

RECONCEPTUALIZATION OF POSITIVE DRIVER BEHAVIORS:
DEVELOPING THE MULTIDIMENSIONAL POSITIVE DRIVER BEHAVIOR
QUESTIONNAIRE (M-PDBQ) AND EXAMINING ITS RELATIONSHIP WITH
DRIVING AND SAFETY RELATED VARIABLES

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

ŞERİFE YILMAZ DEMİROK

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY
IN
THE DEPARTMENT OF PSYCHOLOGY

OCTOBER 2023

Approval of the thesis:

**RECONCEPTUALIZATION OF POSITIVE DRIVER BEHAVIORS:
DEVELOPING THE MULTIDIMENSIONAL POSITIVE DRIVER
BEHAVIOR QUESTIONNAIRE (M-PDBQ) AND EXAMINING ITS
RELATIONSHIP WITH DRIVING AND SAFETY RELATED VARIABLES**

submitted by **ŞERİFE YILMAZ DEMİROK** in partial fulfillment of the
requirements for the degree of **Doctor of Philosophy in Psychology, the Graduate
School of Social Sciences of Middle East Technical University** by,

Prof. Dr. Sadettin KİRAZCI
Dean
Graduate School of Social Sciences

Prof. Dr. Mine MISIRLISOY BIYIKOĞLU
Head of Department
Department of Psychology

Assoc. Prof. Dr. Bahar ÖZ
Supervisor
Department of Psychology

Examining Committee Members:

Prof. Dr. Tülin GENÇÖZ (Head of the Examining Committee)
Middle East Technical University
Department of Psychology

Assoc. Prof. Dr. Bahar ÖZ (Supervisor)
Middle East Technical University
Department of Psychology

Prof. Dr. Türker ÖZKAN
Middle East Technical University
Department of Psychology

Assoc. Prof. Dr. Yeşim ÜZÜMCÜOĞLU ZİHNİ
TOBB University of Economics and Technology
Department of Psychology

Assist. Prof. Dr. Derya AZİK ÖZKAN
Police Academy
Traffic Institute



I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last Name: Şerife YILMAZ DEMİROK

Signature:

ABSTRACT

RECONCEPTUALIZATION OF POSITIVE DRIVER BEHAVIORS: DEVELOPING THE MULTIDIMENSIONAL POSITIVE DRIVER BEHAVIOR QUESTIONNAIRE (M-PDBQ) AND EXAMINING ITS RELATIONSHIP WITH DRIVING AND SAFETY RELATED VARIABLES

YILMAZ DEMİROK, Şerife

Ph.D., The Department of Psychology

Supervisor: Assoc. Prof. Dr. Bahar ÖZ

October 2023, 163 pages

Studies on positive driver behaviors are limited compared to those on risky driver behaviors. These positive behaviors, often defined narrowly as kindness and helpfulness, also possess a broader scope encompassing safety and eco-friendly tendencies. To address this gap, Study 1 explored the multidimensional nature of positive driver behaviors. Accordingly, the Multidimensional Positive Driver Behavior Questionnaire (M-PDBQ) was developed following semi-structured interviews with 16 drivers. In the main study with 628 participants, the M-PDBQ's factor structure was identified, and its psychometric properties were examined. The M-PDBQ, featuring 53 items, measures positive driver behaviors across three key dimensions: smooth and proactive mobility, environmentally sustainable behaviors, and risk communication. This 3-factor structure confirms the multidimensionality of positive driver behaviors. Moreover, hierarchical regression analyses indicated that factors of the M-PDBQ predict safety outcomes, however, the

effect is small. On the other hand, the M-PDBQ factors demonstrated significant associations with driving-related variables, suggesting a potential role of positive driver behaviors in reducing violations and driving anger in traffic. The discussion section proposed a comprehensive definition of positive driver behaviors. The intentionality behind these behaviors was discussed from a theoretical perspective and the expression of them was discussed in a cultural context. The factors and items of the M-PDBQ can be utilized in developing road safety intervention programs aimed at reducing driving anger and violations. Also, road safety messages could focus on promoting positive driver qualities.

Keywords: Positive Driver Behaviors, Human Factor in Driving, Smooth and Proactive Mobility, Environmentally Sustainable Behaviors, Risk Communication

ÖZ

POZİTİF SÜRÜCÜ DAVRANIŞLARININ YENİDEN KAVRAMSALLAŞTIRILMASI: ÇOK BOYUTLU POZİTİF SÜRÜCÜ DAVRANIŞLARI ANKETİNİN (ÇB-PSDA) GELİŞTİRİLMESİ, ARAÇ KULLANMA VE GÜVENLİKLE İLGİLİ DEĞİŞKENLERLE İLİŞKİSİNİN İNCELENMESİ

YILMAZ DEMİROK, Şerife

Doktora, Psikoloji Bölümü

Tez Yöneticisi: Doç. Dr. Bahar ÖZ

Ekim 2023, 163 sayfa

Pozitif sürücü davranışlarına ilişkin çalışmalar, riskli davranışlara kıyasla sınırlıdır. Çoğunlukla nezaket ve yardımseverlik olarak dar anlamda tanımlanan bu pozitif davranışlar, aynı zamanda güvenlik ve çevreci eğilimleri de kapsayan daha geniş bir kapsama sahiptir. Literatürde bu açığı kapatmak için Çalışma 1’de pozitif sürücü davranışlarının çok boyutlu doğası araştırılmıştır. Bu doğrultuda, 16 sürücüyle yapılan yarı yapılandırılmış görüşmelerin ardından Çok Boyutlu Pozitif Sürücü Davranışı Anketi (ÇB-PSDA) geliştirilmiştir. 628 katılımcının yer aldığı ana çalışmada ÇB-PSDA’nın faktör yapısı belirlenerek psikometrik özellikleri incelenmiştir. 53 maddeden oluşan ÇB-PSDA, pozitif sürücü davranışlarını üç temel boyutta ölçer: akıcı ve proaktif hareketlilik, sürdürülebilir çevresel davranışlar ve risk iletişimi. Bu 3 faktörlü yapı, pozitif sürücü davranışlarının çok boyutluluğunu doğrulamaktadır. Hiyerarşik regresyon analizleri, ÇB-

PSDA faktörlerinin güvenlik sonuçlarını yordadığını ancak etkinin küçük olduğunu göstermiştir. Öte yandan, ÇB-PSDA faktörleri, sürüşle ilgili değişkenlerle anlamlı ilişkiler ortaya koymuştur. Buna göre pozitif sürücü davranışları trafikte ihlalleri ve sürüş öfkesini azaltmada potansiyel bir role sahiptir. Tartışma bölümünde pozitif sürücü davranışlarının kapsamlı bir tanımı önerilmiştir. Bu davranışların ardındaki kasıtlılık teorik bir perspektiften tartışılmış ve pozitif sürücü davranışlarının ifadesi kültürel bağlamda ele alınmıştır. ÇB-PSDA'nın faktörleri ve maddeleri, ihlalleri ve sürüş sırasında sergilenen öfkeyi azaltmayı amaçlayan karayolu güvenliği müdahale programlarının geliştirilmesinde kullanılabilir. Ayrıca karayolu güvenliği mesajları pozitif sürücü niteliklerini teşvik etmeye odaklanabilir.

Anahtar Kelimeler: Pozitif Sürücü Davranışları, Sürücülükte İnsan Faktörü, Akıcı ve Proaktif Hareketlilik, Sürdürülebilir Çevresel Davranış, Risk İletişimi



To My Beloved Family

ACKNOWLEDGMENTS

I am grateful to the many people who guided me and kept me company during the Ph.D. First of all, I would like to thank my supervisor, Assoc. Prof. Dr. Bahar Öz. She has always motivated me by being very kind and supportive and providing constructive feedback. She has been a considerate supervisor and an academic mentor to me. I got excited about new research topics, observed how to build relationships with students, and obtained several soft skills thanks to her. It was always nice to chat with her and find the motivation to continue what must be done. I thank you so much for tailoring your style to the needs of every student you supervise. I am lucky to have you as my supervisor and mentor in this journey, and I am excited to be your colleague.

I would like to thank Prof. Dr. Türker Özkan and Assoc. Prof. Yeşim Üzümcüoğlu Zihni for being on my Thesis Monitoring Committee. The thesis topic has been the most exciting topic I have ever studied. I thank my supervisor and the committee members for encouraging the critical thinking process, directing me when necessary, and always providing constructive feedback that contributed to my research development.

I thank my dissertation examining committee member, Prof. Dr. Tülin Gençöz, for providing methodological guidance when I was most confused, and thank Assist. Prof. Derya Azık Özkan, for her valuable insights and thought-provoking questions during the defense.

I would like to acknowledge and thank the contribution of The Scientific and Technological Research Council of Turkey (TÜBİTAK) to my academic career and for their financial support. This dissertation was financially supported by The Science Fellowships and Grant Programmes Department (BİDEB) at TÜBİTAK.

Special thanks go to the study participants, who contributed a lot to the smooth landing of the data collection process. I also thank all my colleagues for their support, especially Özlem and Suzan for their sincere help. I thank my friends, Burcu, Meral, Gizem, Suzan, and Merve, for looking out for my needs, sharing my enthusiasm and anxiety, and comforting me when needed. Every one of you has helped me to achieve what I achieved today. Burcu, my dearest colleague, you have been with me on this journey since I first moved to your house in 2013. Since then, you have always provided me with a safe place. Thank you so much for the generous support you have shown me during this journey. Do not forget, I am always there for you too. Also, I am very grateful to the study participants. For interviews, every participant spared more than an hour of their time. For the main study, we reached out to more than six hundred people in two weeks. Thank you to everyone who made this happen. I especially thank my brothers-in-law Mustafa and Alaattin for their support and effort during the data collection.

Several groups kept me physically and socially active during this process and contributed positively to my psychological well-being. I thank our Flamenco team, our dance instructor, Eren Ergene, and all the team members. Just before my thesis defense, we played in a Musical Theater in one of the fanciest theatres in Ankara, which I would never dream of and forget. I also thank my Turkish folk music choir, our choir conductor Utkan Mesci, and the energetic team members. I enjoyed every minute of singing, sharing all the jokes and laughter, music and coffee, thrill and sweet exhaustion with you. Also, our board game team and the wise GM Onur, thank you so much for introducing us to the fun world of board games.

I sincerely thank my niece and nephew, who always make me smile. My dearest morning sweets, Kayra and Ahmet, you are achieving new milestones every day during the first year of your life. I am very proud of you. You also made me realize how far I have come and how hard our parents struggled to raise us. I thank you for being an ace support team via video calls. Also, thank you to Eymen, my first-born nephew, for calling me, keeping me company, and chatting on various topics when needed. I wish my niece and nephews a great life and a bright future. Also, my lovely sisters, Bahar and Havva, thank you for

supporting me from the first days of my life until today. You have been amazing big sisters to me; we shared the good and bad days and always supported each other. I am so lucky to have you by my side. I also would like to thank Yusuf, my younger brother, for always supporting me and praising me in the most creative ways. Caaanım ablam, seni çok seviyorum. Last but not least, my dearest parents, Selma and Osman. I am very grateful to have you both. Whenever I needed to, you made me feel safe. You are my safe haven, where I seek solace to escape from the troubles and anxieties of life. Your existence and support are where my strength lies. You identify me as who I am today, I am very proud to be your daughter. I love you with all my heart.

Here comes the final thanks. Tarık and Ponçık, you were the closest witnesses of this process; the biggest burden was on your shoulders. No matter how much I thank my dear partner, for all the endless support during this process, it will never be enough. You were there in my best times and most desperate moments; when I am in the deepest recesses of my mind, you guided me by simply being there for me. Sometimes, the simplest solutions are the most helpful—nothing more is needed. Thank you, my love, for caring for, supporting, and believing in me. Of course, Ponçmobile, Ponçwomen, Ponçiketta, our one and only cat daughter. Meeting your everyday needs reminded me that there is more to life than writing a thesis. You were there every morning for a hugging session and every night for a goodbye session. In fact, you were my company for most of the writing process. You walked with me through from the study room to the kitchen, and from the kitchen to the study room every day. My beloved family, you were very generous, always affectionate, and comforting always. You've got my back; I've got your back too. Eternity wouldn't be long enough to spend with you. Sizi çok seviyorum.

TABLE OF CONTENTS

PLAGIARISM	iii
ABSTRACT	iv
ÖZ	vi
DEDICATION	viii
ACKNOWLEDGMENTS.....	ix
TABLE OF CONTENTS	xii
LIST OF TABLES	xviii
LIST OF FIGURES.....	xix
1 INTRODUCTION.....	1
1.1 Human Factors in Driving: Driver Behaviors and Driver Skills	3
1.1.1 <i>Driver Behaviors: Basic Differentiations of Errors, Violations, and Positive Driver Behaviors</i>	4
1.1.1.1 Driver Behaviors: Planned and Spontaneous Behaviors.....	6
1.1.1.2 Driver Behaviors from Safety-I and Safety-II Perspectives.....	8
1.2 Focusing on Positive Driver Behaviors: Conceptualization and the Empirical Findings in the Literature	9
1.2.1 <i>Conceptualization of the Positive Driver Behavior Construct in the Literature</i>	9
1.2.2 <i>Evaluation of the Scope of the Construct</i>	12
1.2.3 <i>Antecedents and Outcomes of Positive Driver Behaviors</i>	14

1.2.3.1 Antecedents of Positive Driver Behaviors.	15
1.2.3.2 Positive Driver Behaviors and Road Safety Outcomes.....	17
1.2.4 <i>Evaluation of the Empirical Findings on Positive Driver Behaviors</i>	18
1.3 Critical Value of Studying Positive Driver Behaviors and the Aim of the Study	19
2 STUDY 1: DEVELOPMENT OF THE MULTIDIMENSIONAL POSITIVE DRIVER BEHAVIOR QUESTIONNAIRE (M-PDBQ).....	22
2.1 Introduction	22
2.2 Method.....	24
2.2.1 <i>Participants</i>	24
2.2.2 <i>Procedure</i>	24
2.2.3 <i>Instruments</i>	26
2.3 Result.....	27
2.4 Discussion	29
3 MAIN STUDY: EXAMINING THE RELATIONSHIP BETWEEN THE M- PDBQ AND DRIVING AND SAFETY RELATED VARIABLES	32
3.1 Introduction	32
3.2 Method.....	34
3.2.1 <i>Participants</i>	34
3.2.2 <i>Procedure</i>	35
3.2.3 <i>Instruments</i>	36
3.2.3.1 Demographic Information Form.	36
3.2.3.2 The Multidimensional Positive Driver Behaviors Questionnaire (M- PDBQ).....	37
3.2.3.3 Positive Driver Behaviors Scale.....	37
3.2.3.4 Driver Behavior Questionnaire.	37

3.2.3.5 Prosocial and Aggressive Driving Inventory (PADI).	38
3.2.3.6 Driving Anger Expression Inventory.	38
3.2.3.7 Driver Skills Inventory.	39
3.2.3.8 Basic Personality Traits Inventory.	39
3.3 Results	39
3.3.1 Factor Structure of the M-PDBQ.....	42
3.3.2 Psychometric Properties of the M-PDBQ.....	43
3.3.2.1 Reliability.....	43
3.3.2.1.1 Cronbach's Alpha.....	43
3.3.2.1.2 Split-Half Reliability Coefficient.	47
3.3.2.1.3 Test-Retest Reliability.....	47
3.3.2.2 Validity.....	47
3.3.2.2.1 Convergent Validity: Correlations with PDBS and PADI- Prosocial.	47
3.3.2.2.2 Discriminant/Divergent Validity: Correlation with DBQ.	48
3.3.3 Bivariate Correlations between the Study Variables	48
3.3.3.1 Correlations between the M-PDBQ Factors and Demographics.	48
3.3.3.1 Correlations between the M-PDBQ Factors and Driver Skills, Driving Anger Expression, and Personality.	49
3.3.4 Group Comparisons on the Factors of the M-PDBQ	52
3.3.4.1 Group Comparisons with Demographic Variables.	52
3.3.4.1.1 Gender Differences.....	52
3.3.4.1.2 Age Differences.....	53
3.3.4.1.3 Driving Experience Differences.....	53
3.3.4.2 Group Comparisons with Safety Outcomes.	54

3.3.4.2.1 Accident and Near-Miss Differences.	54
3.3.4.2.2 Speeding and Traffic Ticket Differences.	55
3.3.5 Regression Analyses.....	56
3.3.5.1 The Relationship between the M-PDBQ Factors and Driving Outcomes.	56
3.3.5.1.1 Risky Driver Behaviors.	57
3.3.5.1.2 Driving Anger Expression.....	60
3.3.5.2 The Relationship between the M-PDBQ Factors and Safety Outcomes.	62
3.3.5.2.1 Near-miss Involvement.	62
3.3.5.2.2 Speeding Tickets.	63
3.3.5.2.3 Total Traffic Tickets.....	63
3.4 Discussion	63
3.4.1 The Multidimensional Nature of Positive Driver Behaviors.....	64
3.4.1.1 Smooth and Proactive Mobility.	64
3.4.1.2 Environmentally Sustainable Behaviors.	67
3.4.1.3 Risk Communication.....	68
3.4.2 A Reliable and Valid Measure: The Multidimensional Positive Driver Behavior Questionnaire	69
3.4.3 Empirical Discussion of the Findings.....	70
3.4.3.1 The M-PDBQ Factors and Demographics.	70
3.4.3.2 The M-PDBQ Factors and Road Safety.....	71
3.4.3.2.1 Direct Link with Accident, Near-miss, and Traffic Tickets.....	71
3.4.3.2.2 Indirect Link with Driver Skills, Driver Behaviors, and Driving Anger Expression.	72
3.4.3.3 Evaluating the Unexpected Findings	73

3.4.4	<i>Critical Remarks</i>	75
4	GENERAL DISCUSSION.....	77
4.1	Conceptual/Theoretical Considerations.....	78
4.1.1	<i>Proposed Reconceptualization of the Construct “Positive Driver Behaviors”</i>	78
4.1.2	<i>Intentionality in Behaviors</i>	79
4.1.2.1	Continuum of Intentional Behavior.....	81
4.1.2.2	Positive Driver Behaviors: Reasoned vs. Socially Reactive, or Both...83	
4.1.3	<i>The Role of Culture in the Expression of Positive Driver Behaviors</i>	84
4.2	Implications of the Study.....	86
4.2.1	<i>Road Safety Interventions</i>	87
4.2.2	<i>Driver Training</i>	88
4.2.3	<i>Creating a Positive Traffic Climate</i>	89
5	CONCLUSION	91
	REFERENCES.....	93
	APPENDICES.....	102
A.	APPROVAL OF THE METU HUMAN SUBJECTS ETHICS COMMITTEE FOR STUDY 1.....	102
B.	INFORMED CONSENT FOR STUDY 1	103
C.	INTERVIEW QUESTIONS	105
D.	TEMPLATE USED FOR ANALYZING INTERVIEWS.....	107
E.	EXPERT EVALUATION FORM	108
F.	APPROVAL OF THE METU HUMAN SUBJECTS ETHICS COMMITTEE FOR MAIN STUDY	123
G.	INFORMED CONSENT FOR MAIN STUDY	124

H. DEMOGRAPHIC QUESTIONS	126
I. MULTIDIMENSIONAL POSITIVE DRIVER BEHAVIOR QUESTIONNAIRE	128
J. POSITIVE DRIVER BEHAVIORS SCALE	132
K. PROSOCIAL AND AGGRESSIVE DRIVING INVENTORY	133
L. DRIVER BEHAVIOR QUESTIONNAIRE	134
M. DRIVER SKILLS INVENTORY	135
N. DRIVING ANGER EXPRESSION INVENTORY	136
O. BASIC PERSONALITY TRAITS INVENTORY	137
P. CURRICULUM VITAE	138
Q. TURKISH SUMMARY / TRKE ZET	143
R. THESIS PERMISSION FORM / TEZ İZİN FORMU	163

LIST OF TABLES

Table 1.....	25
Table 2.....	35
Table 3.....	41
Table 4.....	44
Table 5.....	47
Table 6.....	50
Table 6.....	51
Table 8.....	58
Table 9.....	59
Table 10.....	65
Table 11.....	80

LIST OF FIGURES

Figure 1.	82
----------------	----



CHAPTER 1

1 INTRODUCTION

Moving from point A to B is the primary goal of transportation. The need to be mobile in society comes with certain binding conditions, such as safety, efficiency, comfort, and responsibility. (McKnight & Adams, 1972, p.7). Accordingly, transportation should prioritize the safety of the road users, be time-efficient, care for the comfort of the road users, and include moral and financial responsibility. Although each goal has its function and value, safe transportation is especially critical since it causes vital consequences.

Each year, approximately 1.35 million people die and 20 to 50 million suffer injuries from road traffic accidents (World Health Organization [WHO], 2018). It is the leading cause of death among children and young adults aged 5 to 29. Low- and middle-income countries are particularly at great risk, as 93% of road traffic accidents (RTAs) occur there. In addition, RTAs constitute an economic burden for countries, as they account for 3% of GDP in most countries (WHO, 2018). Türkiye is among the low-middle-income countries listed by the World Bank (2023); therefore, RTAs are a major problem. Recent statistics show that 5 thousand 362 people died and 274 thousand 615 people got injured due to RTAs in 2021 in Türkiye. It means roughly 14 people died, and 752 were injured daily in 2021 due to RTAs. According to the Turkish Statistical Institute (TÜİK, 2022), Türkiye's population was approximately 85 million in 2021. During the same year, the ratio of road traffic incidents (including both injuries and deaths) to the country's population revealed that approximately 3 out of every 1000 individuals were involved in a traffic accident. These statistics effectively demonstrate the magnitude of the issue.

In addressing the road safety challenge, different strategies were adopted worldwide. For example, several countries (e.g., Sweden, Norway, and the Netherlands) have adopted a Vision Zero approach. This approach aims to eliminate all road-related fatalities (Shinar & Gurion, 2019). These countries have implemented various road safety policies and initiatives to enhance overall road safety. Recognizing the issue as a major public health problem with broad social and economic consequences, the United Nations declared the 2021-2030 period the Second Decade of Action for Road Safety following the First Decade of Action for Road Safety in 2011-2020. The goal for this period is to reduce the deaths and injuries caused by RTAs by at least 50% (United Nations General Assembly resolution 74/299, 2020). Countries started following the Vision Zero approach and adopting the safe system approach to halve the casualties due to RTAs, focusing on the interaction between human-environment-vehicle and the roles of different stakeholders such as road users, planners, authorities, and industry (Shinar & Gurion, 2019).

Parallel to this goal, Türkiye - a member of the United Nations – planned threefold interventions. Accordingly, the first phase included the implementation of the Road Traffic Safety Action Plan for 2021-2023, the second phase of the action plan will cover 2024-2027, and the last stage of the action plan will correspond to 2028-2030 (*Karayolu Trafik Güvenliği Strateji Belgesi 2021-2030*, 2021). For example, in the 2021-2023 Road Traffic Safety Action Plan of Türkiye, three priority areas were determined in parallel to the Vision Zero approach: 1) combating excessive speeding and unsuitable speed for road/vehicle structure, 2) protecting vulnerable road users, and 3) improving accident black spots and preventing loss of life at accident black spots through effective, continuous and intensive inspections. Also, six intervention areas were identified by the safe system approach. These areas are 1) traffic safety management, 2) infrastructure: road and road environment, 3) vehicles, 4) trainings, informative activities, and campaigns for road users, 5) traffic controls, and 6) post-accident intervention, maintenance, and rehabilitation (*Karayolu Trafik Güvenliği Eylem Planı 2021-2023*, 2021). As shown in the variety of areas identified for road safety interventions, the system is approached holistically in a safe system approach. Instead of blaming humans for their failed performances, identifying the possible causes of accidents in every system component and

designing the environment to compensate for system failures received significant attention in recent years (Shinar & Gurion, 2019). Therefore, the safe system approach prioritizes shared responsibility where the system functions within efficient and fail-proof cooperation.

Adopting the safe system approach still requires identifying human failures, considering humans committing errors that add to the incidents. Therefore, the aim is to design the system to accommodate human failure. However, humans not only commit errors that end up in incidents, but sometimes, they engage in positive actions that proactively prevent accidents from happening as well. The safe system approach prioritizes proactive safety in reducing risks (European Commission, 2022). Likewise, positive behaviors contributing to the safe system are an integral component of this proactive view. The current study focused on the human component of driving, by investigating the positive behaviors that could have various functions in traffic context.

1.1 Human Factors in Driving: Driver Behaviors and Driver Skills

Human factors in driving are composed of two main components: driver behaviors and driver skills (Elander et al., 1993). Driver behavior or style refers to how a driver chooses to drive. It means a “typical behavior” of a driver, what a driver “does” in a real-life traffic environment. Speeding, overtaking, yielding choices, rule violations, and gap acceptance are examples of driver behaviors (Elander et al., 1993). The driver’s level of risk-taking mainly defines driver behavior, thus the accident risk of a driver. A driver's style becomes habitual and modifiable over time (Lajunen & Özkan, 2021). On the other hand, driver skills or performance refers to what a driver “can” do. Driver skills are related to the capability of a driver (Oppenheim & Shinar, 2011). For example, perceptual-motor skills, hazard perception, and safety skills are driver skills (Lajunen & Summala, 1995), which may be improved through training and practice, in other words, with driving experience (Elander et al., 1993).

There are studies showing that driver behaviors and driver skills are related to accidents. Also, they relate to each other in their effect on predicting road safety outcomes,

suggesting that these human factor components carry critical importance for traffic safety research. For example, Lajunen and Özkan (2021) proposed in a model that low driver skills and risky driving style were related to risky driver behaviors, which in turn related to higher accident risk. Like other models (e.g., Lajunen, 1997; Sümer, 2003), this model suggested a proximal relationship between driver behaviors and accident involvement, making driver behaviors a critical variable to investigate concerning road safety. Given their importance, several studies focused on driver behaviors, driver skills, or both in an attempt to improve road safety from a human factor perspective. In the current study, driver behaviors have been the main focus of the research.

1.1.1 Driver Behaviors: Basic Differentiations of Errors, Violations, and Positive Driver Behaviors

Studies showed that risky driver behaviors are important contributor to accident involvement, prospectively and retrospectively (De Winter & Dodou, 2010; Yılmaz et al., 2022). This fact makes it necessary to identify the different types of risky driver behaviors and factors contributing to the engaging different types of risky driver behaviors to prevent undesired consequences.

In defining and differentiating different types of errors, Reason emphasized that intention is an important characteristic (Reason, 1990). In the suggested taxonomy for distinguishing different types of human error, Reason mentioned several marker questions like “Was there a prior intention to act?”, “Did the action proceed as planned?”, and “Did the actions achieve their desired end?”. Answers given to these questions made it possible to identify the different types of risky behavior and classify these risky behaviors based on their intentionality characteristic (Reason, 1990). Accordingly, driver behaviors are classified under two main categories: errors and violations by Reason and colleagues (1990). Errors refer to the “failure of planned actions to achieve their intended consequence,” whereas violations are “deliberate deviations” of safe practices (Reason et al., 1990). In a traffic context, for example, “not noticing pedestrians crossing the street when turning from the main road to a street” could be considered an error, while “crossing an intersection with traffic lights turning red in your direction” is a rule violation.

In the literature, driver behaviors were studied via different methods (e.g., self-reports, observations, simulators) and in connection to different factors contributing to these behaviors. Among these methods, self-reports are popular and low-cost measures that enable a great volume of driver behavior information (Yılmaz et al., 2022). Used and validated in several countries, the Driver Behavior Questionnaire (DBQ; Reason et al., 1990), which is developed based on the error-violation differentiation that is explained in the human error taxonomy of Reason, is a famous self-report measure for risky driver behaviors. Utilizing the DBQ, various factors were identified as contributing to risky driver behaviors. In general, driving experience, lifestyle, personality, attitudes, norms, and beliefs are commonly studied factors that showed significant associations with driver behaviors (Lajunen & Özkan, 2021).

However, it is also known that everyday performance includes not only erroneous behaviors but also positive behaviors that together provide behavioral diversity and variability for the system (Hollnagel, n.d.; Özkan & Lajunen, 2005). Özkan and Lajunen (2005) proposed that positive driver behaviors in traffic are characterized by taking care of the traffic environment. They suggested that positive driver behaviors are performed to create positive consequences in traffic (Özkan & Lajunen, 2005). To measure the frequency of positive behaviors engaged in a traffic environment, researchers suggested different measurements (Harris et al., 2014; Nandavar et al., 2019; Özkan & Lajunen, 2005) which were discussed in detail in the following sections. Accordingly, some studies showed that positive driver behaviors are associated with fewer traffic fines and accident involvement (Harris et al., 2014; Matović et al., 2020), while other studies revealed no association between them (Chu et al., 2019; Guého et al., 2014; Maslač et al., 2018).

These empirical studies pointed out that studying driver behaviors is crucial since understanding the underlying mechanisms that motivate these behaviors helps to develop effective road safety interventions. Therefore, in-depth efforts focusing on examining driver behaviors would provide valuable insight for better road safety outcomes. Though that is the case, little attention has been given to understanding and empirically studying the positive driver behaviors in the literature (Dewhurst et al., 2023; Harris et al., 2014;

Kaye et al., 2022; Nandavar et al., 2019; Özkan & Lajunen, 2005). Before delving into the details of positive driver behaviors, two relevant perspectives were discussed about driver behaviors.

1.1.1.1 Driver Behaviors: Planned and Spontaneous Behaviors.

Intention to perform the action plays a critical role in categorizing risky driver behaviors (Reason, 1990; Reason et al., 1990). In the literature, different types of behaviors (i.e., errors, violations, and positive driver behaviors) are conceptualized based on the human error taxonomy of Reason (1990). All of these behaviors are classified under intentional behaviors, each follows the path of having a *prior intention* to perform the action in the taxonomy, regardless of whether the action achieved its intended consequences or not. Similarly, positive driver behaviors suggested by Özkan (2006) are also positioned at the end of the intentional path in line with Reason's taxonomy.

However, there is also spontaneous or subsidiary action in Reason's human error taxonomy (1990) which has an intentional component, characterized by *no prior intention* but *intention in action*. In the literature, spontaneous or subsidiary actions have not been considered in the scope of driver behaviors, let alone have not been conceptualized and studied with road safety. Spontaneous or subsidiary actions are also intentional behaviors but without prior intentions. Indeed, Searle (1980) defined spontaneous actions as sudden occurrences of events without consciously or unconsciously forming any prior intention. More precisely, Searle (1980) differentiates prior intention from intention in action. For example, a driver sees from a kilometer away that a traffic light is turning red, so the driver decides to take their foot off the accelerator pedal and step on the brakes as they get closer to the lights while driving. In this example, the driver intended to slow down before arriving at the lights and performed the action of braking intentionally. So, there is both a priorly formed intention and an intention while acting.

On the other hand, the driver may suddenly brake to avoid hitting a child instantaneously running to the road while driving. In this example, the driver performed the action of braking with intention, but the driver did not first form the intention of pressing the brake

pedal. The driver hit the brake pedal right away at the sight of the child. So, there is an intention in action but there was no prior intention formed before the action was performed. As Searle said (1980) the action was performed in the “spur of the moment”. Searle also explained the difference between the two linguistically that prior intention is like “I will/am going to do that” while intention in action is like “I am doing that” (1980). As a result, “all intentional actions have intentions in action but not all intentional actions have prior intentions (Searle, 1980, p.52).” Similarly, Reason mentioned that routine activities require fewer control statements, that is performed more automatically, while novel activities require more conscious attention (1990).

As a result, one can mention different levels of intentionality in performing specific actions in a given context, ranging from planned actions to spontaneous actions. In addition to driver behaviors being planned with prior intention, the current study suggests for the first time in the literature that driver behaviors also include no prior intention but intention in action. In other words, one can talk about spontaneous driver behaviors as well. Although this perspective corresponds to all types of driver behaviors including risky driver behaviors, in the current study positive driver behaviors have been the main focus. In line with this perspective, the concept of spontaneous positive driver behaviors in the road safety context is defined as “*anticipating risks and performing compensatory or preventive actions to avoid accidents or incidents in a fast-changing and dynamic traffic environment*”, that is in line with the proactive nature of positive driver behaviors.

It should also be noted that the timing of the behavior plays a critical role in differentiating behaviors as planned and spontaneous. Michon (1985) divides the road user task into three main categories: strategic level, maneuvering/tactical level, and control/operational level. Accordingly, the strategic level refers to the planning stage for the trip, such as the route choice, transport mode choice, and comfort-related considerations. The maneuvering level also called the tactical level, is characterized by controlled actions that serve the purpose of the trip, such as turning, overtaking, and gap acceptance. Lastly, the control level in Michon’s hierarchy, also called the operational level, means the vehicle's motor control in a very short time, where the actions are automatic, such as steering, braking, etc. (Michon,

1985). Time-wise, the strategic level requires a longer time than the control to perform a task, which is almost instantaneous; that is, actions at this level happen within milliseconds. In between these two levels, the maneuvering level requires seconds to act. Accordingly, the strategic and operational levels in Michon's hierarchy coincide with planned (includes prior intention) and spontaneous (includes no prior intention) behaviors, respectively. In addition to discussing the varying levels of intentionality (i.e., with or without prior intention) in performing positive driver behaviors, the proactive nature of these behaviors is also worth discussing. Hollnagel (n.d.) pointed out that improving safety is not only about focusing on the rare events where things go wrong, resulting in unacceptable consequences; it is also about the most occurring events where things go right, resulting in acceptable consequences. In this view, failures and successes are seen as sources of daily performance variability. From the human factor perspective, while failures in the traffic system can be equivalent to risky driver behaviors that correlate positively with RTAs, successes can be equivalent to positive driver behaviors associated with a developed traffic culture. Hence, the system incorporates this variability and increases its resilience.

1.1.1.2 Driver Behaviors from Safety-I and Safety-II Perspectives.

Hollnagel, (n.d.) mentioned two views of safety which are Safety-I and Safety-II. Safety-I focuses on what goes wrong and why ('find and fix'); thus, it is a *reactive approach*. Alternatively, Safety-II focuses on what goes right or why nothing went wrong; thus, it is a *proactive approach*. In the former view, human is approached as error-prone, thus a potential hazard to the system, whereas in the latter view, human provides the system with flexible solutions and resilience. Thus, human adaptability in the face of varying conditions becomes a valuable resource. This perspective corresponds to Reason (2000, p.770), who asserted that "human variability in the shape of compensations and adaptations to changing events represents one of the system's most important safeguards." Therefore, it can be concluded that focusing on the reasons for failure and learning from how things usually go right is essential for safe systems. Parallel to this view, it can be claimed that road safety research from a human behavior perspective is heavily based on

the Safety-I approach -find and fix the problem- (see De Winter & Dodou, 2010), and only a few studies mentioned what goes right in the system (Harris et al., 2014; Nandavar et al., 2019; Özkan & Lajunen, 2005). It is an undeniable fact that reducing risky driver behaviors is related to an increase in traffic safety. In addition to that, increasing the functioning parts of the system may also improve traffic safety from the perspective of Safety-II. Positive behaviors might be evaluated as functional traffic behaviors considering their relation to lower incident probability (Harris et al., 2014; Matović et al., 2020). Since risky and positive behaviors co-occur in the traffic environment, exploring how positive driver behaviors relate to and contribute to traffic outcomes from a proactive standpoint deserves more attention from scholars.

1.2 Focusing on Positive Driver Behaviors: Conceptualization and the Empirical Findings in the Literature

In this section, the current understanding of positive driver behaviors in the literature was compiled and critically evaluated from conceptual and empirical standpoints. First, the historical background in the development of positive driver behaviors is explained via different conceptualizations of the constructs. The scope of the construct is discussed. Then, the empirical findings regarding the antecedents and consequences of the construct are presented and critically evaluated to understand the further research gaps.

1.2.1 Conceptualization of the Positive Driver Behavior Construct in the Literature

Regarding road safety studies, a few researchers tried defining and measuring positive driver behaviors in the driving context. These researchers, historically, referred to the positive driver behaviors construct as patient and careful driving style (Taubman-Ben-Ari et al., 2004), positive driver behaviors (Özkan, 2006; Özkan & Lajunen, 2005), prosocial driving behavior (Harris et al., 2014), altruistic driving behaviors (Nandavar et al., 2019), and safe driving behaviors (Armitage et al., 2022). Across these studies, there are nuances in the conceptualizations of positive driver behaviors.

In earlier literature, French and colleagues (1993) developed a Driving Style Questionnaire and discussed different types of driving styles, two of which relate to

positive intentions: remaining calm (a factor called *calmness*) and driving cautiously (a factor called *focus*). Likewise, Harré suggested two desirable characteristics of adolescent driver behaviors (Harré, 2000). The first one is *habitual and cautious driving*, which is expected to be performed when both objective and perceived crash risks are low. The second one is *active risk avoidance*, which is anticipated when the perceived crash risk is high even though the objective crash risk is low. These studies may be considered the first ones that signal positive driver behaviors as a distinct driving style.

Later, Taubman-Ben-Ari and colleagues reviewed the literature on driver style inventories and classified driver behaviors under four main domains, one of which is overtly referred to as *patient and careful driving style* (Taubman-Ben-Ari et al., 2004). While the other three domains were related to risky driving styles (e.g., reckless and careless, anxious, angry and hostile), patient and careful style was defined in terms of “planning ahead; attention, patience, politeness, and calmness while driving; and keeping the traffic rules (p. 324).” They developed the Multidimensional Driving Style Inventory (MDSI) which resulted in eight separate driving style dimensions, two of which are named patient driving style (e.g., waiting patiently for the cross-traffic to clear at an intersection requiring me to yield) and careful driving style (e.g., tend to drive cautiously). However, the MDSI has been criticized for not being strictly a behavioral instrument but instead including feelings, cognitions, and coping strategies (Harris et al., 2014; Özkan & Lajunen, 2005).

