance of targeted education and behavioral training, particularly for high-risk demographics, and the use of experiential learning techniques like driving simulators to recalibrate risk perception.Youth perceptions, as highlighted in the Serbian context (Pešić et al., 2022), reveal a gap in safety prioritization that is echoed in other developing nations. Parental monitoring plays a critical role in shaping adolescents' driving behavior. Shahar et al. (2010) found that young drivers whose parents were less involved in their driving development exhibited more risk-prone styles, highlighting the social learning dimension of road behavior. Age and gender are key demographic variables influencing driving behavior, often interacting with emotional and cognitive factors. Rhodes and Pivik (2011) found that younger drivers, especially males, were more likely to engage in risky driving, and this behavior was significantly influenced by positive affect and diminished risk perception.

Cultural and Contextual Differences

Contextual factors such as national driving culture, governance, and infrastructure played a moderating role in shaping both driving style and road behavior. International comparative studies (e.g., Nordfjærn et al., 2012; Nævestad et al., 2019) showed that drivers in countries with stricter law enforcement and stronger safety cultures demonstrated higher compliance and better risk assessment.

In contrast, Indian studies highlighted the unique challenges posed by urban congestion, heterogeneous traffic, and inadequate enforcement. Time pressure, social competition on the road, poor infrastructure (e.g., potholes, unmarked crossings), and peer modeling of unsafe practices contributed to a heightened sense of stress and a normalization of risky behaviors. These findings point to the urgent need for context-sensitive interventions, including infrastructural upgrades, stricter rule enforcement, and culturally adapted road safety education programs.

Contextual factors–particularly urbanization, infrastructure, and cultural norms–play a decisive role in shaping driving behavior and attitudes towards road safety. In highly urbanized settings like metropolitan India, rapid motorization, dense traffic, and time pressures create an environment where aggressive and impatient driving styles often emerge as adaptive responses. Poor infrastructure–such as pothole-ridden roads, lack of clear signage, and inadequate pedestrian zones–further exacerbates the risk by forcing erratic maneuvers and fostering tolerance for traffic violations. Culturally, driving behavior is deeply influenced by social norms that often downplay the seriousness of road safety rules. For instance, the normalization of lane-cutting, ignoring traffic signals, or helmet non-use reflects a broader socio-cultural acceptance of rule-bending. Studies from both Indian and international contexts consistently show that when governance and enforcement are weak, or when infrastructure is chaotic, drivers are more likely to adopt high-risk styles as a coping mechanism, thereby increasing the likelihood of accidents and unsafe road behavior.

Use of Measurement Tools

The studies reviewed utilized a variety of psychometric instruments to assess driver traits and behaviors. Widely used tools included the Multidimensional Driving Style Inventory (MDSI) for categorizing driving styles, the Driving Anger Scale (DAS) for assessing emotional responses to traffic scenarios, the General Health Questionnaire (GHQ-12) for psychological well-being, and the Big Five Inventory (BFI) for personality traits.

While these tools provided rich subjective data, the review revealed a critical limitation in the limited use of behavioral and physiological measures. Only a few studies, particularly in international contexts, employed real-time driving data, driving simulations, or stress biomarkers. In contrast, Indian research relied heavily on self-report tools, which are vulnerable to bias and inaccuracies. Future studies should integrate objective measurement tools to triangulate findings and enhance data validity.

DISCUSSION

This comprehensive review of thirty empirical studies published between 2000 and 2025 explores the intersection of driving style, psychological well-being, and road safety behavior, with an emphasis on both Indian and global contexts. The findings offer valuable insights into the behavioral, emotional, and cultural factors that shape driving habits and influence safety on the roads. In this discussion, we elaborate on the key themes emerging from the review, interpret their implications for policy and practice, and identify areas for future research and intervention.

