



University
of Stavanger

AUNG MAUNG MAUNG MYO

SUPERVISOR: PROFESSOR FREDERIC EMMANUEL BOUDER

The effect of beliefs on intention and behaviour of speeding among young drivers in Norway:

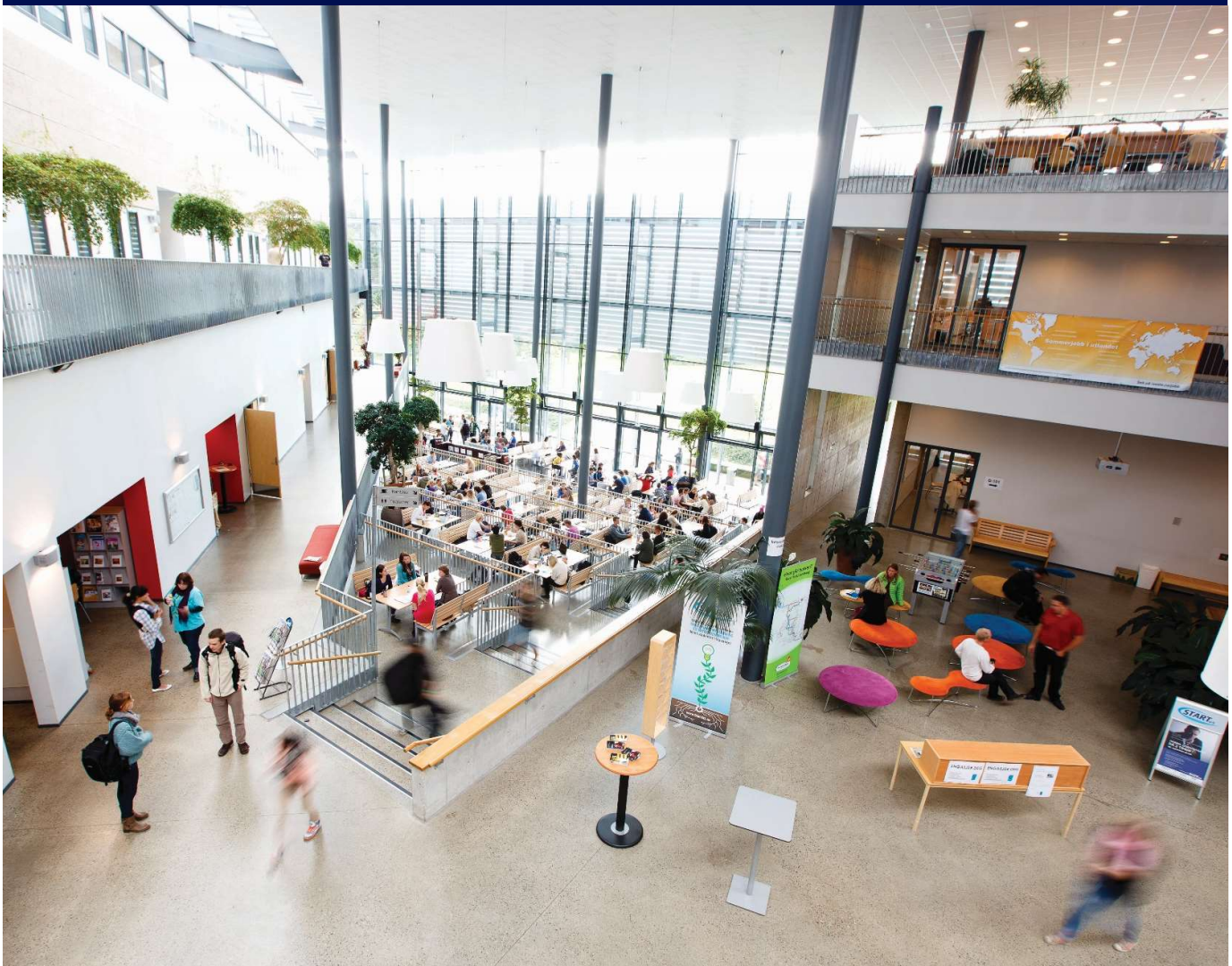
The use of the Theory of Planned Behaviour

Master thesis (2023)

M.Sc. Risk Analysis and Governance

Faculty of Science and Technology

Department of Safety, Economics and Planning



Acknowledgements

This thesis marks the end of a two-year full time Master of Science in Risk Analysis and Governance, a journey filled with diverse courses on crises communication, terror and resilience, and economic decision-making in risk management. It's been an eye-opening experience and my second master's degree, which I'm really thankful for.

Writing this thesis was a long and challenging process, especially gathering responses from young drivers in Norway as a foreign student. It took much more time and effort than I expected.

2021 was tough for the world with the Covid-19 pandemic, and my home country was facing political unrest due to a military coup. Studying during these crises, knowing my family was affected, was really hard. But I didn't give up because I was really interested.

I'm deeply grateful to Professor Frederic Emmanuel Boudier, my thesis supervisor, for his patient guidance and encouragement throughout this thesis. He was always there to help and pushed me to shape my ideas for the thesis. Working with him was a privilege.

I also want to thank everyone in the Department of Safety, Economics, and Planning for their support during my time here. I consider myself fortunate to have a chance to study at the University of Stavanger, recognized as one of the best institutions for risk studies. I hope to use what I've learned to give back to society.

Aung Maung Maung Myo

Stavanger

10-Dec-2023

Abstract

Young drivers worldwide play a major role in causing road accidents, largely due to speeding. Norway is no exception to this trend and faces challenges with speeding among its young drivers, calling for effective safety measures on the roads. Understanding how these drivers perceive risks, their beliefs, intentions, and actions is essential for targeted interventions. Apart from the evident issue of speeding, their perception of risk and their attitudes are key factors shaping their intentions. This study explores how beliefs impact the intentions and behavior related to speeding among young drivers in Norway, using the Theory of Planned Behavior as a framework. The research reveals that attitudes significantly influence intentions to speed and emphasizes the role of perceived control in their actual speeding behaviors. Additionally, it identifies subtle differences between male and female drivers in their attitudes, intentions, and perceived control regarding speeding. These findings stress the importance of taking these beliefs, risk perceptions, and attitudes into account when designing specific and effective campaigns against speeding for young drivers in Norway, ultimately improving road safety measures.

Keywords: *young drivers, speeding, risk perception, accidents, beliefs, the theory of planned behavior, attitude, subjective norm, perceived behavioral control, intention, behavior, male drivers, female drivers, risk communication*

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1. Introduction

Excessive speeding stands as a persistent concern within the global landscape of road safety, particularly affecting young and inexperienced drivers. The World Health Organization (WHO) underscores the gravity of this issue, highlighting road traffic crashes as the primary cause of death among men aged 15-29 and the second leading cause within this demographic worldwide (WHO, 2013). Less progress has been made on adopting best practice on speed limits, despite the importance of speed as a major cause of death and serious injury (WHO,2018). This alarming reality necessitates a thorough understanding of the motives and mindsets propelling young drivers toward perilous speeding behaviors.

In Norway, akin to many nations, individuals aged 18 to 24 frequently become entangled in severe or fatal accidents, with speeding often cited as a significant contributing factor (Norwegian National Road Policing Service, 2023). The recent upsurge in fatalities among the 16-25 age group underscores the imperative to probe into the cognitive and behavioral underpinnings influencing young drivers' decisions on the road. Data for the years 2017 and 2018 show that the risk of being killed or seriously injured is about five times higher per kilometer driven for car drivers aged 18-19 compared to the risk for car drivers aged (Statens Vegvesen, n.d).

The core of this issue revolves around the ongoing developmental stages of young drivers' brains, notably the pre-frontal cortex, responsible for executive functions like decision-making and risk perception. The maturation of this region continues into a person's mid-20s, rendering young drivers less equipped to assess risk and make prudent decisions (Norwegian National Road Policing Service, 2023). Factors such as physical and emotional immaturity, susceptibility to peer influences, and a propensity to challenge boundaries further contribute to their vulnerability to impulsive and high-risk behaviors, notably speeding (European Conference of Ministers of Transport, 2006)

Road safety campaigns in Norway, championed by the Norwegian Public Road Administration under the ambit of "Vision Zero," have long sought to curb speeding among young drivers. However, empirical evidence suggests that those exhibiting the riskiest behaviors often display the least responsiveness to these campaigns (Ulleberg, 2002). Additionally, the overall

effectiveness of these campaigns remains limited, resulting in an average reduction in accidents of only about 9% (Phillips et al., 2011).

Research conducted in countries like Denmark, Germany, and Australia has provided valuable insights into young drivers' speeding behaviors and risk-taking attitudes. However, there exists a scarcity of comprehensive research in Norway specifically addressing young drivers' attitudes toward speeding. This dearth poses a critical gap, especially for the development of effective road safety campaigns targeting this demographic. My attempts to procure data from traffic police and road safety authorities in Norway yielded no response, underscoring the lacuna in available information.

While drawing inspiration from various studies on young drivers' behaviors, it's crucial to note that this current research stands distinct from previous endeavors in the field. While previous studies primarily centered on driving behavior and risk-taking tendencies, this study takes a unique direction by focusing specifically on the beliefs of young drivers in Norway concerning speed driving and the comprehensive influence of these beliefs on both intentions and actual speeding behavior.

Although the foundational frameworks and questionnaire design draw from earlier research utilizing the Theory of Planned Behavior (TPB), this study is not merely a replication of existing inquiries into young drivers' behaviors. It is propelled by studies conducted in Germany and Australia, which underscored the importance of tailored risk communication for young car drivers. While certain survey instruments have been adapted from prior literature, this research adopts a distinct approach, concentrating on the factors influencing behavior and the interconnectedness of variables. Recognizing the importance of understanding the targeted audience's perceptions, this study aims to devise effective campaigns rooted in this understanding.

By employing the TPB as a theoretical framework, this research endeavors to illuminate the beliefs, intentions, and subsequent behaviors regarding speed driving among young drivers in Norway. Central to the TPB model are three key constructs—attitude, subjective norms, and perceived behavioral control—that shape individuals' behavioral intentions and subsequent actions. In the context of speed driving, attitudes encapsulate evaluations, subjective norms encompass social influences, and perceived behavioral control gauges the perceived ease or

difficulty in controlling speed-related actions. Moreover, it seeks to explore potential discrepancies between young male and female drivers in these constructs, providing nuanced insights into how gender influences the intentions and behaviors of young drivers regarding speed driving. This study aims to answer;

- 1) The effect of beliefs on the intention of ng among young drivers in Norway
- 2) The effect of intention on speeding behavior among young drivers in Norway.
- 3) Whether young male drivers inclined to speed driving intention and behavior

This research is structured into five chapters:

Chapter 1 - Introduction: Provides an overview of the research objectives, rationale, and the framework guiding the study.

Chapter 2 – Theory and Literature: Explores background theories and literature on young drivers and risk-taking behavior, outlining theoretical frameworks underpinning their motivations, particularly focusing on the TPB.

Chapter 3 – Method: Details the research methodology, including data collection and analysis processes, highlighting challenges faced in sourcing information.