After that Özkan & Lajunen (2005) explicitly differentiated the driver behaviors as risk and positive driver behaviors. They referred to the construct as *positive driver behaviors* and defined it as “taking care of traffic environment/smooth traffic flow, paying attention to other road users,” “politeness,” and “good manners of driving.” They proposed that these behaviors are “secondary behaviors” and “unofficial behavioral codes” that are performed in less demanding driving situations, developed in a given traffic system, and, thus, adopted through exposure to that system. Özkan & Lajunen (2005) developed the Positive Driver Behavior Scale (PDBS; see Appendix J) to measure the frequency of these behaviors performed while driving. Example items from the scale are “Avoid using the left lane to facilitate the speed of traffic flow,” “Less frequently use long lights to help the

oncoming driver,” “Let pedestrians cross even it is my right to pass,” and “Pay attention to puddle not to splash water on pedestrians or other road users.” Thus, Özkan & Lajunen (2005) set some important cornerstones for conceptualizing positive driver behaviors, such as positive driver behaviors being secondary and unofficial behavior that encompasses smooth traffic flow, consideration for others, politeness, and kindness.

Later, Harris and colleagues (2014) developed an inventory focusing on unsafe and safe driver behaviors, named The Prosocial and Aggressive Driving Inventory (PADI), measuring prosocial and aggressive driving behaviors (see Appendix K). They referred to the construct in question as *prosocial driver behaviors*, which are defined as “a pattern of safe driving behaviors that potentially protect the well-being of passengers, other drivers, and pedestrians, and that promotes effective cooperation with others in the driving environment (Harris et al., 2014, p. 2).” This definition focuses on the well-being of different road users and mainly the cooperation between road users. The example items for prosocial driver behaviors in PADI, later referred to as PADI-Prosocial, are “Drive with extra care around pedestrians,” “Pay special attention when approaching intersections,” and “Break slowly enough to alert drivers behind me.”

Lastly, Nandavar and colleagues (2019) defined the construct as altruistic driving behaviors. They pointed out a motivational difference between prosocial and altruistic behaviors. Accordingly, prosocial and helping behaviors usually anticipate an explicit reward, while altruistic behaviors do not. Nevertheless, they discussed the hardship of identifying an underlying reward motivation in performing a specific behavior as there may be underlying implicit reward motivation. Thus, they defined the concept as “the performance of good driving behaviors carried out to benefit another driver and with or without expecting anything in return.” (Nandavar et al., 2019, p.216). They did not develop a measurement tool but measured drivers’ engagement with two specific altruistic driving behaviors: letting another driver have a car space and giving way to another driver to enter your lane.

1.2.2 Evaluation of the Scope of the Construct

Although each terminology and conceptualization used in the literature are interrelated, they are also distinct, with varying focuses in each study. This fact points out a lack of consensus on conceptualizing the positive driver behavior construct and the diversity of the construct's scope.

Previous studies showed nuances in the conceptualizations of positive driver behaviors. For example, the definition of Nandavar and colleagues (2019) focuses on selfless and altruistic actions, not safety and rule-following behaviors. In contrast, Harris and colleagues (2014) do include safety and rule-following behaviors but do not include any emotional (e.g., concern, empathy) or motivational aspects (e.g., self-interest, altruism), while Özkan & Lajunen (2005) mainly focus on helping and politeness/kindness-related behaviors.

Parallel to the difference in the conceptualization, contextual differences were noticed among the positive driver behavior measures (PDBS and PADI-Prosocial). When the items in these measures were paid attention to, it was possible to observe distinct themes connected to positive driver behaviors. Although PSDA and PASE-Prosocial measure positive driver behaviors as a single factor, these measurement tools actually point to two underlying factors. These are safety-related positive driver behaviors and politeness/kindness-related positive driver behaviors.

The safety-related positive driver behaviors seem primarily about anticipating potential risks, i.e., latent risks hidden in the traffic environment, and taking necessary precautions to prevent other drivers from these potentially risky situations. The example items are “Less frequently use long lights to help the oncoming driver,” “Break slowly enough to alert drivers behind me,” “Pay special attention when making turns, approaching intersections,” and “Arrange my speed to help the driver trying to overtake,” and “Drive with extra care around pedestrians, cyclists.” (Harris et al., 2014; Özkan & Lajunen, 2005).

On the other hand, politeness/kindness-related positive driver behaviors, are related to more naive behaviors. This type of behavior might be divided into three further components: being kind to other road users, being considerate about other's presence in traffic, and being considerate about the environment. Examples of being kind to other road users are "Thank the driver helping me by waving my hand," "Parking car by taking into other road users' free movement," and for being considerate about other's presence in traffic are "Let pedestrians cross even it is my right to pass," "Give my right of way to other drivers," "Pay attention to puddle not to splash water on pedestrians or other road users." Lastly, two items were noted that are related to being considerate about the environment, which are "No sounding horn to disturb the driver in front waiting even after green light" and "No sounding horn to avoid noise" (Harris et al., 2014; Özkan & Lajunen, 2005). When the items presented above and their corresponding scales were considered, PADI-Prosocal seems to involve behavioral items focusing on safety more than the PDBS, which heavily includes politeness/kindness-related behaviors (see items in Appendix J, K).

Given that driver behavior is influenced by the interaction between humans, vehicles, and the environment, it is surprising that only a few items examined the interaction between humans and the environment. Positive driver behavior items in these scales primarily focused on the interaction between road users, which is expected due to the social nature of the behavior (e.g., showing kindness or yielding to accelerate the traffic flow). However, the interaction between road users and the environment and climate was mainly ignored in the scope of the positive driver behaviors construct in previous studies (Harris et al., 2014; Nandavar et al., 2019; Özkan & Lajunen, 2005). One item noted that relates to noise pollution by avoid sounding horns (see Özkan & Lajunen, 2005).

In recent years, environment and climate-related topics have been studied as part of sustainable transportation research. In addition to efforts in sustainable land use (Wei & Lovegrove, 2012), smart city solutions as a tool for sustainable mobility (Zawieska & Pieriegud, 2018), policies targeting behavior change are also proposed. For example, shifting mobility from motorized vehicles to non-motorized vehicles, encouraging the use

of zero-emission transport modes such as walking and cycling or e-vehicles, on-demand shared vehicle use, encouraging the use of public transport instead of private car use (Holden et al., 2020; Santos, 2018; Wei & Lovegrove, 2012). It may be reasonable to assume that all these efforts in sustainable mobility may also have a correspondence at the individual level, i.e., in driver behaviors. For example, adopting an eco-friendly driving style, such as accelerating and decelerating smoothly, anticipating the traffic flow to avoid sudden maneuvers, and maintaining a steady driving pace (Barkenbus, 2010; Dogan et al., 2011) and related behaviors could be evaluated as part of sustainable and positive driver behaviors. These behaviors result in fuel-saving and preventing the possibility of accidents originating from sudden maneuvers; thus, they relate to positive behaviors.

Altogether, many aspects relating to positive driver behaviors have been revealed, categorizing positive driver behaviors into different subdimensions. These categories include safety, kindness, being considerate, and environment-conscious aspects of the construct. These various aspects show that the positive driver behavior construct might be an umbrella term that covers potentially distinct yet conceptually relevant dimensions.

1.2.3 Antecedents and Outcomes of Positive Driver Behaviors

The empirical associations that positive driver behaviors established with other variables have been investigated in a number of studies in the literature. Of these studies, the driver behaviors of private vehicle drivers were primarily targeted (e.g., (Nandavar et al., 2019; Shen, Ge, et al., 2018; Üzümcüoğlu et al., 2019). On the other hand, fewer studies examined positive driver behaviors of professional drivers (Öz, 2011; Öz et al., 2013, 2014), urban bus drivers (Han & Zhao, 2020), and taxi drivers (Mahembe & Samuel, 2016).

Compared to the studies focusing on the antecedents of positive driver behaviors, studies focusing on the consequences were relatively less. In a few studies, positive driver behaviors were studied as a dependent variable, and its predictors (e.g., demographics, personality, culture) were explored. In even fewer studies, positive driver behaviors were studied as an independent variable to predict safety outcomes (e.g., accident involvement

and traffic tickets). This section first presented the relationship between different predictor variables and positive driver behaviors, then the relationship between positive driver behaviors and road safety outcomes.

1.2.3.1 Antecedents of Positive Driver Behaviors.

A relatively higher number of studies were found regarding the predictor of positive driver behaviors as compared to the outcomes. For instance, demographic variables (*gender, age, experience, mileage*) predicted positive driver behaviors in several studies. In general, positive driver behaviors were more likely to be engaged by female drivers (Harris et al., 2014; Matović et al., 2020; Shen, Qu, et al., 2018) and older drivers (Bıçaksız & Özkan, 2016; Ersan et al., 2019; Guého et al., 2014; Harris et al., 2014; Maslać et al., 2018; Matović et al., 2020). Also, being an experienced driver (Maslać et al., 2018) and having higher travel frequency (Ersan et al., 2019) were related to higher levels of more positive driver behaviors. In contrast, increased annual mileage (Maslać et al., 2018; Matović et al., 2020) predicted less positive driver behaviors. It is suggested that drivers with higher mileage are more likely to be exposed to anger-provoking situations in traffic (Matović et al., 2020) and engaged in risky driver behaviors (Maslać et al., 2018), leading to more aggressive and risky behaviors as opposed to positive ones.

In addition to demographic variables, positive driver behaviors were studied with *personality* characteristics. The results of these studies showed that positive driver behaviors were positively predicted by *agreeableness* (Ge et al., 2020; Harris et al., 2014; Shen, Qu et al., 2018), *extraversion* (Shen, Qu et al., 2018), *conscientiousness* (Harris et al., 2014), *openness* (Ge et al., 2020; Harris et al., 2014; Wang et al., 2018), *neuroticism* (Ge et al., 2020; Harris et al., 2014), and *altruism* (Shen, Ge et al., 2018) whereas negatively predicted by *boredom susceptibility* (Harris et al., 2014), *hostility* (Harris et al., 2014), and *sensation-seeking* (Shen, Ge, et al., 2018).

Apart from demographics and personality traits, *driver impulsivity* (Bıçaksız & Özkan, 2016) and *traffic climate* (Öztürk et al., 2022; Üzümcüoğlu et al., 2020) showed significant associations with positive driver behaviors. Among these variables, traffic

climate is particularly relevant to the current study, considering positive driver behaviors are unofficial behavioral codes that are developed in a given region (Özkan & Lajunen, 2005). Therefore, how the traffic is perceived in a given region correlates with positive driver behaviors. Specifically, Üzümcüoğlu and colleagues (2019) found that drivers perceiving the traffic as requiring higher skills (i.e., internal requirement) reported higher engagement with positive driver behaviors, whereas drivers perceiving traffic as emotionally demanding (i.e., external affective demand) reported lower levels of positive driver behaviors. Similarly, Ersan and colleagues (2020) compared different countries on the items of positive driver behaviors and showed differences among countries in the engagement on specific behavioral examples (e.g., Russians scored lower on items involving concerns for other road users). This finding also supports the assumption that the manifestations of positive driver behaviors differ from culture to culture.

For the theoretical association of positive driver behaviors, only a few studies examined positive driver behaviors in a theoretical model. For instance, Nandavar and colleagues (2019) utilized Ajzen's Theory of Planned Behavior and showed that only intention positively predicted the actual performance of positive driver behaviors (measured via different driving scenarios). In a similar vein, Armitage and colleagues (2022) applied an extended theory of planned behavior to explore safe driving behaviors (utilizing the same scenarios as in Nandavar et al., 2019). They displayed that self-reported positive/safe driver behaviors were predicted by intention. These findings prove positive driver behaviors are intentional; still, the proposed perspective on the level of intention ranging from no prior intention to full prior intention maintains its validity. Moreover, Armitage and colleagues found that perceived behavioral control and subjective norms predicted intention to engage in positive driver behaviors (Armitage et al., 2022). In other words, drivers who perceive they have control over performing safe driver behaviors and would be approved by their loved ones for their safe driver behaviors were inclined to drive safely. On the other hand, Wickens and colleagues (2011) tested Weiner's attributional theory of social conduct and revealed that sympathy as an emotional response positively predicted positive driver behaviors. Further theoretical model testing is required for further conclusions.

1.2.3.2 Positive Driver Behaviors and Road Safety Outcomes.

The literature presented inconsistent findings regarding the relationship between positive driver behaviors and road safety outcomes. For example, some studies revealed that drivers engaging in positive driver behaviors were less likely to get *traffic tickets* and be involved in *road traffic accidents* (Harris et al., 2014; Matović et al., 2020). A study comparing drivers with high and low levels of positive behaviors revealed that drivers with a higher level of positive behaviors were less likely to be involved in accidents than drivers with a lower level of positive behaviors (Shirmohammadi et al., 2019). Han & Zhao, (2020) showed that positive driver behaviors decrease the probability of accident involvement by 53% in a sample of urban professional drivers. In one study, after controlling for personality and driving styles, positive driver behaviors negatively predicted traffic fines but not *penalty points* (Wang et al., 2018), while in another study (Shen, Ge, et al., 2018), positive driver behaviors did not predict penalty points and traffic fines after controlling for demographics and personality. Moreover, some studies revealed that positive driver behaviors are not associated with accident involvement (Chu et al., 2019; Guého et al., 2014; Maslač et al., 2018).

Moreover, one study investigating positive driver behaviors with *driver aggression* (Özkan & Lajunen, 2005) showed that positive driver behaviors negatively predicted hostile aggression and revenge for self and other drivers. It means that drivers who reported performing more positive driver behaviors exhibited and were exposed to hostile aggression and revenge less likely. In this study, positive driver behaviors negatively predicted driver aggression, suggesting that positive driver behaviors might buffer the negative consequences of driving anger (Özkan & Lajunen, 2005). In another study, the effect of courteous (e.g., smiling, thanking, apologizing for the inconvenience) and discourteous (e.g., shouting, angry expressions, abusive language and gestures) interaction in traffic on *driver's stress* levels was studied. Results showed that discourteous interactions with other road users increased the driver's blood pressure, heart rate, and stress, whereas courteous interactions with other road users neutralized these adverse effects (Jones et al., 2021).

1.2.4 Evaluation of the Empirical Findings on Positive Driver Behaviors

In light of the literature on positive driver behaviors, it is observed that the relationship between positive driver behaviors and road safety outcomes provided more inconsistent results than the relationship between positive driver behaviors and its predictors. Concerning predictors of the construct, it is safe to conclude that positively-natured variables are positively associated with positive driver behaviors and vice versa. For instance, agreeableness, extraversion, conscientiousness, openness, altruism, and careful driving style positively predicted positive driver behaviors. On the other hand, boredom susceptibility, hostility, and sensation-seeking negatively predicted positive driver behaviors.

Furthermore, inconsistent results were presented in the relationship between positive driver behaviors and outcome variables. One of the explanations for this result could be using different scales to measure positive driver behaviors. It is observed that studies prosocial driver behaviors subscale of the PADI (Harris et al., 2014) found a significant relationship with safety outcomes, whereas studies using Positive Driver Behaviors Scale (Özkan & Lajunen, 2005) did not. When the items in these scales were examined individually, it was realized that PADI-Prosocal items heavily focus on safety-related positive behaviors. In contrast, items in PDBS mainly center around politeness/kindness-related positive behaviors, which have been explained in the following section in detail. Hence, this observation explains the findings showing that safety-related positive behaviors are associated with safety outcomes, whereas politeness/kindness-related positive behaviors are not.

To conclude, the literature suggests that positive driver behavior does not contribute to or positively contribute to traffic safety. However, considering a limited number of studies, more research on the association between positive behaviors and safety outcomes is needed to make firmer conclusions. Still, it is safe to conclude that no finding is available suggesting the negative influence of positive behaviors on traffic safety. Moreover, the differing focus on the two measures of positive driver behaviors (safety vs. politeness)

point out the multidimensional nature of the construct, which requires further investigation.

1.3 Critical Value of Studying Positive Driver Behaviors and the Aim of the Study

In general, studies focusing on positive driver behaviors are scarce in the literature as compared to studies focusing on risky driver behaviors (Dewhurst et al., 2023; Harris et al., 2014; Kaye et al., 2022; Nandavar et al., 2019; Özkan & Lajunen, 2005). Also, researchers investigated positive driver behaviors mainly as part of a more extensive research question that mainly focuses on risky driver (e.g., Bıçaksız & Özkan, 2016; Matović et al., 2020; Üzümcüoğlu et al., 2020) rather than on its own. In different studies, positive driver behaviors have been differently conceptualized and measured (Harris et al., 2014; Nandavar et al., 2019; Özkan & Lajunen, 2005; Taubman-Ben-Ari et al., 2004). Although there are pieces of evidence in the literature suggesting that positive driver behaviors may be more diverse than currently known, including not only kindness and helping others but also safety and environment-conscious tendencies, little attention has been given to the conceptual breadth and depth of the construct in previous studies. Also, there has been a lack of research investigating the function of positive driver behaviors in road safety outcomes, resulting in inconsistent findings. All these findings draw attention to the lack of conceptual and empirical investigation that centers on positive driver behaviors as the primary research question of the study.

Exploring the conceptual depths of positive driver behaviors and investigating their possible correlates could advance our understanding of driver behaviors empirically and theoretically. In the current study, the emphasis on positive driver behaviors is an attempt to adopt a proactive approach (e.g., Safety-II approach). In other words, it aims to explore the positive driver behaviors (i.e., things go right in everyday traffic) in relation to its road safety connection to enable further empirical research, which eventually leads to developing timely interventions that prevent incidents from happening. Thus, it is anticipated that research on positive driver behaviors enables proactive interventions, which is in line with the safe system approach. Secondly, given that positive driver behaviors develop in a given traffic culture/climate, they are also likely to influence a

given traffic culture/climate. Understanding how positive driver behavior manifests itself in a given culture and exploring its association with critical driving and safety related variables would bring a fresh and supporting perspective to the current understanding of road safety management and applications (e.g., policy development), which currently focus on risk factors. Lastly, considering risky and positive driver behaviors co-occur in daily traffic, an in-depth investigation of positive driver behaviors also contributes to the ecological validity of driver behavior studies. As a result, the current thesis develops around the concept of positive driver behavior and understanding its significance to road safety research.

In light of the existing literature on positive driver behaviors, which reveals inconsistencies in its conceptualization and established empirical relationships, a dedicated study focusing solely on positive driver behaviors is deemed necessary. The current thesis study has many aims to gain a deeper comprehension of positive driver behaviors. These are

In Study 1

- i. to explore the multidimensional nature of positive driver behaviors and develop a new questionnaire that brings together the various aspects of positive driver behaviors

In the Main Study

- ii. to identify the newly developed questionnaire's factor structure and investigate its psychometric properties
- iii. to investigate the new questionnaire's relationship with critical demographics (e.g., gender, age, experience) and driving-related variables (i.e., driver skills, driving anger expression, and personality)

- iv. to compare different demographic groups (e.g., gender, age, experience) and safety outcome groups (i.e., accident, near-miss, traffic ticket) on the new questionnaire
- v. to examine the relationship between the new questionnaire and driving outcomes (i.e., risky driver behaviors, driving anger expression) as well as safety outcomes (i.e., near-miss, traffic tickets)
- vi. to make a comprehensive conceptualization of positive driver behaviors



CHAPTER 2

2 STUDY 1: DEVELOPMENT OF THE MULTIDIMENSIONAL POSITIVE DRIVER BEHAVIOR QUESTIONNAIRE (M-PDBQ)

2.1 Introduction

In the literature, positive driver behaviors were conceptualized in a limited number of studies and regarded as a single-component construct in the measurements (Harris et al., 2014; Özkan & Lajunen, 2005). These conceptualizations of the construct differ from each other in several ways, resulting in several definitions. Accordingly, positive driver behaviors were defined as selfless and altruistic actions (Nandavar et al., 2019), safe driving behaviors, considering the wellbeing of others, rule-following behaviors (Harris et al., 2014), helping and politeness/kindness-related behaviors (Özkan & Lajunen, 2005). All these different conceptualizations signaled a lack of consensus on the scope of positive driver behaviors construct.

Furthermore, empirical studies mainly utilized two existing measures: Positive Driver Behavior Scale (Özkan & Lajunen, 2005) and the prosocial subscale of the Prosocial and Aggressive Driving Inventory (Harris et al., 2014). Studies using these scales revealed mixed results concerning the association between positive driver behaviors and safety outcomes. For example, some studies presented a negative association between positive driver behaviors and traffic accidents (Han & Zhao, 2020; Harris et al., 2014; Matović et al., 2020), whereas others displayed no relationship between positive driver behaviors and accident involvement (Chu et al., 2019; Guého et al., 2014; Maslač et al., 2018). Due to these inconsistent results, the safety-critical value of positive driver behaviors remained unclear.

To explain the inconsistent results across studies, the items in the existing positive driver behavior scales (PDBS, PADI-Prosocal) were examined. Although positive driver behaviors emerged as a single-factor construct in both measures, interrelated yet distinct groups of items were observed as a result of qualitative investigation of items. Accordingly, it was noticed that the positive driver behaviors have sub-dimensions that include but are not limited to safety, kindness, being considerate of other's needs, and environment-conscious aspects, which signaled the multidimensional nature of the construct.

In addition to these thematic sub-dimensions, the concept of positive driver behaviors has been classified in the category of intentional driver behaviors in previous studies (Özkan & Lajunen, 2005), in parallel with the theoretical classification based on Reason's human error taxonomy. However, in this taxonomy (Reason, 1990), there are also spontaneous behaviors that are performed with no prior intention but intention exists in performing the action, which has been untouched by the researchers in driver behavior studies. Given that traffic is a dynamic and fast-changing environment, performing positive behaviors, such as yielding to another driver, can sometimes be more spontaneous than planned. For example, if a vehicle suddenly cuts in front of a driver, the driver has to slow down to provide enough space for other vehicles or change lanes to prevent a possible accident with the vehicle. In either case, actively following the traffic environment (i.e., situational awareness), anticipating possible risks, and taking precautions to avoid incidents are vital in traffic. In another scenario, the driver in the example could exhibit stubborn and aggressive behavior toward the driver in the other vehicle, resulting in unwanted consequences in traffic. From a positive driver behavior perspective, yielding to another driver when it is safe to brake or change lanes would be considered spontaneous and positive behavior. Therefore, spontaneous driver behaviors are also explored in the first study.

In light of the literature on positive driver behaviors, the aim of Study 1 is to explore different aspects of positive driver behaviors construct, and develop a new questionnaire that brings together the various aspects of positive driver behaviors.

2.2 Method

2.2.1 Participants

Eight male and eight female drivers participated in interviews whose ages ranged between 28 and 70 years, averaging approximately 37 (see Table 1 for participant characteristics). The participants have held a driver's license for about 13 years now and driving actively for the last 10 years. Most of the participants drove almost every day of the week. They drove an average of 30563 km last year and 211563 km during their lives. Most participants drive a vehicle with an automatic transmission and reported using gasoline, followed by diesel fuel. Also, one participant using a hybrid car fueled by electricity and gasoline was involved in the interviews.

Thirteen participants were from metropolitan cities in Türkiye, Ankara, İstanbul, İzmir, Bursa, Mersin, and Tekirdağ. The remaining three participants were from smaller cities, Yozgat, Bartın, and Bolu. The interviews were conducted in one month, throughout December 2022, and lasted an average of one hour and sixteen minutes.

2.2.2 Procedure

After obtaining ethical permission from the Middle East Technical University Ethics Committee (see Appendix A for ethical approval for Study 1), semi-structured interviews were conducted with 16 drivers. There were predetermined inclusion criteria for interview participants. Accordingly, drivers who have driven at least 3000 km in the past year or 2-3 times a week and at least 10000 km since holding a driver's license were included in the interview phase. The reason for these inclusion criteria was to ensure drivers held enough experience to report a variety of positive driver behaviors.

Sixteen participants were scheduled for approximately one-hour-long online interviews that were conducted via Zoom. At the beginning of each interview, participants introduced the aim of the study and were given verbal consent for their voluntary participation (see Appendix B for informed consent). They were informed that voice recordings would be

Table 1*Characteristics of Interview Participants*

Participants	Age	Gender	License ownership (years)	Active driving (years)	Driving frequency	Last year's mileage (km)	Lifetime mileage (km)	Transmission type	Fuel type	Interview Duration (minutes)
P1	38	Female	20	15	3-4 days a week	5000	160000	Manual	Diesel	67
P2	34	Male	11	11	Almost every day	25000	200000	Automatic	Gasoline	75
P3	31	Female	6	5	Almost every day	5000	40000	Automatic	Gasoline	82
P4	31	Female	11	9	Almost every day	50000	120000	Automatic	Diesel	80
P5	28	Male	8	10	Almost every day	25000	400000	Automatic	Diesel	71
P6	70	Male	20	20	1-2 days a week	9000	250000	Manual	Gasoline	94
P7	33	Male	3	2	3-4 days a week	20000	30000	Automatic	Gasoline	88
P8	40	Male	16	16	3-4 days a week	10000	90000	Manual	Diesel	82
P9	32	Female	9	7	Almost every day	10000	80000	Automatic	Gasoline	91
P10	34	Male	15	13	3-4 days a week	18000	75000	Automatic	Gasoline	84
P11	38	Female	22	13	Almost every day	10000	400000	Manual	Diesel	67
P12	37	Male	12	4	Almost every day	30000	100000	Manual	Gasoline LPG	75
P13	32	Female	5	4	Almost every day	200000	900000	Automatic	Gasoline	61
P14	31	Female	10	6	Almost every day	35000	150000	Automatic	Diesel	67
P15	44	Female	23	19	Almost every day	15000	300000	Automatic	Gasoline	55
P16	52	Male	29	12	Almost every day	22000	90000	Automatic	Hybrid (Gasoline and electricity)	78
N = 16	M = 37.81 SD = 10.44	Female: 8 Ps Male: 8 Ps	M = 13.75 SD = 7.35	M = 10.38 SD = 5.48	Almost every day: 11 Ps 3-4 days in a week: 4 Ps 1-2 days in a week: 1 Ps	M = 30562.5 SD = 46757.49	M = 211562.5 SD = 217498.8	Automatic: 11 Ps Manual: 5 Ps	Gasoline: 9 Ps Diesel: 6 Ps Hybrid: 1 Ps	M = 76.06 SD = 10.91

obtained during interviews. They ensured the anonymity of their answers. Also, the participants were informed that 5 to 10-minute breaks are welcomed whenever necessary because of the lengthy interviews. After each interview was completed, participants were asked whether they would be driving in the next couple of days, and all the participants responded affirmatively. Thus, the participants are requested to observe positive driver behaviors during real-life driving and report via text messages or calls if they think of a new behavioral example to share. Two of the 16 interviewees returned with new positive driver behavior items afterward.

2.2.3 Instruments

The interview form consisted of demographic questions and questions related to positive driver behaviors (see Appendix C for interview questions). For demographics, the questions were as follows: age, gender, number of years holding a driver's license, number of years being an active driver, last year's mileage and lifetime mileage, the frequency of driving in a week, and transmission and fuel type of the vehicle. For the second part of the form, some questions aimed to capture different aspects of positive driver behaviors performed with various motivations. While composing the interview questions, Reason's taxonomy (Reason, 1990), the Safety-II perspective of Hollnagel (n.d.), and the conceptualizations of positive driver behaviors in the literature (Harris et al., 2014; Nandavar et al., 2019; Özkan & Lajunen, 2005) were taken into consideration. For example, participants were asked to report behavioral examples concerning the safe and smooth traffic flow, being cooperative and helpful in the traffic environment, environment-friendly driver behaviors, and precautionary and compensatory actions in traffic. Example interview questions were "Consider the reasons for the traffic jam in daily driving. Which behaviors in traffic are essential for smooth and safe traffic flow? Do you remember a specific incident in which people collaborated on working out a traffic jam?", "There are risky situations and behaviors in traffic, but accidents are rare events. What behaviors prevent us from being involved in accidents more often?" and "Which behaviors are considered polite in traffic?" Besides, participants were asked questions to explore the

spontaneous and planned nature of positive driver behaviors, such as “Are you forced to make sudden maneuvers in traffic?” (see Appendix C for the interview questions)

2.3 Result

To enable the content analysis for the interviews, each voice recording was transcribed verbatim. The transcriptions were performed separately by students who received monetary compensation for their efforts. Sixteen transcriptions were consecutively put together in a Word file, formatted in Times New Roman style, 12 puntos, and single line spacing, thus resulting in 218-page-long data, that was used for content analysis.

To enable differentiating behavioral examples of positive driver behaviors, first, an Excel file in the matrix format was created. In this matrix, behavioral examples were written under the first column, and participants were written side by side in the first row. Also, if provided, the information on which one of the 16 participants reported similar behavioral examples and details of behavior were noted to the cell at the intersection of the behavioral example row and participants column. Thus, the researcher knew which participant reported what kind of information. Later on, transcriptions were read question-wise, and reported behavioral examples were noted to the related cells using the matrix. Thanks to this matrix format, the frequency of each behavioral example (how many participants reported the given behavioral example) was calculated easily in a new column. Behaviors reported by eight or more people (out of 16 people) included in the item pool. Behaviors reported by less than eight people were also reviewed, and outstanding items are also included in the item pool (see Appendix D for the template used for analyzing interviews).

Moreover, when the items in the existing positive driver behavior scales (PDBS, PADI-Prosocial) were reviewed, it was realized that the existing scales and the newly developed questionnaire coincide. Therefore, no extra items were added from the existing scales to the new questionnaire. At this phase, the item pool consisted of approximately 170 items. The researcher read items repetitively so that similar items were grouped under a more comprehensive item. Also, the “positive” nature of the behaviors, whether they performed with extra consideration towards others in traffic and traffic system rather than a routine driving task, was evaluated for each item. Behaviors that are classified out of this scope

were also excluded from the item pool. As a result, the number of items was reduced to 123.

After that, each item was expressed as first-person pronouns and in the form of infinitives. In order to emphasize that the items represent a positive driver behavior construct, specific phrases highlighting “positive tendency” were added to the items, phrases such as “for a smooth traffic flow,” “to avoid accidents,” and so on. From a similar point of view, specific phrases that reflect the sudden occurrence of the behavior (e.g., suddenly) were added where necessary to distinguish the spontaneous nature of the behavior from the more intentional nature. Also, the terminological expressions in the items were added explanations in parentheses where necessary for clarity. For example, road user refers to pedestrians and drivers, and vulnerable road user refers to pedestrians, cyclists, children, etc.

Later, the 123 items were theoretically grouped based on the relevance of the items. Five dimensions were found relevant to the construct of positive driver behaviors. These dimensions were operationally defined, and together with the 123 randomized items, they are presented in the Qualtrics survey format to 3 academics who received their Master’s degrees in traffic and transportation psychology and are currently doing their PhDs in the same field (see Appendix E for expert evaluation form). Experts were asked to match items with the most relevant dimension. As a result of expert evaluations, experts assigned 91 items to the same dimension; thus, the interrater reliability turned out to be 74% ($IRR = 91/123$), which is a reasonable agreement rate. Following the expert evaluations, items that two or more experts classified into different factors were found, indicating an ambiguity in meaning. Some were reworded and included in the final list, while others were excluded.

Moreover, to shorten the list of items, items expressed in too general terms, items that have the potential to be perceived as anger-provoking or focused on skills rather than behaviors, and items that are performed at the strategic level of driving rather than maneuvering or control levels (Michon, 1985) were excluded from the final item pool.

Thus, the final item pool of the M-PDBQ included 79 items (see Appendix I for the 79-item questionnaire) being included in four theoretical dimensions.

2.4 Discussion

In Study 1, a questionnaire to capture the multidimensional nature of positive driver behaviors was developed. In line with that purpose, semi-structured interviews were conducted with 16 drivers, which were content analyzed to extract the behavioral examples. Accordingly, the final questionnaire included 79 example items of positive driver behaviors.

The 79 items of the new questionnaire were theoretically and thematically grouped under four dimensions: *proactive driver behaviors*, *environmentally sustainable behaviors*, *polite and patient behaviors*, and *smooth mobility*. Accordingly, proactive driver behaviors include cautionary behaviors (safety precautions), warning other road users of potentially dangerous situations, and compensating for others' faulty actions to avoid conflict. Environmentally sustainable behaviors refer to eco-friendly behaviors performed to make fuel economy, reduce air pollution, and ensure the long service life of the vehicle and its parts. Polite and patient behaviors were centered on politeness, patience, and being helpful toward other road users in traffic. Lastly, the smooth mobility dimension involves behaviors performed to prevent or relieve traffic congestion to support or facilitate the traffic flow.

Moreover, spontaneous driver behaviors with a positive nature were also explored in the analysis. Several items were noted in the final item pool, including spontaneous events in the dynamic traffic environment and swift positive actions taken in response to these behaviors. Item 21, "Slow down while taking into account the stopping distance of the vehicles behind me in an unexpected event, and item 49, "Instead of sudden braking in the event of a sudden hazard, steer towards the empty side of the road," are some of the example items that can be considered spontaneous, positive driver behaviors in Appendix I (also see items 19, 34, 72 in Appendix I).

As a result of the qualitative analysis in Study 1, the proposed theoretical factor structuring seems to provide a base for the multidimensional nature of the positive driver behaviors construct. Later on, this theoretical factor structure served as a guide during the factor analysis of 79 items in the main study, where a 3-factor structure was found to be the most suitable and retained (see details in the Main Study).

Study 1 is a qualitative study that provided a base for the M-PDBQ. This characteristic strengthens the basis of the questionnaire and makes the development process comprehensive. The gender of the interviewed drivers was balanced. Most of them were driving daily, so they were active drivers with an average of 10 years of active driving experience. The sample had a certain level of driving experience, which is a strength for providing a variety of behavioral examples. On the other hand, the interviews have taken 76 minutes on average, which could be evaluated as too long to maintain attention in a given task. Thanks to the flexibility of a semi-structured interview, the interviewee could have arranged the order of the questions when necessary to change the subject to attract attention or skip certain questions if they were already mentioned in the previous ones. Following the initial interview, the interviewer informed the oncoming participants about the option of taking a break from the interview whenever needed as part of a usual protocol. Also, the interviewer ensured the interviewee was in good physical and mental condition to continue the interview. Some participants responded positively to the break offers, and thus, during these interviews, the recording was paused with the break and then started simultaneously with the interview.

To summarize, a new questionnaire on positive driver behaviors with 79 items was developed, and its theoretical dimensions were determined in Study 1, suggesting the multidimensional nature of the M-PDBQ. Also, spontaneous driver behaviors are exemplified for the first time in the literature. The attempt to develop a multidimensional questionnaire is a valuable step in the reconceptualization of the construct in the literature. In addition to extending the scope of the positive driver behavior construct, the multidimensional nature of the M-PDBQ provides a venue for new research questions. The predictor and outcome relationships are open to empirical, theoretical,

methodological, and practical explorations and intervention development. Thanks to these efforts, positive driver behaviors are expected to contribute positively to reducing the involvement of road traffic incidents and advancing road safety. In the following section, the factor structure, the psychometric properties of the newly developed questionnaire, and relationships with relevant variables were explored.



CHAPTER 3

3 MAIN STUDY: EXAMINING THE RELATIONSHIP BETWEEN THE M-PDBQ AND DRIVING AND SAFETY RELATED VARIABLES

3.1 Introduction

As mentioned in the previous sections, positive driver behaviors have been shown to have different characteristics that connect traffic safety directly or indirectly. Although their relationships with road safety are not in the same line as the risky behavior's relationship with road safety, and the results are mixed for positive driver behaviors, it is still possible to tell that positive driver behaviors have a function in the traffic system. Given the emergence of various positive driver behaviors in Study 1 and drivers' engagement with these behaviors in a given traffic system, the function of positive driver behaviors requires further empirical investigation.

Positive driver behaviors have established several relationships with critical road safety outcomes. The mixed results regarding the relationship between positive driver behaviors and *accidents* were previously mentioned. In addition, positive driver behaviors were studied with aggressive driving. In one study, positive driver behaviors negatively predicted *driver aggression*; drivers who reported performing more positive driver behaviors exhibited and were exposed to less hostile aggression and revenge (Özkan & Lajunen, 2005). It should be noted that this relationship is not causal but relational. For example, another study conducted by Matović and colleagues (2020) showed that driving anger (e.g., slow driving and traffic obstruction) negatively predicted positive driver

behaviors (Matović et al., 2020). Therefore, these studies did not provide information on the relationship between anger/aggression and positive driver behaviors.

On the other hand, studies showed fairly consistent results regarding predictors of positive driver behaviors. For example, *female* drivers and *older* drivers (Bıçaksız & Özkan, 2016; Ersan et al., 2019; Matović et al., 2020) were more likely to engage in positive driver behaviors. Also, people with *agreeable*, *extrovert*, *conscientious*, *neurotic*, and *altruistic* personality traits engaged in positive driver behaviors more (e.g., Ge et al., 2020; Harris et al., 2014; Shen, Ge et al., 2018). On the other hand, people with *high boredom susceptibility*, *hostility*, and *sensation-seeking* characteristics were less likely to perform positive driver behaviors. (Harris et al., 2014; Shen, Ge, et al., 2018). For *driver skills*, perceptual motor skills and safety skills were found to be positively related to positive driver behaviors (Öztürk et al., 2018; Xu et al., 2018). It means that higher levels of driver skills are associated with higher engagement with positive driver behaviors. Furthermore, some studies reported a negative relationship between *risky driver behaviors* and positive driver behaviors. For instance, a negative correlation was noted between positive driver behaviors and violations as well as errors (Guého et al., 2014; Maslač et al., 2018; Özkan & Lajunen, 2005; Shen, Ge et al., 2018; Shen, Qu et al., 2018).