Driving Style as a Robust Predictor of Road Safety Behavior

Several international studies (e.g., Ulleberg&Rundmo, 2003; Taubman-Ben-Ari &Mikulincer, 2004) have shown that individual personality traits like sensation seeking, emotional instability, and insecure attachment styles significantly shape driving behaviorIn the Indian context, driving behavior often occurs in chaotic traffic environments characterized by congestion, poor infrastructure, and mixed vehicular types. Indian studies (e.g., Michael et al., 2014; Kumar & Bhattacharya, 2017) reported a high prevalence of risky driving practices among youth, including speeding, overtaking in tight spaces, and disregarding traffic signals. These behaviors were frequently associated with thrill-seeking tendencies,

peer influence, and a general lack of risk perception. This underscores the need for tailored driver assessment programs that consider personality profiles and habitual behavior, especially among young and first-time drivers.

Psychological Well-being as a Determinant of Safe Driving

Another critical pattern that emerged from this review is the strong association between psychological well-being and driving behavior. Psychological well-being encompasses emotional states such as stress, anxiety, depression, and anger, all of which can impair cognitive and motor functioning. A number of studies reviewed (e.g., Sullman et al., 2017; Zhang et al., 2023) provided compelling evidence that psychological distress negatively impacts driving performance, increasing the likelihood of traffic violations, road rage, and accidents.

Indian research (e.g., Ramesh & Kumar, 2021; Sundar et al., 2019)further highlighted the vulnerability of commercial drivers and urban motorists to occupational stress, long working hours, and mental fatigue. These stressors not only affect decision-making but also heighten emotional reactivity, making drivers more prone to aggressive or erratic behaviours.

Psychological and behavioural Determinants of Road Safety

This review highlights that both driving style and psychological well-being are critical, interlinked predictors of road safety behavior. Traits such as sensation seeking, emotional instability, and stress were repeatedly shown to influence aggressive or risky driving, particularly in chaotic and under-regulated environments like India. Linking with the Theory of Planned Behavior, it is evident that while attitudes and awareness about safe driving are present, perceived behavioral control and subjective norms often lead to non-compliance. Similarly, the Health Belief Model supports the observation that low perceived susceptibility and barriers to behavioral change reduce safety compliance despite knowledge. Yuen, Koppel, and Muir (2014) found that higher levels of psychological distress and lower risk perception significantly predicted risky driving behaviors among young drivers, emphasizing the mental health dimension of traffic safety. Psychological well-being has been associated with safer, more defensive driving practices. Mesken, Hagenzieker, and Rothengatter (2015) found that drivers with higher levels of psychological well-being were significantly more likely to engage in defensive driving behaviors, suggesting that mental health plays a protective role in road safety.

Awareness vs. Practice: The Compliance Gap

Despite widespread awareness of road safety rules, a consistent theme across studies is the gap between knowledge and practice. Several Indian studies (e.g., Goyal et al., 2022; Nikumb et al., 2013) found that although drivers were aware of safety norms such as helmet usage, speed limits, and seatbelt compliance, adherence to these behaviors was significantly lacking in real-world scenarios. Factors such as convenience, peer influence, and habitual disregard for rules contributed to this non-compliance.

This awareness-practice gap is not unique to India but is exacerbated by contextual challenges such as enforcement inconsistency, traffic volume, and socio-cultural attitudes towards risk. The disconnect indicates that knowledge-based interventions alone are insufficient. Instead, behavior change strategies grounded in psychological principles–such as reinforcement theory, social modeling, and motivational enhancement therapy–may yield better results.

Cultural differences, Law Enforcement systems, and Vehicle Technology as moderaters

Cultural norms, law enforcement structures, and technological infrastructure significantly moderate driving behavior and the effectiveness of interventions. Cross-cultural studies (e.g., Nordfjærn et al., 2012; Nævestad et al., 2019) revealed that countries with strong traffic law enforcement, consistent penalties, and culturally ingrained safety norms–such as in Norway and Japan–demonstrate higher compliance with road safety regulations. In contrast, in many parts of India and other low-to-middle-income countries, lenient enforcement, bribery, and public tolerance of violations weaken the impact of road safety laws. This enforcement gap leads to a normalization of risky behaviors, such as speeding and signal jumping, especially among younger or male drivers.

Road safety behavior is influenced not only by individual traits but also by cultural norms and societal attitudes. Lund and Rundmo (2009) emphasized that cross-cultural variations significantly affect how drivers perceive risks, form attitudes toward traffic laws, and ultimately behave on the road. Their study revealed that cultural background can moderate both the awareness and the perceived importance of safety interventions.