Chapter 4 - Results: Presents findings with descriptive and regression result of survey and data analysis.

Chapter 5 – Discussion: Based on the findings, discuss insights into young drivers' beliefs, attitude, intention, and speeding behaviors and correlation between the variables.

Chapter 6 - Conclusion: Summarizes key findings, implications, and recommendations derived from the study, particularly road safety initiatives targeting young drivers in Norway.

This study aims to deepen our understanding of the cognitive and behavioral aspects that drive speeding among young drivers. By delving into their beliefs and motivations, it seeks to enhance road safety initiatives for this demographic in Norway. This introduction sets the stage for a thorough examination of young drivers' beliefs and motivations regarding speeding behaviors in Norway.

2. Theory and Literature

To enhance road safety by preventing accidents, it is imperative to comprehend the pivotal roles that risk perception and driver attitude play, particularly among young drivers. A range of theories has been developed to specifically analyze driving behavior. Additionally, within the domain of psychology, various theories and models have been employed to elucidate and anticipate drivers' behaviors in diverse traffic contexts. Notable examples encompass human error (Reason et al., 1990), the theory of planned behavior (Ajzen, 1991), personality traits (McCrae & Costa, 1995; Zuckerman, 2007), and risk perception (Slovic, 1987). These theories have been instrumental in explicating drivers' behaviors across different traffic situations. The subsequent sections will delineate the foremost models and theories in traffic psychology, shedding light on their implications for understanding drivers' conduct.

2.1. Risk Perception

Understanding how individuals perceive and interpret risks is crucial for effective risk communication. Perceptions of risk are influenced by various psychological, emotional, and societal factors, impacting how people receive and act upon information about risks. Tailoring risk communication strategies to account for diverse perceptions enhances the likelihood of accurate understanding and appropriate responses, thereby improving the effectiveness of risk communication initiatives. Slovic, P. (1999).

The psychological perspective on risk perception encompasses a comprehensive understanding of how individuals subjectively assess and interpret risks, drawing upon a myriad of cognitive, emotional, and societal influences (Covello 1983; Fischhoff et al. 1981; Slovic et al. 1981; Brehmer 1987). This perspective elucidates the intricate interplay between various factors that shape risk perception, transcending mere statistical analysis and delving into the complex realm of human cognition and societal context.

At the core of this perspective lies the recognition that risk perception isn't solely a product of technical assessments but is deeply embedded in subjective judgments and appraisals (Covello 1983). Individuals' perceptions of risk are influenced by an amalgamation of technical risk assessments, personal risk assessments, and perceptual factors such as dread and emotional

responses (Fischhoff et al. 1981). Notably, perceptions often carry more weight than scientific assessments, as they are intertwined with personal experiences, social communication, and cultural traditions (Brehmer 1987).

Slovic's seminal work illuminates the diverse array of influential factors that shape individuals' risk perceptions (Slovic 1987; 1999). Dread, for instance, significantly amplifies perceived risk levels, irrespective of statistical probabilities, thereby influencing societal reactions towards certain risks like nuclear power or terrorism (Slovic 1987). Similarly, familiarity with risks and the sense of control individuals perceive over them significantly impact the perceived severity of those risks (Slovic 1987). Furthermore, voluntariness in engaging with risks and the potential catastrophic outcomes play substantial roles in shaping risk perception. Equally noteworthy is the pervasive impact of media portrayal, which can distort perceived risks, often inflating them beyond actual probabilities (Slovic 1999).

The multifaceted nature of risk perception extends beyond individual cognitive biases and heuristics, encompassing societal and cultural dimensions (Renn & Aven, 2010). This multifaceted understanding underscores the need for nuanced and adaptive risk communication strategies that acknowledge and integrate the diverse facets influencing risk perceptions. Tailoring communication strategies to accommodate diverse perceptions not only enhances accurate comprehension but also promotes informed decision-making and appropriate responses to varying risks in society (Slovic 1987; 1999).

In essence, the psychological perspective on risk perception provides a nuanced framework to comprehend the intricate web of influences that shape how individuals perceive and respond to risks, emphasizing the need for multifaceted approaches in risk communication and management.

2.2. The role of risk perception and the driver's attitude in road safety

Risk perception plays a pivotal role in shaping the behaviors of young drivers within the realm of road safety. It encompasses the cognitive assessment of potential hazards and dangers on the road (Arthur et al., 1991). The multifaceted nature of risk perception, encompassing both intellectual judgment and emotional reaction, has been expounded upon in various

psychological perspectives (Sjöberg, 1998). Studies have revealed that risk perception and emotional reactions, such as worry, are distinct entities, highlighting the independence of emotional responses from cognitive assessments (Sjöberg, 1998).

Personality has emerged as a significant factor influencing risk perception, as indicated by studies that correlated measures of risk perception with traits such as anxiety, altruism, sensation seeking, and normlessness (Machin & Sankey, 2008; Ulleberg & Rundmo, 2003). Furthermore, the evaluation of speed by drivers exemplifies a discrepancy between perceived risk and actual risk, illustrating instances where drivers tend to overestimate potential benefits in terms of travel time while underestimating the associated increase in accident risk (Slovic, 1987).

The correlation between risk perception and attitudes towards traffic safety has also been delineated in research. Studies by Ulleberg and Rundmo (2003) and Ram and Chand (2016) have demonstrated significant effects of risk perception on attitudes towards road safety, reinforcing the interplay between risk perception and overarching safety attitudes.

Understanding how individuals perceive risks on the road is crucial for comprehending their behavioral responses. Models of driver behavior often posit that drivers adapt their actions based on their perceived level of risk (Slovic, 1987). Consequently, acknowledging the pivotal role of risk perception is fundamental for informing risk analysis and policy-making in endeavors aimed at enhancing road safety.

The significance of risk perception among young drivers lies in its influence on their decision-making processes while driving (Arthur et al., 1991). Given its multifaceted nature and its implications for behavioral adjustments, further exploration of risk perception among young drivers stands as an essential avenue for promoting safer driving practices.

Driver attitude, on the other hand, includes a person's feelings, beliefs, and tendencies related to safe driving practices and risky behaviors (Eagly & Chaiken, 1993). Attitudes about road safety can include thoughts about obeying speed limits, using seat belts, following traffic signals, or engaging in risky driving behaviors. These attitudes reflect an individual's personal beliefs and values when it comes to road safety (Ulleberg & Rundmo, 2003).

Research consistently shows a significant connection between driver attitudes and their actual driving behaviors (Parker et al., 1992; Åberg, 1999). Young drivers who have positive attitudes about traffic safety are less likely to engage in risky driving behaviors. Conversely, those with negative or permissive attitudes toward risky behaviors are more likely to engage in them.

Efforts to improve road safety often involve campaigns aimed at influencing attitudes. However, these campaigns tend to focus on general traffic safety attitudes rather than specific attitudes that are more likely to affect risky behavior. This might explain why some attitude campaigns struggle to change behavior on the road. Therefore, there is a need to create targeted interventions that address specific attitudes associated with risky driving.

It is important to recognize that attitudes related to road safety are complex. Young drivers have different opinions about various aspects of road safety, such as attitudes toward speeding, safe driving, rule violations, and beliefs about what causes accidents (Malfetti et al., 1989; Parker and Manstead, 1996). Understanding this complexity is crucial when studying how attitudes and behavior relate on the road.

Both risk perception and driver attitude are significant factors in road safety, especially among young drivers. Their ability to accurately perceive risks and their attitudes toward safe driving practices have a profound impact on their behavior while driving. Recognizing this, interventions aimed at modifying attitudes and improving road safety among young drivers can play a vital role in reducing accidents and their associated costs. Future research can further explore specific attitudes and their effects on driving behavior, offering insights for more effective road safety campaign and risk communication strategies.

2.3. The Theory of Planned Behavior (TPB) and its significance in driving behavior

The Theory of Planned Behavior (TPB), developed by Ajzen in 1991, is a well-established belief-based model used to elucidate individuals' decision-making processes. TPB has found extensive application in understanding various health and social behaviors, including traffic violations such as speeding (Horvath, Lewis, & Watson, 2012; Rozario, Lewis, & White, 2010). This theory posits that intentions are the key determinants of behavior and are shaped by three core constructs: attitude, subjective norm, and perceived behavior control (Ajzen, 1991). These

three constructs directly influence a person's intentions, which, in turn, guide their behavior. Importantly, beliefs underlie each of these constructs and provide a deeper understanding of behavior, making them crucial for comprehending the motivations and determinants of actions (Ajzen, 1985, 2002b).

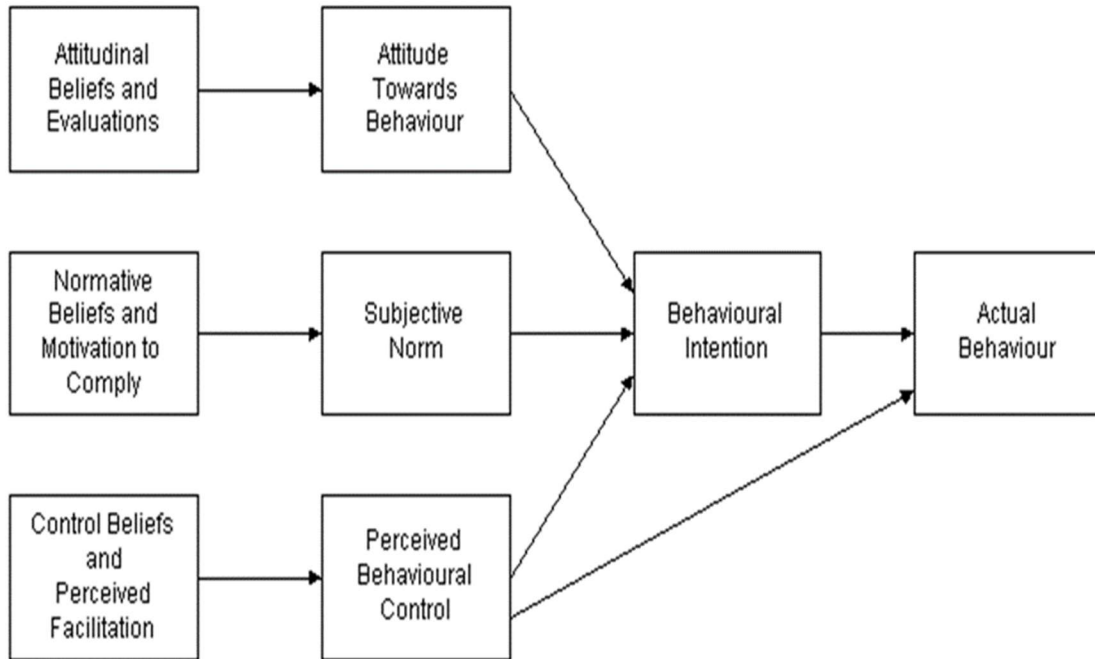


Fig-2.1: Conceptual frame work (TPB) (Source: Ajzen, 1991)

Attitude refers to an individual's evaluation of the behavior in terms of its advantages and disadvantages. Attitude is rooted in the person's beliefs about the benefits and drawbacks associated with performing the target behavior, encompassing both instrumental (e.g., reaching a destination faster) and emotional (e.g., excitement) aspects (Ajzen, 2002a; Ajzen & Driver, 1992).