All these variables whose relationship with positive driver behaviors have been studied are among the main driving related variables that are commonly studied variables in the literature. Even in the scarce literature on positive driver behaviors, essential and critical associations were presented with demographic variables (e.g., gender, age), personality traits, driver skills, driver behaviors, driver anger, and road traffic accidents. Hence, the relationship between these critical variables and the newly developed questionnaire was explored in the main study.

The first aim of the main study was to establish the factor structure of the newly developed questionnaire and investigate its psychometric properties. For this purpose, first, the exploratory factor analysis was performed, and the factor structure of the new questionnaire was determined. Then, the reliability and validity evidence of the new questionnaire were investigated. Also, the correlations between the factors of the new

questionnaire and the main driving and safety related variables (i.e., demographic variables, personality traits, driver skills, driver behaviors, driver anger expression, traffic tickets, near misses, and accidents) were examined. The second aim was to test the new questionnaire's relationship with critical antecedents and outcome variables. Specifically, the group comparisons with critical demographics and safety outcomes on the dimensions of the new questionnaire were performed. Also, the relationships between the factors of the new questionnaire and critical safety outcomes (e.g., near misses, accidents, and traffic tickets), as well as the relationship between the new questionnaire and driving outcomes (e.g., risky driver behaviors and driving anger expression), were examined.

3.2 Method

3.2.1 Participants

The complete data of 628 drivers were used in the current study. Participants are expected to hold a driver's license for a private car (class B driver's license). There were 295 females and 327 males in the sample, and 6 participants did not respond. As presented in Table 2, the age range of participants was between 18 to 70, with an average of 37.5 ($SD = 11.13$). The average number of years holding a driver's license was 15.8 years ($SD = 9.97$). Participants reported driving 10086.27 km ($SD = 13120.18$) on average in the last year while 155935.57 km ($SD = 232642.06$) in a lifetime. Five hundred seventy-three participants (91.2% of the participants) reported driving at least one or two days a week, while the rest reported driving less than that. The participants were reported, on average, involving at least one near-miss in the last month ($M = 1.25$, $SD = 2.72$). Also, they reported the frequency of near-miss involvement in the past year as somewhere between rarely to sometimes ($M = 2.23$, $SD = 0.85$) on a 6-point Likert-type scale ranging from never to almost always. Active accident involvement (i.e., driver hitting a vehicle, a pedestrian, or any object) and passive accident involvement (i.e., vehicle or a pedestrian hitting the driver) in the last three years were less than 1 ($M = 0.61$, $SD = 1$; $M = 0.5$, $SD = 0.88$, respectively).

Table 2*Sample Characteristics in the Main Study*

	Mean (M)	Standard Deviation (SD)	Range
Age	37.5	11.13	18-70
License duration	15.8	9.97	1-50
Last year km	10086.27	13120.18	0-115000
Life time mileage	155935.57	232642.06	5-1500000
Near miss last month	1.25	2.72	0-30
Active accident involvement	0.61	1	0-10
Passive accident involvement	0.5	0.88	0-6
	Likert-type choices	Frequency	Percent
Weekly driving frequency	Always	276	43.9
	Almost always	150	23.9
	3-4 times a week	92	14.6
	1-2 times a week	55	8.8
	1-2 times a month	29	4.6
	Less than once a month	26	4.1
Near miss frequency past year	Never	88	14
	Rarely	370	58.9
	Sometimes	125	19.9
	Frequently	33	5.3
	Almost always	7	1.1
	Always	5	.8

3.2.2 Procedure

Ethical permission was obtained from Middle East Technical University (see Appendix F for ethical approval for the main study). Participants were mainly invited to study via social media announcements. Also, the volunteer acquaintances shared the survey link in their social media accounts and sent e-mails to the personnel and students in their organizations. In addition, an online data collection platform (i.e., Sona System) was utilized where university students receive bonus points upon participation in the study (21

data received from the SONA system). As a result, the convenience sampling strategy with the snowball technique was utilized. An online survey platform (i.e., Qualtrics) was used for data collection. The survey took approximately 30 minutes to complete. Participants are informed that participation is voluntary, and they can drop the survey whenever they want. The anonymity of the collected data was assured, and participants were informed that the data would be used only for scientific purposes (see Appendix G for informed consent for the main study). Data was collected in the first two weeks of May 2023. During the data collection phase, the items of all questionnaires were randomized for every participant to prevent the possibility of the item's order influencing the participant's responses. However, the questionnaires were presented in a predetermined order. For example, participants first filled out the newly developed questionnaire.

After the data collection, participants who provided their e-mail information were invited to the retest phase via e-mail. Retest e-mails were sent at two different time points; the participants who participated and provided their e-mails in the study in the first ($n = 259$) and second week ($n = 137$) of May were contacted for a retest study in the middle of the third and fourth weeks of the May, respectively. So, the retest e-mails were sent to participants on an average of 2 to 3 weeks after participating in the first phase of the survey study.

3.2.3 Instruments

The current study is based on self-report. All the questionnaires used in the study, except for the new questionnaire, have proven reliability and validity properties that are evidenced in several studies. The survey pack is composed of demographic information forms and questionnaires.

3.2.3.1 Demographic Information Form.

The participants were asked to give information about some critical demographic characteristics of age, gender, driving experience in years, last year's mileage, lifetime mileage, near-miss involvement in the past month, accident involvement in the past three years, and the number of traffic tickets received in the past three years (see Appendix H

for demographic questions). The current study defined a *near-miss* as being almost involved in an accident while driving (Giroto et al., 2016; Terry & Terry, 2015). Although no standard measurement method was agreed upon for measuring near-miss, some studies used a 30-day recall period because near-misses are prone to forgetfulness (Chapman & Underwood, 2000; Ishimaru et al., 2019). Therefore, participants in the current study were asked to report the number of near-miss involvements in the past month. Also, the information related to the frequency of near-miss involvement in the past year was collected as a safety outcome measure.

3.2.3.2 The Multidimensional Positive Driver Behaviors Questionnaire (M-PDBQ).

The M-PDBQ, which is developed in the current study, comprises 53 items and three factors: smooth and proactive mobility, environmentally sustainable behaviors, and risk communication. Cronbach's alpha for internal consistency scores is .93, .88, and .83, respectively. Participants are asked to rate the frequency of each behavior based on what they remembered from their driver behavior over the past year. The ratings are over a 6-point Likert scale (1 = never, 6 = almost always), and higher scores indicate performing positive behaviors more (see Appendix I for the M-PDBQ).

3.2.3.3 Positive Driver Behaviors Scale.

PDBS is 14 items, single-factor scale (Özkan & Lajunen, 2005) developed to measure positive driver behaviors (see Appendix J for PDBS). The scale is developed in Turkish. Participants are asked to indicate how frequently they perform each behavioral item on a 6-point Likert-type scale (1 = never and 6 = very often). Higher scores indicate performing positive behaviors more. Cronbach's alpha score for internal consistency in the current study was .81.

3.2.3.4 Driver Behavior Questionnaire.

DBQ measures risky driver behaviors (Reason et al., 1990) with 28 items divided into two main factors which are errors and violations. The questionnaire is translated into Turkish (Sümer et al., 2002) and yielded a three-factor structure as lapses, errors, and violations.

However, in the current study, a 15-item version that is validated in a Turkish sample with two main factors, errors and violations, was used (Ersan et al., 2020; Martinussen et al., 2013). Participants rated how frequently they engage in each behavior while driving on a 6-point Likert scale (1 = never, 6 = almost always). Higher scores mean performing risky behaviors more. In the current study, Cronbach's alpha scores were .74 for errors and .73 for violations.

3.2.3.5 Prosocial and Aggressive Driving Inventory (PADI).

PADI measures safe and unsafe driving behaviors with 29 items that measure two factors; prosocial and aggressive driving behaviors (Harris et al., 2014). The inventory is translated into Turkish via a translation-back translation procedure. The current study used only the 17-item prosocial driving behaviors factor (see Appendix K for PADI-Prosocial). Participants indicated the frequency of engagement of given items while driving on a 6-point Likert scale (1 = never, 6 = always). Higher scores indicate more engagement with prosocial driving behaviors. Cronbach's alpha score for PADI Prosocial was .93 in the current study.

3.2.3.6 Driving Anger Expression Inventory.

Driving Anger Expression Inventory (DAX) is developed to measure how people express their anger while driving (Deffenbacher et al., 2002) and translated into Turkish (Eşiyok et al., 2007). The inventory involves 49 items with a four-factor structure: verbally aggressive expression, physically aggressive expression, using the vehicle for aggressive expression, and adaptive expression. Participants reported the frequency of their anger reactions while driving over a 4-point Likert-type scale (1 = almost never, 4 = almost always), with higher scores indicating more engagement with a given anger expression. In the current study, a 15-item version of DAX, which is validated in a Turkish sample was used (Öztürk et al., n.d.; see Appendix N for DAX). Cronbach's alpha scores in the current study were .79, .73, .75, and .76 for verbally aggressive expression, physically aggressive expression, using the vehicle for aggressive expression, and adaptive expression, respectively. Also, a total aggressive anger expression score (i.e., DAX

aggressive) was calculated by combining the items of verbal, physical, and using the vehicle for aggressive expression, and Cronbach's alpha scores of .83 was found in the current study.

3.2.3.7 Driver Skills Inventory.

Driver Skills Inventory (DSI) is developed to measure driving abilities (Lajunen & Summala, 1995). It includes 20 items with two factors: perceptual motor skills and safety skills (see Appendix M for DSI). Participants rated each item on a 5-point Likert-type scale (1 = very weak, 5 = very strong). Higher scores show stronger driving ability. DSI is translated into Turkish (Lajunen & Özkan, 2004). Cronbach's alpha scores in the current study were .85 for perceptual motor skills and .77 for safety skills.

3.2.3.8 Basic Personality Traits Inventory.

The Basic Personality Traits Inventory (BPTI) consists of 45 person-descriptive adjectives divided into six factors, namely, extraversion, agreeableness, conscientiousness, neuroticism, openness to experience, and negative valence (Gençöz & Öncül, 2012). The inventory is developed in Turkish (see Appendix O for BPTI). Participants are asked to rate how well each adjective represents themselves on a 5-point Likert-type scale (1 = this characteristic does not represent me at all, 5 = this characteristic represents me very well), with higher scores implying better fit. In the current study, Cronbach's alpha scores for internal consistency were .85 for extraversion, .82 for conscientiousness, .85 for agreeableness, .81 for neuroticism, .72 for openness, and .75 for negative valence.

3.3 Results

A total of 1170 people participated in the current study; however, 628 people completed the new questionnaire subjected to factor analysis and thus included in further analyses. The response rate was 53.6% in the current study. Since the current study is mainly designed to investigate the factor structure of the M-PDBQ and its relationship with the driving and safety-related variables, completion of the M-PDBQ was the primary inclusion criterion of the data. The remaining data was mostly not included since they

were incomplete in that sense, and few of them were responded to in an unreliable manner, such as completed in an unrealistic time, completed by providing the same answer to all questions. To ensure descriptive statistics controlled the data accuracy, the minimum and maximum values of the variables. Z-scores were checked for outliers. Since the nature of some variables is skewed (e.g., the number of accidents), z-score values were critically evaluated by considering the nature of the variables. The data cleaning process was completed once the unrealistic values (e.g., km driven in the past year) were replaced with the missing value. Then, the factors of each scale were computed via the mean calculation of the corresponding items. Once each factor was computed, further analyses were pursued.

In the main study, the analyses were presented under five different sections (see Table 3 for the summary of the analyses). In the first part, the items of M-PDBQ were factor analyzed, and the factor structure of the questionnaire was finalized. The second section included testing the psychometric properties of the M-PDBQ. Specifically, the reliability and validity properties of the M-PDBQ were investigated. Cronbach's alpha, split-half reliability, and test-retest reliability were measured for reliability purposes. Regarding validity evidence, convergent validity by correlating the factors of M-PDBQ with PDBS and PADI-Prosocial and discriminant validity by correlating the M-PDBQ factors with DBQ were examined. In the third section, bivariate correlations between the study variables were presented in their relationship to the M-PDBQ factors. In particular, the correlations between the M-PDBQ Factors and demographics as well as driver skills, driving anger expression, and personality, were investigated. The fourth section involved group comparisons with the M-PDBQ factors. Accordingly, different demographic and safety outcome groups were compared with each other on the three factors of the M-PDBQ. Finally, regression analyses were conducted to investigate the relationship between the M-PDBQ factors and driving and safety outcomes. Also, the incremental validity of the M-PDBQ on driving outcomes was investigated in this section via hierarchical regression analyses.

Table 3*Summary of the Analyses Performed by the Study Aims*

Aims	Analysis in Study 1	
i.	1. Content Analysis for Interviews	
Analyses in Main Study		
ii.	1. Factor Structure of the M-PDBQ	Exploratory Factor Analysis
ii.	2. Psychometric Properties of the M-PDBQ	Reliability • Cronbach's Alpha • Split-Half Reliability • Test-Retest Reliability Validity • Convergent Validity Correlations of the M-PDBQ factors with PDBS and PADI-Prosocial • Discriminant Validity Correlation of the M-PDBQ factors with DBQ
iii.	3. Bivariate Correlations	Correlations between the M-PDBQ Factors and Demographics Correlations between the M-PDBQ Factors and Driver Skills, Driving Anger Expression, and Personality
iv.	4. Group Comparisons (ANCOVA)	Group Comparisons with Demographic Variables (i.e., gender, age, driving experience) on the M-PDBQ factors Group Comparisons with Safety Outcomes (i.e., accident, near-miss, speeding ticket, total traffic tickets) on the M-PDBQ factors
v.	5. Regression Analyses (Hierarchical regression analyses)	The Relationship between the M-PDBQ and Driving Outcomes (i.e., risky driver behaviors, driving anger expression) The Relationship between the M-PDBQ and Safety Outcomes (near-miss, speeding ticket, total traffic tickets)

3.3.1 Factor Structure of the M-PDBQ

A factor analysis with principal axis factoring was conducted with 79 items of the new questionnaire. The Kaiser-Meyer-Olkin measure was .946, presented that the sampling was adequate and Bartlett's test of sphericity was significant, showing that the items are factorable ($df = 3081$, $p < .000$). Sixteen factors had eigenvalues greater than 1, whereas the scree plot suggested a 4-factor solution. The 4-factor solution did not produce an interpretable factor structure where two of the factors were overlapping in their content. Therefore, a 3-factor solution was performed with an oblique rotation method. Direct Oblimin was preferred as a rotation method since most of the factor correlations were above .30. As a result, the 3-factor solution was retained since it produced more interpretable item-factor relatedness.

After the 3-factor solution was decided, Principal Axis Factoring with a Direct Oblimin rotation fixing the number of factors to 3 was performed. Coefficients sorted by size and coefficients under .40 were suppressed. Accordingly, the 3-factor solution explained 34.31% of the total variance where the contribution of each factor was 24.91%, 5.22%, and 4.18%, respectively. A total of 55 items were loaded onto the three factors with a coefficient above .40. The pattern matrix showed no cross-loading of 55 items across factors. The remaining 24 items had coefficient values smaller than .40, thus they were dropped from the further analysis.

According to the factor analysis, 35 items were loaded onto the first factor. Two of the items were eliminated from the factor due to the item-factor content mismatch (see Table 4 for factor structure of the new questionnaire). As a result, the first factor is referred to as "smooth and proactive mobility (SPM)" and included 33 items. This factor is mainly characterized by two components; smooth mobility and proactive mobility. The smooth mobility component is related to behaviors supporting or facilitating traffic flow (to benefit either the driver or other road users such as other drivers, pedestrians, etc.). They are catalyzers of traffic flow/smooth mobility. An example item is "Give way to a vehicle stranded in a difficult/congested situation to ensure traffic flow." The proactive component refers to behaviors that mainly aim to prevent or avoid the possibility of an

accident. It involves cautionary behaviors (safety precautions), behaviors performed for accommodating to the given traffic situation to sustain traffic safety and behaviors aiming to compensate for others' or one's faulty actions to avoid any possible conflict. An example item is "Drive with a safety margin that compensates for the mistakes of other road users (e.g., drivers, pedestrians)."

The second factor, "environmentally sustainable behaviors (ESB)," included 12 items. As the name implies, this factor involved behaviors performed to protect the environment, such as eco-friendly behaviors performed to make fuel economy, reduce air pollution, and ensure the long service life of the vehicle and its parts. An example item is "Drive at a steady speed to minimize air pollution."

Lastly, nine items were loaded onto the third factor. One item was eliminated from the factor due to the item-factor content mismatch (see Table 4 for the factor structure of the new questionnaire). As a result, the third and last factor involved eight items and was named "risk communication (RC)." This factor mainly focuses on warning or informing other road users of potentially dangerous overt or latent situations, using the hazard lights, signals, horn, etc. An example item is "Notify the driver of a vehicle if I notice a problem or defect in their vehicle during driving by flashing headlights, honking etc., to prevent a potentially risky situation."

3.3.2 Psychometric Properties of the M-PDBQ

3.3.2.1 Reliability.

3.3.2.1.1 Cronbach's Alpha.

The Cronbach's alpha for internal consistency scores was presented in Table 4. Accordingly, Cronbach's alpha values for three factors ranged between .93 to .83 showing good reliabilities for all the factors. The corrected item-total correlation coefficients ranged between .41 to .67, .43 to .74, and .49 to .62 respectively for smooth and proactive mobility, environmentally sustainable behaviors, and risk communication.

Table 4*Factor Structure of the Newly Developed Questionnaire*

	Translated Items	Smooth and proactive mobility	Environmentally sustainable behaviors	Risk communication
1	Give way to a vehicle stranded in a difficult/congested situation to ensure traffic flow.	.690		
2	Patiently wait for the pedestrians to cross the street completely.	.676		
3	Patiently wait for vehicles attempting to park in a moving traffic.	.658		
4	Yield the right of way to assist a driver who is in a difficult/tight situation.	.617		
5	Drive with a safety margin that compensates for the mistakes of other road users (drivers, pedestrians, etc.).	.616		
6	Patiently wait for a vehicle that is slow to accelerate at a green light or in a stop-and-go traffic.	.601*		
7	Drive at a speed that does not make other road users (drivers, pedestrians, etc.) uneasy.	.600		
8	Yielding to vehicles in narrowing roads or lanes to facilitate their merging.	.595		
9	Yield the right of way to a road user (driver, pedestrian, etc.) who exhibits unpredictable behavior to avoid jeopardizing traffic safety.	.578		
10	Give way to another driver when both they and I are heading in the same direction or taking the same exit.	.577		
11	Drive in a lane that is suitable for my speed to support traffic flow.	.567		
12	Follow my lane in an intersection to avoid disrupting traffic flow.	.562		
13	Give the right of way to road users (drivers, pedestrians, etc.) who suddenly appear in front of me while driving.	.559		
14	Support the traffic flow by following the vehicle in front from a safe distance that does not require me to brake suddenly.	.549		
15	Remain vigilant to the unpredictable movements of vulnerable road users (pedestrians, cyclists, children, etc.) while driving.	.542		
16	Make an early transition to the lane where I will make a turn to avoid disrupting traffic flow.	.520		
17	Facilitate the passage of the vehicle in my side lane waiting to connect to the main road / side road in a congested traffic	.520		

18	Drive predictably, considering other road users, to minimize the risk of accidents while driving.	.519
19	When I realize that I am causing unease among others while driving, slow down or take necessary precautions to avoid compromising traffic safety.	.503
20	Change lanes as soon as possible to avoid colliding with a vehicle tailgating me.	.497
21	When met with an oncoming vehicle on a narrow street, yield by pulling over to an appropriate gap.	.487
22	Facilitate the vehicle which is overtaking me.	.484
23	Give way to vulnerable road users (pedestrians, cyclists, children, etc.) more frequently in adverse weather conditions	.478
24	Stay in the lane that supports traffic flow in congested traffic.	.470
25	Slow down or switch to the right lane while engaged in something that draws my attention away from traffic.	.468
26	Avoid parking my vehicle in places that could block someone else's passage.	.467
27	Move away at the first opportunity to avoid getting into an argument with other road users (drivers, pedestrians, etc.) who jeopardize traffic safety.	.466
28	Make a move only after ensuring that other road users (drivers, pedestrians, etc.) have seen my vehicle, considering the possibility of an accident.	.439
29	Park my vehicle leaving ample space for others.	.430
30	Notify other road users about my maneuvers in advance through signals, etc. to support traffic flow.	.423
31	When I notice an emergency vehicle (ambulance, fire truck, etc.) approaching, make necessary plans and positioning to support traffic flow before the vehicle reaches my location.	.421
32	Minimize in-car vibrations by avoiding sudden accelerations and decelerations for the comfort of the passengers in the vehicle.	.414*
33	Increase the visibility of my vehicle in adverse weather conditions with reduced visibility by turning on hazard lights, headlights, fog lamps, etc.	.410
34	Give way to a merging vehicle even if I have the right of way.	.410
35	When I need to use my phone, ensure traffic safety by pulling over to a suitable location.	.402
36	Drive at a steady speed to minimize air pollution.	.799
37	Drive at a steady speed for fuel efficiency.	.789
38	Avoid driving my vehicle at high speeds for fuel efficiency.	.716
39	Picking routes where I can save more fuel.	.654
40	Not load my vehicle heavily to save fuel	.652

41 Drive my vehicle at a speed/engine speed/gear suitable for the road conditions for an eco-friendly driving.	.584		
42 Allow sufficient time for the vehicle's engine to warm up/cool down before driving/stopping the engine to extend its lifespan.	.542		
43 Avoid sudden accelerations and decelerations during driving for an environmentally friendly journey.	.534		
44 Adjust my speed in a way that allows me to continue driving without stopping at traffic lights to save fuel.	.524		
45 Use routes with better road conditions to reduce wear and tear on my vehicle and its parts.	.503		
46 Avoid using the air conditioning in the vehicle for the short-distance trips to save fuel.	.458		
47 Make use of in-car technologies (e.g., cruise control) for an eco-friendly journey.	.416		
48 Notify the driver of a vehicle if I notice a problem or defect in their vehicle during driving by flashing headlights honking, etc., to prevent a potentially risky situation.			.567
49 Alert a road user (driver, pedestrian, etc.) who may be at risk of an unnoticed danger by flashing headlights, honking, etc.			.565
50 When the traffic unexpectedly slows down, warn the following drivers to take precautions by turning on my hazard lights, etc.			.529
51 Flashing the headlights or honk to notify others when approaching hills or sharp turns where I cannot see far ahead.			.498
52 Alert the driver who is trying to join my lane that which I have the right of way by flashing headlights, honking, etc.			.494
53 Alert a road user (driver, pedestrian, etc.) who is not paying attention to the road by flashing headlights, honking, etc.			.483
54 Warn the vehicles behind me with hazard lights, etc. when I see a person or animal suddenly entering the road from the side of the road.			.471
55 Alert the vehicles behind me using hazard lights, honking, etc. to indicate an unexpected problem or situation on the road (e.g., pothole, accident, etc.).			.451
56 Apologize through body language, speech, horn, flashing headlights, etc. after making a mistake in traffic.			.417*
Number of items	n = 33	n = 12	n = 8
Explained variances	24.91%	5.22%	4.18%
Cronbach's alpha reliability	$\alpha = .93$	$\alpha = .88$	$\alpha = .83$

Note. *These 3 items were not included in the related factor due to content mismatch.

Table 5*Test-retest Reliability Parameters*

	Time 1 <i>M (SD)</i>	Time 2 <i>M (SD)</i>	Pearson's <i>r</i>
Smooth and proactive mobility	5.16 (.48)	5.13 (.5)	.75
Environmentally sustainable mobility	4 (1.02)	4.11 (1.08)	.87
Risk communication	4.79 (.89)	4.85 (.9)	.79

Note. Pearson product-moment correlation coefficient (bivariate correlations) were calculated between Time 1 and Time 2 scores ($n = 137$).

3.3.2.1.2 Split-Half Reliability Coefficient.

For split-half reliability, two halves of the total questionnaire were compared with each other. The Spearman-Brown coefficient and Guttman split-half coefficients showed a good correlation of .96 between the halves.

3.3.2.1.3 Test-Retest Reliability.

About %22 of the sample ($n = 137$ people) participated in the retest study. As shown in Table 5, Pearson correlations between the survey administration at two different time points were .75 for smooth and proactive mobility, .87 for environmentally sustainable mobility, and .79 for risk communication ($p < .001$), that meant acceptable to good correlations.

3.3.2.2 Validity.

3.3.2.2.1 Convergent Validity: Correlations with PDBS and PADI-Prosocial.

PDBS and PADI-Prosocial were used for convergent validity purposes since they both developed to measure positive driver behavior construct. According to the bivariate correlations presented in Table 6, all the factors of the newly developed questionnaire

showed moderate to high significant correlations ($p < .01$), ranging from .46 to .73 with PDBS, and .34 to .65 with PADI-Prosocial. Particularly, the smooth and proactive mobility factor showed a high significant correlation with both measures whereas the environmentally sustainable behaviors and the risk communication factors showed moderate significant correlations.

3.3.2.2 Discriminant/Divergent Validity: Correlation with DBQ.

The correlation between the new questionnaire and DBQ was examined for discriminant validity. The DBQ was chosen since it measures risky driver behaviors which is different from type of driver behaviors. In Table 6, low to moderate correlations, ranging from -.06 to -.38, were noted between the new factors and DBQ errors and violations. Accordingly, the SPM factor presented moderate and significant with errors ($r = -.29, p < .01$) and violations ($r = -.38, p < .01$). The ESB factor showed moderate to low significant correlations with violations ($r = -.31, p < .01$) and errors ($r = -.15, p < .01$). On the other hand, the RC factor displayed significant low correlation with errors ($r = -.19, p < .01$) and no significant correlation with violations ($p > .05$).

3.3.3 Bivariate Correlations between the Study Variables

3.3.3.1 Correlations between the M-PDBQ Factors and Demographics.

The correlations between the M-PDBQ factors and demographic variables are presented in Table 7. For example, age and experience (i.e., license duration) are positively correlated with all factors of the M-PDBQ. Mileage showed positive correlations with certain factors of the new questionnaire. Specifically, higher mileage in the last year is associated with higher risk communication. Higher lifetime mileage is related to higher engagement with environmentally sustainable behaviors and higher risk communication. No significant correlation between mileage and smooth and proactive mobility was noted.

Regarding the correlations between the M-PDBQ factors and safety outcomes, the number of near misses in the past month did not correlate with the M-PDBQ factors but a small negative correlation between smooth and proactive mobility and near miss frequency in

the past year was found ($r = -.08, p < .05$). It means higher involvement in smooth and proactive mobility is related to reduced occurrence of near miss incidents. Similarly, small but significant negative correlations between smooth and proactive mobility and the number of active accidents ($r = -.09, p < .05$) and total accidents in the past three years ($r = -.10, p < .05$) were observed. In other words, higher engagement in smooth and proactive mobility is linked to a decreased likelihood of accident involvement. Negative correlations between positive driver behaviors and speeding tickets were shown regarding traffic tickets. More specifically, the study found a relationship between engagement in smooth and proactive mobility ($r = -.09, p < .05$) as well as environmentally sustainable behaviors ($r = -.13, p < .01$) and a lower frequency of speeding tickets. Furthermore, engagement in smooth and proactive mobility was associated with a lower total number of traffic tickets received ($r = -.10, p < .05$). Lastly, the factors of the M-PDBQ were moderately correlated with each other, correlation coefficients ranging from .44 to .55 ($p < .01$).

3.3.3.1 Correlations between the M-PDBQ Factors and Driver Skills, Driving Anger Expression, and Personality.

The factors of the M-PDBQ showed significant correlations with other variables, such as driver skills, driving anger expression, and personality. According to Table 6, all factors of the M-PDBQ were positively correlated with perceptual motor skills as well as safety skills of DSI, ranging from .18 to .59. Specific to this relationship, higher correlations were observed between the M-PDBQ factors and safety skills than M-PDBQ and perceptual motor skills. Of which the highest correlation of .59 was noted between the smooth and proactive mobility dimension and safety skills.

Furthermore, low to moderate correlations, ranging from -.02 to .40, were observed between the M-PDBQ and DAX. In particular, smooth and proactive mobility, as well as environmentally sustainable behaviors, were negatively correlated with all of the DAX aggressive factors (i.e., DAX verbal, physical, vehicle, and total aggressive), except for the ESB and DAX physical, which showed no correlation. It means that higher engagement in SPM and ESB is related to lower levels of aggressive anger expression on the roads. On the other hand, risk communication did not correlate with any aggressive

Table 6*Correlations between the Study Variables*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. M-PDBQ_SPM	1																				
2. M-PDBQ_ESB	.52**	1																			
3. M-PDBQ_RC	.55**	.44**	1																		
4. M-PDBQ_total	.92**	.79**	.71**	1																	
5. PDBS	.73**	.47**	.46**	.72**	1																
6. PADI_Proc	.65**	.34**	.39**	.60**	.53**	1															
7. DSI_PMS	.18**	.20**	.39**	.27**	.25**	.24**	1														
8. DSI_SS	.59**	.37**	.34**	.56**	.53**	.54**	.42**	1													
9. DBQ_Errors	-.29**	-.15**	-.19**	-.27**	-.29**	-.46**	-.25**	-.29**	1												
10. DBQ_Viol	-.38**	-.31**	-.06	-.36**	-.27**	-.37**	.15**	-.41**	.47**	1											
11. DAX_Verbal	-.24**	-.27**	-.06	-.26**	-.15**	-.22**	.02	-.37**	.15**	.55**	1										
12. DAX_Physic	-.23**	-.02	.06	-.13**	-.12**	-.20**	.07	-.21**	.28**	.37**	.35**	1									
13. DAX_Vehicle	-.33**	-.13**	-.03	-.26**	-.21**	-.31**	.17**	-.31**	.28**	.63**	.49**	.54**	1								
14. DAX_Agg	-.34**	-.19**	-.03	-.28**	-.20**	-.31**	.11*	-.38**	.29**	.67**	.81**	.72**	.86**	1							
15. DAX_Adapt	.40**	.20**	.11*	.34**	.34**	.31**	.01	.42**	-.13**	-.41**	-.39**	-.21**	-.40**	-.43**	1						
16. BPTI_Ext	.15**	.07	.28**	.18**	.10*	.15**	.30**	.14**	-.13**	-.01	-.08	-.07	-.11*	-.11*	.06	1					
17. BPTI_Cons	.34**	.34**	.26**	.39**	.25**	.37**	.18**	.38**	-.18**	-.29**	-.28**	-.13**	-.24**	-.28**	.21**	.27**	1				
18. BPTI_Agree	.45**	.25**	.32**	.43**	.41**	.35**	.24**	.36**	-.18**	-.19**	-.21**	-.09*	-.23**	-.23**	.28**	.35**	.41**	1			
19. BPTI_Neuro	-.23**	-.22**	-.14**	-.25**	-.12**	-.17**	-.06	-.30**	.11*	.35**	.44**	.19**	.34**	.43**	-.30**	-.30**	-.32**	-.26**	1		
20. BPTI_Open	.26**	.22**	.37**	.32**	.28**	.24**	.40**	.34**	-.15**	-.01	-.06	.07	.03	.01	.12**	.45**	.40**	.43**	-.21**	1	
21. BPTI_NegVal	-.23**	-.10*	-.17**	-.21**	-.13**	-.24**	-.09*	-.20**	.24**	.30**	.22**	.22**	.33**	.33**	-.18**	-.31**	-.33**	-.35**	.47**	-.10*	1

Note. ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

Table 7*Correlations between the Study Variables*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. M-PDBQ_SPM	1																				
2. M-PDBQ_ESB	.52**	1																			
3. M-PDBQ_RC	.55**	.44**	1																		
4. M-PDBQ_total	.92**	.79**	.71**	1																	
5. PDBS	.73**	.47**	.46**	.72**	1																
6. PADI_Proc	.65**	.34**	.39**	.60**	.53**	1															
7. DSI_PMS	.18**	.20**	.39**	.27**	.25**	.24**	1														
8. DSI_SS	.59**	.37**	.34**	.56**	.53**	.54**	.42**	1													
9. DBQ_Errors	-.29**	-.15**	-.19**	-.27**	-.29**	-.46**	-.25**	-.29**	1												
10. DBQ_Viol	-.38**	-.31**	-.06	-.36**	-.27**	-.37**	.15**	-.41**	.47**	1											
11. DAX_Verbal	-.24**	-.27**	-.06	-.26**	-.15**	-.22**	.02	-.37**	.15**	.55**	1										
12. DAX_Physic	-.23**	-.02	.06	-.13**	-.12**	-.20**	.07	-.21**	.28**	.37**	.35**	1									
13. DAX_Vehicle	-.33**	-.13**	-.03	-.26**	-.21**	-.31**	.17**	-.31**	.28**	.63**	.49**	.54**	1								
14. DAX_Agg	-.34**	-.19**	-.03	-.28**	-.20**	-.31**	.11*	-.38**	.29**	.67**	.81**	.72**	.86**	1							
15. DAX_Adapt	.40**	.20**	.11*	.34**	.34**	.31**	.01	.42**	-.13**	-.41**	-.39**	-.21**	-.40**	-.43**	1						
16. BPTI_Ext	.15**	.07	.28**	.18**	.10*	.15**	.30**	.14**	-.13**	-.01	-.08	-.07	-.11*	-.11*	.06	1					
17. BPTI_Cons	.34**	.34**	.26**	.39**	.25**	.37**	.18**	.38**	-.18**	-.29**	-.28**	-.13**	-.24**	-.28**	.21**	.27**	1				
18. BPTI_Agree	.45**	.25**	.32**	.43**	.41**	.35**	.24**	.36**	-.18**	-.19**	-.21**	-.09*	-.23**	-.23**	.28**	.35**	.41**	1			
19. BPTI_Neuro	-.23**	-.22**	-.14**	-.25**	-.12**	-.17**	-.06	-.30**	.11*	.35**	.44**	.19**	.34**	.43**	-.30**	-.30**	-.32**	-.26**	1		
20. BPTI_Open	.26**	.22**	.37**	.32**	.28**	.24**	.40**	.34**	-.15**	-.01	-.06	.07	.03	.01	.12**	.45**	.40**	.43**	-.21**	1	
21. BPTI_NegVal	-.23**	-.10*	-.17**	-.21**	-.13**	-.24**	-.09*	-.20**	.24**	.30**	.22**	.22**	.33**	.33**	-.18**	-.31**	-.33**	-.35**	.47**	-.10*	1

Note. ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

factors of DAX, suggesting that risk communication does not relate to driving anger expression. All three factors of the M-PDBQ were positively correlated with adaptive anger expression, of which SPM and DAX adaptive showed the highest correlation ($r = .40, p < .01$).

Lastly, there was significant low to moderate correlations between personality factors and the M-PDBQ. Extraversion, conscientiousness, agreeableness, and openness dimensions of BPTI were significantly and positively correlated with the M-PDBQ factors, except for the ESB and extraversion correlation, which was insignificant. On the other hand, neuroticism and negative valence were negatively related to the M-PDBQ factors. Of these traits, the strongest correlation was observed between agreeableness and SPM ($r = .45, p < .01$). It means that agreeable people tend to exhibit behaviors that facilitate smooth and proactive mobility. Other stronger correlations were observed between conscientiousness and SPM ($r = .34, p < .01$) as well as ESB ($r = .34, p < .01$), suggesting that conscientious people are more likely to drive in a way that promotes smooth and proactive and environmentally sustainable mobility.

3.3.4 Group Comparisons on the Factors of the M-PDBQ

3.3.4.1 Group Comparisons with Demographic Variables.

The key demographic variables, namely gender, age, and driving experience, were subjected to an analysis of covariance (ANCOVA) to examine their relationship with the M-PDBQ. For group comparisons, continuous variables (i.e., age and driving experience) were recoded into a new variable as categorical variables. After categorization, separate analyses were conducted for each of the M-PDBQ factors.

3.3.4.1.1 Gender Differences.

Gender group differences on the factors of M-PDBQ were examined by ANCOVA analysis, controlling the effects of age and annual mileage. Results showed that females ($M = 5.13, SD = .56$) are more likely to engage in behaviors that promote smooth and proactive mobility than males ($M = 5.02, SD = .62$), $F(1,613) = 12.61, p < .001, \eta p^2 = .02$.

On the other hand, no significant gender difference was observed across environmentally sustainable behaviors and risk communication.

3.3.4.1.2 Age Differences.

Age differences on the M-PDBQ factors were investigated via ANCOVA analysis. For this purpose, first, a categorical age variable was created from the continuous age variable. The age data were divided into two groups based on the median age of 35. The first group included individuals aged between 18 and 35 (i.e., younger drivers), while the second group consisted of individuals aged between 36 and 70 (i.e., older drivers). There were 326 people in the younger driver group and 294 people in the older driver group. The gender and annual mileage variables were controlled in the analysis to account for their significant association with positive driver behaviors. The results of ANCOVA showed that older drivers ($M = 5.17$, $SD = .58$) are more inclined to exhibit behaviors that foster smooth and proactive mobility compared to younger drivers ($M = 4.99$, $SD = .59$), $F(1,613) = 16.61$, $p < .001$, $\eta p^2 = .03$. Similarly, older drivers ($M = 4.45$, $SD = .95$) are more likely to engage in environmentally sustainable behaviors than younger drivers ($M = 3.95$, $SD = 1.03$), $F(1,613) = 33.3$, $p < .001$, $\eta p^2 = .05$. Lastly, no significant group difference was found in risk communication ($p > .05$). This implies that age does not play a significant role in behaviors related to risk communication. To conclude, older drivers exhibit more positive driver behaviors than younger drivers, except for the risk communication factor, where no difference between different age groups was observed.