Moreover, the availability and adoption of vehicle technologies–such as Advanced Driver Assistance Systems (ADAS), lane-departure alerts, and fatigue monitors–play a crucial role in mitigating human error. In high-income countries, such technologies are becoming standard and contribute to behavioral correction. However, in the Indian context, widespread use of outdated vehicles, limited access to driver monitoring systems, and cost barriers hinder the technological support available to drivers. Thus, effective intervention must consider the local context not only in terms of law and culture but also in terms of accessible technological solutions.

The Importance of Culturally Sensitive and Community-based Intervention Design

These findings highlight that interventions cannot adopt a one-size-fits-all approach. Instead, they must be grounded in the specific cultural, infrastructural, and behavioral realities of the populations they aim to serve. In India, for example, where road use patterns, enforcement norms, and social influences differ significantly from Western contexts, culturally sensitive strategies–such as community-led awareness programs, peer-based modeling, and localized behavior change campaigns–are essential. Moreover, involving local stakeholders, including transport unions, resident associations, and law enforcement, can ensure interventions are contextually relevant and socially endorsed. Such community-based designs are more likely to shift driving norms and foster sustained behavioral change than top-down, generic policies.

Despite significant advancements in understanding the relationship between psychological well-being, driving style, and road safety, several critical gaps and challenges persist, limiting the development of effective interventions. Research is disproportionately focused on Western populations, neglecting the cultural, social, and economic

factors influencing driving behavior in developing countries. Specific subgroups, such as elderly drivers, female professionals, or young novices, are often overlooked, leaving their unique needs unaddressed. Most studies rely on cross-sectional designs, providing limited insights into the dynamic nature of driving behavior and psychological well-being over time. Additionally, an overreliance on self reported data introduces biases, with objective methods like driving simulators underutilized. Contextual factors such as traffic conditions, infrastructure, and vehicle safety are often treated as peripheral, while the positive dimensions of psychological wellbeing–like life satisfaction and engagement–receive little attention despite their potential to improve decision-making and reduce risky behavior.

Implications of the study

The findings underscore the need for comprehensive approaches to improve road safety and driver well-being by addressing the psychological, environmental, and technological aspects of driving behavior. Key measures include developing personalized interventions tailored to specific driving styles and psychological needs, improving workplace policies to support the mental health of professional drivers, and designing automated systems that prioritize both safety and driver adaptability. Consistent with Odoom et al. (2023), these findings suggest that public road safety campaigns should be grounded in behavior change theories like HBM and TPB to address both attitudinal and perceptual barriers to safe driving. Additionally, integrating psychological education into driver training programs can enhance emotional regulation and encourage defensive driving, while workplace initiatives such as flexible schedules and mental health resources can help reduce stress.

Limitations of the Review

The reliance on secondary data from existing studies may limit the ability to draw definitive conclusions due to variations in study designs and methodologies. However, the systematic approach to reviewing and analyzing the literature ensures the validity and reliability of the findings. Future research should consider primary data collection to validate and extend the insights generated by this study. Another notable limitation across studies is the overreliance on cross-sectional, self-reported data and a focus on young male drivers, limiting the generalizability of findings across age, gender, and professional groups. This calls for longitudinal, diverse-sample studies using objective driving and biometric data for more comprehensive insights.

CONCLUSIONS AND RECOMMENDATIONS

This review highlights the critical influence of psychological well-being and driving style on road safety behavior, drawing on evidence from both Indian and global contexts. It underscores that emotional distress, occupational stress, and risky behavioral patterns are key contributors to unsafe driving. By identifying the moderating role of defensive driving and the need for culturally contextual interventions, this study contributes to a more nuanced understanding of driver behavior.

Policy recommendations include integrating psychological screening and stress management into driver training programs, promoting awareness through targeted behavioral campaigns, and enhancing collaboration between traffic authorities, mental health professionals, and transport agencies. These steps can foster safer driving environments and reduce accident-related burdens.