Subjective Norm is influenced by normative beliefs regarding the perceived expectations of significant others regarding the behavior. It involves the extent to which a person believes that important individuals in their social environment would approve or disapprove of their engagement in the behavior.

Perceived Behavior Control (PBC) is grounded in control beliefs, which relate to an individual's beliefs concerning the ease or difficulty of performing the behavior. It involves an assessment of internal and external factors that could facilitate or hinder the execution of the behavior.

As a general rule, that the stronger an individual's favorable attitude and subjective norm, coupled with a higher perceived control, the more robust their intention to engage in a particular behavior. It's presumed that given adequate control over the behavior, individuals will likely act on their intentions when the opportunity arises. Intention is therefore regarded as the immediate precursor to behavior. However, considering that some behaviors may pose challenges that limit voluntary control, perceived behavioral control becomes essential to supplement intention. Realistic assessments of a behavior's difficulty, captured through perceived behavioral control, can serve as a proxy for actual control and aid in predicting the behavior in question (Ajzen, 1991).

Furthermore, the theory defines the relationship between beliefs and attitudes, rooted in an expectancy-value model. According to this model, individuals' attitudes toward a behavior are shaped by their accessible beliefs, where a belief represents the subjective probability of an outcome resulting from the behavior (Fishbein & Ajzen, 1975). Per the expectancy-value model, a person's overall attitude toward a behavior is influenced by the subjective values of associated outcomes and the strength of these associations (Fishbein & Ajzen, 1975). In essence, the evaluation of each outcome contributes to shaping the attitude based on the individual's perceived likelihood that the behavior will lead to that specific outcome.

From a broader perspective, the TPB offers a valuable conceptual framework for addressing the complexities of human social behavior. It incorporates key concepts from social and behavioral sciences and defines them in a manner that enables the prediction and understanding of specific behaviors in defined contexts (Ajzen & Fishbein, 1980). Attitudes, subjective norms, and perceived behavioral control consistently emerge as robust predictors of behavioral intentions, and these intentions, in conjunction with perceived behavioral control, account for a substantial proportion of variance in behavior.

However, despite the theory's utility, certain issues remain unresolved. While there is evidence of significant relationships between belief-based measures and the theory's constructs, the exact

nature of these relationships remains uncertain. Additionally, moderate correlations are often observed when relating belief-based measures to global measures of these constructs, indicating room for improvement.

In the context of road safety, the TPB has been effectively applied to examine and predict various driving behaviors, including speeding. It has been instrumental in understanding young drivers' intentions and actions related to speeding. Attitude, subjective norm, and perceived behavior control have all been shown to significantly explain variations in young drivers' intentions to speed, often explaining a substantial portion of their intentions (Warner & Åberg, 2008).

A deeper examination of the TPB's components sheds light on the importance of each in understanding young drivers' speeding behavior. Attitude, shaped by beliefs about the advantages and disadvantages of speeding, influences how young drivers perceive this behavior. Subjective norm, grounded in normative beliefs about peer approval, reflects the influence of social expectations on their decisions. Finally, perceived behavior control, rooted in control beliefs, underscores the confidence young drivers have in their ability to control external factors that may facilitate or hinder speeding.

Moreover, it is evident that the TPB can provide a nuanced understanding of why some young drivers exhibit a stronger intention to speed compared to others. Differences in beliefs about the behavior, as revealed by TPB-based investigations, offer insights into the motivations driving speeding behavior. For instance, studies have shown that those with high intentions to speed perceive more advantages, greater approval from others, and fewer inhibiting factors, underscoring the need for targeted interventions (Walsh et al., 2007).

Furthermore, the TPB allows for the consideration of social norms, including descriptive norms (beliefs about the prevalence of a behavior) and injunctive norms (perceived expectations of peer approval or disapproval). This distinction can be particularly relevant when studying speeding among young drivers, as peer influence is a prominent factor in their risk-taking behaviors. The Theory of Planned Behavior can be used as a framework for understanding the speeding behavior of young drivers. It illuminates the roles of attitudes, subjective norms, and perceived behavior control in shaping their intentions and actions. Moreover, the theory's emphasis on beliefs as the foundation of these constructs provides a deeper understanding of

the motivations driving speeding behavior among young drivers. This understanding, in turn, can inform the development of targeted and effective road safety interventions aimed at reducing speeding and enhancing road safety outcomes.

2.4. Literature review

In their investigation into the influence of peers on speeding behaviors among male drivers aged 18 to 28, Mette Møller and Sonja Haustein, 2014 delved into the roles played by both injunctive and descriptive subjective norms. Their primary objective was to discern the impact of these norms on speeding behaviors at two distinct age brackets, while also considering a spectrum of contributing factors, such as socio-demographic indicators, attitudes, and behavioral patterns. To accomplish this, they conducted a comprehensive survey involving a sample of 4000 male drivers randomly selected from the Danish driving license register. This survey meticulously assessed driving conduct, peer influence, and attitudes towards traffic regulations and behaviors. Employing a robust linear regression analysis, the research scrutinized the variables predictive of excessive speed while driving. Their findings revealed a compelling association between the perception of peer behavior and individual conduct at both 18 and 28 years of age, albeit with differing manifestations of influence across these age cohorts. Specifically, the study highlighted that peer influence at 18 years old contributed to an escalation in speeding behaviors that persisted into the age of 28. These results underscore the necessity of considering age-specific influences of peer behavior in formulating interventions aimed at mitigating speeding proclivities. Future endeavors aimed at addressing such behaviors would benefit from a nuanced understanding of the intricate relationship between perceived and actual peer behaviors across varying age groups

Phillips, Ulleberg, and Vaa's, 2011 meta-analysis of 67 studies from 1975 to 2007 rigorously evaluated the impact of road safety campaigns on accidents, adhering to established methodologies in road safety and communication research. Their selection criteria, aligned with Delhomme et al.'s standards (2009), encompassed both controlled and non-controlled evaluations, culminating in a comprehensive dataset. Statistical analyses revealed a notable average 9% reduction in accidents attributable to road safety campaigns, with a confidence interval of -12% to -6%. Notably, the study identified seven campaign factors linked to accident

reduction, emphasizing the efficacy of personal communication, roadside media, and enforcement strategies. Campaigns emphasizing drink-driving themes and shorter durations (< one month) were particularly effective (Phillips et al., 2011). The study underscored the significance of timely message delivery, especially in proximity to the targeted behavior. This research contributes empirically-grounded insights crucial for designing more effective road safety campaigns and provides practitioners with valuable guidance in tailoring strategies to specific audiences

Pal Ulleberg and Rundmo's 2023 study on the predictors of risk driving behavior among young Norwegian drivers stands out as a rare exploration within Norway's context. Their survey encompassed 4500 adolescents from 1998 to 2003, coinciding with the onset of a traffic safety campaign initiated by the Norwegian Authorities of Public Roads in collaboration with the Police Safety Committees of two Norwegian Counties. Through rigorous statistical analysis, the study unveiled that personality traits influence risky driving behavior indirectly through attitudes, with attitude towards traffic safety emerging as the sole variable with a direct impact on such behavior. The findings underscore the significance of personality traits within the realm of traffic safety campaigns, emphasizing the need to integrate these traits effectively for more impactful interventions (Ulleberg & Rundmo, 2023).

Another pertinent study within this domain was conducted by Horvath, Lewis and Watson in 2012. This research delved into the application of the Theory of Planned Behavior (TPB) as a framework to understand the underlying motivational factors driving speeding behaviors among a cohort of 339 young licensed drivers in Australia. Employing a structured TPB-based questionnaire, the study meticulously assessed the influence of distinct TPB measures—specifically, Behavioral beliefs, Normative Beliefs, and Control Beliefs—on Intention, meticulously comparing these influences between male and female young drivers. The outcomes of this investigation notably highlighted the paramount importance of these beliefs in shaping intentions, elucidating a higher inclination among young male drivers toward speeding in contrast to their female counterparts. However, it's noteworthy that this study didn't extend its focus to explore the subsequent impact of these intentions on actual behavioral outcomes (Horvath et al., 2012)

3. Method of the study

Quantitative survey: Descriptive and analytical survey research method conducted with primary data collection and Regression Analysis Model was used for data analysis based on TPB framework. Self-completion by young drivers by using structured questionnaires assessed the TPB-based beliefs, as well as an indication of speeding intentions. The methods, approach and questionnaire are adopted from some previous studies to measure TPB variables.

3.1. Questionnaire

In this study, the initial part of the survey collected information about demographics, while the rest of the survey focused on understanding beliefs, intentions, and behaviors using the Theory of Planned Behavior (TPB). The scenario chosen and included in the questionnaire for the speeding condition was derived from (Horvath et al., 2012), and subsequently tailored to align with the distinct road and driving environment prevailing in Norway.

“It is a beautiful sunny Saturday in Norway's summer. You are driving alone on a multi-lane highway to meet a friend in another town. You don't need to care what time you arrive to your friend as it is still in the middle of the day and you have plenty of time. The car in front is driving a bit under the speed limit and it is very frustrating to follow behind for several minutes. So, you decide to overtake. After you change lanes and speed up to overtake, the car in front of you suddenly speed up. Now you need to exceed the speed limit if you want to continue to overtake.” All TPB belief measures were structured on a 5-point Likert type scale and without negatively scored items where; 1-Strongly disagree, 2-Disagree, 3- Natural, 4-Agree, 5-Strongly disagree.

Attitude: Six items (AQ1 to AQ6) with 5-Likert scale were used to measure Attitude to reflect affective aspects of speeding and instrumental aspects of speeding. Subjective Norms: Five items (NQ1 to NQ5) with 5-Likert scale were used to measure Subjective Norms focus on young drivers. Mostly same aged peers were used as normative reference except the parents and other drivers. Perceived Behavior Control (PBC): PBC was measured by using five items (CQ1 to CQ5) with 5-Likert scale to reflect the conditions. **Intention:** Two items (IQ1 and IQ2) were used to measure the intention to speed. These two questions are adopted from Terry, Hog and White (1999) and time frame was set as recommended by Ajzen and Fishbein (1980).

Four items (BQ1 to BQ4) were used to measure speeding behavior and accident/incident involvement. While BQ1 measuring frequency of speeding (From 1= Never to 5= Usually). The rest of the questions BQ2, BQ3 and BQ4 to be answered Yes or No to measure the involvement of accident/accident and violation of traffic rules and regulation. (Yes or No) answers are not calculated in scale analysis and just to represent the Descriptive.