3.3.4.1.3 Driving Experience Differences.

Driving experience on the factors of M-PDBQ was investigated via ANCOVA analysis. For this purpose, first, a categorical driving experience variable was created from the annual mileage variable, lifetime mileage, and license duration variable, separately.

The data for annual mileage was divided into two groups from the median of 7000 km. The first group included drivers who had driven in the past year 0 to 7000 km, which is called less experienced drivers ($n = 311$). The second group consisted of drivers who had driven more than 7000 km (7000 to 115000) in the past year, which is called more

experienced drivers ($n = 302$). Similarly, the data for lifetime mileage was also divided into two from the median of 60000 km. The less experienced group is consisted of 305 drivers who had driven 5 to 60000 km in their life and the more experienced group is composed of 295 people who had driven more than 60000 km (60000 to 1500000). Later, ANCOVAs were performed on the three factors of the M-PDBQ, by controlling the effects of gender and age. However, no significant group difference was observed on any of the factors of the M-PDBQ with respect to less experienced and more experienced driver groups divided by annual mileage and lifetime mileage.

Lastly, the data for license duration was divided into two groups from the median duration of 14 years. The first group included drivers who had held their driving licenses for 1 to 14 years and were called less experienced drivers ($n = 335$). The second group consisted of drivers with a driving license of more than 14 years (14 to 50 years in the current sample) and called more experienced drivers ($n = 285$). In the ANCOVA, the gender and age of the drivers were controlled. As a result, more experienced drivers ($M = 5.13$, $SD = .59$) engaged in behaviors that foster smooth and proactive mobility more than less experienced drivers ($M = 5.03$, $SD = .59$; $F(1,620) = 4.54$, $p = .03$, $\eta p^2 = .007$). On the other hand, no significant group difference was found in environmentally sustainable behaviors and communicating risk with other road users ($p > .05$). This suggests that behaviors related to ESB and RC are not significantly influenced by driving experience, after controlling the effects of age and gender. In summary, more experienced drivers display a higher frequency of smooth and proactive mobility when compared to their less experienced counterparts.

3.3.4.2 Group Comparisons with Safety Outcomes.

3.3.4.2.1 Accident and Near-Miss Differences.

First, a categorical accident variable was created to investigate whether people having an accident history and people not having an accident history differ on the factors of M-PDBQ. The continuous total accident variable was recoded into different variables by dividing people with zero accidents into group one and people with one or more accidents

into group two. The number of accidents is divided into two categories (the driving experience variable was created from the license duration variable. The first group, people not having an accident history, included 293 drivers, and people with at least one accident history involved 316 drivers. For group comparison, three separate ANCOVAs were conducted for each factor of the M-PDBQ. Gender, age, and last year's kilometer were controlled and the categoric accident variable was entered into the analysis as an independent variable. ANCOVA results showed that people with no accident history ($M = 5.14$, $SD = .61$) engaged in behaviors that favor smooth and proactive mobility more than people with an accident history ($M = 5.01$, $SD = .57$), $F(1,609) = 4.54$, $p < .05$, $\eta p^2 = .007$. Besides, people with no accident history ($M = 4.31$, $SD = 1.02$) reported higher frequencies of environmentally sustainable behaviors than people with an accident history ($M = 4.08$, $SD = 1.02$), $F(1,609) = 6.37$, $p < .05$, $\eta p^2 = .009$. Lastly, there were no significant differences between the accident groups on the risk communication factor of the M-PDBQ ($p > .05$), which means that accident history does not make a difference in risk communication behaviors.

Similarly, the number of near-misses in the last month was also categorized into two groups: zero near-miss involvement and one or more near-miss involvement. Then, the group comparisons on the factors of the M-PDBQ were carried out by ANCOVA. However, there was no significant group difference on any positive driver factors, meaning that near miss history does not affect people's engagement with positive driver behaviors ($p > .05$).

3.3.4.2.2 Speeding and Traffic Ticket Differences.

Since the speeding tickets received in the past three years were significantly correlated with the factors of the M-PDBQ (see Table 7 for correlations), speeding ticket group comparisons were conducted on the M-PDBQ factors. A categorical speeding ticket variable was created in which people having zero speeding tickets were categorized as group one and people having one and more speeding tickets were categorized as group two. Specifically, group one is called drivers with no speeding ticket history ($n = 355$), and group two is called drivers with a speeding ticket history ($n = 231$). Three separate

ANCOVAs were conducted for each factor of the M-PDBQ in order to investigate whether people's engagement with positive driver behaviors differs as a function of speeding ticket history. The categorical speeding ticket variable was entered into the analysis as an independent variable, and gender, age, and last year's kilometer were controlled. ANCOVA results showed that drivers with no speeding ticket history ($M = 5.13$, $SD = .57$) showed behaviors promoting smooth and proactive mobility more than drivers with speeding ticket history ($M = 4.99$, $SD = .62$), $F(1,586) = 7.70$, $p < .01$, $\eta p^2 = .01$. Similarly, drivers with no speeding ticket history ($M = 4.26$, $SD = .98$) engaged in environmentally sustainable behavior to a greater extent than people with speeding tickets history ($M = 4.05$, $SD = 1.08$), $F(1,586) = 12.47$, $p < .001$, $\eta p^2 = .02$. These two groups did not differ on risk communication behaviors ($p > .05$). It means that speeding ticket history was not related to drivers with no traffic ticket history ($n = 273$) and drivers with traffic ticket history ($n = 323$).

Also, three separate ANCOVAs were conducted for each factor of the M-PDBQ to examine whether traffic ticket history affects positive driver behaviors. The categorical traffic ticket history variable was entered into the analysis as the independent variable, and gender, age, and last year's kilometer were control variables. ANCOVA results showed a significant group difference in environmentally sustainable behaviors and not in smooth and proactive mobility and risk communication factors. In particular, the ticket free group ($M = 4.26$, $SD = .96$) showed environmentally sustainable behaviors more than drivers with traffic ticket history ($M = 4.12$, $SD = 1.07$), $F(1,596) = 7.81$, $p < .01$, $\eta p^2 = .01$. On the other hand, traffic ticket history did not make any difference on drivers' engagement with behaviors that promotes smooth and proactive mobility and risk communication.

3.3.5 Regression Analyses

3.3.5.1 The Relationship between the M-PDBQ Factors and Driving Outcomes.

In the current study, risky driver behaviors and driving anger expression variables are referred to as driving outcomes. Hierarchical regression analysis was conducted to

investigate the relationship between the M-PDBQ factors and risky driver behaviors as well as driving anger expressions. In all analyses, the first step included gender, age, and last year's kilometers as control variables, and in the second step, the factors of the M-PDBQ were added to the analysis. Separate analyses were conducted for each dependent variable. Significant results were presented in Table 8.

After that, incremental validity evidence for the M-PDBQ was investigated in terms of its relationship to driving outcomes, specifically, risky driver behaviors and driving anger expression. The M-PDBQ explained small variances in the safety outcomes such as near-misses, speeding tickets, and total tickets, whereas it explained greater variance with driving outcomes. Separate hierarchical regression analyses were conducted with driving outcomes to investigate whether the M-PDBQ explains variance in driving outcomes (e.g., risky driver behaviors and driving anger expression) beyond the similar scales (i.e., PDBS, PADI Prosocial) and demographic variables. For all analyses, the following variables were entered in each step in the same order. In the first step, demographic variables such as gender, age, and last year's kilometers were entered into the analysis. In the second step, PDBS and PADI Prosocial were entered together. In the third and final step, the M-PDBQ factors, namely SPM, ESB, and RC, were entered into the analysis. The significant results are presented in Table 10.

3.3.5.1.1 Risky Driver Behaviors.

Two hierarchical regression analyses were conducted for two factors of the DBQ: errors and violations. As presented in Table 8, the overall regression model predicted a 9% variance in errors ($R^2 = .09$, $F(6, 510) = 8.76$, $p < .001$). Gender, age, and last year's kilometers predicted a 1% variance in errors. After controlling for the demographic variables in the first step, the M-PDBQ factors predicted an 8% variance in errors in the second step. Higher SPM was linked to less errors. Regarding violation factors of DBQ, the overall model explained a 23% variance in violations ($R^2 = .23$, $F(6, 509) = 25.42$, $p < .001$). In particular, demographics in the first step accounted for 8%, while the M-PDBQ explained a 16% variance in violations. In the first step, being male and driving higher kilometers were positively associated with violations, whereas being older was negatively

Table 8

The Relationship between the M-PDBQ Factors and Driving Outcomes

	<i>DBQ Errors</i>					<i>DBQ Violations</i>					<i>DAX Verbal</i>				
	<i>R²</i>	<i>R²Δ</i>	<i>FΔ</i>	<i>df</i>	<i>β</i>	<i>R²</i>	<i>R²Δ</i>	<i>FΔ</i>	<i>df</i>	<i>β</i>	<i>R²</i>	<i>R²Δ</i>	<i>FΔ</i>	<i>df</i>	<i>β</i>
1 st Step	.01	.01	2.06	3, 507		.08	.08	14.09***	3, 506		.05	.05	9.44***	3, 527	
Gender					.04					.12**					.10*
Age					-.08					-.23***					-.22***
Last year km					-.08					.14**					.05
2 nd Step	.09	.08	15.29***	3, 504		.23	.16	34.00***	3, 503		.12	.07	14.15***	3, 524	
SPM					-.28***					-.34***					-.16**
ESB					-.02					-.22***					-.21***
RC					-.04					.22***					.13**
	<i>DAX Physical</i>					<i>DAX Vehicle</i>					<i>DAX Aggressive</i>				
	<i>R²</i>	<i>R²Δ</i>	<i>FΔ</i>	<i>df</i>	<i>β</i>	<i>R²</i>	<i>R²Δ</i>	<i>FΔ</i>	<i>df</i>	<i>β</i>	<i>R²</i>	<i>R²Δ</i>	<i>FΔ</i>	<i>df</i>	<i>β</i>
1 st Step	.03	.03	4.66**	3, 527		.05	.05	10.10***	3, 527		.06	.06	10.88***	3, 527	
Gender					.17***					.20***					.19***
Age					-.03					-.16***					-.19***
Last year km					-.01					.04					.04
2 nd Step	.11	.08	15.96***	3, 524		.16	.11	21.81***	3, 524		.17	.11	23.69***	3, 524	
SPM					-.37***					-.40***					-.37***
ESB					.06					-.00					-.08
RC					.22***					.18***					.22***
	<i>DAX Adaptive</i>														
	<i>R²</i>	<i>R²Δ</i>	<i>FΔ</i>	<i>df</i>	<i>β</i>										
1 st Step	.03	.03	4.74**	3, 527											
Gender					-.15***										
Age					.10*										
Last year km					-.01										
2 nd Step	.17	.15	31.15***	3, 524											
SPM					.43***										
ESB					.05										
RC					-.14**										

Note. * $p < 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

Table 9*The Relationship between the M-PDBQ Factors and Safety Outcomes*

	<i>Frequency of near miss involvement</i>					<i>Number of speeding tickets</i>					<i>Number of total tickets</i>				
	<i>R²</i>	<i>R²Δ</i>	<i>FΔ</i>	<i>df</i>	<i>β</i>	<i>R²</i>	<i>R²Δ</i>	<i>FΔ</i>	<i>df</i>	<i>β</i>	<i>R²</i>	<i>R²Δ</i>	<i>FΔ</i>	<i>df</i>	<i>β</i>
1 st Step	.02	.02	3.89**	3, 609		.07	.07	15.03***	3, 582		.04	.04	7.35***	3, 592	
Gender					.06					.15***					.09*
Age					-.10*					-.02					-.00
Last year km					.084*					.19***					.14***
2 nd Step	.03	.02	3.11*	3, 606		.10	.03	5.98***	3, 579		.05	.01	2.80*	3, 589	
SPM					-.12*					-.01					-.10
ESB					-.03					-.18***					-.07
RC					.14**					.05					-.07

Note. * $p < 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

related to violations. For the second step, higher SPM and ESB engagement were connected to fewer violations, whereas higher RC was correlated to more violations.

For the incremental validity evidence of the M-PDBQ in predicting risky driver behaviors, two separate hierarchical regression analyses were conducted. After entering the related variables in the three steps described above, errors and violation factors of DBQ were entered separately as dependent variables. For errors, the overall model was not significant ($p > .05$). For violations, the overall model predicted a 27% variance in violations ($R^2 = .27$, $F(8, 497) = 22.17$, $p < .001$). In particular, the first step explained that an 8% variance in violations with being male and having higher mileage were linked to more violations, whereas being older was related to fewer violations. After controlling for demographics, the second step accounted for a 10% variance in violations. Higher levels of PDBS and PADI Prosocial were related to fewer violations. In the third step, the factors of the M-PDBQ explained an 8% unique variance in violations over and above the variables in the first and second steps. Specifically, higher engagement with behaviors that foster smooth and proactive mobility and environmentally sustainable behaviors were associated with fewer violations, while behaviors performed to communicate risk in the traffic were linked to more violations.

3.3.5.1.2 Driving Anger Expression.

As for the relationship between the M-PDBQ factors and driving anger expression, five separate hierarchical regression analyses were conducted specifically for the verbal, physical, vehicle, aggressive (the total of the previous three types), and adaptive expression of anger. The overall regression model explained 12 % variance in verbal aggressive expression ($R^2 = .12$, $F(6, 530) = 12.15$, $p < .001$), 11% in physical aggressive expression ($R^2 = .11$, $F(6, 530) = 10.51$, $p < .001$), 16 % in using vehicle for aggressive expression ($R^2 = .16$, $F(6, 530) = 16.55$, $p < .001$), 17% in total aggressive expression ($R^2 = .17$, $F(6, 530) = 17.99$, $p < .001$), and 17% in adaptive expression ($R^2 = .17$, $F(6, 530) = 18.35$, $p < .001$) for anger. Particularly, gender, age, and last year's kilometers entered in the first step accounted for 5%, 3%, 5%, 6%, and 3% variance in verbal, physical, vehicle, aggressive, and adaptive expression, respectively. Being male was related to a

more verbal, physical, vehicle, and aggressive expression of anger, whereas being female was connected to a more adaptive expression of anger. Also, being younger was associated with higher levels of verbal, vehicle, and aggressive expressions of anger, while being older was linked to a more adaptive expression of anger. In the second step, the M-PDBQ factors explained 7%, 8%, 11%, 11%, and 15% variance in verbal, physical, vehicle, aggressive, and adaptive expression, respectively. In detail, people engaging with behaviors that promote smooth and proactive mobility are less likely to perform verbal, physical, vehicle, and aggressive expressions of anger and more adaptive expressions of anger. Besides, people engaging in environmentally sustainable behaviors were less prone to verbally aggressive expression. On the contrary, people who communicate risk with other road users tend to show more verbal, physical, vehicle, and aggressive anger and are less likely to adaptively express anger.

Secondly, the incremental validity evidence of the M-PDBQ was investigated in predicting driving anger expression. After entering the related variables in three steps described above, the factors of the DAX (i.e., verbal, physical, vehicle, total aggressive, and adaptive expression) were separately used as dependent variables. Therefore, five separate hierarchical regression analyses were carried out. According to the results, the overall models predicted 14% variance in verbal expression ($R^2 = .14$, $F(8, 498) = 9.91$, $p < .001$), 11% variance in physical expression ($R^2 = .11$, $F(8, 498) = 7.88$, $p < .001$), 18% variance in using vehicle for anger expression ($R^2 = .18$, $F(8, 498) = 13.46$, $p < .001$), 19% in total aggressive expression ($R^2 = .19$, $F(8, 498) = 14.56$, $p < .001$), and 19% in adaptive expression of anger ($R^2 = .19$, $F(8, 498) = 14.15$, $p < .001$). The significant contribution of each variable respective to their first entered steps was presented in Table 10. After controlling for the effects of demographics (gender, age, last year's km) in the first step and existing positive driver behavior inventories (PDBS and PADI Prosocial) in the second step, the factors of the M-PDBQ explained an additional 6% variance in verbal expression, 6% variance in physical expression, 5% variance in using vehicle for anger expression, 7% in total aggressive expression, and 4% in adaptive expression of anger in third step (see $R^2\Delta$ in Table 10). In other words, the factors of the M-PDBQ have an

incremental validity in explaining driving anger expression beyond the PDBS and PADI Prosocial.

3.3.5.2 The Relationship between the M-PDBQ Factors and Safety Outcomes.

Hierarchical regression analysis was conducted to investigate the relationship between the M-PDBQ factors and safety outcomes, i.e., near misses, accidents, and traffic tickets. In all the analyses, the first step included gender, age, and last year's kilometers as control variables. In the second step, the factors of the M-PDBQ were added to the analysis. Safety outcomes were separately entered into the analyses. Significant results are presented in Table 9.

In particular significant results were found for near-miss involvement in the last year, speeding tickets, and total tickets. However, no significant relationships were found for other safety outcomes, such as active and passive accidents, the total number of accidents, the number of near-misses in the last month, and other types of traffic tickets (e.g., parking, overtaking, redlight, alcohol, and other tickets); thus, they were not reported. In summary, our findings indicated that the positive driver behaviors measured by the M-PDBQ were linked to near-miss incidents in the previous year, speeding tickets, and the total number of traffic tickets received within the past three years. Conversely, these behaviors showed no associations with active and passive accidents, the overall number of accidents, the number of near-misses in the last month, and other types of traffic tickets received in the past three years.

3.3.5.2.1 *Near-miss Involvement.*

Regarding the relationship between the M-PDBQ and frequency of near-miss involvement in the last year, the analysis showed that the overall regression model predicted a 3% variance in the frequency of near-miss involvement ($R^2 = .03$, $F(6, 612) = 3.52$, $p = .002$). Gender, age, and last year's kilometers predicted a 2% variance in near-miss involvement. Age showed a negative association, while kilometers driven exhibited a positive relationship with near-miss involvement. After controlling the effects of gender, age, and kilometers driven, step two also predicted a 2% variance in near-miss involvement. In

particular, being more engaged in smooth and proactive mobility was linked to a decrease in near-miss involvement, while higher levels of risk communication were associated with an increase in near-miss involvement.

3.3.5.2.2 *Speeding Tickets.*

For traffic tickets, the model was significant for the relationship between the M-PDBQ and the number of speeding tickets received in the last three years. The overall regression model predicted a 10% variance in the number of speeding tickets ($R^2 = .10$, $F(6, 585) = 10.7$, $p < .001$). The control variables in the first step explained the 7% variance. Males and drivers with higher mileage were more likely to get speeding tickets. In the second step, after controlling for the demographics, the factors of the M-PDBQ explained a 3% variance in speeding tickets. Only environmentally sustainable behaviors significantly predicted speeding tickets in which greater engagement with ESB was associated with fewer speeding tickets.

3.3.5.2.3 *Total Traffic Tickets.*

Lastly, the total number of traffic tickets was predicted by the M-PDBQ. The model explained a 5% variance in the total number of traffic tickets ($R^2 = .05$, $F(6, 595) = 5.11$, $p < .001$). The first step accounted for a 4% variance. Male drivers and drivers with higher mileage were more likely to receive traffic tickets. After controlling the effects of demographics, the M-PDBQ factors explained only 1 % variance in traffic tickets. A negative relationship between the M-PDBQ and traffic tickets was observed in correlations; however, no specific factor of the M-PDBQ contributed significantly to this relationship.

3.4 Discussion

In the main study, first, the factor structure of the M-PDBQ and its psychometric properties were explored. For this purpose, the reliability and validity evidences of the new questionnaire were examined. Moreover, the correlations between the, as well as the M-PDBQ factors and driver skills, driving anger expression, and personality, were

explored. After that, the M-PDBQ's relationship with critical demographics and driving-related variables was investigated. Specifically, the group comparisons across different gender, age driving experience, accident histories, and speeding ticket groups on the factors of the M-PDBQ were conducted. Following these analyses, the relationship between the M-PDBQ factors and critical driving (risky driver behaviors and driving anger expression) and safety (e.g., near-miss, speeding ticket, total traffic ticket) outcomes were explored.

3.4.1 The Multidimensional Nature of Positive Driver Behaviors

The current study showed that the Multidimensional Positive Driver Behavior Questionnaire (the M-PDBQ) measures drivers' tendencies to engage in positive driver behaviors with 53 items in three key aspects, namely smooth and proactive mobility, environmentally sustainable behaviors, and risk communication. The 3-factor structure of the M-PDBQ supported the assumption that positive driver behaviors are, in fact, multidimensional as opposed to the single-factor measures in the literature (Harris et al., 2014; Özkan & Lajunen, 2005). Moreover, the factors showed the different aspects and functions of positive driver behaviors in the traffic environment. Accordingly, positive driver behaviors are related to smooth and proactive mobility, so they include favor flow and include safety emphasis. They are expressed in traffic as environmentally sustainable behaviors, which points out that they are responsible driving behaviors regarding environmental perspective. Also, they are performed to communicate risk in the traffic, in which the “risk” points out the importance of safety concern and the “communication” relates to consideration for others in engaging in positive driver behaviors. These three aspects of positive driver behaviors were discussed in terms of different goals of transportation (McKnight & Adams, 1972, p.7).

3.4.1.1 Smooth and Proactive Mobility.

The first factor suggested that performing positive driver behaviors is related to smooth traffic flow. In a similar vein, Dogan et al. (2011) mentioned that time-saving is an essential goal of driving. Likewise, smooth traffic flow reduces environmental pollution,

Table 10*Incremental Validity of the M-PDBQ*

	DBQ Errors					DBQ Violations					DAX Verbal				
	R^2	$R^2\Delta$	$F\Delta$	df	β	R^2	$R^2\Delta$	$F\Delta$	df	β	R^2	$R^2\Delta$	$F\Delta$	df	β
1st Step	.02	.02	3.37*	3, 494		.08	.08	13.90***	3, 494		.05	.05	8.34***	3, 495	
Gender					.05					.12**					.08
Age					-.11*					-.23***					-.21***
Last year km					-.10*					.14**					.06
2nd Step	.23	.21	66.77***	2, 492		.18	.10	31.41***	2, 492		.08	.03	7.68***	3, 493	
PDBS					-.09					-.13**					-.06
PADI Prosocial					-.43***					-.25***					-.14**
3rd Step	.23	.00	.33	3, 489		.27	.08	18.64***	3, 489		.14	.06	11.84***	3, 490	
SPM					-.07					-.27***					-.16*
ESB					.01					-.24***					-.26***
RC					.01					.25***					.14**
	DAX Physical					DAX Vehicle					DAX Aggressive				
	R^2	$R^2\Delta$	$F\Delta$	df	β	R^2	$R^2\Delta$	$F\Delta$	df	β	R^2	$R^2\Delta$	$F\Delta$	df	β
1st Step	.02	.02	3.78*	3, 495		.05	.05	9.23***	3, 495		.05	.05	9.47***	3, 495	
Gender					.15***					.20***					.18***
Age					-.02					-.15***					-.18***
Last year km					.00					.04					.05
2nd Step	.06	.03	8.95***	2, 493		.13	.08	21.73***	2, 493		.13	.07	13.65***	3, 493	
PDBS					-.00					-.07					-.06
PADI Prosocial					-.19***					-.24***					-.24***
3rd Step	.11	.06	10.57***	3, 490		.18	.05	10.06***	3, 490		.19	.07	13.65***	3, 490	
SPM					-.35***					-.35***					-.35***
ESB					.05					-.04					-.13*
RC					.21***					.18***					.22***

Note. * $p < 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

Table 10*(continued) Incremental Validity of the M-PDBQ*

	<i>DAX Adaptive</i>				
	<i>R²</i>	<i>R²Δ</i>	<i>FΔ</i>	<i>df</i>	<i>β</i>
1st Step	.02	.02	3.91**	3, 495	
Gender					-.15**
Age					.06*
Last year km					.00
2nd Step	.15	.13	37.63***	2, 493	
PDBS					.26***
PADI Prosocial					.16**
3rd Step	.19	.04	7.07***	3, 490	
SPM					.28***
ESB					.06
RC					-.14**

Note. * $p < 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

enhances road users' life quality, and saves money (Markakis et al., 2022). Likewise, McKnight and Adams (1972, p.7) explained *efficiency* as one of the goals of transportation. Efficiency was referred to as avoiding disrupting the traffic flow via performing the correct behavior that enables smooth traffic flow. For example, positioning the vehicle in the correct lane to make a turn without causing any delays to the traffic is an example provided for efficient transportation (McKnight & Adams, 1972, p.7) that perfectly aligns with the smooth mobility dimension that emerged in the M-PDBQ.

Moreover, proactive mobility refers to positive driver behaviors being performed to prevent or avoid accident risk. Therefore, the cautionary behaviors performed in the traffic- behaviors other than following traffic rules - and behaviors performed to enable safety in the traffic could be evaluated as proactive, positive driver behaviors. This factor is in line with the *safety* goal of transportation that is mentioned by McKnight and Adams (1972, p.7). Accordingly, safe transportation aims to minimize the possibility of injury and damage. Given that intersections or roundabouts are one of the conflicting points in traffic, McKnight and Adams mentioned that yielding right-of-way at intersections is an

example of safe transportation. This example matches well with the proactive positive driver behaviors factor of the M-PDBQ.

Furthermore, as opposed to reactive behaviors, which are performed as a response to an incident (like the Safety-I approach), proactive behaviors aim to play a preventive role, or a barrier, in the system. As in the Swiss-cheese model of Reason (1990), positive driver behaviors in traffic function as barriers/defenses/safeguards in the system that potentially prevent undesired incidents. Thus, building these defenses in the system is a proactive measure taken to mitigate the effects of traffic incidents. This view coincides with the Safety-II approach as well as the safe system approach. Both favor the proactive perspective in road safety management (Hollnagel, n.d.; Shinar & Gurion, 2019).

3.4.1.2 Environmentally Sustainable Behaviors.

Environmentally sustainable behaviors are about engaging in eco-friendly driver behaviors. McKnight and Adams (1972, p.7) mentioned *responsibility* as one of the goals of transportation. Responsibility in the transportation context refers to holding moral and monetary responsibility for the consequences of one's actions. For example, driving at a steady speed relates to fuel-saving and reducing environmental pollution which was the example provided by McKnight and Adams for responsible driving style. Inspired by the eco-driving studies (e.g., Barkenbus, 2010; Dogan et al., 2011), the eco-friendly driving style emerged as part of positive driver behaviors in this study.

In the current study, environmentally sustainable driving behaviors emerged as part of the positive driver behaviors. Specific examples regarding making fuel economy, reducing air pollution, and ensuring the vehicle's and its parts' long service life are all related to sustainable and responsible, thus, positive driver behaviors. With this respect, the current study also contributed to the literature on human factors in driving by introducing sustainable driving behaviors as part of positive driver behaviors to the literature.

3.4.1.3 Risk Communication.

Parallel to the proactive behaviors in the first factor, risk communication emerged as a separate factor of positive driver behaviors in our sample. It contains safety and consideration for others, which aim to warn other road users of potentially dangerous traffic situations proactively. This factor also coincides with the *safe transportation* goal (McKnight and Adams, 1972, p.7), which aims to minimize a casualty in traffic. Although the behaviors in this factor are reported to be performed with positive intentions, there is a possibility that the message (e.g., warning other road users in case of a risk) sent by the driver who perceived the risk may not be accurately or timely perceived by the warned road user. The further relationships were discussed in the following sections.

Altogether, these three factors of the M-PDBQ being related to the main goals of driving confirms that positive driver behaviors are part of the daily functioning of transportation. Positive driver behaviors facilitate efficient, responsible, and safe transportation. Also, they directly or indirectly contribute to traffic safety by providing a compensatory, facilitative, responsible, protective, and considerate approach against various traffic situations faced in the system. In that sense, positive driver behaviors are essential to daily driving. These functions of positive driver behaviors contribute to the traffic system being resilient and flexible in the face of danger, thus safer.

It should also be noted that a 3-factor solution was accepted as the best fit for the data unlike the four theoretical dimensions proposed in Study 1. As opposed to separately identified factors in Study 1, smooth mobility and proactive mobility factors are grouped under one factor in the main study. The fact that smooth mobility and proactive mobility are loaded under one factor, in fact, concurs with the previous literature. The first factor of the M-PDBQ is an elaborated version of the items in the existing literature that covers traffic flow items (Özkan & Lajunen, 2005) and safety-related items (Harris et al., 2014). Thus, these two components emerging under the same factor would indicate the previously evidenced single-factor structure of the construct. On the other hand, another possible explanation would be the proactive nature of the smooth mobility items. The

smooth mobility component includes behaviors performed to prevent or relieve traffic congestion, which is proactive in nature. Environmentally sustainable behaviors emerged as a separate factor as proposed; on the other hand, the polite and patient behaviors items were either not loaded onto any factor or loaded onto the smooth and proactive mobility factor. Since the polite and patient behaviors included yielding behaviors and proactive intentions in performing the given action, it is reasonable they loaded onto the first factor. Lastly, although it has safety-related items that are also proactive, risk communication emerged as a separate factor as a result of factor analysis. These items become a separate factor could be due to the use of similar expressions in the formation of the items and similarity across the sentence structuring of the items (e.g., “warning others in case something risky emerges in the traffic”).

3.4.2 A Reliable and Valid Measure: The Multidimensional Positive Driver Behavior Questionnaire

The M-PDBQ showed good reliability (internal consistency, split-half reliabilities, test-retest) and validity evidence (convergent, discriminant, incremental validities). In particular, all three factors of the M-PDBQ showed good internal reliability coefficients above .83. Also, the three-week test-retest reliability displayed above .75 correlation among all pairs of factors. Lastly, the split-half reliability coefficient for the total questionnaire was above .95. All these reliability scores proved that the M-PDBQ is a reliable measure.

With respect to validity properties, the convergent validity of the new questionnaire was tested with PDBQ and PADI-Prosocal. The observed moderate to high correlations between the new questionnaire and similar measures showed that the new questionnaire captures the intended construct. On the other hand, discriminant validity was investigated by correlating the factors of the new questionnaire with the factors of the DBQ. The observed low to moderate correlations between these two showed that the new questionnaire is a distinct measure and discriminates from other constructs of driver behaviors. Last but not least, incremental validity evidence was provided for the M-

PDBQ. After controlling for the effects of demographics and existing positive driver behaviors measures, the M-PDBQ provided significant additional variance in explaining risky driver behaviors (e.g., violations) and driving anger expression factors. This result provided evidence for the unique contribution of the M-PDBQ in explaining driving outcomes.

3.4.3 Empirical Discussion of the Findings

3.4.3.1 The M-PDBQ Factors and Demographics.

Group comparisons showed that females tend to exhibit behaviors that foster smooth and proactive mobility (e.g., give way, take precautions) more than males, while no significant gender difference was observed for the environmentally sustainable behaviors (i.e., responsible driving) and communicate risk in the traffic (e.g., warn other road users). Similar findings regarding female drivers engaging in more positive driver behaviors (Harris et al., 2014; Matović et al., 2020; Shen, Qu, et al., 2018) and giving way (Li et al., 2023) have been shown previously. For environmentally sustainable driver behaviors, mixed findings were reported in the literature suggesting that female drivers are better at fuel economy than male drivers in uncongested traffic, whereas the situation is reversed during peak hours (Zhang et al., 2020). Furthermore, older drivers, as well as drivers with higher driving experience reported higher engagement with smooth and proactive mobility. Also, older drivers reported performing more environmentally sustainable behaviors than younger drivers. The previous studies also showed that being older (Bıçaksız & Özkan, 2016; Ersan et al., 2019; Guého et al., 2014; Harris et al., 2014; Maslač et al., 2018; Matović et al., 2020) and experienced (Maslač et al., 2018) were related to higher frequencies of positive driver behaviors. Older and more experienced drivers are likely to have greater exposure to diverse traffic scenarios and possess more automatic vehicle handling skills. These automatic reflexes allow them more opportunities to interact with other road users and navigate the traffic environment efficiently. In contrast, novice drivers tend to focus primarily on fundamental driving tasks, such as vehicle handling and adhering to formal traffic regulations. As a result, they may be less

aware of their surroundings, resulting in less engagement with positive behaviors. Even if they are aware, they may lack the necessary skills to execute specific compensatory actions, leading to a tendency to ignore engaging in positive driver behaviors. On the other hand, no significant difference for different experience groups was observed in environmentally sustainable behaviors and risk communication. It means that these factors of positive driver behaviors are performed regardless of one's experience in driving.

3.4.3.2 The M-PDBQ Factors and Road Safety.

3.4.3.2.1 Direct Link with Accident, Near-miss, and Traffic Tickets

Positive driver behaviors measured with the M-PDBQ suggested a direct safety connection; however, the strength of the observed relationships was not strong enough to draw definitive conclusions. Specifically, the smooth and proactive mobility factor showed a significant reverse but small correlation with the number of active and total accidents. Also, negative relationships between the smooth and proactive mobility dimension and near-miss involvement, as well as environmentally sustainable behaviors and speeding tickets, and positive relationships between the risk communication factor and speeding tickets were noted from the regression analyses. However, the highest explained variance, 3% between ESB and speeding tickets, was still small. Hence, it is concluded that there is a weak direct link between the M-PDBQ factors and critical safety outcomes which aligns with the existing literature (Harris et al., 2014; Matović et al., 2020; Wang et al., 2018).

Moreover, group comparisons showed that people with no accident history engaged in behaviors promoting smooth and proactive mobility and environmental sustainability more than those with an accident history. In other words, accident-free drivers were likelier to engage in positive driver behaviors. Similarly, higher engagement with SPM and ESB were noted for people with no speeding ticket history than those with a speeding ticket history. These results implied that speeding drivers were less likely to engage in positive driver behaviors. Non-speeders were likelier to engage in positive driver behaviors, precisely smooth and proactive mobility, and environmentally sustainable

behaviors. To conclude, drivers with no accident history and no speeding ticket history were likelier to show positive driver behaviors. In other words, safer drivers showed more positive driver behaviors.

3.4.3.2.2 Indirect Link with Driver Skills, Driver Behaviors, and Driving Anger Expression.

As compared to the relationship between the factors of the M-PDBQ and safety outcomes, relatively strong associations (i.e., moderate degree correlations) were observed between the factors of the M-PDBQ and driver skills, suggesting that the positive driver behaviors were positively related to safety skills and perceptual motor skills. Stronger associations were noted between safety skills and the factors of the M-PDBQ (see Table 6 for correlations), suggesting the safety connection of positive behaviors. The link between positive driver behaviors and driver skills has also been shown in previous studies (Öztürk et al., 2018; Üzümcüoğlu et al., 2020; Xu et al., 2018). These positive correlations imply that a certain level of driver skills is required to perform positive driver behaviors. This finding is consistent with positive driver behaviors being secondary behaviors performed over and above the primary requirements of the driving task. Moreover, the reverse connection between safety skills and the number of violations (Üzümcüoğlu et al., 2020) and safety skills and accident involvement (Özkan et al., 2006) were presented in the literature. Therefore, positive driver behaviors may be utilized in interaction with safety skills to decrease violations and road traffic accidents.

Concerning the relationship between the M-PDBQ factors and violations, regression analyses showed except for the risk communication dimension that higher positive behavior engagement was related to a lower frequency of violation engagement. Similarly, Qu and colleagues (2022) showed a negative relationship between prosocial tendencies and risky driver behaviors. Although there was a negative correlation between the M-PDBQ factors and errors, regression analyses revealed only smooth and proactive mobility factor was negatively related to errors. Although the established relationship was not causal, given that driving violations are connected to road traffic accidents (De Winter &

Dodou, 2010), our findings imply that positive driver behaviors may serve as a buffer to weaken the link between violations and accidents.

Furthermore, slightly less strong but still significant correlations were observed between the M-PDBQ and DAX factors (see Table 6 for correlations). Congruently, regression analyses also presented that engaging with positive driver behaviors (except for the risk communication factor) was related to reduced levels of aggressive anger expression and increased levels of adaptive expression of anger. A reverse relationship between prosocial tendencies and driving anger (Qu et al., 2022), positive driver behaviors and aggression (Özkan & Lajunen, 2005), and prosocial behaviors and aggressive behaviors (Dorantes Argandar et al., 2019) were also shown in the literature. Driving anger is related to increased aggressive driving, risky driver behaviors, and accident involvement (Demir et al., 2016; Wickens et al., 2016). Therefore, the presented results signal that positive driver behaviors may be a protective factor for accident involvement via decreasing aggressive anger expression and increasing adaptive expression of anger; however, this speculation requires empirical research.

3.4.3.3 Evaluating the Unexpected Findings

The risk communication dimension, referred to as warning other road users in a risky traffic situation, displayed unexpected relationships with outcome variables. Contrary to expectations, higher engagement with risk communication behaviors was associated with increased near-miss involvement, higher frequency of violations, more aggressive expression of anger, and less adaptive expression of anger.

There might be several explanations for the unexpected results. For example, there is a possibility that the wording of the items misled the participants into misunderstanding. As presented in Table 4, most items under the risk communication factor include the expression "warning others" (e.g., warning other road users in case of a risky traffic situation). Although these items had been written assuming to imply goodwill via warning other road users to prevent involvement in a likely incident, the fact that the word "warning" inherently carries a negative connotation was overlooked. This oversight might

have contributed to some participants misunderstanding the items and perceiving them as interfering with other drivers' driving styles, leading to potential biases and unexpected findings. In future studies, it would be advisable to consider using the term "informing" instead of "warning" to convey a more positive connotation that aligns with the inherent characteristic of positive driver behaviors in future studies. By using "informing," participants are more likely to perceive the actions as proactive and beneficial as intended rather than negative or interfering. This adjustment in wording may lead to more accurate responses and interpretations from participants, ultimately improving the validity and reliability of the study's results.