In light of the reviewed evidence, it is imperative that key stakeholders–such as the Department of Transportation, traffic enforcement authorities, and transportation companies–recognize psychological well-being as a central determinant of road safety. Policymakers should mandate the inclusion of psychological assessment and emotional regulation training within driver licensing and renewal processes. Traffic police departments can benefit from behavioral profiling tools and stress-management workshops tailored for high-risk drivers. Transportation companies, especially those managing commercial fleets, should implement structured wellness programs, including routine mental health screening and fatigue-reduction protocols for their drivers. Above all, there is a pressing need for evidence-based advocacy that promotes the integration of psychological education into formal driver training curricula and traffic legislation. Such systemic adoption of psychological insights will not only improve individual driver behavior but also contribute to a safer, more responsive traffic environment.

DECLARATION

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Authors' contributions:

Garima Singh conceptualised the study, researched the literature, and wrote the manuscript. Anubhuti Dubey supervised the research process and provided critical revisions. Both authors read and approved the final manuscript.

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REFERENCES

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Amoadu, Y. D., Kusi-Appiah, E., & Mensah, K. E. (2024). The relationship between job demands, psychological well-being, and driving safety: A study of long-distance bus drivers in Ghana. *Journal of Occupational Health Psychology, 29*(1), 12–25.

Boardman, J., & Grimes, R. (2024). Psychological distress and its impact on risky driving behaviors: A longitudinal study. *Transportation Research Part F: Traffic Psychology and Behaviour, 96*, 53–68.

Brown, L., & Davis, P. (2022). Risky driving behaviors and road safety: A meta-analysis. *Accident Analysis & Prevention, 166*, 106561. https://doi.org/10.1016/j.aap.2022.106561

Cordellieri, P., Baralla, F., Ferlazzo, F., Sgalla, R., Piccardi, L., & Giannini, A. M. (2016). Gender effects in young road users on road safety attitudes, behaviors and risk perception. *Frontiers in Psychology, 7*, 1412. https://doi.org/10.3389/fpsyg.2016.01412

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

Dubey, A., & Singh, R. (2024). Driving style, psychological well-being, and road safety behavior among Indian drivers: A literature review. *Journal of Traffic Psychology and Road Safety, 12*(1), 45–58.

Eboli, L., Mazzulla, G., & Pungillo, G. (2017). How to define the accident risk level of car drivers by combining objective and subjective measures of driving style. *Transportation Research Part F: Traffic Psychology and Behaviour, 49*, 29–38. https://doi.org/10.1016/j.trf.2017.06.004

Evans, L. (2004). *Traffic safety*. Science Serving Society.

Eysenck, H. J. (1967). *The biological basis of personality*. Charles C Thomas.

Friedman, M., & Rosenman, R. H. (1974). *Type A behavior and your heart*. Knopf.

Goyal, T., Sharma, A., & Kaushal, S. (2022). Awareness and practices regarding road safety rules among drivers in a North Indian city: A cross-sectional study. *International Journal of Community Medicine and Public Health, 9*(5), 2015–2020.

Hasan, M. M., & Hossain, M. I. (2021). Psychological well-being and risky driving behavior: Evidence from a developing country. *International Journal of Psychology and Behavioral Sciences, 11*(2), 25–31.

Isler, R. B., & Newland, R. L. (2017). Happiness orientation and self-reported driving incidents among New Zealand drivers. *Transportation Research Part F: Traffic Psychology and Behaviour, 46*, 123–131.

Jessor, R., Turbin, M. S., & Costa, F. M. (1997). Predicting developmental change in risky driving: The transition to young adulthood. *Applied Developmental Science, 1*(1), 4–16. https://doi.org/10.1207/s1532480xads0101_2

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*(2), 263–291. https://doi.org/10.2307/1914185

Keyes, C. L. M. (1998). Social well-being. *Social Psychology Quarterly, 61*(2), 121–140. https://doi.org/10.2307/2787065

Kumar, A., & Bhattacharya, S. (2017). Risky driving behavior among Indian youth: Role of personality traits and peer pressure. *International Journal of Adolescence and Youth, 22*(4), 430–440. https://doi.org/10.1080/02673843.2016.1201112

Lund, I. O., & Rundmo, T. (2009). Cross-cultural comparisons of traffic safety, risk perception, attitudes, and behaviour. *Safety Science, 47*(4), 547–553.