Number	Questions	1. Strongly disagree 5. Strongly agree					Measure	
		1	2	3	4	5		
AQ1	Driving fast will help me get my destination quicker and save time	1	2	3	4	5	Attitude	
AQ2	I feel speeding is not very dangerous to myself and others than driving at the speed limit	1	2	3	4	5		
AQ3	Speeding in this situation with my driving skill would not likely result in a crash.	1	2	3	4	5		
AQ4	It is not likely to be caught by police for driving a little faster than speed limit while overtaking.	1	2	3	4	5		
AQ5	I like to drive just a little faster than the speed limit.	1	2	3	4	5		
AQ6	Speeding would save me fuel and cost less money as driving slowly is not economical.	1	2	3	4	5	Subjective Norms	
NQ1	Most of my close friends would think I should speed.	1	2	3	4	5		
NQ2	The other drivers behind my car would like me to speed.	1	2	3	4	5		
NQ3	friend I often drive together with would want me to speed	1	2	3	4	5		
NQ4	My parents would want me to drive faster	1	2	3	4	5		
NQ5	My coworkers would encourage me my decision to speed	1	2	3	4	5	Perceived Behavior Control	
CQ1	I would speed if I was far from schools and urban areas.	1	2	3	4	5		
CQ2	I would be more likely to speed if the road and environment was familiar to me.	1	2	3	4	5		
CQ3	I would be more likely to speed if the condition of the road is good (eg. wide, clear traffic, straight, visible)	1	2	3	4	5		
CQ4	I would likely to drive more than the speed limit if there is an important schedule to catch up.	1	2	3	4	5		
CQ5	I would likely to drive faster if I believe that the speedometer of my car is showing more than the actual speed I am driving.	1	2	3	4	5	Intention	
IQ1	It is very likely that I will engage in speeding while overtaking within the next 6 months.	1	2	3	4	5		
IQ2	I intend to engage in speeding in the next 6 month for a similar encounter.	1	2	3	4	5	Behavior	
BQ1	During the past, I found myself driving more than the speed limit (frequency scale 1-5, Never to usually)	1	2	3	4	5		
BQ2	During the past driving experience, have you been involved in an accident related to speeding?	Yes						No
BQ3	Have you ever encountered near accident or dangerous conditions due to speeding?	Yes						No
BQ4	Have you ever fined, penalized or given warning due to speeding?	Yes					No	

Table-3.1: Questionnaire and TPB measures (Source: survey data 2023)

3.2. Data collection

The questionnaire was designed using Google Forms and tested with a group of 10 students before being distributed online and in paper form with barcodes. The survey link was shared on social media platforms, such as faculty pages on Facebook. Participants could access the survey online through the shared link or by scanning the barcode, ensuring anonymity in their responses.

Reaching out to young drivers in Norway proved challenging, particularly through online channels. Despite a week-long presence on social media, there were no responses, potentially due to concerns about cybersecurity or privacy issues related to clicking on links.

Efforts to engage this demographic involved distributing 40 survey papers in University of Stavanger classes and libraries, resulting in 20 responses within a day. However, none of the respondents were below 20 years old.

In attempts to reach younger respondents, contact was made with high schools and pre-university institutions via email to connect with headmasters or administration. Unfortunately, no replies were received, and when visits were made to these schools, distribution of papers was not allowed, only their display on notice boards.

A total of 400 printed survey pamphlets were distributed, encouraging participation in the online survey, along with a concise explanation of the research. These were handed out in person at various locations across three cities in Norway—Oslo, Stavanger, and Sandefjord. Additionally, posters containing barcodes were placed on notice boards at University Libraries, Community Libraries, and High Schools.

Responses were monitored closely on a daily basis and adjusted pamphlet distribution locations to maintain a balanced response ratio. For instance, an imbalance in gender responses was noticed, pamphlets were distributed strategically at specific locations (e.g., sport events) to engage more young males and achieve a more representative gender ratio in the responses until reached to 206 respondents which is more than targeted number of respondents.

3.3. Profile of respondents.

Purposive sampling was used for survey and as a final result, overall 206 young drivers in Norway responded. This section aims to outline the demographic details of these participants, including aspects such as their age, gender, occupation, driving experience, and the type of license they hold as in the Table-3.2.

Sr. No	Particular	Number of Respondents	Percentage
1	Gender		
	Male	104	49.50
	Female	102	50.50
2	Age		
	18-years	17	8.30
	19-Years	55	26.70
	20-Years	25	12.10
	21-Years	24	11.70
	22-Years	22	10.70
	23-Years	32	15.50
	24-Years	31	15.00
3	License age		
	Less tan 1 year	64	31.10
	1 to 3 years	100	48.50
	More than 3 years	42	20.40
4	License Type		
	Norwegina License	192	93.20
	Others	14	6.80
5	Occupation		
	Student	166	80.60
	Employed	40	19.40
	TOTAL	206	100.00

Table-3.1. Profile of respondents (Source: survey data, 2023)

There are 104 male and 102 female respondents. The ratio appears almost equal, with a slight difference of only 2 individuals between the genders, indicating a relatively balanced representation of males and females in the dataset.

The age group with the highest representation among respondents appears to be the "19-Years" category, comprising 55 individuals or approximately 26.7% of the total sample.

The highest count or percentage lies within the "1 to 3 years" category, encompassing 100 individuals or approximately 48.5% of the respondents. Concerning license type, the majority, 192 individuals or 93.2% of the sample, possess a Norwegian license, while only 14 individuals, around 6.8%, have other types of licenses.

The dataset indicates that 166 individuals, approximately 80.6% of the respondents, are students, whereas 40 individuals, roughly 19.4%, are employed.

3.4. Data analysis

Upon the completion of the survey through the utilization of a self-administered survey methodology, the assessment of the reliability coefficient, specifically Cronbach's alpha, was undertaken for each dimension encompassed within the study. This meticulous examination aimed to ascertain the extent of reliability inherent in the survey dimensions. The obtained reliability coefficients exceeded the threshold of 0.7 as shown in Table-3.2, thereby meeting the established criterion for deemed acceptability within the statistical evaluation conducted in this study. Descriptive analysis, Multiple Linear Regression analysis and Binary linear regression are applied to find out the correlations between the variables.

Questionnaire Section	Questions	Alpha		
		All	Male	Female
Attitude	AQ1 to AQ6	0.775	0.752	0.727
Subjective Norms	NQ1 to NQ5	0.747	0.704	0.743
Perceived Behavior Control	CQ1 to CQ5	0.866	0.830	0.886
Intention	IQ1 to IQ2	0.875	0.860	0.873
Behavior	BQ1 to BQ5	0.822	0.855	0.779

Table-3.2. Reliability test with Cronbach's alpha (Source: survey data, 2023)

4. Results

The main characteristics of the data are quantitatively described in the descriptive statistics and summaries about the sample population responses are provided in the descriptive statistics. The mean and standard deviation in relation to the independent, dependent and mediating variables are executed in multiple regression analysis by SPSS application. The relationships described in the **conceptual framework in Chapter-2**, were thoroughly checked against the results of the multiple regression analysis

4.1 Descriptive result of Attitude

"The findings from the survey regarding young drivers' attitudes in Norway are detailed in Table-4.1, illuminating their perspectives on the concept of Attitude within the Theory of Planned Behavior.

Number	Questions	ALL		Male		Female		Measure
		Mean	Std	Mean	Std	Mean	Std	
AQ1	Driving fast will help me get my destination quicker and save time	3.21	1.028	3.47	0.995	2.95	0.999	Attitude
AQ2	I feel speeding is not very dangerous to myself and others than driving at the speed limit	2.38	1.162	2.78	1.165	1.98	1.015	
AQ3	Speeding in this situation with my driving skill would not likely result in a crash.	3.20	1.124	3.61	0.989	2.78	1.105	
AQ4	It is not likely to be caught by police for driving a little faster than speed limit while overtaking.	3.11	1.110	3.31	1.124	2.91	1.063	
AQ5	I like to drive just a little faster than the speed limit.	3.24	1.201	3.51	1.061	2.97	1.278	
AQ6	Speeding would save me fuel and cost less money as driving slowly is not economical.	2.40	0.976	2.59	0.972	2.21	0.948	
Overall Means		2.92		3.210		2.700		

Table-4.1. Descriptive result of Attitude (Source: survey data, 2023)

Within the framework of TPB, Attitude ranks as the second highest among the three measured variables. The overall mean for Attitude stands at 2.92 across all 206 respondents, portraying a general tendency towards lower attitudes regarding speeding among most young drivers, although some hold positive views about speeding.

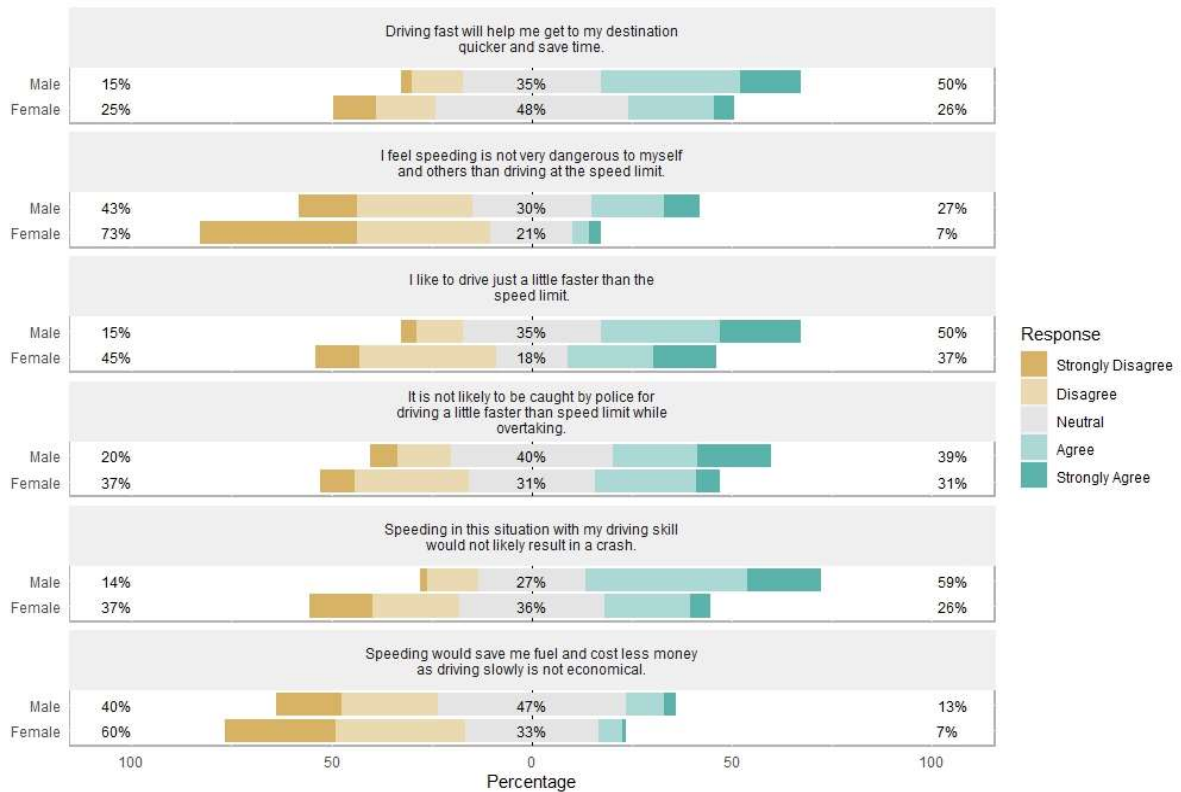


Fig-4.1. Gender influence on Attitude (Source: survey data, 2023)

There is a discernible gender-based contrast. Male respondents exhibit a notably higher overall mean of 3.21 compared to females' mean of 2.7, indicating a stronger inclination among males towards endorsing favorable attitudes regarding speed. Particularly, a consensus exists among respondents, especially males, regarding the beliefs that driving at higher speeds saves time and that their driving skills can mitigate accidents when speeding. Male respondents tend to express stronger agreement than females on four out of six identified reasons for speeding, whereas most female drivers tend to hold views deviating from the average score on all six reasons.