The other explanation assumes the participants' "correct" interpretation of the items and tries to explain the genuine reverse relationship in the study. In this case, the unexpected result might be explained by the fact that communication in a traffic environment does not foster a positive environment as anticipated. Even if the risk communication in traffic aims to increase the safety of other road users by proactively “helping” them, the subsidiary actions performed to enable this communication (e.g., using the hazard lights, signals, honking, changing lanes when necessary) may be perceived as a distraction, rule violation, risk-taking and such by the “warned” road users. Moreover, the message conveyed between two parties may be misperceived or not trusted depending on the requirements of the traffic. This, in turn, results in unexpected outcomes, as shown in the current study findings.

In addition, risk communication involves the sudden occurrence of a risk or sudden realization of a potential risk in the traffic environment. According to the hazard perception-response framework proposed by Barragan and colleagues (2021), there are several steps in play to form a response to a potential hazard such as detecting hazard, being consciously aware of the extent of the hazard, selecting response and executing response. In a fast-changing and dynamic traffic environment, communication of any sort requires quick action taking, which otherwise can lead to errors and undesirable outcomes in traffic. However, there is no guarantee that this communication will be adequately perceived and timely acted upon between the two parties. In other words, there is always

a possibility of the recipient misinterpreting the message or being late to act upon it. It means that communicating risk with another road user in traffic is related to the cognitive and behavioral processes of the two parties. However, since these two parties are human operators, they are fallible to inattention, wrong decision-making, delay in taking action, and the like. Such actions can create unwanted ambiguity in the traffic environment and jeopardize safety. As a result, people may be hesitant or indecisive about exhibiting behaviors concerning warning other road users when confronted with risk or responding to a warning coming from a human operator in the traffic environment.

Furthermore, environmentally sustainable behaviors were found to be not related to DAX factors, except for verbal expression. The nonsignificant associations could be explained by the fact that driving anger expression requires interaction between road users (i.e., human-to-human interaction) as in smooth and proactive mobility and risk communication. However, environmentally sustainable behaviors mainly target drivers' interaction with the environment and climate-related issues; therefore, this may be why this factor did not relate to anger expression on the roads.

3.4.4 Critical Remarks

The sample of the main study is composed of active drivers who mostly drive daily. The gender distribution of the sample was reasonably balanced. The data was collected via the snowball sampling method. Although the survey reached out to drivers in different cities in Türkiye, the generalizability of the findings may still be an issue. Further research is suggested to validate the results of the current study. The survey package consisted of many questionnaires due to the nature of the study requiring reliability and validity checks. On average, surveys have been completed in 30 minutes, which can be considered long for people to pay attention in one session. The study was a self-report study; therefore, there is a risk of socially desirable responses. Yılmaz and colleagues showed that self-reported driving inventories are vulnerable to socially desirable responses (Yılmaz et al., 2022). However, in the current study, the participants were assured of

anonymity. They were informed about the anonymity of their data at the beginning of the online survey study, which could prevent the socially desirable responses.



CHAPTER 4

4 GENERAL DISCUSSION

In the literature, a limited number of studies have investigated positive driver behaviors (Dewhurst et al., 2023; Harris et al., 2014; Kaye et al., 2022; Nandavar et al., 2019; Özkan & Lajunen, 2005). These studies have referred to positive driver behaviors with different terminologies and conceptualizations. These conceptualizations of the construct addressed various characteristics that positive driver behaviors possess. Also, due to these inconsistencies in defining the construct, measurement tools developed to measure positive driver behaviors presented inconsistent results regarding the safety connection of the construct. Due to all these reasons, in the current study, a new questionnaire that captures the multidimensional nature of positive driver behaviors have been developed. In the literature, researchers measured altruistic and safe driver behaviors with a single self-report item or a limited number of scenarios presented to prompt positive driver behavior engagement (Armitage et al., 2022; Dewhurst et al., 2023; Nandavar et al., 2019). Therefore, they mentioned a limitation of the narrow scope of the measurement method that only evaluates certain positive driver behaviors. The M-PDBQ developed in the current study provided a reliable and valid measure for measuring positive driver behaviors with various behavioral examples represented under different factors. These behavioral examples can be used in future research to exemplify the positive driver behaviors as relevant. Thus, the current thesis contributed to the literature with a new questionnaire that can be used whenever applicable (e.g., empirical studies, developing interventions and policies).

Mainly, three latent factors were extracted from the factor analysis. Accordingly, the M-PDBQ has three key aspects: positive driver behaviors, smooth and proactive mobility, environmentally sustainable behaviors, and risk communication. As a novel contribution of the current study, the safety aspect of positive driver behaviors (e.g., proactive mobility and risk communication) is recognized and identified in the scope of the M-PDBQ. In fact, the smooth and proactive mobility factor, focusing on traffic flow and safety, corresponds to the "safe mobility" goal, which is the primary goal of transportation. Moreover, for the first time in the literature, environmentally sustainable behaviors were investigated and discussed in the scope of the positive driver behaviors construct and emerged as a separate factor under the M-PDBQ. This factor also relates to the responsible transportation goal suggested by McKnight & Adams (1972). Furthermore, different ways of risk communication in traffic, i.e., to warn the other road user via flashing or honking, stood out as a separate factor that has not been identified as positive driver behaviors in the previous studies. Overall, the three-factor structure conceptually developed this area of research by introducing a new questionnaire and multidimensional factor structure.

4.1 Conceptual/Theoretical Considerations

4.1.1 Proposed Reconceptualization of the Construct “Positive Driver Behaviors”

In previous literature, positive driver behaviors were addressed with different underlying motives such as taking care of the traffic environment and politeness (Özkan & Lajunen, 2005), prosocial nature (Harris et al., 2014) altruistic motive (Nandavar et al., 2019) in separate studies. Until now, the existing literature has not proposed a unified definition that encompasses the diverse aspects of this construct despite the abundance of different perspectives that highlight the construct's depth and scope. In line with the study's last aim and based on the findings of Study 1 and the main study (e.g., factors of the M-PDBQ), the construct of positive driver behavior was reconceptualized with a comprehensive definition introducing critical aspects provided in the single definition. Accordingly, positive driver behaviors are defined as

... secondary "unofficial/unwritten behavioral codes" that develop uniquely to a given region within the interaction of person, environment and climate, and vehicle components. Positive driver behaviors are characterized by preventing the possibility of an accident via a proactive driving style, promoting smooth traffic flow, engaging in eco-friendly behaviors during driving, and communicating with other road users regarding risks in the traffic environment. The intention for engaging in positive driver behaviors alternates between having a prior intention and no prior intention.

There are several emphases in the proposed conceptualization; each one is explained in detail to communicate the thinking process behind the reconceptualization. Below, each component provided in the new definition is further explained (see Table 11 for reconceptualization).

Altogether, this definition has important emphases, each tapping into the different parts of the construct. One of the less-discovered parts of this definition is the suggestion that positive driver behaviors are intentional behaviors with prior intention (i.e., planned behaviors) or no prior intention (i.e., spontaneous behaviors).

4.1.2 Intentionality in Behaviors

The context in which the behavior is developed is an important determining factor in classifying the underlying intention. One can mention different levels of intentionality in performing specific actions in a given context. For instance, in the M-PDBQ, drivers were asked to report spontaneous actions to prevent possible accidents in traffic. The way this question is asked shows the proactive nature of spontaneous, positive driver behaviors. Example items reported by the participants are “Give the right of way to road users (drivers, pedestrians, etc.) who suddenly appear in front of me while driving.” which is loaded onto the smooth and proactive mobility factor, and “Warn the vehicles behind me with hazard lights, etc. when I see a person or animal suddenly entering the road from the

Table 11*Reconceptualization of Positive Driver Behaviors*

secondary behaviors	PDBs are performed over and above the primary requirements of the driving task (driving according to the traffic rules to move from point A to B). Performing PDBs may require specific skills (hazard anticipation, vehicle handling skills, safety skills) and readiness (vigilance, motivation, experience, etc.); thus, it is secondary to driving tasks.
unofficial/unwritten behavioral codes	PDBs are not formally defined in traffic laws and legislation like traffic rules; thus, they are unofficial/unwritten behaviors.
unique to each system	PDBs may differ across different traffic cultures/climates. Their expression within and across neighborhoods, cities, regions, and countries is open to change. Thus, PDBs are unique to each system.
develops within the interaction of person, environment and climate, and vehicle components	PDBs are performed as a response to one's interaction with other road users, vehicle and its technological functions, elements in the traffic environment, and one's connection to the ecology/climate issues.
intentional behaviors	Intention for behavior may be formed prior to action (i.e., planned action) or not (i.e., spontaneous action). It depends on the given traffic situation. Therefore, one can say that PDB is an intentional behavior involving a varying degree of prior intention.
characterized by preventing the possibility of an accident via a proactive driving style, promoting smooth traffic flow, engaging in eco-friendly behaviors, and communicating the risk in the traffic environment.	In the current study, positive driver behaviors focus on three key aspects: smooth and proactive mobility, environmentally sustainable behaviors, and risk communication. These different aspects show the multidimensional nature of the construct.

side of the road.” which is loaded on the risk communication factor. Both of these examples show the spontaneity of the action performed as a response to the requirements of a given traffic condition.

Yielding intention might spontaneously manifest itself in case of a vehicle suddenly cutting into one’s way (no prior intention), or it manifests itself in a more deliberate/conscious manner (prior intention) where a driver slows down from a distance to give way to a vehicle. Alternatively, suppose a driver foresaw that an approaching vehicle might overtake themselves even though there is no explicitly stated intention of overtaking (e.g., by giving signals, etc.). In that case, they may consider changing lanes to move away from the approaching vehicle. In this case, the yielding driver’s intention is not fully self-initiated yet not entirely spontaneous as it involves judgment, but rather, the intention is in between. Thus, the level of intentionality in behaviors might vary as a function of the contextual circumstances. Therefore, it might be plausible to suggest that intention can be considered a continuum rather than a dichotomous notion as portrayed in Reason’s taxonomy (i.e., Yes or No format). In parallel to this view, a continuum of intentional behavior was proposed and presented in Figure 1.

4.1.2.1 Continuum of Intentional Behavior.

The continuum of intentional behavior suggests that the intention ranges from prior to no prior intention, like a spectrum of intentionality. In between these two ends, various behaviors performed in the prevailing traffic situation correspond to different levels of intentionality. The logic of the representation in Figure 1 timewise coincides with Michon’s hierarchical structure of the road user task. Having a prior intention corresponds to the strategic level (use longer time, including preplanning); however, having no prior intention corresponds to the control level (use shorter time, automatic behaviors) in Michon’s hierarchy. The middle ground between these two ends corresponds to the maneuvering level, also called the tactical level, which requires longer time to perform a task than the control level and shorter time than the strategic level (Michon, 1985). As a result, the timing depicted in the hierarchy also coincides with the proposed continuum

where actions performed with no prior intention happen so quickly while actions with prior intention have more time to be performed.

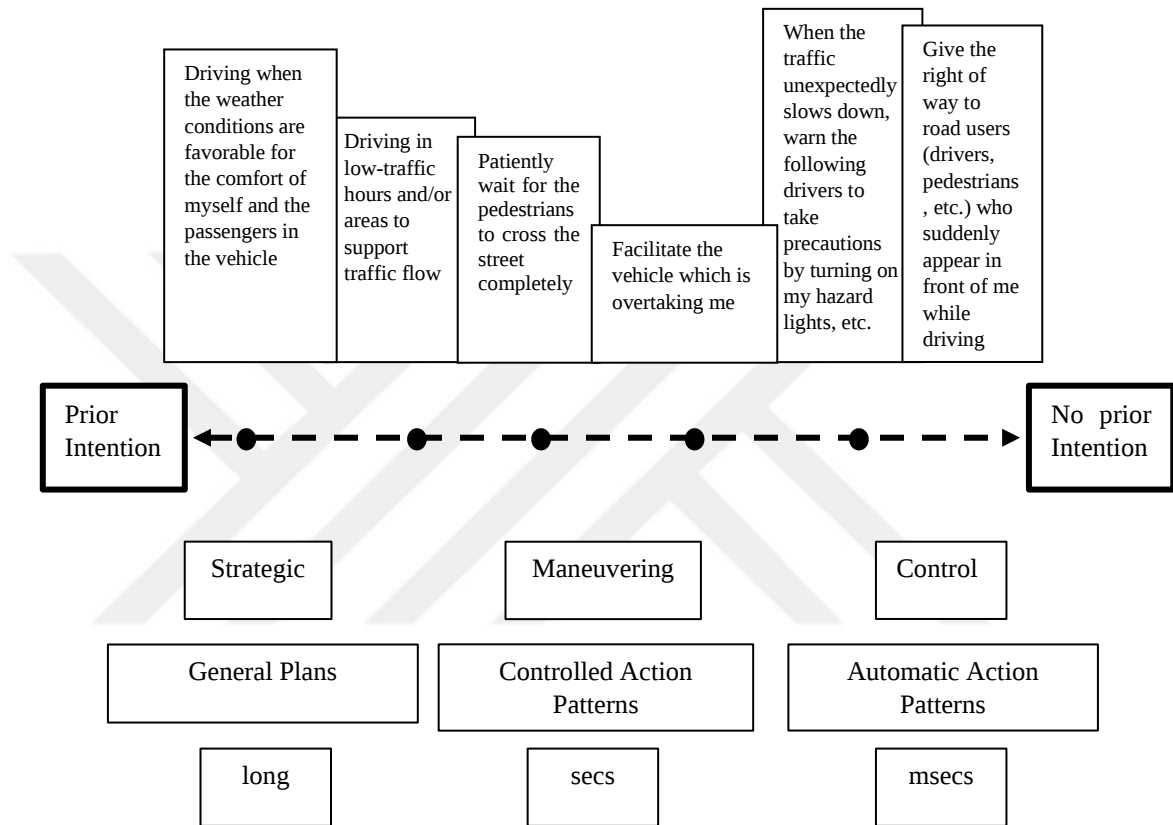


Figure 1. *Proposed continuum for intentional behavior joined with Michon's hierarchical structure of the road user task*

This demonstration is intended to provide a basis that guides road safety researchers in driver behavior studies. Knowing what kind of intention lies behind the behavior and how long before the behavior is planned provides a cognitive and behavioral theoretical basis for road safety interventions to be developed. Furthermore, although behavioral examples related to positive driver behaviors were presented in Figure 1, the logic of continuum could apply to any intentional behaviors (e.g., risky driver behaviors). For example, Demir and colleagues showed that pedestrian violations are mostly socially reactive behaviors

rather than deliberate ones (2019). This finding suggests that deliberate pedestrian violations (e.g., planned behaviors) and pedestrian violations are engaged as a response to the constantly changing demands of the environment (e.g., spontaneous behaviors).

4.1.2.2 Positive Driver Behaviors: Reasoned vs. Socially Reactive, or Both.

Prototype Willingness Theory (PWT; Gerrard et al., 2008) defines that there are non-intentional but volitional behaviors (i.e., no prior intention but intention in action) and that behavioral willingness -being open to engaging in given behavior- determines if the behavior is performed. This is called a social reaction path. On the other hand, the intentional route in Reason's human error taxonomy (1990) may coincide with the reasoned path that PWT (Gerrard et al., 2008) explains as the deliberative and analytical decision-making process. This theory suggests that intention drives action in the reasoned path, while willingness is in the social reaction path. The similarity between the reasoned path and planned behaviors, and the socially reactive path and spontaneous behaviors, are worth exploring.

According to PWT, reasoned and social reactive pathways usually operate simultaneously (Gerrard et al., 2008). Thus, it may be plausible to infer that positive driver behaviors operate through both reasoned (i.e., with prior intention) and social reactive pathways (i.e., without prior intention). One study (Nandavar et al., 2019) indicated that intention explains small yet significant variance in positive driver behaviors, which provides evidence for positive driver behaviors following a reasoned pathway. Also, in the same study, authors draw attention to the intention-behavior gap, suggesting exploring the social reactive pathway for spontaneous driving-related decisions (Nandavar et al., 2019). In the current study, it is suggested that in addition to socially reactive and reasoned paths, there may also be other paths that explain the gap between intention and behavior. These alternative paths might correspond to the middle ground between the no prior intention and prior intention presented in the continuum (see Figure 1 for the proposed continuum).

To the author's knowledge, there is no previous effort/research explicitly focusing on discovering spontaneous behaviors in the traffic environment. Therefore, this study is the

first study that suggests investigating spontaneous driver behaviors in a road safety context. The spontaneous behaviors were conceptualized from a positive driver behavior perspective in line with the current study's focus, and behavioral examples were explored. The varying levels of intentional behaviors, from spontaneous to planned, extend the current knowledge of intentional behavior in the literature. Hopefully, this attempt will contribute to exploring spontaneous driver behaviors in the literature and their association with road safety in an attempt to develop effective road safety interventions.

Overall, the multidimensional nature of positive driver behaviors performed with a varying degree of intentionality (including no prior intention and prior intention) seems to be worth investigating from the perspective of both reasoned and social reaction paths in PWT. In addition to the theoretical investigation of the construct of positive drivers' behaviors, it is also worth investigating the construct's manifestation across cultures. The items of the M-PDBQ contain several cultural practices reflected in the behavioral expression of positive driver behaviors (e.g., risk communication items), which point out the culture-dependent nature of positive driver behaviors.

4.1.3 The Role of Culture in the Expression of Positive Driver Behaviors

Positive driver behaviors, as mentioned in the comprehensive definition, are referred to as *“secondary unofficial/unwritten behavioral codes that develop uniquely to a given region within the interaction of person, environment and climate, and vehicle components.”* In other words, these behaviors are not formally recognized and are open to change depending on the traffic culture and climate of different regions. Although the factor “risk communication” has been identified in the current sample as a separate factor under the M-PDBQ, it is speculated that this factor may be more culture-specific than the other factors. Just like the other items of the M-PDBQ, were reported by the drivers driving in the different cities of Türkiye reported the risk communication items. For example, in one study, the traffic climate in Türkiye is perceived as more demanding (cognitively and emotionally demanding) and less functional than the traffic climate in Sweden (Öztürk et al., 2022). In other words, Turkish drivers perceived the traffic in Türkiye as more chaotic

and demanding because it requires being vigilant and less safe and harmonious. This type of traffic environment can be considered to provide an environment conducive to the emergence, adoption and expression of informal traffic or rules of conduct. For instance, the emergence of the risk communication dimension as a separate factor in Turkey can be explained as a necessity of efforts to ensure safety in the chaotic, demanding and less safe and harmonious traffic environment in Turkey.

Similarly, in Westrum's organizational culture typology, each country/organization/unit has its way of responding to the problems (Westrum, 2004). Accordingly, three patterns of culture were identified: pathological, bureaucratic, and generative. Later, Parker and colleagues suggested two additional levels (reactive and proactive) and thus proposed five levels of safety culture: pathological culture being the lowest level, reactive, calculative (bureaucratic), and generative being the highest level (Parker et al., 2006). While pathological cultures do not care about safety unless there is a punishment, reactive cultures react after an incident happens. In calculative (bureaucratic) cultures, people are willing to manage the risk, but, unlike proactive cultures, they try to foresee safety problems before they happen. On the other hand, generative cultures build their system by prioritizing health and safety practices; thus, they are classified as high-reliability cultures. In general, people in Türkiye are less likely to obey the traffic rules, and there is no regular enforcement applied when the rules are violated (Nordfjærn et al., 2014; Öztürk et al., 2022; Üzümcüoğlu et al., 2019). When an accident occurs, there is a response to prevent future accidents from happening, but it is mostly reactive. On the other hand, there are specific efforts to build capacity for better road safety management in Türkiye (*Karayolu Trafik Güvenliği Eylem Planı 2021-2023*, 2021; *Karayolu Trafik Güvenliği Strateji Belgesi 2021-2030*, 2021). All these findings are considered together: Türkiye's overall traffic safety culture could be classified below calculative or bureaucratic culture (Westrum, 2004) and above reactive culture (Parker et al., 2006). As opposed to the proactive or generative cultures, there might be more room for unofficial driving codes to develop in a pathological, reactive, and maybe calculative culture. A chaotic and demanding traffic climate and reactive to calculative level safety culture in Türkiye might

explain the emergence of positive driver behaviors and people's engagement with these behaviors.

Still, among the three factors of the M-PDBQ, risk communication seems to be the most culturally relevant factor compared to the SPM and ESB. Therefore, this factor may be unique to Türkiye or to countries that have similar traffic climate characteristics to Türkiye. It is suggested that future studies adapt the M-PDBQ to their country and compare the similarities and differences in positive driver behaviors across countries and regions.

4.2 Implications of the Study

In the literature, *prosocial* behavior measurements are divided into two categories: global and specific measurements (Luengo Kanacri et al., 2021). Global measurements of prosocial behaviors are more likely to be perceived as a measurement of an individual disposition or tendency to behave in a prosocial manner (Luengo Kanacri et al., 2021). Therefore, they are mostly utilized by integrating them into a more extensive questionnaire that investigates various research questions. On the other hand, specific measurements such as helping, caring, sharing or donating, or empathic feelings/concern enable exploring the underlying psychological mechanisms, motives, and cognitions involved in given behavioral expression (Luengo Kanacri et al., 2021). Therefore, these specific measurements were utilized in studies focusing on specific subjects. In the current study, the M-PDBQ factors showed low to moderate correlations with personality dimensions. People with certain personality characteristics tend to show more positive driver behaviors. This result offers evidence for the M-PDBQ measuring the driver's disposition to behave positively in driving. In this regard, it can be reasonable to conclude that the M-PDBQ provides a tool for studies interested in the global measurement of positive driver behaviors, i.e., to measure positive driver behavior tendencies of drivers.

On the other hand, relatively higher correlations were noted between driver skills and positive driver behaviors, which suggest that positive driver behaviors can be trained and improved via driver skills training and like. In other words, this finding proposes an

opposing view to considering PDBs as individual predispositions; instead, it approaches positive driver behavior as a modifiable construct that has potential for use in intervention programs. In this case, specific types of positive driver behaviors (e.g., smooth mobility, proactive mobility, environmental behaviors, risk communication) could be the subject of the training, leading to utilizing each and separating the M-PDBQ factor for specific research purposes. Moreover, each subfactor in the M-PDBQ emerged as an independent factor with good internal reliabilities; therefore, each factor can be utilized as a specific measure in different studies. In this manner, researchers would have the opportunity to delve into more intricate connections that arise from each subfactor of positive driver behaviors. The findings could then be harnessed to create road safety interventions with greater effectiveness.

4.2.1 Road Safety Interventions

The results of the current study can be utilized for intervention purposes. Specifically, intervention programs focusing on behavior change by reducing aggressive driving or road anger and committing violations might benefit from promoting positive driver behaviors. These programs can integrate content that promotes positive driver behavior shown in the M-PDBQ into their curriculum. Haustein and colleagues incorporated cognitive-behavioral techniques into the road anger intervention program (Haustein et al., 2021) aiming to promote adaptive coping with anger in traffic. Likewise, the wide range of behavioral examples in the M-PDBQ may be utilized as training material for intervention programs. In addition to practicing cognitive behavior change strategies such as reappraisal, perspective taking, and reframing, drivers can also receive training through real-life case scenarios on handling conflicts. For instance, a repertoire of positive behavioral responses can be developed for commonly encountered real-life traffic conflicts. Drivers' behavioral repertoire can be expanded by teaching them to perform positive driver behaviors in response to situations that, for instance, provoke anger. This way, drivers can choose the most appropriate response from the repertoire in a given traffic situation. Thus, positive behaviors as compensatory mechanisms for accidents (e.g., proactive mobility, risk communication) and as the catalyzers of traffic flow (smooth

mobility) may serve a function for handling road anger. For the reverse relationship between positive driver behaviors and violations taken into consideration, the factors of the M-PDBQ also offer a tool that can be utilized for developing a similar intervention program that targets the rehabilitation of the offending drivers.

Furthermore, road safety messages could utilize the findings of the current study. The change in behavior can be facilitated by emphasizing the desired qualities of drivers. For instance, the characteristics of drivers, such as good, safe, responsible, eco-friendly, considerate, and polite drivers, may be promoted in road safety messages to influence the public appeal positively towards safe and sustainable driving practices (Armitage et al., 2022; Dewhurst et al., 2023; Harré, 2000). Instead of emphasizing dangerous driver behaviors and their undesired consequences, examples of positive driver behaviors presented in the M-PDBQ paired with desirable consequences, such as yielding to others, helping other road users, accelerating traffic flow, preventing incidents from happening, saving fuel, and exercising green driver behaviors may be promoted to facilitate the desired change.

Also, certain personality characteristics paired with specific behaviors may resonate with targeted audiences as well. The following messages can be drawn from this study: agreeable people give way to others, agreeable drivers are safe drivers, conscientious people are the catalyzers of the traffic flow, and conscientious drivers are eco-friendly drivers. Promoting desirable drivers' qualities might gain the general public's sympathy and encourage positive driver behaviors. Therefore, it is suggested that future studies investigate the impact of *positive* road safety messages on driver behaviors and road safety.

4.2.2 Driver Training

The M-PDBQ factors presented moderate to high correlations with driver skills. This means that people with improved driver skills show a higher prevalence of positive driver behaviors. Luckily, driver skills improve with training (Lajunen & Özkan, 2021). For example, risk awareness and anticipation training (RAPT) might help teach effective

monitoring skills in a driving environment (Horswill & Hill, 2021). In this way, drivers remain vigilant ahead of time when facing potential dangers or have more time to make informed decisions in risky situations. These possibilities pave the way to engage in behaviors that promote smooth and proactive mobility, communicate risk with other road users, and so on. Therefore, any training in improving driver skills might indirectly increase the chance of positive driver behavior engagement in traffic or vice versa.

4.2.3 *Creating a Positive Traffic Climate*

Last but not least, positive driver behaviors may be harnessed to create a positive traffic climate. A qualitative study conducted by Kleisen (2013) displayed the concept of reciprocity in traffic, with the term “car karma”. It is best explained in the following quotation:

Liam: Yeah. Definitely, like just on the weekend when I was in Sydney, if someone’s let you in, you feel quite obliged to let someone else in, and you always have that karma situation, and then as soon as someone cuts you off, you do not want to let them in at all but then they find that gap, and it is not a gap, and they will go for it, and it will just irritate you more. So yeah, I believe there is car karma. [all chuckle]
So yeah. (Kleisen et al., 2013, p. 710)

Indeed, a similar behavioral example was reported in the semi-structured interview, and included in the M-PDBQ, “When someone helps me in traffic, assist someone else at a later point in my journey.” Though this item has not loaded onto any factor in the current study, it points out a possible function that positive driver behaviors may serve within a traffic culture. Positive driver behaviors could facilitate a positive driver atmosphere in traffic environments.

Moreover, in countries like Türkiye, where people are less likely to follow traffic rules and enforcement is insufficient and inconsistently applied to violating drivers (Nordfjærn et al., 2014; Öztürk et al., 2022; Üzümcüoğlu et al., 2019), positive driver behavior may also serve a function of bringing order into the chaotic traffic system. Positive driver

behaviors may emerge to compensate for others' faulty behaviors or regulate a traffic flow to enable a functioning and positive traffic environment. It is suggested that future studies investigate cultural representations and functions of positive driver behaviors.



CHAPTER 5

5 CONCLUSION

The current study contributed to the nascent body of literature on positive driver behaviors conceptually, methodologically, and empirically. The multidimensional nature of the positive driver behaviors was explored and a new reliable and valid questionnaire has been developed, the Multidimensional Positive Driver Behavior Questionnaire. The relationships between positive driver behaviors measured by the M-PDBQ and driving and safety related variables have been empirically evidenced. The incremental validity of the M-PDBQ in predicting critical driving and safety related variables was shown. Lastly, a comprehensive conceptualization of positive driver behaviors was proposed.

With the M-PDBQ, positive driver behaviors were defined and measured not only by politeness or prosocial emphasis but also with a safety emphasis from a proactive perspective critical to a safe system (European Commission, 2022) and also from an environmentally responsible perspective critical to climate actions. The safety aspect of the construct was evidenced by the smooth and proactive mobility and risk communication dimensions. The environment/climate-conscious perspective is established as a separate factor that is related to a responsible driving style and sustainable mobility. As a result, the multidimensional nature of positive driver behaviors, beyond the previous understanding that relates these behaviors only to kindness and helping, has been shown for the first time in the literature.

Also, the spontaneous nature of driver behaviors was explored for the first time in the literature. In line with the current study's focus on positive driver behaviors, spontaneous, positive driver behaviors were conceptualized in the road safety context for the first time

in the literature, and behavioral examples were obtained. Although no further analysis has been pursued in the current study, the proposed intentionality continuum for driver behaviors provides a venue for future research attempts in this regard. Understanding the varying levels of driver behaviors is believed to contribute to developing tailored road safety interventions with increased effectiveness focusing on human-environment-vehicle interaction.

The M-PDBQ proved to be a reliable and valid measure, having incremental validity beyond the existing measures of positive driver behaviors. The relationship between positive behaviors and violations and driving anger is stronger than the safety connections of positive driver behaviors. This finding pointed out that positive driver behaviors have the potential to contribute to enhanced road safety via the connection to reducing undesired driver behaviors. In this way, positive driver behaviors are suggested to be utilized as a tool for intervention to enhance the safety of offending drivers and drivers showing driving anger based on the current study findings.

The current study advanced the understanding of positive driver behaviors in the literature. Thanks to the developed questionnaire, the M-PDBQ, and the proposed conceptualization, the current study leads the way for future research efforts. Research on positive driver behaviors should be encouraged for future road safety interventions and sustainable road safety management (see Wegman, 2017).

REFERENCES

- Armitage, S., Rodwell, D., & Lewis, I. (2022). Applying an extended theory of planned behaviour to understand influences on safe driving intentions and behaviours. *Transportation Research Part F: Traffic Psychology and Behaviour*, 90, 347–364. <https://doi.org/10.1016/j.trf.2022.09.009>
- Barkenbus, J. N. (2010). Eco-driving: An overlooked climate change initiative. *Energy Policy*, 38(2), 762–769. <https://doi.org/10.1016/j.enpol.2009.10.021>
- Barragan, D., Peterson, M. S., & Lee, Y. C. (2021). Hazard perception–response: A theoretical framework to explain drivers’ interactions with roadway hazards. *Safety*, 7(2). <https://doi.org/10.3390/safety7020029>
- Bıçaksız, P., & Özkan, T. (2016). Developing the Impulsive Driver Behavior Scale. *Transportation Research Part F: Traffic Psychology and Behaviour*, 43, 339–356. <https://doi.org/10.1016/j.trf.2016.09.005>
- Chapman, P., & Underwood, G. (2000). Forgetting Near-Accidents: The Roles of Severity, Culpability and Experience in the Poor Recall of Dangerous Driving Situations. *Applied Cognitive Psychology*, 14(1), 31–44. [https://doi.org/10.1002/\(SICI\)1099-0720\(200001\)14:1<31::AID-ACP622>3.0.CO;2-9](https://doi.org/10.1002/(SICI)1099-0720(200001)14:1<31::AID-ACP622>3.0.CO;2-9)
- Chu, W., Wu, C., Atombo, C., Zhang, H., & Özkan, T. (2019). Traffic climate, driver behaviour, and accidents involvement in China. *Accident Analysis and Prevention*, 122(1178), 119–126. <https://doi.org/10.1016/j.aap.2018.09.007>
- De Winter, J. C. F., & Dodou, D. (2010). The driver behaviour questionnaire as a predictor of accidents: A meta-analysis. *Journal of Safety Research*, 41(6), 463–470. <https://doi.org/10.1016/j.jsr.2010.10.007>
- Deffenbacher, J. L., Lynch, R. S., Oetting, E. R., & Swaim, R. C. (2002). The Driving Anger Expression Inventory: a measure of how people express their anger on the road. *Behaviour Research and Therapy*, 40(6), 717–737. [https://doi.org/10.1016/S0005-7967\(01\)00063-8](https://doi.org/10.1016/S0005-7967(01)00063-8)
- Demir, B., Demir, S., & Özkan, T. (2016). A contextual model of driving anger: A meta-analysis. *Transportation Research Part F: Traffic Psychology and Behaviour*, 42, 332–349. <https://doi.org/10.1016/j.trf.2016.09.020>

- Demir, B., Özkan, T., & Demir, S. (2019). Pedestrian violations: Reasoned or social reactive? Comparing theory of planned behavior and prototype willingness model. *Transportation Research Part F: Traffic Psychology and Behaviour*, 60, 560–572. <https://doi.org/10.1016/j.trf.2018.11.012>
- Dewhurst, I., Rodwell, D., & Lewis, I. (2023). Attachment, altruistic personality traits and the theory of planned behaviour as predictors of altruistic driving behaviours in young adults. *Transportation Research Part F: Traffic Psychology and Behaviour*, 92, 89–107. <https://doi.org/10.1016/j.trf.2022.11.011>
- Dogan, E., Steg, L., & Delhomme, P. (2011). The influence of multiple goals on driving behavior: The case of safety, time saving, and fuel saving. *Accident Analysis and Prevention*, 43(5), 1635–1643. <https://doi.org/10.1016/J.AAP.2011.03.002>
- Dorantes Argandar, G., Anaí, E., Macedo, C., & Ferrero Berlanga, J. (2019). Hope, Self-Efficacy, Prosocial and Aggressive Behavior, and the Anger and Frustration Scale for Mexican Drivers. *Journal of Psychology and Behavioral Science*, 7(2), 2374–2399. <https://doi.org/10.15640/jpbs.v7n2a4>
- Elander, J., West, R., & French, D. (1993). Behavioral correlates of individual differences in road-traffic crash risk: An examination of methods and findings. *Psychological Bulletin*, 113(2), 279–294. <https://doi.org/10.1037/0033-2909.113.2.279>
- Ersan, Ö., Üzümcüoğlu, Y., Azık, D., Fındık, G., Kaçan, B., Solmazer, G., Özkan, T., Lajunen, T., Öz, B., Pashkevich, A., Pashkevich, M., Danelli-Mylona, V., Georgogianni, D., Berisha Krasniqi, E., Krasniqi, M., Makris, E., Shubenkova, K., & Xheladini, G. (2020). Cross-cultural differences in driver aggression, aberrant, and positive driver behaviors. *Transportation Research Part F: Traffic Psychology and Behaviour*, 71, 88–97. <https://doi.org/10.1016/j.trf.2020.03.020>
- Ersan, Ö., Üzümcüoğlu, Y., Azık, D., Fındık, G., Kaçan, B., Solmazer, G., Özkan, T., Lajunen, T., Öz, B., Pashkevich, A., Pashkevich, M., Danelli-Mylona, V., Georgogianni, D., Krasniqi, E. B., Krasniqi, M., Makris, E., Shubenkova, K., & Xheladini, G. (2019). The relationship between self and other in aggressive driving and driver behaviors across countries. *Transportation Research Part F: Traffic Psychology and Behaviour*, 66, 122–138. <https://doi.org/10.1016/j.trf.2019.08.020>
- Eşiyok, B., Yasak, Y., & Korkusuz, I. (2007). Anger expression on the road: Validity and reliability of the driving anger expression inventory. *Türk Psikiyatri Dergisi*, 18(3).
- European Commission. (2022). *Road Safety Thematic Report –Safe System Approach*. European Road Safety Observatory.
- French, D. J., West, R. J., Elander, J., & Wilding, J. M. (1993). Decision-making style, driving style, and self-reported involvement in road traffic accidents. *Ergonomics*, 36(6), 627–644. <https://doi.org/10.1080/00140139308967925>

- Ge, Y., Qu, W., Zhou, M., Özkan, T., Bıçaksız, P., & Zhang, K. (2020). Psychometric adaption of the impulsive driver behavior scale in a Chinese sample. *Transportation Research Part F: Traffic Psychology and Behaviour*, 68, 218–230. <https://doi.org/10.1016/j.trf.2019.11.004>
- Gençöz, T., & Öncül, Ö. (2012). Examination of personality characteristics in a Turkish sample: Development of basic personality traits inventory. *Journal of General Psychology*, 139(3), 194–216. <https://doi.org/10.1080/00221309.2012.686932>
- Gerrard, M., Gibbons, F. X., Houlihan, A. E., Stock, M. L., & Pomery, E. A. (2008). A dual-process approach to health risk decision making: The prototype willingness model. *Developmental Review*, 28(1), 29–61. <https://doi.org/10.1016/j.dr.2007.10.001>
- Giroto, E., Andrade, S. M. de, González, A. D., & Mesas, A. E. (2016). Professional experience and traffic accidents/near-miss accidents among truck drivers. *Accident Analysis and Prevention*, 95, 299–304. <https://doi.org/10.1016/j.aap.2016.07.004>
- Guého, L., Granié, M. A., & Abric, J. C. (2014). French validation of a new version of the Driver Behavior Questionnaire (DBQ) for drivers of all ages and level of experiences. *Accident Analysis and Prevention*, 63, 41–48. <https://doi.org/10.1016/j.aap.2013.10.024>
- Han, W., & Zhao, J. (2020). Driver behaviour and traffic accident involvement among professional urban bus drivers in China. *Transportation Research Part F: Traffic Psychology and Behaviour*, 74, 184–197. <https://doi.org/10.1016/j.trf.2020.08.007>
- Harré, N. (2000). Risk Evaluation, Driving, and Adolescents: A Typology. *Developmental Review*, 20(2), 206–226. <https://doi.org/10.1006/drev.1999.0498>
- Harris, P. B., Houston, J. M., Vazquez, J. A., Smither, J. A., Harms, A., Dahlke, J. A., & Sachau, D. A. (2014). The Prosocial and Aggressive Driving Inventory (PADI): A self-report measure of safe and unsafe driving behaviors. *Accident Analysis and Prevention*, 72, 1–8. <https://doi.org/10.1016/j.aap.2014.05.023>
- Haustein, S., Holgaard, R., Åbele, L., Andersen, S. K., & Møller, M. (2021). A cognitive-behavioural intervention to reduce driving anger: Evaluation based on a mixed-method approach. *Accident Analysis and Prevention*, 156. <https://doi.org/10.1016/J.AAP.2021.106144>
- Holden, E., Banister, D., Gössling, S., Gilpin, G., & Linnerud, K. (2020). Grand Narratives for sustainable mobility: A conceptual review. *Energy Research and Social Science*, 65. <https://doi.org/10.1016/j.erss.2020.101454>
- Hollnagel, E. (n.d.). *From Safety-I to Safety-II: A White Paper*.
- Horswill, M. S., & Hill, A. (2021). Drivers' hazard perception skill. In R. Vickerman (Ed.), *International Encyclopedia of Transportation* (Vol. 7, pp. 151–157). Elsevier.