Matthews, G., Dorn, L., & Glendon, A. I. (1991). Personality correlates of driver stress. *Personality and Individual Differences, 12*(6), 535–549. https://doi.org/10.1016/0191-8869(91)90248-A

Mauricio, D. (2024). Factors, prediction, and explainability of vehicle accident risk due to driving behavior through machine learning: A systematic literature review (2013–2023). *Computation, 12*(7), 131.

Mesken, J., Hagenzieker, M. P., & Rothengatter, J. A. (2015). Defensive driving and psychological well-being: The interplay of mental health and road safety behavior. *Safety Science, 76*, 85–92.

Michael, J., Singh, S. P., & Batra, A. (2014). Risky driving behavior among young drivers in India: Psychosocial factors and its implications. *Journal of the Indian Academy of Applied Psychology, 40*(2), 293–299.

Nævestad, T.-O., Laiou, A., Phillips, R. O., Bjørnskau, T., & Yannis, G. (2019). Safety culture among private and professional drivers in Norway and Greece: Examining the influence of national road safety culture. *Safety, 5*(2), 20. https://doi.org/10.3390/safety5020020

Nguyen, H., & Tran, T. (2024). Automated road defect and anomaly detection for traffic safety: A systematic review. *Sensors, 24*(7), 2101. https://doi.org/10.3390/s24072101

Nikumb, V. B., Nandimath, V. A., & Jadhav, S. M. (2013). A study of helmet use among two-wheeler riders in an urban area. *International Journal of Community Medicine and Public Health, 38*(1), 1–4.

Nordfjærn, T., Šimunović, L., & Rundmo, T. (2012). Culture related to traffic safety, risk perception and accident involvement in Croatia, Norway and Bosnia and Herzegovina. *Safety Science, 50*(5), 1148–1155. https://doi.org/10.1016/j.ssci.2011.12.003

Odoom, R., Odoom, P. T., & Essandoh, M. (2023). Perceptions underlying road safety behaviours of drivers in urban Ghana–A health-belief and planned behavior perspective. *Journal of Social Marketing, 13*(4), 631–657.

Özkan, T., & Lajunen, T. (2020). Reckless driving and psychological well-being: The role of thrill-seeking and impulsivity. *Journal of Safety Research, 73*, 124–131.

Pešić, A., Stephens, A. N., Newnam, S., Čičević, S., Pešić, D., & Trifunović, A. (2022). Youth perceptions and attitudes towards road safety in Serbia. *Systems, 10*(5), 191.

Ramesh, R., & Kumar, P. (2021). Occupational stress and mental health among commercial vehicle drivers in urban India: A cross-sectional study. *Indian Journal of Occupational and Environmental Medicine, 25*(2), 74–80.

Rastogi, R., Mehta, A., & Tripathi, N. (2020). Personality traits and safety rule compliance among Indian university students. *Indian Journal of Psychological Science, 12*(2), 75–83.

Rhodes, N., & Pivik, K. (2011). Age and gender differences in risky driving: The roles of positive affect and risk perception. *Accident Analysis & Prevention, 43*(3), 923–931.

Rosenstock, I. M. (1974). Historical origins of the health belief model. *Health Education Monographs, 2*(4), 328–335. https://doi.org/10.1177/109019817400200403

Rowden, P., Matthews, G., Watson, B., & Biggs, H. (2011). The relative impact of work-related stress, life stress, and driving environment stress on driving outcomes. *Accident Analysis & Prevention, 43*(4), 1332–1340.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*(6), 1069–1081. https://doi.org/10.1037/0022-3514.57.6.1069

Sagberg, F., Selpi, Bianchi Piccinini, G. F., & Engström, J. (2015). A review of research on driving styles and road safety. *Human Factors, 57*(7), 1248–1275.

Seligman, M. E. P. (2002). *Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment*. Free Press.