4.2. Descriptive result of Subjective Norm

Subjective Norms, one of the three factors examined in TPB, obtained the lowest average score of 2.55, according to Table- 4.2.

Number	Questions	ALL		Male		Female		Measure
		Mean	Std	Mean	Std	Mean	Std	
NQ1	Most of my close friends would think I should speed.	2.75	1.144	3.03	1.110	2.47	1.114	Subjective Norms
NQ2	The other drivers behind my car would like me to speed.	3.27	0.955	3.34	0.855	3.21	1.047	
NQ3	friend I often drive together with would want me to speed	2.79	1.187	3.23	1.090	2.33	1.111	
NQ4	My parents would want me to drive faster	1.73	0.995	1.95	1.046	1.5	0.887	
NQ5	My coworkers would encourage me my decision to speed	2.19	0.993	2.39	0.929	1.99	1.020	
Overall Means		2.55		2.7885		2.3		

Table-4.2. Descriptive result of Subjective Norm (Source: survey data, 2023)

This indicates a prevailing tendency among most respondents to express disagreement with the questions posed. This suggests that normative beliefs stemming from peer influence might not hold the strongest influence among the TPB measures. Notable trend is that most young drivers, regardless of gender, don't believe that parents would encourage driving fast."

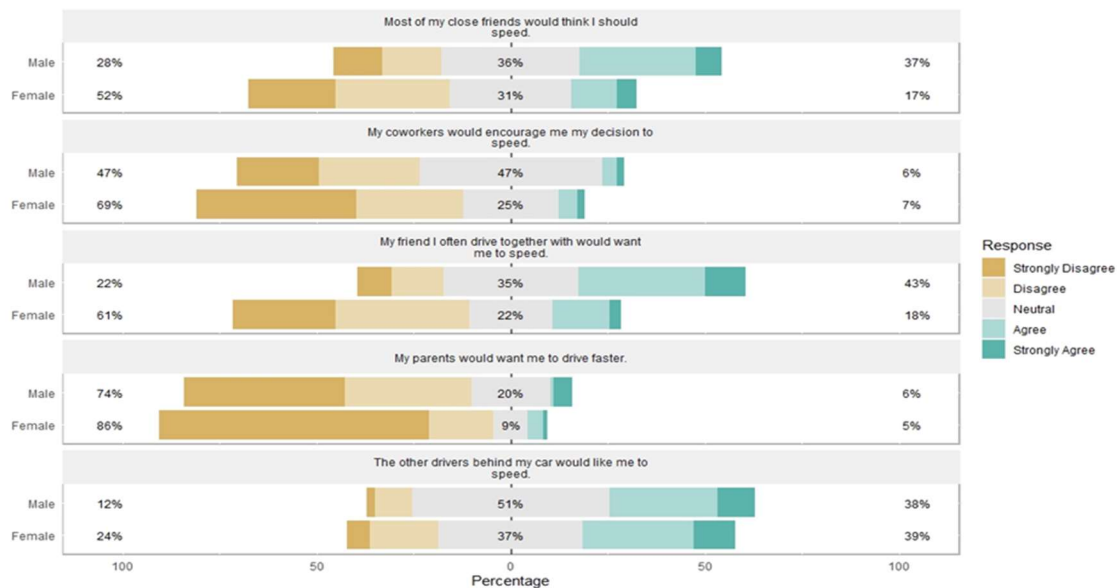


Fig-4.2. Gender influence on Subjective Norm (Source: survey data, 2023)

However, there's a difference in how males and females responded as in Fig-4.2. Generally, males tend to agree that friends, driving partners, and other drivers would encourage speeding, as their scores for these questions are higher than the overall average. On the contrary, all female drivers consistently show much lower scores across all five questions, indicating a strong disagreement with the idea that these social influences promote driving at higher speeds.

4.3. Descriptive result of Perceived Behavior Control (PBC)

The data from Table-4.3 provides insights into how young drivers in Norway perceive their control over their actions, known as Perceived Behavior Control (PBC).

Number	Questions	ALL		Male		Female		Measure
		Mean	Std	Mean	Std	Mean	Std	
CQ1	I would speed if I was far from schools and urban areas.	3.08	1.197	3.22	1.165	2.94	1.217	Perceived Behavior Control
CQ2	I would be more likely to speed if the road and environment was familiar to me.	3.60	1.180	3.73	1.151	3.46	1.047	
CQ3	I would be more likely to speed if the condition of the road is good (eg. wide, clear traffic, straight, visible)	3.46	1.208	3.65	1.139	3.25	1.111	
CQ4	I would likely to drive more than the speed limit if there is an important schedule to catch up.	3.56	1.038	3.69	1.006	3.42	0.887	
CQ5	I would likely to drive faster if I believe that the speedometer of my car is showing more than the actual speed I am driving.	2.97	1.207	3.22	1.132	2.71	1.020	
Overall Means		3.33		3.50		3.15		

Table-4.3. Descriptive result of Perceived Behavior Control (PBC) (Source: survey data, 2023)

The findings indicate that Perceived Behavior Control (PBC) garnered the highest mean score among the total 206 respondents. This implies that these drivers perceive a potential need to engage in speeding under specific circumstances where it appears justifiable. This underscores that control beliefs pertaining to speeding situations rank highest among all the belief measures within the Theory of Planned Behavior (TPB).

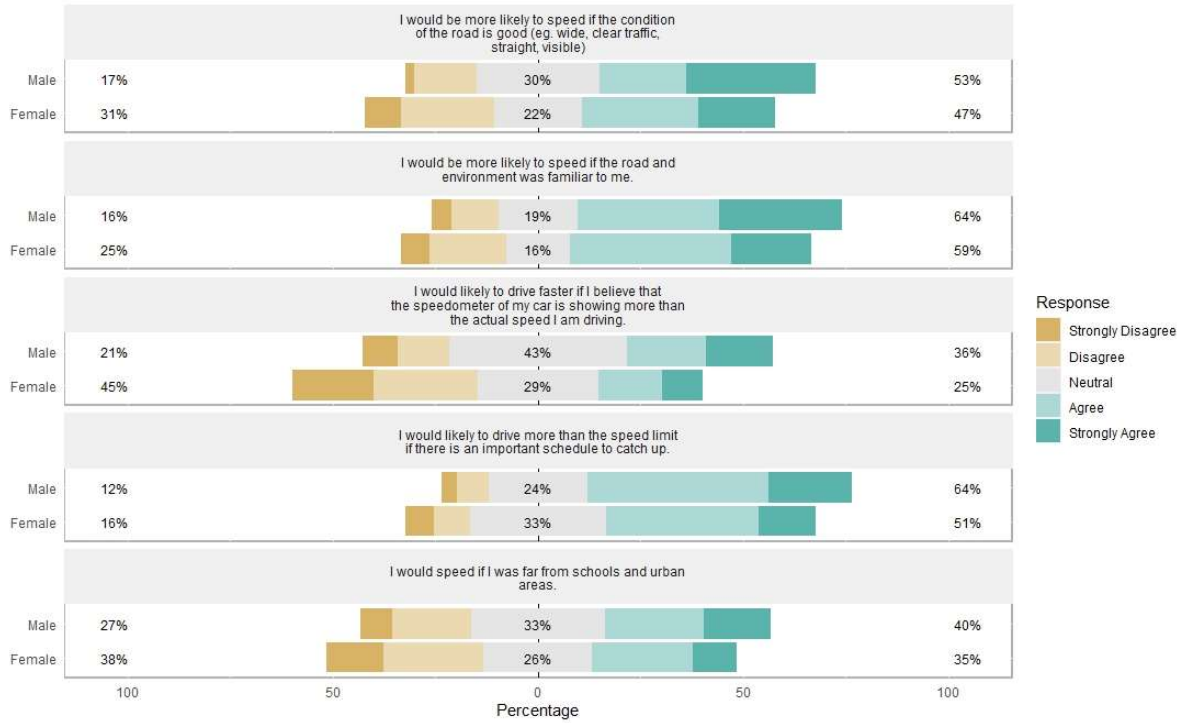


Fig-4.3. Gender influence on Perceived Behavior Control (PBC) (Source: survey data, 2023)

On average, male respondents score 3.5, with all their mean scores for the five questionnaire items being higher than the average. In contrast, female respondents have mean scores lower than the average, particularly when it comes to speeding away from schools and urban areas or when the speedometer shows a higher speed than the actual speed. This indicates a significant difference in how males and females perceive their control over speeding in specific situations. See fig-4.3.

4.4. Descriptive result of Intention

As per Table-4.4 and Figure-4.4, descriptive findings regarding the respondents, the majority of young drivers express a likelihood to engage in speeding, indicated by a mean score of 3.12 for question IQ1, surpassing the average. Conversely, for IQ2, the mean score of 2.6 falls below the average, suggesting that most respondents do not intend to engage in speeding. The overall mean of 2.86 indicates a generally low intention among all young drivers to engage in speeding.

Number	Questions	ALL		Male		Female		Measure
		Mean	Std	Mean	Std	Mean	Std	
IQ1	It is very likely that I will engage in speeding while overtaking within the next 6 months.	3.12	1.275	3.41	1.187	2.81	1.295	Intention
IQ2	I intend to engage in speeding in the next 6 month for a similar encounter.	2.60	1.237	2.90	1.195	2.28	1.205	
Overall Means		2.86		3.16		2.55		

Table-4.4. Descriptive result of Intention (Source: survey data, 2023)

For the query regarding the likelihood of engaging in speeding while overtaking (IQ1), 22% of male respondents either strongly disagreed or disagreed, whereas 43% of female respondents expressed similar disagreement. In contrast, 33% of male respondents and 25% of female respondents provided natural responses to this query. The mean value for male respondents was 3.41, signifying a tendency toward a higher inclination, while female respondents yielded a mean value of 2.81, suggesting a comparatively lower inclination toward this scenario.