- Ishimaru, T., Kubo, T., Honno, K., Toyokuni, Y., & Fujino, Y. (2019). Near misses and presenteeism among paramedics. *Occupational Medicine*, 69(8–9), 593–597. <https://doi.org/10.1093/occmed/kqz076>
- Jones, C., Lins Menêses, A., Askew, C., & Scott-Parker, B. (2021). The impact of courteous and discourteous drivers on physiological stress. *Transportation Research Part F: Traffic Psychology and Behaviour*, 82(September), 285–296. <https://doi.org/10.1016/j.trf.2021.08.015>
- Karayolu Trafik Güvenliği Eylem Planı 2021-2023. (2021). https://en.guvenlitrafik.gov.tr/kurumlar/en.guvenlitrafik/belgeler%281%29/eylem-planı_en_.pdf
- Karayolu Trafik Güvenliği Strateji Belgesi 2021-2030. (2021). https://en.guvenlitrafik.gov.tr/kurumlar/en.guvenlitrafik/belgeler%281%29/strateji-belgesi_en_.pdf
- Kaye, S.-A., Rodwell, D., Watson-Brown, N., Rose, C., & Buckley, L. (2022). Road users' engagement in prosocial and altruistic behaviours: A systematic review. *Journal of Safety Research*. <https://doi.org/10.1016/J.JSR.2022.06.010>
- Kleisen, L. M. B. (2013). A positive view on road safety: Can “car karma” contribute to safe driving styles? *Accident Analysis and Prevention*, 50, 705–712. <https://doi.org/10.1016/j.aap.2012.06.022>
- Lajunen, T. (1997). *Personality Factors, Driving Style, and Traffic Safety*. University of Helsinki.
- Lajunen, T., & Özkan, T. (2004). *Kültür, güvenlik kültürü, Türkiye ve Avrupa’da trafik güvenliği (Rapor No: SBB-3023)*.
- Lajunen, T., & Özkan, T. (2021). Driving Behavior and Skills. In *International Encyclopedia of Transportation* (Vol. 7, pp. 59–64). Elsevier. <http://dx.doi.org/10.1016/B978-0-08-102671-7.10657-8>
- Lajunen, T., & Summala, H. (1995). Driving experience, personality, and skill and safety-motive dimensions in drivers' self-assessments. *Personality and Individual Differences*, 19(3), 307–318. [https://doi.org/10.1016/0191-8869\(95\)00068-H](https://doi.org/10.1016/0191-8869(95)00068-H)
- Li, X., Oviedo-Trespalacios, O., Pooyan Afghari, A., Kaye, S. A., & Yan, X. (2023). Yield or not to yield? An inquiry into drivers' behaviour when a fully automated vehicle indicates a lane-changing intention. *Transportation Research Part F: Traffic Psychology and Behaviour*, 95, 405–417. <https://doi.org/10.1016/j.trf.2023.05.012>
- Luengo Kanacri, B. P., Eisenberg, N., Tramontano, C., Zuffiano, A., Caprara, M. G., Regner, E., Zhu, L., Pastorelli, C., & Caprara, G. V. (2021). Measuring Prosocial Behaviors:

Psychometric Properties and Cross-National Validation of the Prosociality Scale in Five Countries. *Frontiers in Psychology*, 12, 2968. <https://doi.org/10.3389/FPSYG.2021.693174/BIBTEX>

Mahembe, B., & Samuel, O. M. (2016). Influence of personality and fatalistic belief on taxi driver behaviour. *South African Journal of Psychology*, 46(3), 415–426. <https://doi.org/10.1177/0081246315623106>

Markakis, M. G., Talluri, K., & Tikhonenko, D. (2022). Managing lane-changing of algorithm-assisted drivers. *Transportation Research Part C: Emerging Technologies*, 138. <https://doi.org/10.1016/j.trc.2022.103586>

Martinussen, L. M., Lajunen, T., Moller, M., & Özkan, T. (2013). Short and user-friendly: The development and validation of the Mini-DBQ. *Accident Analysis and Prevention*, 50, 1259–1265. <https://doi.org/10.1016/j.aap.2012.09.030>

Maslač, M., Antić, B., Lipovac, K., Pešić, D., & Milutinović, N. (2018). Behaviours of drivers in Serbia: Non-professional versus professional drivers. *Transportation Research Part F: Traffic Psychology and Behaviour*, 52, 101–111. <https://doi.org/10.1016/j.trf.2017.11.020>

Matović, B., Jovanović, D., Pljakić, M., & Stanojević, P. (2020). Driving anger and factors related to aggressive driving among Serbian drivers. *Traffic Injury Prevention*, 21(5), 319–323. <https://doi.org/10.1080/15389588.2020.1758933>

McKnight, A. J., & Adams, B. B. (1972). *Driver Education Task Analysis. Volume II: Task Analysis Methods. Final Report.*

Michon, J. (1985). A critical view of driver behavior models: What do we know, what should we do? In L. Evans & R. C. Schwing (Eds.), *Human behavior and traffic safety* (pp. 485–520). Plenum Press.

Nandavar, S., Lewis, I., & White, K. M. (2019). Understanding drivers' altruistic driving decisions: A theoretically guided investigation. *Transportation Research Part F: Traffic Psychology and Behaviour*, 62, 212–227. <https://doi.org/10.1016/j.trf.2018.12.017>

Nordfjærn, T., Şimşekoğlu, Ö., & Rundmo, T. (2014). Culture related to road traffic safety: A comparison of eight countries using two conceptualizations of culture. *Accident Analysis and Prevention*, 62, 319–328. <https://doi.org/10.1016/j.aap.2013.10.018>

Oppenheim, I., & Shinar, D. (2011). Human Factors and Ergonomics. In *Handbook of Traffic Psychology* (pp. 193–211). Elsevier. <https://doi.org/10.1016/B978-0-12-381984-0.10015-3>

Öz, B. (2011). *Professional Driving: An Emphasis on Organizational Safety Climate.*

- Öz, B., Özkan, T., & Lajunen, T. (2013). An investigation of professional drivers: Organizational safety climate, driver behaviours and performance. *Transportation Research Part F: Traffic Psychology and Behaviour*, 16, 81–91. <https://doi.org/10.1016/j.trf.2012.08.005>
- Öz, B., Özkan, T., & Lajunen, T. (2014). Trip-focused organizational safety climate: Investigating the relationships with errors, violations and positive driver behaviours in professional driving. *Transportation Research Part F: Traffic Psychology and Behaviour*, 26(PB), 361–369. <https://doi.org/10.1016/j.trf.2014.03.004>
- Özkan, T. (2006). *The regional differences between countries in traffic safety: A cross-cultural study and Turkish Case* (Issue 4072).
- Özkan, T., & Lajunen, T. (2005). A new addition to DBQ: Positive driver behaviours scale. *Transportation Research Part F: Traffic Psychology and Behaviour*, 8(4–5), 355–368. <https://doi.org/10.1016/j.trf.2005.04.018>
- Özkan, T., Lajunen, T., Chliaoutakis, J. El, Parker, D., & Summala, H. (2006). Cross-cultural differences in driving behaviours: A comparison of six countries. *Transportation Research Part F: Traffic Psychology and Behaviour*, 9(3), 227–242. <https://doi.org/10.1016/j.trf.2006.01.002>
- Öztürk, İ., Bıçaksız, P., Üzümcüoğlu, Y., & Özkan, T. (n.d.). *MAD-DAX: Anger and driver behaviours on the road*.
- Öztürk, İ., Özkan, T. (2018). Genç Sürücülerde Sürücü Becerileri ve Sürücü Davranışları Arasındaki İlişki. *Trafik ve Ulaşım Araştırmaları Dergisi*, 1(2), 1–15.
- Öztürk, İ., Wallén Warner, H., & Özkan, T. (2022). Traffic climate scale: Comparing samples from Turkey and Sweden. *IATSS Research*, 46(1), 130–137. <https://doi.org/10.1016/j.iatssr.2021.11.001>
- Parker, D., Lawrie, M., & Hudson, P. (2006). A framework for understanding the development of organisational safety culture. *Safety Science*, 44(6), 551–562. <https://doi.org/10.1016/j.ssci.2005.10.004>
- Qu, W., Zhang, Y., & Ge, Y. (2022). Social exclusion affects aggressive driving behaviour: The mediating effect of prosocial tendencies and driving anger. *Transportation Research Part F: Traffic Psychology and Behaviour*, 89, 97–108. <https://doi.org/10.1016/J.TRF.2022.06.010>
- Reason, J. (1990). *Human error*. Cambridge University Press.
- Reason, J. (2000). Education and debate Human error: models and management. *BMJ*, 320, 768–770. <https://doi.org/10.1136/bmj.320.7237.768>

- Reason, J., Manstead, A., Stephen, S., Baxter, J., & Campbell, K. (1990). Errors and violations on the roads: A real distinction? *Ergonomics*, 33(10–11), 1315–1332. <https://doi.org/10.1080/00140139008925335>
- Santos, G. (2018). Sustainability and shared mobility models. *Sustainability (Switzerland)*, 10(9). <https://doi.org/10.3390/su10093194>
- Searle, J. R. (1980). The intentionality of intention and action. *Cognitive Science*, 4, 47–70.
- Shen, B., Ge, Y., Qu, W., Sun, X., & Zhang, K. (2018). The different effects of personality on prosocial and aggressive driving behaviour in a Chinese sample. *Transportation Research Part F: Traffic Psychology and Behaviour*, 56, 268–279. <https://doi.org/10.1016/j.trf.2018.04.019>
- Shen, B., Qu, W., Ge, Y., Sun, X., & Zhang, K. (2018). The relationship between personalities and self-report positive driving behavior in a Chinese sample. *PLoS ONE*, 13(1), 1–16. <https://doi.org/10.1371/journal.pone.0190746>
- Shinar, D., & Gurion, B. (2019). Crash causes, countermeasures, and safety policy implications. *Accident Analysis and Prevention*, 125, 224–231. <https://doi.org/10.1016/j.aap.2019.02.015>
- Shirmohammadi, H., Hadadi, F., & Saeedian, M. (2019). Clustering Analysis of Drivers Based on Behavioral Characteristics Regarding Road Safety. *International Journal of Civil Engineering*, 17(8), 1327–1340. <https://doi.org/10.1007/s40999-018-00390-2>
- Sümer, N. (2003). Personality and behavioral predictors of traffic accidents: Testing a contextual mediated model. *Accident Analysis and Prevention*, 35, 949–964.
- Sümer, N., Lajunen, T., & Özkan, T. (2002). *Sürücü davranışlarının kaza riskindeki rolü: İhlaller ve hatalar*.
- Taubman-Ben-Ari, O., Mikulincer, M., & Gillath, O. (2004). The multidimensional driving style inventory - Scale construct and validation. *Accident Analysis and Prevention*, 36(3), 323–332. [https://doi.org/10.1016/S0001-4575\(03\)00010-1](https://doi.org/10.1016/S0001-4575(03)00010-1)
- Terry, C. P., & Terry, D. L. (2015). Cell phone-related near accidents among young drivers: Associations with mindfulness. *The Journal of Psychology*, 149(7), 665–683. <https://doi.org/10.1080/00223980.2014.964166>
- The World Bank. (2023). *Low & middle income*. <https://data.worldbank.org/income-level/low-and-middle-income>
- Türkiye İstatistik Kurumu (TÜİK). (2022, December 19). *Nüfus ve Konut Sayımı, 2021*. <https://data.tuik.gov.tr/Bulten/Index?p=Nufus-ve-Konut-Sayimi-2021-45866>

- United Nations General Assembly resolution 74/299. (2020). *Improving global road safety, A/RES/74/299*.
- Üzümcüoğlu, Y., Özkan, T., Wu, C., & Zhang, H. (2019). How drivers perceive traffic? How they behave in traffic of Turkey and China? *Transportation Research Part F: Traffic Psychology and Behaviour*, 64, 463–471. <https://doi.org/10.1016/j.trf.2019.06.006>
- Üzümcüoğlu, Y., Özkan, T., Wu, C., & Zhang, H. (2020). Traffic climate and driver behaviors: The moderating role of driving skills in Turkey and China. *Journal of Safety Research*, xxxx. <https://doi.org/10.1016/j.jsr.2020.08.004>
- Wang, Y., Qu, W., Ge, Y., Sun, X., & Zhang, K. (2018). Effect of personality traits on driving style: Psychometric adaption of the multidimensional driving style inventory in a Chinese sample. *PLoS ONE*, 13(9), 1–17. <https://doi.org/10.1371/journal.pone.0202126>
- Wegman, F. (2017). The future of road safety: A worldwide perspective. *IATSS Research*, 40(2), 66–71. <https://doi.org/10.1016/j.iatssr.2016.05.003>
- Wei, V. F., & Lovegrove, G. (2012). Sustainable road safety: A new (?) neighbourhood road pattern that saves VRU lives. *Accident Analysis and Prevention*, 44(1), 140–148. <https://doi.org/10.1016/j.aap.2010.12.005>
- Westrum, R. (2004). A typology of organisational cultures. In *Quality and Safety in Health Care* (Vol. 13, Issue SUPPL. 2). <https://doi.org/10.1136/qshc.2003.009522>
- Wickens, C. M., Mann, R. E., Ialomiteanu, A. R., & Stoduto, G. (2016). Do driver anger and aggression contribute to the odds of a crash? A population-level analysis. *Transportation Research Part F: Traffic Psychology and Behaviour*, 42, 389–399. <https://doi.org/10.1016/j.trf.2016.03.003>
- Wickens, C. M., Wiesenthal, D. L., Flora, D. B., & Flett, G. L. (2011). Understanding Driver Anger and Aggression: Attributional Theory in the Driving Environment. *Journal of Experimental Psychology: Applied*, 17(4), 354–370. <https://doi.org/10.1037/a0025815>
- World Health Organization (WHO). (2018). Global Status Report on Road. *World Health Organization*, 20.
- Xu, J., Liu, J., Sun, X., Zhang, K., Qu, W., & Ge, Y. (2018). The relationship between driving skill and driving behavior: Psychometric adaptation of the Driver Skill Inventory in China. *Accident Analysis and Prevention*, 120(June), 92–100. <https://doi.org/10.1016/j.aap.2018.07.032>
- Yılmaz, Ş., Arslan, B., Öztürk, İ., Özkan, Ö., Özkan, T., & Lajunen, T. (2022). Driver social desirability scale: A Turkish adaptation and examination in the driving context. *Transportation Research Part F: Psychology and Behaviour* 84, 53–64. <https://doi.org/10.1016/j.trf.2021.11.009>

- Zawieska, J., & Pieriegud, J. (2018). Smart city as a tool for sustainable mobility and transport decarbonisation. *Transport Policy*, 63, 39–50. <https://doi.org/10.1016/j.tranpol.2017.11.004>
- Zhang, H., Sun, J., & Tian, Y. (2020). The impact of socio-demographic characteristics and driving behaviors on fuel efficiency. *Transportation Research Part D: Transport and Environment*, 88. <https://doi.org/10.1016/j.trd.2020.102565>



APPENDICES

A. APPROVAL OF THE METU HUMAN SUBJECTS ETHICS COMMITTEE FOR STUDY 1

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

DÜMLUPINAR BULVARI 06800
ÇANKAYA ANKARA/TÜRKİY
T: +90 312 210 22 91
F: +90 312 210 79 59
ueam@metu.edu.tr
www.ueam.metu.edu.tr



ORTA DOĞU TEKNİK ÜNİVERSİTESİ
MIDDLE EAST TECHNICAL UNIVERSITY

Sayı: 28620816 /

14 NİSAN 2022

Konu : Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (IAEK)

İlgi : İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Doç.Dr. Bahar ÖZ

Danışmanlığını yürüttüğünüz Şerife YILMAZ'ın "Developing an omnibus scale of positive driver behaviors" başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülmüş ve **235-ODTÜIAEK-2022** protokol numarası ile onaylanmıştır. Saygılarımızla bilgilerinize sunarız.


Prof.Dr. Mine MISIRLIŞI
IAEK Başkanı

B. INFORMED CONSENT FOR STUDY 1

ARAŞTIRMAYA GÖNÜLLÜ KATILIM FORMU

Bu çalışma ODTÜ Psikoloji Bölümü Trafik ve Ulaşım Psikolojisi Anabilim Dalı doktora öğrencilerinden Şerife Yılmaz tarafından Doç. Dr. Bahar Öz danışmanlığında yürütülmektedir. Bu form sizi araştırma koşulları hakkında bilgilendirmek için hazırlanmıştır.

Çalışmanın Amacı Nedir?

Bu çalışmanın amacı sürücülerin trafik ortamında sergiledikleri pozitif sürüş davranışlarını araştırmaktır.

Bize Nasıl Yardımcı Olmanızı İsteyeceğiz?

Araştırmaya katılmayı kabul ederseniz sizden araştırmacımız tarafından size yönlendirilecek olacak bir dizi açık uçlu soruyu yanıtlamanız beklenecektir. Soruların doğru ya da yanlış cevapları bulunmamaktadır. Mülakat uygulamasının ortalama 30-45 dk sürmesi beklenmektedir. Mülakatlar ses kayıt uygulaması ile kayıt altına alınacaktır. Eğer katılımcı izin vermezse ses kaydı alınmayacak ve kâğıt kalem ile not tutulacaktır.

Sizden topladığımız bilgileri nasıl kullanacağız?

Araştırmaya katılımınız tamamen gönüllülük temelinde olmalıdır. Mülakatlar sırasında sizden kimlik belirleyici hiçbir bilgi istenmemektedir. Cevaplarınız gizli tutulacak, sadece araştırmacılar tarafından değerlendirilecektir. Elde edilen bilgiler toplu halde değerlendirilecek ve bilimsel yayımlarda kullanılacaktır. Sağladığınız veriler gönüllü katılım formlarında toplanan kimlik bilgileri ile eşleştirilmeyecektir. Mülakatlardan direkt alıntı yapılması söz konusu olursa alıntılarda anonim isimler kullanılacak, kimlik belirleyici bir ibareye yer verilmeyecektir. Ses kayıtları anonim isimlerle kaydedilip 3 yıl süre ile bir çevrimiçi depolama platformunda tutulması planlanmaktadır.

Katılımınızla ilgili bilmeniz gerekenler:

Mülakat uygulaması genel olarak kişisel rahatsızlık verecek sorular içermemektedir. Ancak katılım sırasında herhangi bir nedenden ötürü kendinizi rahatsız hissederseniz çalışmayı istediğiniz zaman bırakabilirsiniz. Böyle bir durumda mülakatta elde edilen bilgiler çalışmaya dahil edilmeyecektir.

Araştırmayla ilgili daha fazla bilgi almak isterseniz:

Bu arařtırmaya katıldığınız ve verdiğiniz destek için çok teřekkür ederiz. Çalışmayla ilgili soru ve yorumlarınızı arařtırmacıya _____adresinden iletebilirsiniz.

Yukarıdaki bilgileri okudum ve bu çalışmaya tamamen gönüllü olarak katılıyorum.

İsim Soyad

Tarih

İmza

---/---/----



C. INTERVIEW QUESTIONS

Demografik sorular

1. Yaşınız:
2. Cinsiyet:
3. Kaç yıldır ehliyet sahibisiniz?
4. Kaç yıldır aktif olarak araç kullanıyorsunuz?
5. Son bir yılda yaklaşık olarak toplam kaç kilometre araç kullandınız?
6. Bir haftada ne sıklıkla araç kullanırsınız?
Hemen hemen her gün
Haftada 3-4 gün
Haftada 1-2 gün
7. Bütün hayatınız boyunca yaklaşık olarak toplam kaç kilometre araç kullandınız?
8. Kullandığınız araç şanzımanı nedir?
9. Aracınızın yakıt türü nedir?

Görüşme soruları

1. Günlük rutin sürüş sırasında gideceğiniz yere güvenli bir şekilde ulaşmanızda rol oynayan davranışlar bulunuyor mu?
 - a. Trafikte riskli durumlar ve davranışlar vardır ancak kazalar nadir görülen olaylardır. Sizin veya trafikteki diğer yol kullanıcılarının sergilediği ve insanları daha sık kaza yapmaktan alıkoyan davranışlar nelerdir?
2. Trafikte pozitif sürüş davranışı sergiliyor musunuz? Evetse, hangi durumlarda ne tür pozitif sürüş davranışı sergiliyorsunuz?
3. Trafikte diğer yol kullanıcılarının farkında olarak veya olmayarak sergiledikleri riskli davranışları (diğer araçlar, yayalar, yolcular ile etkileşimleri düşünün) veya oluşturdukları riskli durumları telafi etmek için sergilediğiniz davranışlar var mıdır? Nelerdir?
 - a. Bu olayda orada duruma müdahale eden kişinin özellikle siz olmanızdan kaynaklanan bir avantaj olduğunu düşünüyor musunuz? Herhangi bir şoför de aynı davranışı sergiler miydi? Hayırsa, sizinle ilgili ayırt edici bir özellik buna katkı sundu mu?
 - b. Pozitif sürüş davranışı sergilerkenki temel motivasyonunuz nedir?
 - c. Genel olarak hayatınızda insanlara yardım eden bir insan mısınız? Trafikte pozitif davranışlar sergilemenizin sebepleri nelerdir?
4. Trafikte, sizi ani manevralar yapmaya sürükleyen hareketler yapmak durumunda kalıyor musunuz trafikte? Bu gibi durumların içinden nasıl çıkıyorsunuz?
5. Günlük sürüş sırasında kazalardan kıl payı kurtulduğumuz riskli anlar vardır. Ramak kala dediğimiz bu olaylar (yani neredeyse bir kazaya karışmak) kazalardan

- daha yaygındır. Ramak kala olaylarına sebebiyet veren durumları ve davranışları bir düşünün. Ramak kalalara karışmamızı neler engeller? Ramak kalaların kazaya dönmesini neler engeller? Kazaya dönmüşse sebebi neler olabilir? Trafikte güvenliğinizi sağlamak için önlem amacıyla sergilediğiniz davranışlar nelerdir?
6. Günlük sürüşte trafik sıkışıklığının nedenlerini düşünün. Akıcı ve güvenli trafik akışı için trafikte hangi davranışların sergilenmesi gereklidir? Trafik sıkışıklığını çözmek için insanların iş birliği yaptığı belirli bir olayı hatırlıyor musunuz?
 7. Yol kullanıcıları trafikte hangi durumlarda ve nasıl iş birliği yapıyor ve birbirlerine yardım ediyor?
 8. Trafikte hangi davranışlar kibar olarak kabul edilir?
 9. Çevreyi/doğayı korumak motivasyonu ile dikkat ettiğiniz sürüş davranışları var mı? Nelerdir?
 10. Yakıt tasarrufu yapmak için dikkat ettiğiniz sürüş davranışları var mı? Nelerdir?
 11. Sürüş konforuna önem veriyor musunuz? Sürüş konforuna etki eden faktörler nelerdir? Yolculuğunuzun rahat/konforlu geçmesi için sergilediğiniz sürüş davranışları var mı?
 12. Aracınızın kullanım ömrünün uzun olması için neler yapıyorsunuz? Araç kullanırken aracınızı korumak adına özellikle dikkat ettiğiniz sürüş davranışlarınız var mıdır? Nelerdir?
 13. Araç kullanırken trafik için risk teşkil ediyor olduğunuzu düşündüğünüz anlar oluyor mu? Bu anlar nelerdir? Bu gibi bir durumda trafik güvenliğini sağlamak için yaptığınız şeyler var mı?
 14. Eğer varsa, kendisi ve çevresi için risk teşkil eden davranışlar sergileyen ve bunun farkında olmayan bir yol kullanıcısı ile karşılaştığınız bir durumu ve eğer müdahalede bulunduysanız müdahalenizi anlatır mısınız?
 15. Sürüş sırasında çevreye karşı oluşturduğunuz riskin veya çevrede var olan riskin farkında olmadığınız bir durumda size yardım eden oldu mu? Lütfen bize durumu anlatın.
 16. Trafikteyken kendinizi zorlu bir trafik durumunda bulduğunuz oluyor mu? Diğer yol kullanıcıları zorlu durumlarda size yardımcı oluyor mu? Diğer yol kullanıcılarının trafikte size yardım ettiğine/sizi desteklediğine veya sizin onlara yardım ettiğinize dair belirli örnekleri hatırlıyor musunuz?
 17. Konuştuğumuz bu davranış türü sizin için ne anlama geliyor? Nasıl tanımlarsınız?

D. TEMPLATE USED FOR ANALYZING INTERVIEWS

Participants Items	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	Frequency
Item 1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	16
Item 2	+	+	+	+	+	+	+	+	+	+		+	+	+	+		14
Item 3	+	+	+	+	+		+	+			+	+		+		+	11
Item 169					+								+				2
Item 170									+								1

E. EXPERT EVALUATION FORM

Sayın

Uzman,

Bu anket Orta Doğu Teknik Üniversitesi, Trafik ve Ulaşım Psikolojisi doktora öğrencisi Şerife Yılmaz Demirok'un Doç. Dr. Bahar Öz danışmanlığında yürütmekte olduğu doktora tezi kapsamında hazırlanmıştır. Tezim kapsamında geliştirmekte olduğum "Pozitif Davranışlar Ölçeği"nin teorik olarak boyutlandırmasını yapmak üzere uzman görüşünüze ihtiyaç duymaktayız. Aşağıda sizinle bu çalışma kapsamında kullandığımız Pozitif Sürücü Davranışı tanımı ve bu konseptin 5 ayrı alt boyutunun tanımları paylaşılmaktadır. Bu alt boyutlar; "Proactive behaviors", "Smooth mobility", "Environmentally sustainable behaviors", "Polite and patient behaviors" ve "Comfort-related behaviors" olarak adlandırılmıştır. **Lütfen her bir boyutu dikkatlice okuyunuz.** Positive driver behaviors are secondary "unofficial/unwritten behavioral codes" that develop unique to a given region within the interaction of person, environment and climate, and vehicle components. Positive driver behaviors are characterized by preventing a possibility of an accident, promoting smooth traffic flow, engaging in eco-friendly behaviors, polite and patient behaviors, and caring for the comfort of the driver and/or the passengers in the vehicle.

1. Proactive behaviors refer to behaviors that mainly aim to prevent or avoid the possibility of an accident or occasionally a burst of anger. It may involve cautionary behaviors (safety precautions), warning other road users of potentially dangerous situations and behaviors aiming to compensate for others' faulty actions, behaviors performed in case of spontaneous or instantaneous occurrence of an event.

2. Smooth mobility refers to behaviors supporting or encouraging smooth traffic flow to benefit either the driver or other road users (other drivers, pedestrians, etc.). This dimension may include behaviors performed to relieve traffic congestion or give way to other road users to facilitate or support their safe mobility in traffic.

3. Environmentally sustainable behaviors refer to behaviors performed with the motivation of protecting the environment such as eco-friendly behaviors performed to make fuel economy, reduce air pollution, and ensure the long service life of the vehicle and its parts.

4. Polite and patient behaviors center on politeness, patience, and being helpful toward other road users in traffic.

5. Comfort-related behaviors refer to prioritizing the comfort of both the driver and the passengers in the vehicle.

Sizden istenen aşağıda karışık olarak sıralanmış olan 123 ölçek maddesinin her birini bu 5 boyuttan **en alakalı** gördüğünüz boyut ile eşleştirmenizdir.

		Proactive behaviors	Smooth mobility	Environmentally sustainable behaviors	Polite and patient behaviors	Comfort-related behaviors
1	Bana yeşil yansa dahi trafiği ekstra sıkıştırmamak için dolu kavşağa girmemeye özen göstermek					
2	Benim ve araçtaki yolcuların rahat edebilmesi için yol şartlarının daha iyi olduğu güzergahlarda araç kullanmak					
3	Beni sollamaya çıkmış aracın sollamasını kolaylaştırmak					
4	Davranışını kestiremediğim yol kullanıcılarının (sürücüler, yayalar vb.) çevresindeyken ekstra temkinli olmak					
5	Savunmasız yol kullanıcılarının (yayalar, bisiklet/motosiklet kullanıcıları vb.) güvenli hareketliliğini destekleyecek şekilde araç kullanmak					
6	Trafikte geçiş önceliği konusundaki belirsizlikleri önlemek için trafik işaret ve					

	işaretçilerine dikkat etmek					
7	Bir tehlikenin farkında olmayan yol kullanıcısını kaza ihtimaline karşı (sürücü, yaya vb.) selektör, korna vs. ile uyarmak					
8	Trafik ışıklarına belirli bir hızla yaklaşırken ışıklar birden kırmızıya döndüğünde kaza ihtimali yaratmamak için durmadan devam etmek					
9	Yerleşim yerlerinde araç kullanırken gürültü kirliliği yaratacak davranışlar sergilememeye özellikle dikkat etmek					
10	Özel bir durumu olan yayalara (engelli, yaşlı, çocuğuyla bekleyen, eşya taşıyan vb.) yol vermek					
11	Daha çok hava kirliliği yaratmamak için güvenilir yakıt firmalarından/kaliteli yakıt almaya dikkat etmek					
12	Olumsuz yol ve hava koşullarında trafik güvenliğini riske atmamak için takip mesafesini ekstra arttırmak					
13	Sürüş sırasında aniden beliren bir durum karşısında ani fren yapmak yerine yol müsaitse şerit değiştirmek					
14	Daha çok hava kirliliği yaratmamak için aracımın ve/veya parçalarının bakımını düzenli yaptırmak					
15	Geçiş hakkı bende dahi olsa yolun müsait olduğu durumlarda yayalara yol vermek					

16	Araç kullanırken çevreyi herhangi bir tehlikeli duruma karşı gözlemlemek/kolaçan etmek					
17	Dar bir sokakta başka bir araçla karşı karşıya kaldığımda diğer araca yol vermek					
18	Su tasarrufu yapmak için aracımı sık yıkatmamak					
19	Benim ve araçtaki yolcuların rahat edebilmesi için hava şartlarının daha elverişli olduğu zamanlarda araç kullanmaya özen göstermek					
20	Başka bir araçla aynı anda aynı yöne/çıkışa yöneldiğim durumda diğer araca yol vermek					
21	Sürüş sırasında aniden önüme çıkan yol kullanıcısına (sürücü, yaya vb.) yol vermek					
22	Akan trafikte park yerinden çıkan araçların trafiğe karışmasını sabırla beklemek					
23	Yaya yoğunluğunun fazla olabileceği belirli bölgelerde trafik güvenliğini riske atmamak için daha dikkatli araç kullanmak (örn. okul, yurt, hastane yakınları vb.)					
24	Daralan yollarda, daralan şeritteki araçların yola katılmasını kolaylaştırmak					
25	Yolculuğum için daha çok yakıt tasarrufu yapabileceğim güzergahları tercih etmeye özen göstermek					
26	Yağmurlu havalarda yayalara ve/veya diğer araçlara su					

	sıçratmamaya özellikle dikkat etmek					
27	Olumsuz hava koşullarında yayalara yol vermek					
28	Konforlu bir sürüş için araç içi teknolojilerden faydalanmak (örn. hız sabitleyici)					
29	Trafikte diğer yol kullanıcılarının (sürücü, yaya vb.) hareket alanlarını engellememeye özellikle dikkat etmek					
30	Sürüş öncesi şoför mahalinde konforlu hissedeceğim şekilde bir düzenleme yapmak (koltuk, ayna, navigasyon, müzik ayarlarını yapmak gibi)					
31	Benim aracımdan küçük araçlara yol vermek					
32	Trafikte güvenliğimi tehlikeye atan yol kullanıcılarıyla (sürücüler, yayalar vb.) tartışmak yerine ilk fırsatta oradan uzaklaşmak					
33	Ana yoldan ayrılmayacağım durumlarda trafik akışını desteklemek için sağ şeridi boş bırakmak					
34	Sürüş sırasında aniden önüme çıkan hayvana çarpmamak için yavaşlamak					
35	Gittiğim şeritte ısrarla yakın mesafe takip yapan araçla çarpışmamak için ilk fırsatta şerit değiştirmek					
36	Devamını göremediğim yollarda diğer yol kullanıcılarının (sürücüler, yayalar vb.) hata yapabileceğini düşünerek daha dikkatli davranmak					

37	Davranışını kestiremediğim yol kullanıcılarına yol vermek					
38	Kaza ihtimaline karşı diğer yol kullanıcılarının (sürücüler, yayalar vb.) o anda orada olduğumu gördüklerine emin olduktan sonra hamle yapmak					
39	Yakıt tasarrufu için aracıma; sürüş öncesi, sürüş sırası ve sürüş sonrasında daha özenli davranmak					
40	Konforlu bir yolculuk için uzun süreli yolculuklarda yorulduğumda camı açıp aracın içindeki havayı yenilemek					
41	Yakıt tasarrufu için kısa mesafe yolculuklarda araç içindeki klimayı çalıştırmaktan kaçınmak					
42	Trafikte bana yardım edildiğinde seyahatimin ilerleyen bir noktasında bir başkasına yardım etmek					
43	Trafikte diğer yol kullanıcılarının (sürücüler, yayalar vb.) hamlelerini öngörüp ona göre pozisyon almak					
44	Tali yoldan ana yola bağlanmak için bekleyen araca geçiş hakkı bende dahi olsa yol vermek					
45	Işıklarda veya dur kalk ilerlediğimiz trafikte hareket etmekte geciken aracı sabırla beklemek					
46	Telefonla ilgilenmem gerektiğinde trafik güvenliğini riske atmamak için aracımı uygun bir yere çekmek					
47	Trafik akışını desteklemek için dalgın					

	araç sürücüsünü hareket etmesi için kibarca uyarmak					
48	Yoldaki beklenmedik bir bozulmayı (örn. çukur) bildirmek için arkamdan gelen araçları dörtlüler, korna vs. ile uyarmak					
49	Aracımın ve parçalarının kullanım ömrünü gözeterek aracımı zorlu (engebeli, çamurlu) yollara sokmamaya özen göstermek					
50	Hata yapan veya riskli davranışlar sergileyen yol kullanıcısını (sürücü, yaya vb.) bana zararı olmasa dahi kaza ihtimaline karşı selektör, korna vs. ile uyarmak					
51	Çevre dostu bir sürüş için aracımı yol koşullarına uygun olmayan hızda/devirde/viteste kullanmamak					
52	Beklenmedik bir şekilde trafiğin yavaşladığı durumlarda dörtlüleri yakarak arkadan gelen araçları önlem almaları için uyarmak					
53	Sürüş sırasında önüme birden bir yol kullanıcısı (sürücü, yaya vb.) veya hayvan çıkma ihtimali olan belirli bölgelerde kaza ihtimaline karşı özellikle dikkatli araç kullanmak					
54	Şerit değiştirmeden önce kör noktamda kalan araç olup olmadığını birden fazla yöntemle kontrol etmek (aynalardan, omuz üstünden baş ile kontrol etmek vb.)					
55	Yol hakkı bendeyken yola çıkmak için bekleyen diğer araç					

	sürücüsünü önlem amacıyla selektör, korna vs. ile uyarmak					
56	Sürüş sırasında aniden beliren bir durum karşısında ani fren yapmak yerine kontrollü bir şekilde yavaşlamak					
57	Trafik akışını engelleyen bir yerde veya pozisyonda kalmış araca geçiş önceliği tanımak					
58	Araç kullanırken savunmasız yol kullanıcılarının (yayalar, bisiklet/motosiklet kullanıcıları vb.) öngörülemeyen ani hareketlerine karşı tetikte olmak					
59	Konforlu bir yolculuk için ihtiyaç halinde veya yorulduğumda ilk fırsatta mola vermek					
60	Araç kullanırken çevremde tedirginlik uyandırdığımı fark ettiğimde trafik güvenliğini riske atmamak için yavaşlamak ve gerekli önlemleri almak					
61	Aracımı park ederken başkasının görüşünü engellememeye özellikle dikkat etmek					
62	Tali yoldan ana yola bağlanmak için bekleyen bir aracın şeride girişini kolaylaştırmak için sağ şeridi boş bırakmak					
63	Yayalar geçerken geçişi tamamlamalarını sabırla beklemek					
64	Muhtelif hava olaylarına veya çevreden gelebilecek herhangi bir tehlikeye karşı aracımı güvenli gördüğüm bir yere park etmek					