Shahar, A., Bar-David, S., & Shani, M. (2010). Risk perception and risk-taking among young novice drivers: The effects of driving style and parents' level of involvement. *Accident Analysis & Prevention, 42*(6), 1949–1959.

Simons-Morton, B. G., Lerner, N., & Singer, J. (2005). The observed effects of teenage passengers on the risky driving behavior of teenage drivers. *Accident Analysis & Prevention, 37*(6), 973–982. https://doi.org/10.1016/j.aap.2005.04.014

Smith, A., & Gupta, R. (2023). Impact of road conditions and traffic situations on driving behavior: A systematic review. *Journal of Safety Research, 84*, 120–136.

Sticher, G. (2005). An investigation of attitudes towards risk factors, personal driving ability, and road safety information among rural and remote road users. In *Conference of Australian Institutes of Transport Research*.

Sullman, M. J. M., Stephens, A. N., & Yong, M. (2017). Driving style, psychological wellbeing, and stress: A bidirectional relationship? *Transportation Research Part F: Traffic Psychology and Behaviour, 47*, 65–74.

Sundar, S., Krishnan, R., & Rajkumar, R. P. (2019). Mental health status and work-related stress among auto-rickshaw drivers in a South Indian city. *Journal of Mental Health and Human Behaviour, 24*(1), 18–24.

Taiwo, A. O., Atibioke, O., & Chinyio, E. (2016). Pattern of alcohol consumption and psychological well-being among commercial bus drivers and Okada riders in Ibadan Nigeria. In *INTED2016 proceedings: 10th International Technology, Education and Development Conference* (pp. 179–187). IATED. https://doi.org/10.21125/inted.2016.1030

Taubman-Ben-Ari, O., Mikulincer, M., & Gillath, O. (2004). The multidimensional driving style inventory–Scale construct and validation. *Accident Analysis & Prevention, 36*(3), 323–332. https://doi.org/10.1016/S0001-4575(03)00010-1

Taubman-Ben-Ari, O., & Yehiel, D. (2012). Driving styles and their associations with personality and motivation. *Accident Analysis & Prevention, 45*, 416–422. https://doi.org/10.1016/j.aap.2011.08.007

Ulleberg, P., & Rundmo, T. (2003). Personality, attitudes, and risk perception as predictors of risky driving behaviour among young drivers. *Safety Science, 41*(5), 427–443.

Useche, S. A., Cendales, B., & Montoro, L. (2020). Work stress and health problems in professional drivers: The moderating role of driving-related variables. *Transportation Research Part F: Traffic Psychology and Behaviour, 68*, 145–159. https://doi.org/10.1016/j.trf.2019.11.014

Wilde, G. J. S. (2001). *Target risk 2: A new psychology of safety and health*. PDE Publications.

Yuen, K. S., Koppel, S., & Muir, C. (2014). The influence of risk perception and psychological distress on young drivers' risky driving behaviors. *Transportation Research Part F: Traffic Psychology and Behaviour, 24*, 123–131. https://doi.org/10.1016/j.trf.2014.03.007

Zhang, L., Qian, Z., & Wang, Y. (2023). Aggressive driving and its implications for road safety: The role of psychological well-being. *International Journal of Transportation Science and Technology, 12*(2), 91–104.

ADDITIONAL INFORMATION

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Table 1. Summary of key studies on driving style, psychological well-being and road safety behavior.