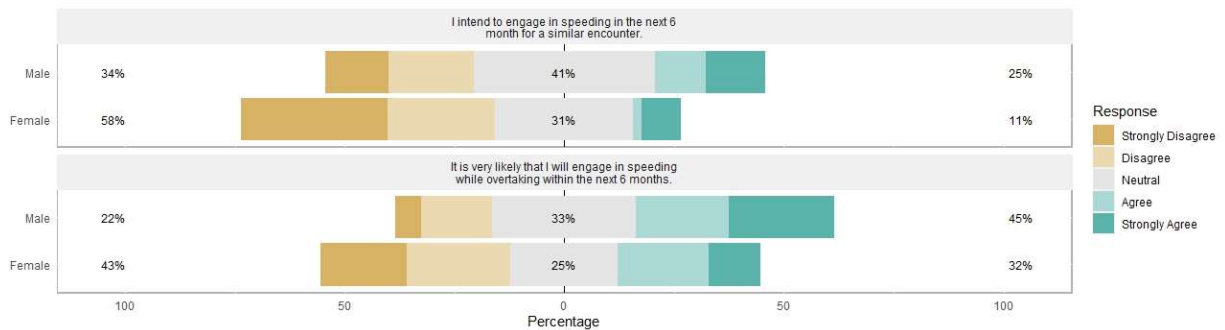


Fig-4.4. Gender influence on Intention (Source: survey data, 2023)

Regarding the intention to engage in speeding in similar encounters within the next six months (IQ2), 34% of male respondents expressed either strong disagreement or disagreement. Conversely, 58% of female respondents conveyed the same sentiment. Additionally, 41% of male respondents and 31% of female respondents offered natural responses to this query. The mean value for male respondents was 2.9, reflecting a moderately higher intention compared to female respondents, who displayed a mean value of 2.55 for this intention. These distinctions in responses emphasize varying attitudes and intentions toward speeding behaviors between male and female young drivers in Norway.

4.5. Descriptive result of Behavior

Table-4.5. insights into the behavior of young drivers in Norway emerge from responses. The data focused on driving habits associated with speeding.

Questions	ALL		Male		Female		Measure
	Mean	Std	Mean	Std	Mean	Std	
During the past, I found myself driving more than the speed limit. (frequency scale 1-5, Never to usually)	3.50	1.159	3.66	1.085	3.33	1.213	Behavior
During the past driving experience, have you been involved in an accident related to speeding?	Yes	No	Yes	No	Yes	No	
	4%	96%	6%	94%	1%	99%	
Have you ever encountered near accident or dangerous conditions due to speeding?	31%	69%	38%	62%	24%	76%	
Have you ever fined, penalized or given warning due to speeding?	12%	88%	14%	86%	10%	90%	

Table-4.5. Descriptive result of Behavior (Source: survey data, 2023)

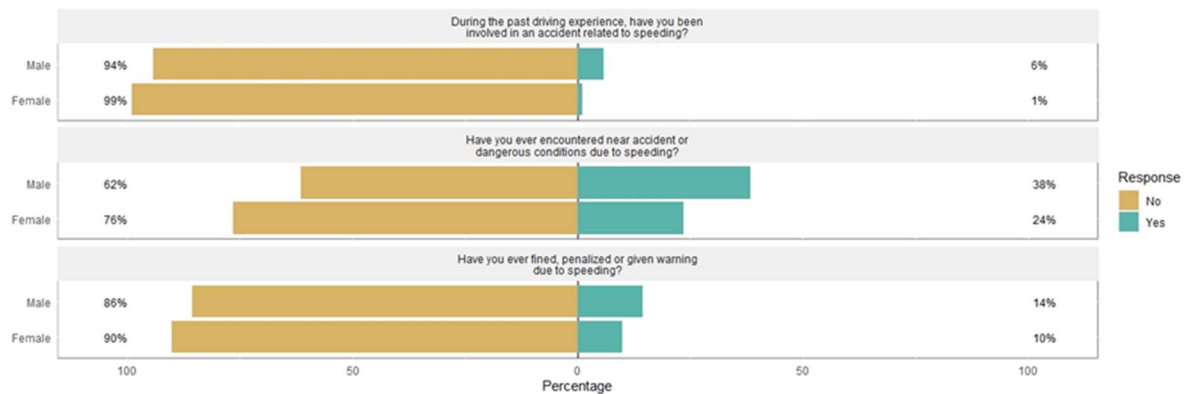


Fig-4.5. Gender influence on Behavior (Source: survey data, 2023)

The mean value for driving above the speed limit (BQ1) was notably higher among all participants, averaging at 3.5. Notably, males reported a slightly higher frequency, with a mean value of 3.66, compared to females at 3.33. Regarding accidents related to speeding (BQ2), a significant majority of both males (94%) and females (99%) stated no involvement. Similarly, a substantial portion, 62% of males and 76% of females, indicated no instances of near accidents due to speeding (BQ3). Furthermore, the inquiry about penalties for speeding (BQ4) revealed that 86% of males and 90% of females had not encountered such consequences. These results

suggest a prevalent trend of more frequent speeding behaviors reported among male respondents in comparison to their female counterparts.

4.6. Effect of Beliefs on Intention to speed among young drivers

As per Table-4.6, the established model offers only partial insights into the variability of speeding intentions among young drivers in Norway, accounting for 56 percent of the variance. This model's capacity to clarify the relationship between independent and dependent variables is supported by an Adjusted R-square of 0.558, signifying its validity. Additionally, the overall significance of the model, as indicated by the F-test value, holds high significance at the 1 percent level.

Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	VIF
	B	Std. Error	Beta			
(Constant)	-0.641	0.243		-2.632	0.009	
Attitude	0.370***	0.106	0.236	3.500	0.001	2.114
Norm	0.011	0.089	0.007	0.122	0.903	1.458
Control	0.717***	0.078	0.570	9.140	0.000	1.803
R Square	0.564					
Adjusted R Square	0.558					
F value	87.210					
Dependent variable	Intension					

Table-4.6. Multiple regression result for young drivers (Source: survey data, 2023)

Notes: *** Significant at 1% level, **Significant at 5% level, * Significant at 10% level

The variable denoting Perceived Behavior Control (PBC) exhibits an anticipated positive correlation with a highly significant coefficient value at the 1 percent level ($p < 0.01$). This positive association suggests that heightened PBC corresponds to an increased intention to speed among young Norwegian drivers. Specifically, a one-unit increase in PBC escalates the effect on the intention to speed by 0.717 units. Notably, the standardized coefficient (beta) for

PBC, at 0.57, surpasses those of the other explanatory variables, indicating its dominant influence on speeding intentions while controlling for variance explained by other factors.

Similarly, the Attitude factor reveals an expected positive relationship with a highly significant coefficient value at the 1 percent level ($p < 0.01$). This demonstrates that elevated Attitude factors align with an augmented intention to speed among young drivers. An increase of one unit in the Attitude factor corresponds to a 0.370-unit increase in the intention to speed.

However, the Subjective Norm factor fails to exhibit a significant correlation within the model, given its non-significant value of 0.972 ($p > 0.5$). This suggests that the model doesn't account for a notable relationship between Subjective Norms and the intention to speed among young drivers.

4.7. Effect of Beliefs on Intention to speed among young male drivers

This study, presented in Table-4.7, conducts a multiple regression analysis to assess the influence of Attitude, Norms, and PBC on young male drivers' propensity to speed.

Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	VIF
	B	Std. Error	Beta			
(Constant)	-0.638	0.364		-1.750	0.083	
Attitude	0.368**	0.158	0.233	2.335	0.022	2.397
Norm	-0.026	0.131	-0.016	-0.194	0.846	1.570
Control	0.766***	0.116	0.594	6.590	0.000	1.961
R Square	0.586					
Adjusted R Square	0.574					
F value	47.217					
Dependent variable	Intension					

Table-4.7. Multiple regression result for young male drivers (Source: survey data, 2023)

Notes: *** Significant at 1% level, **Significant at 5% level, * Significant at 10% level

The model partially elucidates the variability in speeding intention ($R^2 = 0.586$), clarifying 57.4% of the interplay between the independent and dependent variables (adjusted R-squared = 0.574). The model's overall significance, established by the highly significant F-test at the 1% level, said to be valid.

Attitude exhibits an anticipated positive association ($p < 0.05$), implying that heightened Attitude among young male drivers corresponds to an increased inclination to speed. Conversely, Subjective Belief displays a negative sign but lacks statistical significance in relation to speeding intention.

PBC, however, displays the expected positive sign and holds significant influence at the 1% level ($p < 0.01$), presenting the most robust correlation among the three independent variables. A unitary rise in the PBC factor escalates the intention to speed by 0.766 units. Furthermore, the standardized coefficient (Beta) associated with PBC surpasses those of other explanatory variables, signifying its primary role in shaping the intention to speed among young male drivers. In summary, while two of the three variables exhibit noteworthy associations, the predominant determinant impacting young male drivers' intention to speed is the Perceived Behavioral Control (PBC) construct

4.8. Effect of Beliefs on Intention to speed among young female drivers

According to the result from Table-4.8, the specified model could explain only some extent about the variation of the intention to speed among female young drivers in Norway since the value of R-square is 50 percent.

The model can explain 48.5 percent about the variance of the independent variable and dependent variable because Adjusted R-Square is 0.485. The value of F-test, the overall significance of the model, is highly significant at 1 percent level. This specified model can be said valid.

Attitude variable factor of female young drivers has the expected positive sign and significant at 10%. The positive relationship indicates that the increase in attitude variable factors leads to more intention to speed among female young drivers. An increase in attitude factor by 1 unit will also raise the effect on intention to speed by .287 units.

Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	VIF
	B	Std. Error	Beta			
(Constant)	-0.398	0.365		-1.091	0.278	
Attitude	0.287*	0.148	0.182	1.939	0.055	1.734
Norm	-0.004	0.125	-0.003	-0.035	0.972	1.180
Control	0.69***	0.112	0.579	6.184	0.000	1.719
R Square	0.501					
Adjusted R Square	0.485					
F value	32.744					
Dependent variable	Intension					

Table-4.8. Multiple regression result for Female young drivers (Source: survey data, 2023)

Notes: *** Significant at 1% level, **Significant at 5% level, * Significant at 10% level

Non-significant p-value suggests that the observed relationship between Subjective Norm and speeding intention is statistically not significant and not reliable.

Perceive Control Believe (PCB) facto has the expected positive sign and highly significant coefficient value at 1 percent level ($p < 0.001$) with the strongest correlation among three independent variables. The positive relationship indicates that the increase in attitude leads to more intention to speed. An increase in attitude factor by 1 unit will raise the effect on intention speed by 0.69 unit.

PCB also has the largest value of standardized coefficient (Beta) among three explanatory variables indicating that PCB has the greatest contribution to the effect on intention to speed among young female drivers.

In summary, the results show that two of three factors have significant value and the main determination of intention to be the PCB.

4.9. Effect of intention on Behavior

Binary logistic regression was utilized to explore potential associations between intention factors, assessed via a 5-point Likert scale, and dichotomous variables linked to speeding behavior—namely, questions BQ2 (pertaining to involvement in accidents), BQ3 (encounters with dangerous conditions), and BQ4 (instances of being penalized or warned). Table-4.9 represents summary of three binary logistic regression tested between Intention and BQ2, BQ3 and BQ4.