65	Yakıt tasarrufu için aracımın ve/veya parçalarının bakımını düzenli yaptırmak					
66	Dikkatimi trafikten uzaklaştıran bir şeyle meşgul olurken yavaşlamak veya sağ şeride geçmek					
67	Karbon emisyonunu azaltmak için sabit hızda araç kullanmaya özen göstermek					
68	Trafikte bana yardımcı olan yol kullanıcısına (sürücü, yaya vb.) teşekkür etmek					
69	Yapacağım bir sonraki hamlenin iletişimini kurmak için sinyal kullanmaya ekstra özen göstermek					
70	Çevre dostu bir sürüş için araç içi teknolojilerden faydalanmak (örn. hız sabitleyici)					
71	Olumsuz hava koşullarında savunmasız yol kullanıcılarına (yayalar, bisiklet/motosiklet kullanıcıları vb.) yol vermeye daha çok özen göstermek					
72	Yakıt tasarrufu için aracımı ağır yüklememeye dikkat etmek					
73	Çevre dostu bir sürüş için aracımın ve/veya parçalarının bakımını düzenli yaptırmak					
74	Trafik akışını desteklemek için sıkışık trafiklerde yoldan ayrılmak gibi zaruri durumlar haricinde şerit değişikliği yapmamaya özen göstermek					
75	Orada olduğumu fark ettirmek için yola bakmayan yol					

	kullanıcısını (sürücü, yaya vb.) kaza ihtimaline karşı selektör, korna vs. ile uyarmak					
76	Aracımın ve parçalarının kullanım ömrünü gözeterek yol şartlarının daha iyi olduğu güzergahlarda araç kullanmak					
77	Trafikte hatalı bir davranış sergilediğimde özür dilemek					
78	Sıkışık/dur kalk trafiklerde tali yol giriş ve çıkışlarını kapamayacak şekilde aracımı konumlandırmak					
79	Kaza ihtimalini en aza indirmek için hava şartlarının daha elverişli olduğu zamanlarda araç kullanmaya özen göstermek					
80	Çevremdeki yol kullanıcılarını (yayaları, sürücüleri vb) tedirgin etmeyecek hızda araç kullanmaya özen göstermek					
81	Araç içi sarsıntıları en aza indirmek için ani hızlanma ve yavaşlamalardan kaçınmaya özen göstermek					
82	Trafik kuralına uymanın daha riskli olduğunu düşündüğüm durumlarda kaza ihtimali yaratmamak için bulunduğum bölgedeki trafiğin gerekliliklerine uygun şekilde araç kullanmak					
83	Zor/sıkışık bir durumda kalmış bir araç sürücüsüne yol vermek					
84	Sürüş sırasında aniden beliren bir tehlike karşısında ani fren yapmak yerine yolun					

	boş olan tarafına direksiyonu kırmak					
85	Kullanım ömrü uzun olsun diye aracımın ve/veya parçalarının bakımını düzenli yaptırmak					
86	Sürüş sırasında aracında bir problem/kusur gördüğüm sürücüyü durumdan haberdar etmek					
87	Trafikte ekstra sıkışıklığa sebebiyet vermemek için öndeki aracı ani fren yapmamı gerektirmeyecek bir mesafeden takip etmek					
88	Olumsuz yol ve hava koşullarında kaza ihtimaline karşı belirlenen hız limitlerinden daha yavaş araç kullanmak					
89	Şeridin akış hızına uymayan aracı şerit değiştirmesi için sıkıştırmadan kibarca uyarmak					
90	Sürüş konforu için güvenli sürüş yapabileceğim saatlerde araç kullanmak (gece veya gündüz sürüşü tercih etmek gibi)					
91	Yolun kenarında aniden yola çıkabilecek bir insan veya hayvan gördüğümde dörtlüleri yakarak arkadan gelenleri uyarmak					
92	Bir kurala uymak için dahi olsa trafik güvenliğini riske atmamak için ani fren yapmamaya özen göstermek					
93	Aracımı park ederken başkalarına maksimum alanı bırakacak şekilde park etmeye özen göstermek					

94	Uzun yolda uyanık kalmak için yakınımda içecek, yiyecek vb. bulundurmak					
95	Trafik akışını desteklemek için trafik yoğunluğunun az olduğu saatlerde ve/veya bölgelerde araç kullanmaya özen göstermek					
96	Yakıt tasarrufu için sabit hızda araç kullanmaya özen göstermek					
97	Yakıt tasarrufu için aracımı yüksek devirde veya hızda kullanmamak					
98	Aracımın ve parçalarının kullanım ömrünü gözeterek aracıma; sürüş öncesi, sürüş sırası ve sürüş sonrasında daha özenli davranmak					
99	Akan trafikte park etmeye çalışan araçları sıkıştırmadan sabırla beklemek					
100	Trafikte diğer yol kullanıcılarının (sürücüler, yayalar vb.) hatalarını telafi edebileceğim bir güvenlik payı bırakarak araç kullanmak					
101	Trafikte yaşanabilecek olumsuzlukları önleyebilecek öngörülü davranışlar sergilemek					
102	Trafik akışını aksatmamak için dönüş yapacağım şeride erken geçiş yapmak					
103	Işıklardan kalkışlarda veya dönüşlerde trafik akışını aksatmamak için şeridimi takip etmeye özellikle dikkat etmek					
104	Çevre dostu bir sürüş için sürüş sırasında ani hızlanma ve yavaşlamalardan					

	kaçınmaya özen göstermek					
105	Yakıt tasarrufu için trafik ışıklarında durmadan devam edebileceğim şekilde sürüş hızımı ayarlamak					
106	Yakıt tasarrufu için uygun lastik basıncında araç kullanmaya özen göstermek					
107	Aracımı park ederken başkasının geçişini engellememeye özellikle dikkat etmek					
108	Benim ve araçtaki yolcuların konforu için sabit hızda araç kullanmaya özen göstermek					
109	Aracımın motor ömrünün uzun olması için hareket öncesi ve/veya sonrası araç motorunun yeterince ısınmasını ve/veya soğumasını beklemek					
110	Trafik akışını engellemeyecek alanlarda bekleme yapmak					
111	Kaza ihtimalini en aza indirmek için devamını göremediğim yollara yaklaşırken selektörle veya kornayla geldiğimi haber vermek					
112	Şeridimde yalpaladığımı hissettiğimde hızımı önlem amacıyla yavaşlamak veya sağ şeride geçmek					
113	Sıkışık bir trafikte ana yola/tali yola bağlanmak için sinyal vermiş araca yol vermek					
114	Kaza ihtimalini en aza indirmek için araç kullanırken diğer yol kullanıcıları için tahmin edilebilir bir sürüş					

	sergilemeye özen göstermek					
115	Kavşağın/yolun ortasında kalıp kavşağı/yolu daraltmamak için ışıklarda yeterli sürem yoksa bir sonraki ışığı beklemek					
116	Aracımı korumak için güvenilir yakıt firmalarından/kaliteli yakıt almaya dikkat etmek					
117	Trafik güvenliğini riske atmamak için uzun süreli yolculuklarda yorulduğumda ilk fırsatta mola vermek					
118	Trafikte öfkelendiğimde trafik güvenliğini riske atmamak için kendimi sakinleştirdikten sonra yoluma devam etmek					
119	Sürüş sırasında aniden beliren yabancı bir cisme çarpmamak için şerit değiştirmek					
120	Sürüş sırasında aniden beliren bir durum karşısında arkamdaki araçların durma mesafesini gözeterek yavaşlamaya özen göstermek					
121	Akan trafiğe karışmak için bekleyen araca yol vermek					
122	Görüşün kısaldığı olumsuz hava koşullarında aracımın görünürlüğünü arttırmak için dörtlüleri yakmak					
123	Trafikte başkalarının sağlığını, iyiliğini gözeterek araç kullanmak					



F. APPROVAL OF THE METU HUMAN SUBJECTS ETHICS COMMITTEE FOR MAIN STUDY

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER



ORTA DOĞU TEKNİK ÜNİVERSİTESİ
MIDDLE EAST TECHNICAL UNIVERSITY

DUMLUPINAR BULVARI 06800
ÇANKAYA ANKARA/TÜRKİYE
T: +90 312 210 22 91
F: +90 312 210 79 59
iletisi@metu.edu.tr
www.iletisi.metu.edu.tr

15 MAYIS 2023

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Doç.Dr. Bahar ÖZ

Danışmanlığını yürüttüğünüz Şerife Yılmaz Demirok'un "*Rethinking the concept of positive driver behaviors: Developing a new measurement tool and examining its relationship to traffic safety variables*" başlıklı araştırmanız İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek 0277-ODTÜİAEK-2023 protokol numarası ile onaylanmıştır.

Bilgilerinize saygılarımla sunarım.

Prof. Dr. Ş. Hani TÜRAN
Başkan

Prof. Dr. İ. Semih AKÇOMAK
Üye

Doç. Dr. Ali Emre Turgut
Üye

Doç. Dr. Şerife SEVİNÇ
Üye

Dr. Öğretim Üyesi Murat Perit ÇAKIR
Üye

Dr. Öğretim Üyesi Süreyya ÖZCAN KABASAKAL
Üye

Dr. Öğretim Üyesi Müge GÜNDÜZ
Üye

G. INFORMED CONSENT FOR MAIN STUDY

ARAŞTIRMAYA GÖNÜLLÜ KATILIM FORMU

Bu çalışma ODTÜ Psikoloji Bölümü Trafik ve Ulaşım Psikolojisi Anabilim Dalı doktora öğrencilerinden Şerife Yılmaz tarafından doktora tezi kapsamında Doç. Dr. Bahar Öz danışmanlığında yürütülmektedir. Bu form sizi araştırma koşulları hakkında bilgilendirmek için hazırlanmıştır.

Çalışmanın Amacı Nedir?

Araştırmanın amacı, yeni geliştirilen pozitif sürücü davranışları ölçeğinin psikometrik özelliklerini test etmek ve bu davranışların çeşitli değişkenlerle ilişkisini araştırmaktır.

Bize Nasıl Yardımcı Olmanızı İsteyeceğiz?

Araştırma çevrimiçi olarak gerçekleştirilecektir. B sınıfı ehliyeti olan sürücüler çalışmaya katılımcı olarak davet edilecektir. Çalışma sırasında bölüm başlarında verilen açıklamaları dikkatlice okuyarak size en uygun cevabı işaretlemeniz beklenmektedir. Anket uygulaması yaklaşık olarak 20-25 dakika sürmektedir.

Sizden topladığımız bilgileri nasıl kullanacağız?

Bu çalışmaya katılmak tamamen gönüllülük esasına dayalıdır. Herhangi bir yaptırıma veya cezaya maruz kalmadan çalışmaya katılmayı reddedebilir veya dilediğiniz noktada çalışmayı bırakabilirsiniz. Araştırma esnasında cevap vermek istemediğiniz sorular olursa boş bırakabilirsiniz.

Araştırmaya katılanlardan toplanan veriler tamamen gizli tutulacak, veriler ve kimlik bilgileri herhangi bir şekilde eşleştirilmeyecektir. Ayrıca toplanan verilere sadece araştırmacılar ulaşabilecektir. Bu araştırmanın sonuçları toplu şekilde değerlendirilecek olup bilimsel ve profesyonel yayınlarda veya eğitim amaçlı kullanılabilir.

Katılımınızla ilgili bilmeniz gerekenler:

Anket uygulaması genel olarak kişisel rahatsızlık verecek sorular içermemektedir. Ancak katılım sırasında herhangi bir nedenden ötürü kendinizi rahatsız hissederseniz çalışmayı istediğiniz zaman bırakabilirsiniz. Böyle bir durumda araştırmacıyı bilgilendirmeniz halinde ankette elde edilen bilgiler çalışmaya dahil edilmeyecektir.

Araştırmayla ilgili daha fazla bilgi almak isterseniz:

Bu arařtırmaya katıldığınız ve verdiğiniz destek için çok teřekkür ederiz. Çalışmayla ilgili soru ve yorumlarınızı arařtırmacıya řerife Yılmaz (_____) adresinden iletebilirsiniz.

Yukarıdaki bilgileri okudum ve bu çalışmaya tamamen gönüllü olarak katılıyorum. Tarih İmza

---/---/---



H. DEMOGRAPHIC QUESTIONS

Sürücü Bilgi Formu

1. Yaşınız: _____
1. Cinsiyet: Kadın _____ Erkek _____
2. B sınıfı araç ehliyetiniz var mı? Evet _____ Hayır _____
3. Kaç yıldır ehliyet sahibisiniz? _____ yıl
4. Son bir yılda yaklaşık olarak toplam kaç km araç kullandınız? _____ km
5. Bütün hayatınız boyunca yaklaşık olarak toplam kaç km araç kullandınız? _____ km
6. Genel olarak ne sıklıkla araç kullanırsınız?
Her gün _____
Hemen hemen her gün _____
Haftada 3-4 gün _____
Haftada 1-2 gün _____
Ayda birkaç kez _____
Ayda bir kez veya daha az _____
7. Son bir ayda araç kullanırken kaç kez ramak kala olay (neredeyse bir kazaya karışacak duruma gelmek) yaşadınız? _____ kez
8. Son bir yılda araç kullanırken ne sıklıkla ramak kala olay (neredeyse bir kazaya karışacak duruma gelmek) yaşadınız? Lütfen en uygun seçeneği işaretleyiniz.
1=Hiçbir zaman 2=Nadiren 3=Bazen 4=Oldukça sık 5=Sık sık 6=Neredeyse her zaman
9. Son üç yılda araç kullanırken kaç kez aktif kaza (sizin bir araca, bir yayaya veya herhangi bir nesneye çarptığınız durumlar) yaptınız? (Hafif kazalar dâhil) _____ kez

10. Son üç yılda araç kullanırken kaç kez pasif kaza (bir aracın ya da bir yayanın size çarptığı durumlar) geçirdiniz? (Hafif kazalar dâhil) _____ kez

11. Son üç yıl içerisinde, aşağıdaki trafik cezalarını kaç kere aldığınızı belirtiniz.

- a) Yanlış park etme _____
- b) Hatalı sollama _____
- c) Hız ihlali _____
- d) Kırmızı ışıktaki geçme _____
- e) Alkollü araç kullanma _____
- f) Diğer (eksik ekipman, kırık far vb.) _____

I. MULTIDIMENSIONAL POSITIVE DRIVER BEHAVIOR QUESTIONNAIRE

Aşağıda verilen davranışları ne sıklıkta yaparsınız?

Aşağıda, sürücülerin trafik ortamında karşılaşabileceği bazı durumlar verilmiştir. Sizden istenen, aşağıda verilen her bir madde için bu tür şeylerin sizin başınıza **NE SIKLIKLA** geldiğini belirtmenizdir. Değerlendirmelerinizi geçtiğimiz yıl boyunca kendinizin araç kullanma davranışlarından ne hatırlıyorsanız onları temel alarak yapınız. Lütfen değerlendirmelerinizi size göre en doğru olan seçeneği işaretleyerek belirtiniz. Her bir soru için cevap seçenekleri:

1=Hiçbir zaman 2=Nadiren 3=Bazen 4=Oldukça sık 5=Sık sık 6=Neredeyse her zaman

1	Dar bir sokakta bir araçla karşı karşıya kaldığımda uygun bir boşluğa girerek diğer araca yol vermek	1	2	3	4	5	6
2	Beni sollamaya çıkmış aracın sollama yapmasını kolaylaştırmak	1	2	3	4	5	6
3	Karşıdan karşıya geçen yayaların geçişini tamamlamalarını sabırla beklemek	1	2	3	4	5	6
4	Akan trafiğe karışmak için bekleyen araca geçiş hakkı bende dahi olsa yol vermek	1	2	3	4	5	6
5	Işıklarda veya dur-kalk ilerleyen trafikte hareket etmekte geciken aracı sabırla beklemek	1	2	3	4	5	6
6	Trafikte bana yardımcı olan yol kullanıcısına (sürücü, yaya vb.) beden dili, konuşma, korna, selektör vs. yoluyla teşekkür etmek	1	2	3	4	5	6
7	Yakıt tasarrufu için aracımı ağır yüklememek	1	2	3	4	5	6
8	Beklenmedik bir şekilde trafiğin yavaşladığı durumlarda dörtlüleri yakmak vb. yöntemler ile arkadan gelen araçları önlem almaları için uyarmak	1	2	3	4	5	6
9	Yağmurlu havalarda yayalara ve/veya diğer araçlara su sıçratmayacak şekilde araç kullanmak	1	2	3	4	5	6
10	Aracımı başkasının geçişini zorlaştırma ihtimali olan yerlere park etmemek	1	2	3	4	5	6
11	Zor/sıkışık bir durumda kalmış araç sürücüsüne trafik akışını sağlamak için yol vermek	1	2	3	4	5	6
12	Bir kurala uymak için dahi olsa kaza ihtimaline karşı ani fren yapmamak	1	2	3	4	5	6
13	Akan trafikte park etmeye çalışan araçları sıkıştırmadan sabırla beklemek	1	2	3	4	5	6
14	Geçiş üstünlüğü olan bir aracın (ambulans, itfaiye aracı vb.) yaklaştığını fark ettiğimde, araç olduğum yere geleceği zaman trafik akışını nasıl destekleyeceğimle ilgili gerekli planlamayı ve konumlanmayı yapmak	1	2	3	4	5	6

15	Kaza ihtimaline karşı diğer yol kullanıcılarının (sürücü, yaya vb.) o anda orada olduğumu gördüklerine emin olduktan sonra hamle yapmak	1	2	3	4	5	6
16	Kullanım ömrü uzun olsun diye aracımın ve/veya parçalarının bakımını düzenli yaptırmak	1	2	3	4	5	6
17	Daralan yollarda, daralan şeritteki araçların yola katılmasını kolaylaştırmak için araçlara yol vermek	1	2	3	4	5	6
18	Şerit değiştirmeden önce kör noktada kalan araç olup olmadığını birden fazla yöntemle kontrol etmek (aynalardan, omuz üstünden baş ile kontrol etmek vb.)	1	2	3	4	5	6
19	Sürüş sırasında aniden önüne çıkan yol kullanıcısına (sürücü, yaya vb.) yol vermek	1	2	3	4	5	6
20	Dikkatimi trafikten uzaklaştıran bir şeyle meşgul olurken yavaşlamak veya sağ şeride geçmek	1	2	3	4	5	6
21	Sürüş sırasında aniden beliren bir durum karşısında arkamdaki araçların durma mesafesini gözeterek yavaşlamak	1	2	3	4	5	6
22	Yerleşim yerlerinde araç kullanırken gürültü kirliliği yaratacak davranışlar sergilememek	1	2	3	4	5	6
23	Olumsuz hava koşullarında korunmasız yol kullanıcılarına (yaya, bisikletli, çocuk vb.) daha sık yol vermek	1	2	3	4	5	6
24	Sıkışık trafikte trafik akışını destekleyecek şeritte kalmak	1	2	3	4	5	6
25	Aracımı çevredeki yol kullanıcılarını (sürücü, yaya vb.) tedirgin etmeyecek hızda kullanmak	1	2	3	4	5	6
26	Trafikte bana yardım edildiğinde seyahatimin ilerleyen bir noktasında bir başkasına yardım etmek	1	2	3	4	5	6
27	Fark etmediği bir tehlike nedeniyle kaza yapma ihtimali olan yol kullanıcısını (sürücü, yaya vb.) selektör, korna vb. ile uyarmak	1	2	3	4	5	6
28	Sıkışık/dur-kalk trafiklerde tali yol giriş ve çıkışlarını kapamayacak şekilde aracımı konumlandırmak	1	2	3	4	5	6
29	Yakıt tasarrufu için uygun lastik basıncında araç kullanmak	1	2	3	4	5	6
30	Öndeki aracı ani fren yapmamı gerektirmeyecek bir mesafeden takip ederek trafik akışını desteklemek	1	2	3	4	5	6
31	Işıklardan kalkışlarda veya dönüşlerde trafik akışını aksatmamak için şeridimi takip etmek	1	2	3	4	5	6
32	Daha fazla hava kirliliği yaratmamak için sabit hızda araç kullanmak	1	2	3	4	5	6
33	Yakıt tasarrufu için sabit hızda araç kullanmak	1	2	3	4	5	6
34	Gececeğim sırada trafik ışıkları birden kırmızıya döndüğünde kaza ihtimali yaratmamak için sürmeye devam etmek	1	2	3	4	5	6
35	Çevre dostu bir sürüş için sürüş sırasında ani hızlanma ve yavaşlamalardan kaçınmak	1	2	3	4	5	6
36	Yola bakmayan yol kullanıcısını (sürücü, yaya vb.) kendisine doğru ilerlediğini fark ettirmek için selektör, korna vb. ile uyarmak	1	2	3	4	5	6
37	Yolculuğum için daha çok yakıt tasarrufu yapabileceğim güzergahlarda araç kullanmak	1	2	3	4	5	6
38	Görüşün kısıldığı olumsuz hava koşullarında aracımın görünürlüğünü arttırmak için dörtlülere, farları, sis lambalarını vb. yakmak	1	2	3	4	5	6
39	Aracımın ve parçalarının daha az yıpranması için yol şartlarının daha iyi olduğu güzergahlarda araç kullanmak	1	2	3	4	5	6
40	Yoldaki beklenmedik bir problemi veya durumu (örn. çukur, kaza vb.) bildirmek için arkamdan gelen araçları dörtlüler, korna vb. ile uyarmak	1	2	3	4	5	6
41	İlerlediğim şeritte ısrarla yakın mesafe takip yapan araçla çarpışmamak için ilk fırsatta şerit değiştirmek	1	2	3	4	5	6
42	Trafik akışını desteklemek için kendi hızıma uygun olan şeritte araç kullanmak	1	2	3	4	5	6

43	Sıkışık bir trafikte ana yola/tali yola bağlanmak için yan şeridimde sinyal vermiş aracın geçişini kolaylaştırmak için araca yol vermek	1	2	3	4	5	6
44	Araç kullanırken kaza ihtimaline karşı diğer yol kullanıcılarını gözeterek tahmin edilebilir bir sürüş sergilemek	1	2	3	4	5	6
45	Sürüş sırasında aracında bir problem/kusur gördüğüm sürücüyü riskli bir durum oluşma ihtimaline karşı selektör, korna vb. ile durumdan haberdar etmek	1	2	3	4	5	6
46	Çevre dostu bir yolculuk için sürüş sırasında araç içi teknolojilerden faydalanmak (örn. hız sabitleyici)	1	2	3	4	5	6
47	Yol hakkının bende olduğu durumda seyahat ettiğim yola çıkmak için bekleyen diğer araç sürücüsünü önlem amacıyla selektör, korna vb. ile uyarmak	1	2	3	4	5	6
48	Tali yoldan ana yola bağlanmak için bekleyen bir aracın şeride girişini kolaylaştırmak için sağ şeridi boş bırakmak	1	2	3	4	5	6
49	Sürüş sırasında birdenbire ortaya çıkan bir tehlike karşısında ani fren yapmak yerine yolun boş olan tarafına direksiyonu kırmak	1	2	3	4	5	6
50	Araçtaki yolcuların rahat edebilmesi ani hızlanma ve yavaşlamalardan kaçınarak araç içi sarsıntıları en aza indirmek	1	2	3	4	5	6
51	Araç kullanırken çevremde tedirginlik uyandırdığımı fark ettiğimde trafik güvenliğini riske atmamak için yavaşlamak veya gerekli önlemleri almak	1	2	3	4	5	6
52	Özel bir durumu olan yayalara (engelli, yaşlı, çocuğuyla bekleyen, eşya taşıyan vb.) ilk geçiş hakkına sahip olmadıkları durum ve alanlarda dahi olsalar yol vermek	1	2	3	4	5	6
53	Aracımın motor ömrünün uzun olması için hareket öncesi ve/veya sonrası araç motorunun yeterince ısınmasını ve/veya soğumasını beklemek	1	2	3	4	5	6
54	Kaza ihtimalini en aza indirmek için devamını göremediğim yollara yaklaşırken selektörle veya kornayla o anda orada olduğumu haber vermek	1	2	3	4	5	6
55	Aracımı başkaları için geniş bir alan bırakacak şekilde park etmek	1	2	3	4	5	6
56	Trafikte hatalı bir davranış sergilediğimde beden dili, konuşma, korna, selektör vs. yoluyla özür dilemek	1	2	3	4	5	6
57	Çevre dostu bir sürüş için (örn. daha az hava kirliliği, yakıt tasarrufu) aracımın bakımını düzenli yaptırmak	1	2	3	4	5	6
58	Benim aracımdan küçük araçlara yol vermek	1	2	3	4	5	6
59	Sürüş sırasında oluşan olumsuz bir durum karşısında ani fren yapmak yerine trafik akışını bozmamak için şerit değiştirmek	1	2	3	4	5	6
60	Trafik akışını aksatmamak için dönüş yapacağım şeride erken geçiş yapmak	1	2	3	4	5	6
61	Telefonla ilgilenmem gerektiğinde trafik güvenliğini riske atmamak için aracımı uygun bir yere çekerek konuşmak	1	2	3	4	5	6
62	Trafik güvenliğini riske atmamak için uzun süreli yolculuklarda belirli aralıklarla veya yorulduğumda ilk fırsatta mola vermek	1	2	3	4	5	6
63	Araç kullanırken yapacağım hamleleri trafik akışını desteklemek için diğer yol kullanıcılarına sinyal vb. yöntemler ile önden işaret etmek	1	2	3	4	5	6
64	Başka bir araçla aynı anda aynı yöne/çıkışa yöneldiğim durumda diğer araca yol vermek	1	2	3	4	5	6
65	Araç kullanırken korunmasız yol kullanıcılarının (yaya, bisikletli, çocuk vb.) öngörülemeyen ani hareketlerine karşı tetikte olmak	1	2	3	4	5	6
66	Zor durumda kalan bir araç sürücüsünün istemesi durumunda park edebilmesi, aracını hareket ettirebilmesi vs. için aracına şoförlük yapmak	1	2	3	4	5	6

67	Trafikte güvenliğini tehlikeye atan yol kullanıcılarıyla (sürücü, yaya vb.) tartışmaya girmemek için ilk fırsatta oradan uzaklaşmak	1	2	3	4	5	6
68	Zor/sıkışık bir durumda kalmış araç sürücüsüne yardımcı olmak için yol vermek	1	2	3	4	5	6
69	Yakıt tasarrufu için trafik ışıklarında aracımı durdurmadan sürüşe devam edebileceğim şekilde hızımı ayarlamak	1	2	3	4	5	6
70	Bana yeşil yansa dahi zaten sıkışık olan bir kavşağa girmeyip kavşağın açılmasını beklemek veya gideceğim istikamet için başka bir yol tercihi aramak	1	2	3	4	5	6
71	Trafikte diğer yol kullanıcılarının (sürücü, yaya vb.) hatalarını telafi edebileceğim bir güvenlik payı bırakarak araç kullanmak	1	2	3	4	5	6
72	Yolun kenarında aniden yola çıkabilecek bir insan veya hayvan gördüğümde arkadan gelenleri dörtlüler vb. ile uyarmak	1	2	3	4	5	6
73	Yakıt tasarrufu için aracımı yüksek hızda kullanmamak	1	2	3	4	5	6
74	Trafikte öfkelendiğimde trafik güvenliğini riske atmamak için kendimi sakinleştirdikten sonra yoluma devam etmek	1	2	3	4	5	6
75	Aracın motorunu korumak ve/veya daha fazla hava kirliliği yaratmamak için güvenilir yakıt firmalarından kaliteli yakıt almak	1	2	3	4	5	6
76	Davranışını öngöremediğim yol kullanıcısına (sürücü, yaya vb.) trafik güvenliğini riske atmamak için yol vermek	1	2	3	4	5	6
77	Çevre dostu bir sürüş için aracımı yol koşullarına uygun olan hızda/devirde/viteste kullanmak	1	2	3	4	5	6
78	Yakıt tasarrufu için kısa mesafe yolculuklarda araç içindeki klimayı çalıştırmaktan kaçınmak	1	2	3	4	5	6
79	Trafik akışını engellemeyecek alanlarda bekleme yapmak	1	2	3	4	5	6

J. POSITIVE DRIVER BEHAVIORS SCALE

Aşağıda verilen davranışları ne sıklıkta yaparsınız?

Aşağıda, sürücülerin trafik ortamında karşılaşılabileceği bazı durumlar verilmiştir. Sizden istenen, aşağıda verilen her bir madde için bu tür şeylerin sizin başınıza **NE SIKLIKLA** geldiğini belirtmenizdir. Değerlendirmelerinizi geçtiğimiz yıl boyunca kendinizin araç kullanma davranışlarından ne hatırlıyorsanız onları temel alarak yapınız. Lütfen değerlendirmelerinizi size göre en doğru olan seçeneği işaretleyerek belirtiniz. Her bir soru için cevap seçenekleri:

1=Hiçbir zaman 2=Nadiren 3=Bazen 4=Oldukça sık 5=Sık sık 6=Neredeyse her zaman

1	Önünüzdeki aracın sürücüsünü, onu rahatsız etmeyecek bir mesafede takip etmek	1	2	3	4	5	6
2	Karşıdan gelen araç sürücüsünün görüş mesafesini koruyabilmesi için uzunları mümkün olduğunca az kullanmak	1	2	3	4	5	6
3	Aracınızı park ederken diğer yol kullanıcılarının (yayalar, sürücüler vb.) hareketlerini sınırlamamaya özen göstermek	1	2	3	4	5	6
4	Aracınızı kullanırken yol kenarında birikmiş suyu ve benzeri maddeleri yayaların üzerine sıçratmamaya dikkat etmek	1	2	3	4	5	6
5	Sollama yapan sürücüye kolaylık olması için hızınızı onun geçiş hızına göre ayarlamak	1	2	3	4	5	6
6	Gereksiz yere gürültü yapmamak için kornayı kullanmaktan kaçınmak	1	2	3	4	5	6
7	Arkamdan hızla gelen aracın yolunu kesmemek için sollamadan vazgeçip eski yerinize dönmek	1	2	3	4	5	6
8	Otobanda trafik akışını sağlayabilmek için en sol şeridi gereksiz yere kullanmaktan kaçınmak	1	2	3	4	5	6
9	Yayaların karşıdan karşıya geçebilmeleri için geçiş hakkı sizde dahi olsa durarak yol vermek	1	2	3	4	5	6
10	Trafikte, herhangi bir sürücü size yol verdiğinde veya anlayış gösterdiğinde, elinizi sallayarak, korna çalarak vb. şekilde teşekkür etmek	1	2	3	4	5	6
11	Trafikte, diğer sürücülere engel teşkil etmemeye gayret göstermek	1	2	3	4	5	6
12	Yeşil ışık yandığı halde hareket etmekte geciken öndeki araç sürücüsünü korna çalarak rahatsız etmemek	1	2	3	4	5	6
13	Geçiş hakkı sizde dahi olsa diğer sürücülere yol vermek	1	2	3	4	5	6
14	Arkanızdaki aracın ileriye iyi göremediği durumlarda sinyal vb. ile işaret vererek sollamanın uygun olduğunu belirtmek	1	2	3	4	5	6

K. PROSOCIAL AND AGGRESSIVE DRIVING INVENTORY

Aşağıda verilen her bir madde için sizden istenen bu tür şeylerin sizin başınıza **NE SIKLIKLA** geldiğini belirtmenizdir. Değerlendirmelerinizi size göre doğru olan seçeneği daire içine alarak belirtiniz.

1=Hiçbir zaman 2=Neredeyse hiçbir zaman 3=Bazen 4=Oldukça sık 5=Sık sık 6=Her zaman

1	Etrafta yayalar varken daha dikkatli araç kullanmak	1	2	3	4	5	6
2	Kavşaklara yaklaşırken özellikle dikkatli olmak	1	2	3	4	5	6
3	Etrafta bisikletliler varken daha dikkatli araç kullanmak	1	2	3	4	5	6
4	Dönüş yaptığım durumlarda özellikle dikkatli olmak	1	2	3	4	5	6
5	Araç kullanırken trafiğe ve çevremdekilere dikkat etmek	1	2	3	4	5	6
6	Arkamdaki sürücülerin hızımı düşürüyor olduğuma dikkatlerini çekebilmek için mümkün olduğunca yavaş bir şekilde fren yapmak	1	2	3	4	5	6
7	Kötü yol koşullarına uyum sağlamak amacıyla hız düşürmek	1	2	3	4	5	6
8	Şerit değiştirirken aynaları kullanmak ve kör noktaları kontrol etmek	1	2	3	4	5	6
9	Yol kenarındaki insanlara ya da araçlara hareket alanı sağlamak için daha tedbirli araç kullanmak (örn. Yavaşlamak, kenara çekilmek)	1	2	3	4	5	6
10	Diğer araçları takip ederken güvenli takip mesafesini korumak	1	2	3	4	5	6
11	İnşaat alanında hız düşürmek	1	2	3	4	5	6
12	Dur işaretinde tamamen durmak	1	2	3	4	5	6
13	Kötü hava koşullarına uyum sağlamak amacıyla hız düşürmek	1	2	3	4	5	6
14	Yol hakkı diğer sürücülerde olduğunda onlara yol vermek	1	2	3	4	5	6
15	Trafik işaretlerine uymak	1	2	3	4	5	6
16	Okul bölgesindeyken belirlenen hız sınırlarına uymak	1	2	3	4	5	6
17	Diğer sürücüler dönüş yapacağıma dair bilgilendirmek için sinyal lambalarını kullanmak	1	2	3	4	5	6

L. DRIVER BEHAVIOR QUESTIONNAIRE

Aşağıda verilen davranışları ne sıklıkta yaparsınız?

Aşağıda verilen her bir madde için sizden istenen bu tür şeylerin sizin başınıza **NE SIKLIKLA** geldiğini belirtmenizdir. Değerlendirmelerinizi geçtiğimiz yıl boyunca kendinizin araç kullanma davranışlarından ne hatırlıyorsanız onları temel alarak yapınız. Lütfen değerlendirmelerinizi size göre doğru olan seçeneği karalayarak belirtiniz. Her bir soru için cevap seçenekleri:

**1=Hiçbir Zaman 2=Nadiren 3=Bazen 4=Oldukça Sık 5=Sık Sık
6=Her Zaman**

1	Dönel kavşakta dönüş istikametinize uygun olmayan şeridi kullanmak	1	2	3	4	5	6
2	Anayoldan bir sokağa dönerken karşıdan karşıya geçen yayaları fark edememek	1	2	3	4	5	6
3	Başka bir sürücüye kızgınlığınızı belirtmek için korna çalmak	1	2	3	4	5	6
4	“Yol ver” işaretini kaçırıp, geçiş hakkı olan araçlarla çarpışacak duruma gelmek	1	2	3	4	5	6
5	Trafik ışıklarında üçüncü vitesle kalkış yapmaya çalışmak	1	2	3	4	5	6
6	Sola dönüş sinyali veren bir aracın sinyalini fark etmeyip onu sollamaya çalışmak	1	2	3	4	5	6
7	Trafikte sinirlendiğiniz bir sürücüyü takip edip ona haddini bildirmeye çalışmak	1	2	3	4	5	6
8	Aracınızı park alanında nereye bıraktığınızı unutmak	1	2	3	4	5	6
9	Solda yavaş giden bir aracın sağından geçmek	1	2	3	4	5	6
10	Trafik ışığında en hızlı hareket eden araç olmak için yandaki araçlarla yarışmak	1	2	3	4	5	6
11	Trafik işaretlerini yanlış anlamak ve kavşakta yanlış yöne dönmek	1	2	3	4	5	6
12	Trafik ışıkları sizin yönünüze kırmızıya döndüğü halde kavşaktan geçmek	1	2	3	4	5	6
13	Bazı tip sürücülere kızgın olmak (illet olmak) ve bu kızgınlığı bir şekilde onlara göstermek	1	2	3	4	5	6
14	Sollama yaparken karşıdan gelen aracın hızını olduğundan daha yavaş tahmin etmek	1	2	3	4	5	6
15	Otobanda hız limitlerini dikkate almamak	1	2	3	4	5	6

M. DRIVER SKILLS INVENTORY

Araç kullanırken güçlü ve zayıf yönleriniz nelerdir?

Özellikle araç kullanmanın farklı yönlerinde sürücüler arasında pek çok farklılıklar vardır. Hepimizin sürücü olarak güçlü ve zayıf yönleri vardır. Lütfen sizin bir sürücü olarak güçlü ve zayıf yönlerinizin neler olduğunu her bir madde için aşağıdaki uygun seçeneği işaretleyerek belirtiniz. Her bir soru için cevap seçenekleri:

1=Çok zayıf 2=Zayıf 3=Ne zayıf ne de güçlü 4=Güçlü 5=Çok güçlü

1	Seri araç kullanma	1	2	3	4	5
2	Trafikte tehlikeleri görme	1	2	3	4	5
3	Sabırsızlanmadan yavaş bir aracın arkasından sürme	1	2	3	4	5
4	Kaygan yolda araç kullanma	1	2	3	4	5
5	İlerideki trafik durumlarını önceden kestirme	1	2	3	4	5
6	Belirli trafik ortamlarında nasıl hareket edileceğini bilme	1	2	3	4	5
7	Yoğun trafikte sürekli şerit değiştirme	1	2	3	4	5
8	Hızlı karar alma	1	2	3	4	5
9	Sinir bozucu durumlarda sakin davranma	1	2	3	4	5
10	Aracı kontrol etme	1	2	3	4	5
11	Yeterli takip mesafesi bırakma	1	2	3	4	5
12	Koşullara göre hızı ayarlama	1	2	3	4	5
13	Geriye kaçırmadan aracı yokuşta kaldırma	1	2	3	4	5
14	Sollama	1	2	3	4	5
15	Gerektiğinde kazadan kaçınmak için yol hakkından vazgeçme	1	2	3	4	5
16	Hız sınırlarına uyma	1	2	3	4	5
17	Gereksiz risklerden kaçınma	1	2	3	4	5
18	Diğer sürücülerin hatalarını telafi edebilme	1	2	3	4	5
19	Trafik ışıklarına dikkatle uyma	1	2	3	4	5
20	Dar bir yere geri geri park edebilme	1	2	3	4	5

N. DRIVING ANGER EXPRESSION INVENTORY

Aşağıda kızgın veya öfkeli hissettiğinizdeki tepkilerinizi tanımlayan ifadeler yer almaktadır. Her bir ifadeyi okuyun ve sürüş sırasında öfkeli veya kızgın hissettiğinizde genellikle **NE SIKLIKLA** bu şekilde tepki verdiğinizizi veya davrandığınızı belirtiniz.