Author(s) Year	Focus/Objective	Demographics of Participants	Study type	Country	Measures/Tools	Overall Theme	Limitations
Friedman&Rosenman (1974)	Personality and risk	General adults	Conceptual	USA	Type A Personality Theory	Type A personality increases driving risk	Lacks empirical driving data
Rosenstock (1974)	Health beliefs and compliance	General population	Theoretical	USA	Health Belief Model	Beliefs impact road safety behavior	General health framework
Ryff, C. D. (1989)	Psychological well-being definition	General population	Conceptual	USA	Ryff′s Well-being Scale	Defines emotional and social well-being	Not specific to driving
Ajzen (1991)	Theory of Planned Behavior	General adults	Theoretical	USA	TPB Model	Attitude, norms, control predict behavior	General application
Deery (1999)	Hazard perception in novices	Young novice drivers	Experimental	Australia	Driving Hazard Perception Task	Hazard perception improves road safety	Only early drivers studied
Wilde (2001)	Risk perception and risky driving	General drivers	Review	Canada	Behavioral Theory	Low perceived risk = risky driving	No direct data
Ulleberg&Rundmo (2003)	Personality and risk perception	Young drivers	Correlational	Norway	Personality and Risk Questionnaires	Traits influence risky driving	Self-report bias
Taubman-Ben-Ari et al. (2004)	Driving style inventory	Mixed age drivers	Scale validation	Israel	MDSI	Constructed and validated MDSI scale	Needs cultural validation
Sticher (2005)	Rural and remote road user attitudes	Rural road users	Survey	Australia	Road User Questionnaire	Risk perception in remote areas	Geographically limited
Simons-Morton et al. (2005)	Parental influence on youth driving	Teenage drivers	Observational	USA	Parental Involvement, Behavior Logs	Parenting affects safe driving	Limited control groups
Cordellieri et al. (2016)	Gender differences in safety attitudes	Young male/female drivers	Survey	Italy	Attitude & Risk Perception Survey	Gender impacts safety attitudes	Focused on youth
Taiwo et al. (2016)	Alcohol and psychological well-being	Nigerian drivers	Quantitative	Nigeria	Alcohol Use Inventory, GHQ-12	Alcohol impairs road safety	No female representation
Eboli et al. (2017)	Driving style and emotional state	Italian drivers	Mixed-method	Italy	Self-report, Cinematic Measures	Fatigue, anger = unsafe driving	Measurement bias
Isler& Newland (2017)	Happiness and driving incidents	General NZ drivers	Survey	New Zealand	Happiness Orientation Scales	Meaning reduces incidents	Self-report tools
Kumar& Bhattacharya (2017)	Driving anger and aggression	Urban Indian drivers	Correlational	India	Driving Anger Scale	Anger = aggressive driving	Metro city focus only

Sundar et al. (2019)	Auto drivers' mental health	Auto drivers in Delhi	Survey	India	GHQ-12, Self-report scales	Job stress = unsafe behavior	Urban sample only
Useche et al. (2020)	Job stress and work crashes	Professional drivers	Quantitative	Spain	Stress Scales, Driving Records	Driving style moderates job strain	Limited generalizatio n
Rastogi et al. (2020)	Personality and safety compliance	Indian university students	Survey	India	Big Five, Safety Attitude Scale	Traits predict rule-following	Sample not diverse
Pešić et al. (2022)	Youth perceptions in Serbia	Young Serbian drivers	Survey	Serbia	Risk Attitude Scales	Gender and location influence risk	Cultural limitation
Brown & Davis 2022	Meta-analysis of risky driving	Multiple populations	Meta-analysis	Internati onal	Synthesized Studies	/speeding linked to crashes	Publication bias
Zhang et al. (2023)	Aggression and well-being	Urban Chinese drivers	Survey	China	Aggression & Well-being Scales	Mental distress = risky behavior	Urban bias
Smith & Gupta (2023)	Road conditions and behavior	Drivers globally	Systematic Review	India/Glo bal	Thematic Synthesis	Infrastructu re affects safety	Generalized findings
Dubey & Singh (2024)	Driving style, well-being, safety	Indian drivers	Literature Review	India	TPB, MDSI, HBM	Integrates psych and behavior	Secondary data only
Amoadu et al. (2024)	Job strain and safety	Bus drivers in Ghana	Quantitative	Ghana	Job Demand, Incident Logs	Stress harms safety	Country-specific results
Nguyen & Tran (2024)	Automation and road defects	Not applicable	Systematic Review	Vietnam	Sensors, AI Review	Tech aids safety monitoring	Tech not widely applied
Mauricio (2024)	ML in accident prediction	Not applicable	Systematic Review	Internati onal	AI Techniques	ML models predict crash risk	Not driver-specific
Boardman & Grimes (2024)	Distress and risky driving	General US drivers	Longitudinal	USA	Psych Distress, Driving Records	Mental health predicts risk	US-centric sample

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