Covariates	Dependent Variable	Omnibus Tests of Model coefficients			Model Summary	
		Chi-Square	df	sig	Cox & Snell R Square	Nagelkerke R Square
Intention (IQ1 and IQ2)	BQ2-accident	0.728	2	0.695	0.004	0.014
	BQ3- near accident	7.881	5	0.163	0.38	0.053
	BQ4 - penalized	4.754	2	0.093	0.23	0.044

Table-4.9. Summary results of binary logistic regression between Intention and Behavior (Source: survey data, 2023)

However, findings from the Omnibus tests of model coefficients revealed non-significant results, suggesting that the model lacks statistical significance in predicting the relationship between intentions and occurrences of accidents, encounters with dangerous conditions, or facing penalties or warnings due to speeding. With the p-values exceeding 0.05 for each individual binary logistic regression model (BQ2, BQ3, and BQ4), there exists weak evidence, and thereby, fails to reject the null hypothesis regarding the association between intention factors and speeding-related behaviors. Since the initial binary logistic regression analysis for all young drivers did not indicate any statistically significant correlation within the entire young cohort, attempts to discern differences between male and female drivers using this method were not pursued in this study.

4.10. Effect of PBC on Behavior

Covariates	Dependent Variable	Omnibus Tests of Model coefficients			Model Summary	
		Chi-Square	df	sig	Cox & Snell R Square	Nagelkerke R Square
PCB (CQ1 to CQ5)	BQ2-accident	41.174	20	0.004***	0.181	0.706
	BQ3- near accident	12.410	8	0.134	0.580	0.820
	BQ4 - penalized	32.878	20	0.035**	0.148	0.282

Table -4.10: Summary results of binary logistic regression between PCB and Behavior (Source: survey data, 2023)

Notes: *** $p < 0.01$, ** $p < 0.05$

Binary logistic regression analysis was employed to evaluate the potential associations between perceived control belief (PCB) factors, measured on a 5-point Likert scale, and dichotomous variables representing speeding-related behaviors—questions BQ2 (involvement in accidents), BQ3 (encountering near accident or dangerous conditions), and BQ4 (being penalized or warned). The Omnibus tests of model coefficients indicated that the regression models **for BQ3** lacked statistical significance ($p > 0.05$), indicating an inability to predict these speeding-related behaviors.

However, for BQ2 (involvement in accidents), the model exhibited validity. Moreover, the model for BQ2 assessed the association between PCB factors and traffic rule violations related to accidents caused by speeding. Multicollinearity assumption was met, as assessed by the Variance Inflation Factor (VIF) test. The full model for BQ2 (involvement in accidents) demonstrated significant prediction performance (Chi-Square=41.174, df=20, $p=0.004 < .05$), rejecting the null hypothesis. The model's explanatory power, measured by Pseudo-R square (Nagelkerke R Square), ranged from 0.181 to 0.706, indicating a moderate to strong explanatory capacity for variance in the dependent variable. Notably, certain independent variables, specifically CQ4:(I would likely to drive more than the speed limit if there is an important schedule to catch up) and CQ5:(I would likely to drive faster if I believe that the speedometer

of my car is showing more than the actual speed I am driving), exhibited statistical significance in predicting accidents, as indicated by odds ratios.

The binary logistic regression analysis conducted for BQ4 (pertaining to being penalized or warned) demonstrated its validity. This model explored the correlation between Perceived Control Belief (PCB) factors and traffic rule violations associated with accidents resulting from speeding behaviors. The test for multicollinearity met the assumption criteria, as confirmed by the Variance Inflation Factor (VIF) test. The complete model for BQ4 (penalized or warned) exhibited notable predictive performance (Chi-Square=32.878, df=20, $p=0.035<.05$), thereby rejecting the null hypothesis. The model's capacity to explain the variance in the dependent variable, assessed through Pseudo-R square (Nagelkerke R Square), ranged between 0.148 and 0.282, indicating a moderate to strong explanatory capability. Interestingly, specific independent variables, particularly CQ2 (expressing likelihood to speed in familiar road environments), displayed statistical significance in predicting accidents, as evidenced by their odds ratios. As the objective of this section was to examine the correlation between perceived behavioral control (PBC) and actual behavior through a Binary logistic regression encompassing all respondents, separate regression analyses for young male and female drivers were not conducted within this section.

5. Discussion

The varying attitudes among young drivers in Norway toward speeding reveal a complex spectrum of beliefs and perceptions. The study illuminated several facets of positive attitudes toward speeding among respondents. Notably, a significant subset of young drivers displayed a belief that driving at higher speeds facilitates quicker arrival at destinations, correlating speed with time efficiency (AQ1). Additionally, a portion of respondents expressed confidence in their driving skills to mitigate accidents while speeding (AQ3). This positive correlation between driving ability and accident avoidance during speeding suggests a subset of young drivers possessing a sense of mastery over potential risks associated with higher speeds.

Interestingly, amidst the positive attitudes, a contradictory perception emerged. Despite acknowledging potential time-saving benefits and self-perceived driving competence, a discrepancy existed regarding the dangers associated with speeding (AQ2). This contradiction underscores the complexity of attitudes, wherein respondents simultaneously acknowledge risks while seemingly downplaying them due to perceived driving proficiency.

Moreover, discernible gender disparities were evident in attitudes toward speeding among young drivers in Norway, elucidating distinct patterns between male and female respondents. Male drivers exhibited a notably stronger inclination toward endorsing favorable attitudes regarding speed compared to their female counterparts. This gender divergence was evident in responses indicating a stronger agreement with statements implying the benefits of speeding (AQ1, AQ3, AQ4).

Understanding the multifaceted nature of attitudes toward speeding behaviors among young drivers holds paramount importance in shaping effective interventions. Positive attitudes toward speeding, particularly prevalent among male drivers, signify the need for targeted interventions addressing misconceptions and promoting risk-awareness. Educational initiatives and awareness campaigns should challenge and modify attitudes by emphasizing the real risks associated with speeding and debunking overconfident beliefs in driving abilities.

Subjective Norms, a pivotal component within the Theory of Planned Behavior (TPB), encapsulate the perceived societal or peer influences on behaviors. The study conducted among young drivers in Norway delineated intricate patterns and divergences in their subjective norms

regarding speeding behaviors. The findings illuminated an intriguing aspect concerning subjective norms among respondents, emphasizing a notable discrepancy between perceived societal or peer influences and individual behaviors regarding speeding. Contrary to conventional TPB expectations, the majority of both male and female respondents exhibited disagreement with social encouragements for speeding behaviors (NQ1-NQ5). This divergence indicates a resilient resistance among young drivers to external influences promoting speeding, challenging the anticipated impact of subjective norms on their behaviors.

Furthermore, the study elucidated distinct patterns in subjective norms between male and female respondents. Male drivers tended to exhibit a stronger inclination to agree that friends, driving partners, and other drivers would encourage speeding (NQ1-NQ3). In contrast, female drivers consistently displayed lower agreement with these notions, suggesting a stronger disagreement with social influences promoting speeding behaviors (NQ1-NQ3).

Understanding the divergence between societal perceptions and individual behaviors regarding speeding behaviors holds significance for interventions. The discrepancy signifies a resilience among young drivers against societal norms advocating speeding behaviors. Interventions aiming to modify subjective norms should focus on fostering a collective understanding of the risks associated with speeding, highlighting the disparity between perceived social influences and actual individual behaviors.

Gender-specific patterns in subjective norms emphasize the necessity for tailored interventions addressing differing perceptions and attitudes toward speeding behaviors among male and female drivers. Educational initiatives should target gender-specific social influences, debunking misconceptions and promoting safer driving practices. Moreover, interventions should aim to empower drivers to resist perceived societal pressures advocating speeding behaviors, fostering a sense of autonomy in making responsible driving choices.

Perceived Behavior Control, an integral component within the Theory of Planned Behavior (TPB), encompasses individuals' beliefs regarding their ability to control or resist speeding behaviors. The study conducted among young drivers in Norway unraveled noteworthy insights into the perceptions and control beliefs surrounding speeding behaviors. The findings underscored the significance of perceived behavior control among young drivers in influencing intentions and behaviors related to speeding. Overall, respondents exhibited varying levels of

perceived control over their speeding behaviors, indicating a nuanced spectrum of beliefs regarding situational control.

The results revealed distinct situational factors influencing perceived control over speeding behaviors. Male respondents, in particular, expressed a stronger inclination toward perceiving control in specific circumstances. For instance, male drivers indicated higher agreement with statements implying greater control over speeding when far from schools or urban areas (CQ1). This suggests a gender-based disparity in perceived control, signifying potential situational influences on speeding behaviors.

The study highlighted disparities in perceived control between male and female drivers. Male respondents, on average, exhibited higher levels of perceived control across various scenarios related to speeding (CQ1-CQ5). In contrast, female drivers displayed lower levels of perceived control, particularly when considering speeding away from schools or when the speedometer shows a higher speed than the actual (CQ1, CQ5). This gender-based discrepancy implies differing perceptions of control between males and females in specific driving contexts.

Understanding the nuances in perceived behavior control holds critical implications for interventions aimed at curbing speeding behaviors among young drivers in Norway. Interventions targeting perceived control should focus on enhancing drivers' self-efficacy in managing speeding behaviors, especially among female drivers who exhibited lower levels of perceived control in specific situations. Educational programs should aim to empower drivers to make informed decisions and exert control over their behaviors, irrespective of situational influences.

The responses obtained from young drivers in Norway regarding their intentions to engage in speeding behaviors within the upcoming six months reveal distinct patterns between male and female respondents. In the context of speeding while overtaking (IQ1), a divergence in responses becomes apparent. Male respondents showcased a mean value of 3.41, indicating a notably more affirmative inclination toward engaging in speeding during overtaking situations. Conversely, female respondents exhibited a lower mean value of 2.81, suggesting a decreased inclination or reluctance toward speeding during similar scenarios. This disparity in mean values underscores a gender-based contrast in attitudes toward speeding while overtaking.

Moving to the intention to speed in similar encounters (IQ2), a noticeable reduction in intentions across both genders is observed compared to the speeding while overtaking scenario. Male respondents maintained a moderately higher intention to speed, displaying a mean value of 2.9, in contrast to female respondents whose mean value for this intention was 2.55. Despite this decrease in intentions compared to IQ1, the gender-based divergence persists, indicating a subtle yet consistent variation in intentions between male and female young drivers regarding similar speeding encounters.

The comparative analysis of these responses highlights a nuanced gender-specific variation in intentions toward speeding behaviors. While both genders demonstrated reduced intentions in IQ2 compared to IQ1, male respondents consistently showcased a relatively higher inclination toward speeding in both scenarios. In contrast, female respondents displayed a more restrained attitude toward speeding, maintaining lower intentions in both scenarios, suggesting a notable divergence in attitudes and intentions related to speeding behaviors between male and female young drivers in Norway. This gender-based disparity underscores the necessity for tailored interventions aimed at modifying attitudes and intentions toward speeding behaviors among young drivers, considering gender-specific perspectives and influences on driving intentions.

Regarding the behavior of respondents, it's essential to scrutinize the reported frequencies and occurrences among young drivers in Norway. The data unveiled a prevailing trend indicating a heightened inclination toward driving above the speed limit among the respondents. The mean values depicted a notable tendency among both male and female participants to engage in speeding behaviors, with males demonstrating a slightly higher frequency than their female counterparts. Despite these inclinations, a significant majority of respondents, both male and female, reported no involvement in accidents or near accidents due to speeding, as well as a limited experience of penalties or warnings associated with speeding offenses.

This pattern aligns with existing observations of youthful drivers exhibiting a propensity toward driving above prescribed speed limits, often due to factors such as thrill-seeking tendencies, peer influence, or perceptions of invincibility on the road. The prevalence of speeding behavior, as indicated in the data, could potentially be attributed to the prevailing societal norms or a lack of awareness regarding the potential risks associated with speeding among younger drivers in Norway.

The overwhelmingly low reported incidents of accidents or near accidents might suggest a divergence between perceptions and actual experiences or an underreporting of such occurrences among the respondents. Furthermore, the limited instances of penalties or warnings due to speeding raise questions about the effectiveness of enforcement mechanisms or the perceived severity of consequences among young drivers in Norway.

However, these findings should be interpreted cautiously, considering potential biases in self-reported behaviors and experiences. To accurately assess the true prevalence and impact of speeding behaviors among young drivers, supplementary research methodologies like observational studies or qualitative inquiries could complement the self-reported data.

Assessing the speeding intention variables, particularly IQ1 and IQ2, offered a glimpse into participants' likelihood and intent to engage in speeding over the next six months. These variables showcased distinct gender differences, indicating diverse attitudes and inclinations toward speeding behaviors. For instance, while a considerable segment of both genders expressed disagreement or reluctance toward speeding, males generally exhibited a higher inclination toward speeding behaviors compared to females.

The regression analyses, particularly those involving Attitude, Subjective Norms, and Perceived Behavior Control (PBC), underscored the significance of intention in predicting speeding behaviors. Attitude and PBC emerged as influential factors shaping intentions to speed, especially among males. The robust correlation between these factors and intentions highlighted their considerable impact on predisposing individuals toward engaging in speeding behaviors.

However, it's crucial to approach these findings judiciously. Intentions, as indicated by the Likert scale responses, may not unilaterally dictate actual behaviors on the road. External influences, societal norms, and situational contexts likely interplay with intentions to shape real driving behaviors. The reported low incidents of accidents or penalties related to speeding contradicted the intentions expressed, suggesting a potential gap between intentions and actual behaviors.

This discrepancy between expressed intentions and observed behaviors raises intriguing questions about the underlying factors contributing to this gap. It indicates that multiple

complex variables beyond intentions might influence driving behaviors, necessitating further exploration through qualitative studies or observational assessments.

The examination of Perceived Behavior Control (PBC) on driving conduct, particularly among young drivers in Norway concerning speeding and its implications for accidents, emerges as a pivotal factor. Through binary logistic regression analysis, a robust correlation surfaced between specific dimensions of PBC and traffic violations associated with speeding-related incidents. Notably, factors such as the inclination to surpass speed limits in familiar road environments (CQ2) demonstrated a statistically significant association with occurrences of accidents, evident in their respective odds ratios. This nuanced finding underscores the substantial role of young drivers' perceived control in familiar settings, hinting at its potential sway on speeding behaviors and subsequent accident involvement. Furthermore, the model's efficacy in predicting traffic rule transgressions linked to accidents triggered by speeding (BQ2) underscores the prominence of PBC in shaping driving behavior among young drivers in Norway. These insights collectively illuminate the significant influence of PBC, especially in contexts where young drivers perceive a higher degree of control, indicating its pivotal role in shaping decisions and behaviors associated with speeding and their potential impact on road safety outcomes among this demographic in Norway.

6. Conclusion

The findings from the comprehensive analysis of beliefs—Attitude, Subjective Norms, and Perceived Behavior Control (PCB)—and their influence on speed driving intention highlight pertinent aspects shaping young drivers' behaviors. Attitude emerges as a significant determinant, exhibiting a positive correlation with the intention to speed. It underscores the importance of altering perceptions toward speeding by emphasizing associated risks and advocating for safer driving attitudes. However, Subjective Norms exhibit a comparatively weaker association with speed driving intention, suggesting that peer influence and social norms might hold less sway in shaping young drivers' intentions to speed.

When examining the effect of intention and PCB on speed driving behavior, a notable discrepancy emerges. While intention plays a pivotal role in shaping behavior, PCB, which denotes the perceived control over speeding in specific situations, showcases a stronger correlation with actual behavior. This emphasizes the critical role of perceived control beliefs in influencing young drivers' actions on the road. It signals that interventions targeting contexts where drivers feel more in control—such as familiarity with roads or belief in speedometer discrepancies—could significantly impact actual speeding behavior.

The comparison between young male and female drivers reveals nuanced disparities. Male drivers tend to exhibit stronger attitudes favoring speeding, higher intentions to speed, and a greater sense of perceived control in specific situations, compared to their female counterparts. This suggests gender-based variations in beliefs and behaviors related to speeding, indicating a need for gender-specific interventions tailored to address these discrepancies effectively.

The dominant influence of Perceived Behavior Control (PBC) among young drivers highlights a focal point for intervention. Targeting initiatives to reshape control perceptions in familiar driving scenarios, as highlighted in previous inputs, could significantly impact speeding tendencies. Furthermore, the revelation that Subjective Norms receive relatively lower scores suggests an opportunity for intervention by addressing societal norms against speeding, countering perceived peer pressures. The established link between Attitude and the intention to speed indicates a vital area for communication strategies. Efforts aimed at altering attitudes toward speeding, emphasizing associated risks, and promoting safer driving behaviors could yield significant outcomes. Leveraging behavioral theories like the Theory of Planned Behavior

(TPB) could assist in tailoring messaging aligned with drivers' attitudes, norms, and perceived control.

Moreover, insights derived from behavior-related questions (BQ1-BQ4) and intentions underscore the need to address contextual influences on speeding behaviors. Campaigns should not only discourage speeding but also consider mitigating factors like road familiarity and beliefs regarding speedometer accuracy. Using these nuanced insights, targeted communication strategies can engage young drivers, resonating with their perceptions and motivations while emphasizing the societal, personal, and legal ramifications of speeding.

Ultimately, a multifaceted communication strategy addressing attitudes, norms, control perceptions, and contextual factors can better engage young drivers in Norway. Applying evidence-based insights from diverse inputs can enhance the effectiveness of anti-speeding campaigns, promoting safer driving practices and reducing speeding-related accidents on Norwegian roads.

However, this research also uncovers certain weaknesses. Notably, the study lacks extensive exploration of external factors beyond the Theory of Planned Behavior (TPB) framework that might influence speeding behavior. Understanding speed driving behavior among young drivers in Norway requires a multifaceted approach that extends beyond the existing research presented in this analysis. While the gathered insights offer valuable perspectives on beliefs and intentions influencing speeding, a need for further exploration is evident. The current study, primarily rooted in the Theory of Planned Behavior (TPB), presents an empirical understanding but lacks a comprehensive examination of external factors that may significantly influence speeding behaviors. A broader exploration encompassing socio-cultural, psychological, and environmental aspects is vital to capture the holistic landscape driving these behaviors. Incorporating qualitative methodologies alongside quantitative analyses would provide nuanced insights into contextual intricacies and individual perceptions that quantitative data might overlook. Additionally, an expanded scope could entail longitudinal studies to track behavioral patterns over time, offering a deeper understanding of how attitudes and beliefs evolve among young drivers. Utilizing mixed-method approaches and involving diverse stakeholder perspectives could provide a more comprehensive understanding of the complexities surrounding speed driving behaviors. Ultimately, a holistic research approach

with diversified methodologies and an expanded scope beyond TPB could enrich the comprehension of speeding behaviors among young drivers in Norway.

In conclusion, the interplay between beliefs—Attitude, Subjective Norms, and PCB—holds significance in shaping speed driving intentions among young drivers. The link between intention, PCB, and actual behavior underscores the importance of targeting perceived control beliefs in interventions aimed at curbing speeding. Recognizing gender-based disparities in beliefs and behaviors presents an opportunity for tailored strategies. To strengthen research, a holistic approach encompassing both quantitative and qualitative dimensions, coupled with an exploration of broader external influences, is essential for a more comprehensive understanding of speeding behaviors among young drivers in Norway.

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Appendix 1- Survey form

Are you under 25-years and driving in Norway?



Help me by answering survey **anonymously!**

Only to answer about your Age, gender, type of driving license, occupation and

21 Questions to answer “Yes or No” and “Agree or Disagree”

Your 10-min help is precious and extremely important for my master thesis!

Just follow the Link: <https://forms.gle/jbPwRDMR1aYeW2m38> or scan the **QR code** to answer the survey in Google form. Contact me at am.maungmyo@stud.uis.no if any question or suggestion.



Please read the following given case and answer the questions.

It is a beautiful sunny Saturday in Norway's summer.

You are driving alone on a multi-lane highway to meet a friend in another town.

You don't need to care what time you arrive to your friend as it is still in the middle of the day and you have plenty of time.

The car in front is driving a bit under the speed limit and it is very frustrating to follow behind for several minutes. So, you decide to overtake.

After you change lanes and speed up to overtake, the car in front of you suddenly speed up.

Now you need to exceed the speed limit if you want to continue to overtake.

Please continue next page to see the survey questions. It will take about 10 mins!

SN	Questions	1. Strongly disagree 5. Strongly agree				
		1	2	3	4	5
6	Driving fast will help me get my destination quicker and save time	1	2	3	4	5
7	I feel speeding is not very dangerous to myself and others than driving at the speed limit	1	2	3	4	5
8	Speeding in this situation with my driving skill would not likely result in a crash.	1	2	3	4	5
9	It is not likely to be caught by police for driving a little faster than speed limit while overtaking.	1	2	3	4	5
10	I like to drive just a little faster than the speed limit.	1	2	3	4	5
11	Speeding would save me fuel and cost less money as driving slowly is not economical.	1	2	3	4	5
12	Most of my close friends would think I should speed.	1	2	3	4	5
13	The other drivers behind my car would like me to speed.	1	2	3	4	5
14	friend I often drive together with would want me to speed	1	2	3	4	5
15	My parents would want me to drive faster	1	2	3	4	5
16	My coworkers would encourage me my decision to speed	1	2	3	4	5
17	I would speed if I was far from schools and urban areas.	1	2	3	4	5
18	I would be more likely to speed if the road and environment was familiar to me.	1	2	3	4	5
19	I would be more likely to speed if the condition of the road is good (eg. wide, clear traffic, straight, visible)	1	2	3	4	5
20	I would likely to drive more than the speed limit if there is an important schedule to catch up.	1	2	3	4	5
21	I would likely to drive faster if I believe that the speedometer of my car is showing more than the actual speed I am driving.	1	2	3	4	5
22	It is very likely that I will engage in speeding while overtaking within the next 6 months.	1	2	3	4	5
23	I intend to engage in speeding in the next 6 month for a similar encounter.	1	2	3	4	5
24	During the past, I found myself driving more than the speed limit (frequency scale 1-5, Never to usually)	1	2	3	4	5
25	During the past driving experience, have you been involved in an accident related to speeding?	Yes			No	
26	Have you ever encountered near accident or dangerous conditions due to speeding?	Yes			No	
27	Have you ever fined, penalized or given warning due to speeding?	Yes			No	