1=Neredeyse hiçbir zaman 2=Bazen 3=Sık sık 4=Neredeyse her zaman

1	Diğer sürücüyü korkutmayı denerim	1	2	3	4
2	Aracımdan dışarı çıkıp fiziksel olarak kavga etmeyi denerim	1	2	3	4
3	Yolda kötü sürücülerin olabileceğini kabul ederim	1	2	3	4
4	Kendime uğraşmaya/bulaşmaya değmeyeceğini söylerim	1	2	3	4
5	Öfkemi göstermek için camı indiririm	1	2	3	4
6	Durumla başa çıkmak için olumlu çözüm yolları düşünürüm	1	2	3	4
7	Aracıma çok daha hızlı sürerim	1	2	3	4
8	Diğer sürücüye yüksek sesle söylerim	1	2	3	4
9	Diğer sürücü hakkında yüksek sesle olumsuz yorumlar yaparım	1	2	3	4
10	Kendime sinirlenmeye değmeyeceğini söylerim	1	2	3	4
11	Diğer sürücünün tam tamponuna doğru sürerim	1	2	3	4
12	Kendime görmezden gelmeyi söylerim	1	2	3	4
13	Diğer sürücülerin bana yaptıklarının aynısını onlara yaparım	1	2	3	4
14	Aracımdan dışarı çıkıp diğer sürücüye ağzının payını vermeyi denerim	1	2	3	4
15	Diğer sürücüye bağırırım	1	2	3	4

O. BASIC PERSONALITY TRAITS INVENTORY

Aşağıda size uyan ya da uymayan pek çok kişilik özelliği bulunmaktadır. Bu özelliklerden her birinin sizin için **NE KADAR UYGUN** olduğunu uygun seçeneği işaretleyerek belirtiniz.

*Örneğin;
Kendimi biri olarak görüyorum.*

1=Hiç uygun değil 2=Uygun değil 3=Kararsızım 4=Uygun 5=Çok uygun

1	Aceleci	1	2	3	4	5	24	Pasif	1	2	3	4	5
2	Yapmacık	1	2	3	4	5	25	Disiplinli	1	2	3	4	5
3	Duyarlı	1	2	3	4	5	26	Açgözlü	1	2	3	4	5
4	Konuşkan	1	2	3	4	5	27	Sinirli	1	2	3	4	5
5	Kendine güvenen	1	2	3	4	5	28	Cana yakın	1	2	3	4	5
6	Soğuk	1	2	3	4	5	29	Kızgın	1	2	3	4	5
7	Utangaç	1	2	3	4	5	30	Sabit fikirli	1	2	3	4	5
8	Paylaşımçı	1	2	3	4	5	31	Görgüsüz	1	2	3	4	5
9	Geniş / rahat	1	2	3	4	5	32	Durgun	1	2	3	4	5
10	Cesur	1	2	3	4	5	33	Kaygılı	1	2	3	4	5
11	Agresif (Saldırgan)	1	2	3	4	5	34	Terbiyesiz	1	2	3	4	5
12	Çalışkan	1	2	3	4	5	35	Sabırsız	1	2	3	4	5
13	İçten pazarlıklı	1	2	3	4	5	36	Yaratıcı (Üretken)	1	2	3	4	5
14	Girişken	1	2	3	4	5	37	Kaprisli	1	2	3	4	5
15	İyi niyetli	1	2	3	4	5	38	İçine kapanık	1	2	3	4	5
16	İçten	1	2	3	4	5	39	Çekingen	1	2	3	4	5
17	Kendinden emin	1	2	3	4	5	40	Alıngan	1	2	3	4	5
18	Huysuz	1	2	3	4	5	41	Hoşgörülü	1	2	3	4	5
19	Yardımsever	1	2	3	4	5	42	Düzenli	1	2	3	4	5
20	Kabiliyetli	1	2	3	4	5	43	Titiz	1	2	3	4	5
21	Üşengeç	1	2	3	4	5	44	Tedbirli	1	2	3	4	5
22	Sorumsuz	1	2	3	4	5	45	Azimli	1	2	3	4	5
23	Sevecen	1	2	3	4	5							

P. CURRICULUM VITAE

ŞERİFE YILMAZ

Research Assistant at Department of Psychology, Bartın University, Bartın, Türkiye

E-mail: _____

ORCID: _____

EDUCATION

Ph.D., Middle East Technical University, Türkiye, 2023

Graduate School of Social Sciences, Traffic & Transportation Psychology

CGPA: 3.94 / 4.00

M.S., Middle East Technical University, Türkiye, 2018

Graduate School of Social Sciences, Traffic & Transportation Psychology

CGPA: 3.86 / 4.00

B.S., Middle East Technical University, Türkiye, 2014

Faculty of Arts and Sciences, Department of Psychology

CGPA: 3.34 / 4.00

Pedagogical Formation Certificate Programme, Ege University, Türkiye, 2017

Erasmus+ European Mobility, Leuphana University Luneburg, Germany, 2013

PROJECT EXPERIENCES

October – November 2016 **Project Assistant** for **EuropeAid/136124/IH/SER/TR** project in the field of Social Inclusion Policies

“Increasing the Institutional Capacity of the Ministry of Family and Social Policies (MoFSP)”

February 2015 – April 2016 **Researcher** for the **EU FP7** project

“Tools, Methods and Training for Communities and Society to Better Prepare for a Crisis”

(2014-2016; FP7-SEC-2013-1, Grant Agreement No. 608058)

Project Coordinator: Prof. A. Nuray Karancı

September 2012 – 2015 **Project Assistant and Field observer** for the **Road Safety10** (RS10)

Global Road Safety 10 Project: “Seat-belt and child seat usage and speeding measures in Afyon and Ankara”

Joint Project with Bloomberg School of Public Health International Injury Unit and John Hopkins University

Project Coordinator: Prof. Türker Özkan

THESIS

Yılmaz, Ş. (2018). *Development of the professional driver behavior questionnaire*. [Master's thesis]. Middle East Technical University.

PUBLICATIONS

JOURNAL ARTICLES

Yılmaz, Ş., Fındık, G., & Öz, B. (2023). *Transportation experiences and future suggestions of public transport users in Türkiye during Covid-19 pandemic: A qualitative study from a developing country perspective*. [Under review]

Yılmaz, Ş., Arslan, B., Öztürk, İ., Özkan, Ö., Özkan, T., & Lajunen, T. (2022). Driver social desirability scale: A Turkish adaptation and examination in the driving context. *Transportation Research Part F: Traffic Psychology and Behaviour*, 84, 53-64. <https://doi.org/10.1016/j.trf.2021.11.009>. SSCI

Yılmaz, Ş., Özkan, T., & Öz, B. (2022). Organisational safety climate, professional driver behaviours, and accidents among a mixed group professional driver. *Journal of Road Safety*, 33(2), 5-16. <https://doi.org/10.33492/JRS-D-21-00054>. ESCI

Çınar, S., **Yılmaz, Ş.**, & Öz, B. (2022). Pedestrians' crossing behaviors and crossing preferences: A field study. *Transactions on Transport Sciences*, 13(2), 18-26. DOI: 18-26. 10.5507/tots.2022.006. SCOPUS, EBSCO

Yılmaz, Ş., Öz, B., & Özkan, T. (2019). Profesyonel sürücülükte sürücü davranışlarına yönelik nitel bir çalışma [A qualitative study of driving behaviors of professional driving]. *Trafik ve Ulaşım Araştırmaları Dergisi*, 2(1), 51–65. <https://doi.org/10.38002/tuad.525441>.

BOOK CHAPTERS

Yılmaz, Ş. (2023). Korunmasız yol kullanıcıları: Elektrikli skuter kullanıcıları [Vulnerable Road users: Electric scooter users]. Book in preparation.

Koç-Arık, G., & **Yılmaz, Ş. (2022).** Duygusal gelişim [Emotional development]. G. Akyürek (Ed.), *Büyüme ve Gelişim* içinde (s. 269-283). Ankara: Hipokrat Yayınevi.

Yılmaz, Ş. (2021). Toplumsal mobilité ve koruyucu yaklaşımlar [Community mobility and preventive approaches]. G. Bumin ve G. Akyürek (Ed.), *Koruyucu Ergoterapi ve Çevresel Düzenlemeler* içinde (s. 209-222). Ankara: Hipokrat Yayınevi.

REPORTS

Özkan, T., Üzümcüoğlu, Y., Kaçan, B., Arslan, B., Tekeş, B., . . . **Yılmaz, Ş., Erkuş, U. U. (2016).** Türkiye analizi: Takip çalışması sürücü ve ön koltuk yolcularının emniyet kemeri kullanımı. (Available upon request).

Karancı, A. N., Doğulu, C., **Yılmaz, Ş., İkizer, G., Bayraktar, H. (2015).** Short Report on Workshop 2, Case Study Earthquakes in Turkey [Deliverable 7.2]. Ankara, Turkey: Middle East Technical University for the TACTIC Project.

Karancı, A. N., Doğulu, C., **Yılmaz, Ş., & Bayraktar, H. (2015).** Short Report on Workshop 1, Case Study Earthquakes in Turkey [Deliverable 7.1]. Ankara, Turkey: Middle East Technical University for the TACTIC Project.

Özkan, T., Üzümcüoğlu, Y., Öztürk, İ., Öz, C., Fındık, G., Serin, G., . . . **Yılmaz, Ş. (2015).** Türkiye analizi: Takip çalışması sürücü ve ön koltuk yolcularının emniyet kemeri kullanımı. (Available upon request).

PRESENTATIONS

Yılmaz, Ş., & Öz, B. (July 3-6, 2023). The relationship between demographic variables, gender roles, and pedestrian behaviours. Paper orally presented at the 18th European Congress of Psychology, Brighton, United Kingdom.

Öztürk, İ., Kaçan-Bibican, B., Philipose, J., Sutherland, N., & **Yılmaz, Ş. (July 3-6, 2023).** Distractions on the road: Role of driving skills, traffic locus of control and traffic climate in distracted driving across countries. Paper orally presented at the 18th European Congress of Psychology, Brighton, United Kingdom.

Yılmaz, Ş., Cantekin, D. (August 23-25, 2022). Thematic analysis of road safety action

plan of Turkey. Paper orally presented at the 7th International Conference on Traffic and Transport Psychology, Gothenburg, Sweden

Yılmaz, Ş., Öz, B. (August 23-25, 2022). A systematic review on prosocial driver behaviors. Paper orally presented at the 7th International Conference on Traffic and Transport Psychology, Gothenburg, Sweden.

Yılmaz, Ş., & Arslan, B. (August 23-25, 2022). Analyzing values of Ankara public transportation services. Poster presented at the 7th International Conference on Traffic and Transport Psychology, Gothenburg, Sweden.

Çınar, S., **Yılmaz, Ş., & Öz, B.** (October 28-29, 2021). Pedestrians' Crossing Behaviors and Preferences: A Field Study. Paper orally presented at the 33rd ICTCT: Paving the way to safer active urban mobility—challenges and opportunities. Online.

Yılmaz, Ş., & Arslan, B. (October 15-16, 2021). Analyzing the values of Ankara Electricity, Gas and Bus Operations Organization in terms of Schwartz's Value Theory. Paper orally presented at the International Road Safety Congress. Online.

Çınar, S., **Yılmaz, Ş., & Öz, B.** (May 21-23, 2021). Pedestrian' crossing behaviors at Iran street-Poland street intersection in Ankara: A study based on observation and survey data. Paper orally presented at the International Lale Oraloglu Congress on Culture, Arts, and Multidisciplinary Studies. Online.

Yılmaz, Ş., Öz, B., & Lajunen, T. (September 5-7, 2016). Sürücülükte öfke ifade şekillerinin yolcunun varlığı ve cinsiyeti ile ilişkisi [Driving anger expressions in relation with passenger presence and sex while driving]. Poster presented at the 19th National Congress of Psychology, İzmir, Turkey.

Karancı, A. N., Doğulu, C., **Yılmaz, Ş., & İkizer, G.** (March 25, 2016). Toplumları afetlere hazırlamak: TACTIC Projesi kapsamında kurumsal ve toplumsal öz-değerlendirme öğrenme platformu [Preparing communities to disasters: Organisational and public self-assessment and learning platform as part of the TACTIC Project]. Paper orally presented at the 18th Round Table Meeting of Disaster Management Implementation and Research Center, Middle East Technical University, Ankara, Turkey.

ONGOING ACADEMIC COLLABORATIONS

BikeBarometer 2023 – Researcher

Data collection from Türkiye for an international cycling project.

Project Coordinator: Dr. Sergio. A. Useche, Valencia University, Spain

ARTS 2022-2023 – Team Member

The Advanced Research Training Seminar (ARTS), organized by the International

Association of Applied Psychology (IAAP). I am a team member of a research project on “Motivational factors of driver distraction”

Project Leader: Dr. İbrahim Öztürk



Q. TURKISH SUMMARY / TRKE ZET

Giriř

Her yıl yaklaşık olarak 1,35 milyon insan karayolu trafik kazaları neticesinde hayatını kaybetmekte, 20 ila 50 milyon yaralanmaktadır (Dnya Saęlık rgt [DS], 2018). Bu durum 5 ila 29 yař arasındaki çocuklar ve gen yetiřkinlerin hayatını kaybetmesinin nde gelen nedenidir. Son istatistikler, 2021 yılında Trkiye'de trafik kazaları sonucu 5 bin 362 kiřinin ldęn ve 274 bin 615 kiřinin yaralandıęını gstermektedir. Bu, 2021 yılında trafik kazaları nedeniyle gnlk olarak yaklaşık olarak 14 kiřinin ldę ve 752 kiřinin yaralandıęı anlamına gelmektedir. Bu istatistikler, karayolu trafik gvenlięi ile ilgili sorunun boyutunu etkili bir řekilde gstermektedir.

Son yıllarda poplerlik kazanan gvenli sistem yaklařımı trafik gvenlięini saęlamak konusunda insan, ara ve evre arasındaki etkileřime odaklanmayı nermektedir. Bu yaklařıma gre bařarısız srř performansları iin srcleri sulamak yerine, trafik sisteminin her bir bileřenindeki olası risk faktrlerini tanımlama ve sistemdeki noksanları telafi etmek iin evreye mdahalede bulunma veya evreyi gvenlięi nceleyecek řekilde tasarlama fikri dikkat ekmektedir (Shinar & Gurion, 2019). Gvenli sistem yaklařımını benimsemek, hala insan hatalarını tanımlamayı gerektirir, nk insanlar kazalara yol aan hataları yaparlar. Bu nedenle ama, sistemi insan hatalarını telafi edecek řekilde tasarlamaktır. Ancak insanlar yalnızca kazalara yol aan hatalar yapmazlar, bazen olası kazaları nlemek iin proaktif olarak pozitif eylemlerde de bulunurlar. Gvenli sistem yaklařımı, riskleri azaltmada proaktif gvenlięi nceliklendirir (Avrupa Komisyonu, 2022). Benzer řekilde, gvenli sisteme katkıda bulunan pozitif davranıřlar, bu proaktif bakıřın ayrılmaz bir parasıdır. Bu alıřma, trafik baęlamında eřitli iřlevlere sahip olabilecek pozitif src davranıřlarını inceleyerek srř ortamlarındaki insan faktr bileřenine odaklanmaktadır.

Sürüş ortamında insan faktörleri, iki temel bileşen kapsamında ele alınmaktadır: sürücü davranışları ve sürücü becerileri (Elander vd., 1993). Sürücü davranışı veya tarzı, bir sürücünün aracı nasıl sürmeyi tercih ettiğini ifade eder. Bu, bir sürücünün trafik ortamındaki "tipik davranışı" demektir, diğer bir deyişle bir sürücünün gerçek trafik ortamında "ne yaptığı" anlamına gelir. Hız aşımı, sollama, yol verme seçimleri, kurallara uyma/uymama, sürücü davranışlarının örnekleridir (Elander vd., 1993). Öte yandan, sürücü becerileri veya performansı, bir sürücünün "ne yapabileceği" ile ilgilidir. Sürücü becerileri, bir sürücünün yetenekleri ile ilgilidir (Oppenheim & Shinar, 2011). Örneğin, algısal-motor beceriler, tehlike algılama ve güvenlik becerileri sürücü becerilerine örnektir (Lajunen & Summala, 1995). Bu beceriler eğitim ve pratikle, sürüş deneyimi arttıkça gelişir (Elander vd., 1993). Birçok çalışma sadece sürücü davranışları, sadece sürücü becerileri veya her ikisine odaklanarak insan faktörü perspektifinden yol güvenliğini iyileştirmeye odaklanmaktadır. Bu çalışma kapsamında sürücü davranışları araştırmanın ana odak noktasıdır.

Yol güvenliği çalışmaları bağlamında, birkaç araştırmacı sürüş bağlamında pozitif sürücü davranışlarını tanımlama ve ölçme girişimlerinde bulunmuştur. Bu araştırmacılar tarihsel olarak pozitif sürücü davranışlarını sabırlı ve dikkatli sürüş tarzı (Taubman-Ben-Ari vd., 2004), pozitif sürücü davranışları (Özkan, 2006; Özkan & Lajunen, 2005), prososyal sürüş davranışları (Harris vd., 2014), fedakâr sürüş davranışları (Nandavar vd., 2019) ve güvenli sürüş davranışları (Armitage vd., 2022) olarak adlandırmışlardır. Bu çalışmalar arasında pozitif sürücü davranışlarının tanımlanmasında kavramsal farklılıklar bulunmaktadır. Örneğin, Nandavar ve meslektaşlarının (2019) tanımı özverili ve fedakâr eylemlere odaklanmaktadır. Buna karşılık, Harris ve meslektaşlarının kavramı tanımı (2014) güvenlik ve kurallara uygun davranışları içermektedir. Özkan ve Lajunen (2005) ise daha çok yardım etme ve nezaket ile ilişkilendirilen davranışlara odaklanmıştır.

Pozitif sürücü davranışlarının tanımlanmasındaki kavramsal farklılıklara ek olarak önceki çalışmalarda pozitif sürücü davranışı ölçümleri incelendiğinde, aralarındaki arasında bağlam farkları da göze çarpmaktadır. Pozitif sürücü davranışlarının iki temel ölçümlerinden Pozitif Sürücü Davranışları Ölçeği (PSDÖ; Özkan & Lajunen, 2000) ve

Prososyal ve Agresif Sürüş Envanterinin prososyal boyutunda (PASE-Prososyal; Harris vd., 2014) yer alan maddelere dikkat edildiğinde, pozitif sürücü davranışlarına bağlı farklı temaların ortaya çıktığı görülebilir. PSDÖ ve PASE-Prososyal, pozitif sürücü davranışlarını tek bir faktör olarak ölçmüş olsa da bu ölçüm araçları esasında iki temel faktöre işaret etmektedir. Bunlar, güvenlikle ilgili pozitif sürücü davranışları ve nezaket ile ilgili pozitif sürücü davranışlarıdır. Güvenlikle ilgili pozitif sürücü davranışları, potansiyel riskleri yani trafik ortamındaki örtük riskleri önceden tahmin etme ve diğer sürücüler bu potansiyel riskli durumlardan korumak için gerekli önlemleri almak ile ilgilidir. Öte yandan, nezaket ile ilgili pozitif sürücü davranışları sürüş ortamındaki daha naif davranışlarla ilişkilidir.

Son yıllarda, çevre ve iklimle ilgili konular sürdürülebilir ulaştırma araştırmasının bir parçası olarak incelenmeye başlanmıştır. Örneğin, hızlanma ve yavaşlama konusunda stabil bir şekilde hareket etme, ani manevralardan kaçınmak için trafik akışını tahmin etme ve istikrarlı bir sürüş hızını koruma gibi çevre dostu bir sürüş tarzını benimsemek (Barkenbus, 2010; Dogan vd., 2011) ve ilgili davranışlar, sürdürülebilir ve pozitif sürücü davranışlarının bir parçası olarak değerlendirilebilir. Bu davranışlar yakıt tasarrufuna yol açar ve ani manevralardan kaynaklanabilecek kazaların olasılığını önler; bu nedenle pozitif davranışlarla ilişkilidirler. Fakat yol kullanıcısı ve çevre/iklim arasındaki ilişki önceki çalışmalarda pozitif sürücü davranışları kavramı kapsamında büyük ölçüde göz ardı edilmiştir (Harris vd., 2014; Nandavar vd., 2019; Özkan & Lajunen, 2005). Var olan ölçeklerin maddeleri incelendiğinde bu konuda yazılmış tek bir maddeye rastlanmaktadır; gürültü kirliliği yaratmamak için korna çalmaktan kaçınmak ile ilgili bir madde belirtilmiştir (bkz. Özkan & Lajunen, 2005). Sonuç olarak, literatürde önerilen pozitif sürücü davranışlarının tek faktörlü yapısından farklı olarak bu kavramla ilişkili birçok alt boyuttan bahsedilebileceği görülmektedir.

Pozitif sürücü davranışları, kritik yol güvenliği çıktılarıyla birçok ilişki kurmuştur. Örneğin, bazı çalışmalar, pozitif sürücü davranışlarında bulunan sürücülerin trafik cezası alması ve karayolu trafik kazalarına karışma olasılığının daha düşük olduğunu ortaya koymuştur (Harris vd., 2014; Matović vd., 2020). Öte yandan bazı çalışmalar, pozitif

sürücü davranışları ile kazaya karışma arasında bir ilişki bulunmadığını göstermiştir (Chu vd., 2019; Guého vd., 2014; Maslać vd., 2018). Bu bulgulara göre pozitif sürücü davranışları ile kazalar arasındaki ilişki karışık sonuçlar ortaya koymaktadır denebilir. Öte yandan, pozitif sürücü davranışları, agresif sürüşle ilgili çalışmalarla incelenmiştir. Bir çalışmada, daha fazla pozitif sürücü davranışı sergileyen sürücüler, daha az düşmanca saldırganlık ve intikam davranışlarıyla karşılaşmışlardır (Özkan & Lajunen, 2005). Benzer şekilde Matović ve meslektaşları tarafından yapılan başka bir çalışmada (2020), sürüş öfkesini (örneğin, yavaş sürme ve trafik engellemesi) ile pozitif sürücü davranışları arasında negatif yönlü bir ilişki olduğu gösterilmiştir (Matović vd., 2020).

Diğer yandan, pozitif sürücü davranışlarının yordayıcıları konusunda çıktı değişkenlerine kıyasla tutarlı sonuçlar elde edilmiştir. Yapılan çalışmalara göre kadın sürücüler ve yaşlı sürücülerin (Bıçaksız & Özkan, 2016; Ersan vd., 2019; Matović vd., 2020) pozitif sürücü davranışları sergileme olasılığı daha yüksektir. Ayrıca, anlayışlı, dışa dönük, sorumluluk sahibi, nörotik ve fedakâr kişilik özelliklerine sahip kişiler (örneğin, Ge vd., 2020; Harris vd., 2014; Shen, Ge vd., 2018) daha fazla pozitif sürücü davranışları sergileme eğilimindedir. Öte yandan, yüksek sıkılganlık, düşmanlık ve heyecan arayışı yüksek olan kişiler, pozitif sürücü davranışlarını daha az sergileme eğilimindedirler (Harris vd., 2014; Shen, Ge vd., 2018). Sürücü becerileri için algısal motor becerileri ve güvenlik becerilerinin pozitif sürücü davranışları ile pozitif bir ilişkisi bulunmuştur (Öztürk vd., 2018; Xu vd., 2018). Yani sürücü becerileri yüksek olan sürücüler daha fazla pozitif sürücü davranışı göstermektedir. Ayrıca, bazı çalışmalar riskli sürücü davranışları ile pozitif sürücü davranışları arasında negatif bir ilişki bildirmiştir. Örneğin, pozitif sürücü davranışları ile meşgul olma daha az ihlal ve hata yapmak ile ilişkili bulunmuştur (Guého vd., 2014; Maslać vd., 2018; Özkan & Lajunen, 2005; Shen, Ge vd., 2018; Shen, Qu vd., 2018).

Tüm bu değişkenler, pozitif sürücü davranışları ile ilişkisi incelenen sürüşle ilgili temel değişkenler arasında yer almaktadır ve bu değişkenler literatürde yol güvenliği çalışmalarında yaygın olarak incelenen değişkenlerdir. Pozitif sürücü davranışları hakkındaki sınırlı literatürde bile, demografik değişkenler (örneğin, cinsiyet, yaş), kişilik

özellikleri, sürücü becerileri, sürücü davranışları, sürücü öfkesi ve trafik kazaları gibi önemli ve kritik ilişkiler, öne çıkmıştır.

Pozitif sürücü davranışlarına ilişkin mevcut literatürün kavramsallaştırılmasında ve kurulan ampirik ilişkilerde gözlenen tutarsızlıklar ışığında, yalnızca pozitif sürücü davranışlarına odaklanan özel bir çalışmanın gerekli olduğu görülmektedir. Mevcut tez çalışmasının pozitif sürücü davranışlarını daha derinlemesine anlamaya yönelik olarak pek çok amacı bulunmaktadır. Bu amaçlar şunlardır:

Çalışma 1'de

i. Pozitif sürücü davranışlarının çok boyutlu doğasını keşfetmek ve pozitif sürücü davranışlarının çeşitli yönlerini bir araya getiren yeni bir anket geliştirmek

Ana Çalışma'da

ii. Yeni geliştirilen anketin faktör yapısını belirlemek ve psikometrik özelliklerini araştırmak

iii. Yeni anketin cinsiyet, yaş, deneyim gibi kritik demografik özellikler ve sürüşle ilgili değişkenler (sürücü becerileri, sürücü öfkesi ifadesi ve kişilik) ile ilişkisini incelemek

iv. Demografik (örneğin, cinsiyet, yaş, deneyim) ve güvenlik çıktılarına (kaza, ramak kala, trafik cezası) göre oluşturulmuş grupları yeni anket üzerinde karşılaştırmak

v. Yeni anket ile sürüşle ilgili çıktı değişkenleri (riskli sürücü davranışları, sürücü öfkesi ifadesi) ve güvenlik çıktıları (ramak kala, trafik cezaları) arasındaki ilişkiyi incelemek

vi. Pozitif sürücü davranışlarını kavramını kapsamlı bir şekilde tanımlamak

Çalışma 1: Çok Boyutlu Pozitif Sürücü Davranışı Anketi (ÇB-PSDA) Geliştirilmesi

Giriş

Pozitif sürücü davranışları PSDÖ ve PASE-Prososyal ölçeklerinde tek faktörlü bir yapı ortaya koymuş olsa da literatür bu yapının çok boyutlu olabileceğine işaret etmektedir. Örneğin davranışları PSDÖ ve PASE-Prososyal ölçeklerindeki maddelerinin nitel olarak incelenmesi sonucunda, pozitif sürücü davranışları çatı kavramı altında birbirine bağlı ancak farklı alt boyutlara gruplanan maddeler gözlemlenmiştir. Ek olarak ampirik çalışmalarda bu iki farklı ölçümü kullanan çalışmalar arasında güvenlik çıktı değişkenlerini yordama konusunda tutarsız sonuçlar ortaya konmuştur (Harris vd., 2014; Matović vd., 2020; Chu vd., 2019; Guého vd., 2014; Maslać vd., 2018). Bu durumda pozitif sürücü davranışları kavramının tanımlanmasında ve ölçümündeki farklılıklara işaret etmektedir. Sonuç olarak pozitif sürücü davranışlarının güvenlik, nezaket başkalarının ihtiyaçlarına saygı gösterme ve çevre bilincini içeren ancak bununla sınırlı olmayan alt boyutları olabileceği, bu nedenle yapının çok boyutlu doğasının incelenmesi gerekliliği doğmuştur.

Bu tematik alt boyutlara ek olarak, pozitif sürücü davranışları kavramı önceki çalışmalarda Reason'ın insan hatası sınıflandırması temelindeki teorik sınıflandırmaya paralel olarak kasıtlı sürücü davranışları kategorisinde sınıflandırmıştır (Özkan ve Lajunen, 2005). Ancak bu sınıflandırmada (Reason, 1990), sürücü davranışı çalışmalarında araştırmacılar tarafından dokunulmamış, önceden bir niyet olmadan gerçekleştirilen, ancak eylemin gerçekleştirilmesinde niyetin var olduğu *spontane davranışlar* da bulunmaktadır. Dinamik ve hızlı değişen bir ortam olan trafikte, başka bir sürücüye yol vermek gibi pozitif davranışlar bazen önden planlanmak yerine daha spontane gerçekleşebilir. Bu bakış açısıyla bu çalışma kapsamında spontane sürücü davranışları da araştırılmıştır.

Çalışma 1'in amacı pozitif sürücü davranışı yapısının farklı yönlerini keşfetmek ve bu yönlerini bir araya getiren yeni bir anket geliştirmektir.

Yöntem

Katılımcılar

Çalışma katılımcıları yaşları 28 ile 70 arasında değişen sekiz erkek ve sekiz kadın sürücüden oluşmaktadır. Katılımcıların sürücü belgesine sahip olma süreleri ortalama olarak yaklaşık 13 yıldır ve katılımcılar yaklaşık on yıldır aktif bir şekilde araç kullanmaktadır. Katılımcıların çoğu haftanın hemen hemen her günü araç kullanmaktadır, geçtiğimiz yıl ortalama olarak 30.563 km ve yaşamları boyunca 211.563 km kadar araç kullanmışlardır.

Prosedür

ODTÜ İnsan Araştırmaları Etik Kurulu'ndan etik izin alınmıştır. 16 katılımcı ile yaklaşık bir saat süren çevrimiçi görüşmeler için Zoom programı üzerinden yapılmıştır. Her görüşmenin başlangıcında katılımcılara çalışmanın amacı tanıtılmış ve gönüllü katılım için sözlü onay alınmıştır (bilgilendirilmiş onam için Ek B'ye bakınız). Katılımcılara görüşmeler sırasında ses kayıtlarının alınacağı bildirilmiş, cevaplarının anonimliği sağlanmıştır.

Ölçekler

Görüşme formu, demografik sorular ve pozitif sürücü davranışları ile ilgili soruları içermektedir (görüşme soruları için Ek C'ye bakınız).

Sonuçlar

Görüşmelerin içerik analizi için her ses kaydı kelimesi kelimesine yazıya geçirilmiş, 16 mülakat metni ardışık olarak bir Word dosyasında birleştirilmiş ve Times New Roman stili, 12 punto ve tek satır aralığı biçiminde düzenlenmiştir. Sonuç olarak içerik analizi için kullanılan 218 sayfalık veri oluşmuştur. Metinler soru bazlı okunduktan sonra tespit edilen davranış örnekleri ve bir Excel dosyasında bir araya getirilmiştir. Her davranış örneğinin (verilen davranış örneğini kaç katılımcının rapor ettiği) frekansı hesaplanmış,

16 katılımcının sekizi veya daha fazlası tarafından bildirilen davranışlar madde havuzuna dahil edilmiştir. Maddelerin incelenmesi ve revize edilmesi sonucunda 123 maddeden oluşan bir madde havuzu elde edilmiştir. Bu 123 madde maddeler arasındaki bağlantılar göz önünde bulundurularak 5 teorik boyuta ayrılmıştır. Bu boyutlar operasyonel olarak tanımlandıktan sonra alanda uzman 3 araştırmacıdan 123 maddeyi 5 boyuttan birine atamaları istenmiştir (uzman değerlendirme formu için Ek E'ye bakınız). Araştırmacılar arası güvenirlik oranı 74% (IRR = 91/123) olarak bulunmuştur. Uzman değerlendirmesi sonucuna göre maddeler ve boyutlar tekrar gözden geçirilmiş ve sonuç olarak 79 madde, dört teorik boyuttan oluşan anket hazırlanmıştır (79 maddelik anket için Ek I'ya bakınız).

Tartışma

Çalışma 1'de pozitif sürücü davranışlarının çok boyutlu yapısını yakalamak için bir anket geliştirilmiştir. Geliştirilen anket 79 maddeden oluşmaktadır. Yeni anketin 79 ögesi, dört boyut altında teorik ve tematik olarak gruplandırılmıştır: proaktif sürücü davranışları, sürdürülebilir çevresel davranışlar, nazik ve sabırlı davranışlar ve akıcı hareketlilik.

Buna göre, proaktif sürücü davranışları, güvenlik davranışlarını, diğer yol kullanıcılarını potansiyel tehlikeli durumlar konusunda uyarmayı ve olası bir tehlikeden kaçınmak için diğerlerinin hatalı davranışlarını telafi etmeye yönelik sergilenen davranışları içerir. Sürdürülebilir çevresel davranışlar, yakıt ekonomisi sağlamak, hava kirliliğini azaltmak ve aracın ve parçalarının uzun ömürlü olmasını sağlamak amacıyla gerçekleştirilen davranışları ifade eder. Nazik ve sabırlı davranışlar, trafikte diğer yol kullanıcılarına karşı nezaket, sabır ve yardımseverlik üzerine odaklanmıştır. Son olarak, akıcı hareketlilik boyutu, trafik sıkışıklığını önlemek, desteklemek, kolaylaştırmak veya hafifletmek amacıyla gerçekleştirilen davranışları içerir.

Ayrıca, pozitif bir doğaya sahip spontane sürücü davranışları literatürde ilk kez incelenmiş ve analiz edilmiştir. Final öge havuzunda, dinamik trafik ortamında gerçekleşen spontane olaylar ve bu davranışlara hızlı bir şekilde yanıt veren pozitif eylemlerle ilgili çeşitli maddeler yer almıştır (ör. Ek I'deki 19, 21, 34, 49, 72 numaralı maddeler). Bu perspektif doğrultusunda, yol güvenliği bağlamında *spontane pozitif sürücü davranışları* kavramı,

"hızla değişen ve dinamik trafik ortamındaki riskleri ön görmek ve kazaları/olayları önlemek için önleyici/telafi edici eylemler gerçekleştirmek" olarak tanımlanmıştır. Bu açıdan incelendiğinde, spontane davranışlar pozitif sürücü davranışlarının proaktif doğasına uygundur.

Çalışma 1'deki nitel analiz sonucunda önerilen teorik faktör yapısının pozitif sürücü davranışlarının çok boyutlu yapısına bir temel sağladığı görünmektedir. Bu teorik faktör yapısı, ana çalışmada gerçekleştirilen faktör analizi sırasında bir rehber olarak kullanılmıştır (Detaylar için Ana Çalışma'ya bakınız)

Ana Çalışma: ÇB-PSDA ve Sürüş ve Güvenlik İlişkisinin İncelenmesi

Giriş

Ana çalışmanın ilk amacı, yeni geliştirilen anketin faktör yapısını tespit etmek ve psikometrik özelliklerini incelemektir. Bu amaçla, ilk olarak keşfedici faktör analizi yapılmıştır. Ardından, yeni anketin güvenilirlik ve geçerlik kanıtları incelenmiştir. Ek olarak yeni anketin faktörleri ile sürüş ve güvenlikle ilgili değişkenler arasındaki korelasyonlar incelenmiştir (örneğin, demografik değişkenler, kişilik özellikleri, sürücü becerileri, sürücü davranışları, sürücü öfke ifadesi, trafik cezaları, ramak kalalar ve kazalar). İkinci amaç ise yeni anketin kritik öncü ve sonuç değişkenleri ile ilişkisini grup karşılaştırmaları yaparak test etmektir. Son olarak yeni anketin faktörleri ile kritik güvenlik sonuçları arasındaki ilişkiler (örneğin, ramak kalalar, kazalar ve trafik cezaları) ile yeni anket ile sürüş sonuçları (örneğin, riskli sürücü davranışları ve sürüş öfke ifadesi) arasındaki ilişkiler incelenmiştir.

Yöntem

Katılımcılar

Bu çalışmada 628 sürücünün (295 kadın, 327 erkek, 6 cinsiyetini belirtmedi) verisi kullanılmıştır. Katılımcıların B sınıfı sürücü belgesine sahiptirler. Yaş ortalaması 37.5 olup katılımcılar geçtiğimiz yıl içinde 10 bin kilometreden fazla yol katetmişlerdir.

Prosedür

Orta Doğu Teknik Üniversitesi'nden etik izin alındıktan sonra (ana çalışma için etik onay için Ek F'ye bakınız) katılımcılar sosyal medya duyuruları yoluyla çalışmaya davet edilmiştir. Veri toplama için kartopu tekniği kullanılmıştır. Toplanan verilerin anonimliği garanti altına alınmış ve katılımcılara verilerin sadece bilimsel amaçlar için kullanılacağı bilgisi verilmiştir (ana çalışma için bilgilendirilmiş onam için Ek G'ye bakınız).

Araçlar

Ana çalışmada aşağıda bahsedilen ölçüm araçları kullanılmıştır.

Demografik Bilgi Formu (demografik sorular için Ek H'ye bakınız).

Çok Boyutlu Pozitif Sürücü Davranışları Anketi (ÇB-PSDA için Ek I'ye bakınız).

Pozitif Sürücü Davranışları Ölçeği (PSDÖ için Ek J'ye bakınız).

Sürücü Davranışları Anketi (SDA için Ek L'ye bakınız).

Prososyal ve Agresif Sürüş Envanteri (PASE-Prososyal için Ek K'ye bakınız).

Sürüş Öfke İfade Envanteri (SÖİE için Ek N'ye bakınız).

Sürücü Becerileri Envanteri (SBE için Ek M'ye bakınız).

Temel Kişilik Özellikleri Envanteri (TKÖE için Ek O'ya bakınız).

Sonuçlar

ÇB-PSDA'nın Faktör Yapısı ve Psikometrik Özellikleri

Yeni anketin 79 maddesiyle yapılan keşfedici faktör analizi sonucuna göre yeni anketin 3 faktörlü yapıya sahip olduğu tespit edilmiştir. Buna göre, 3 faktörlü yapı, toplam varyansın %34,31'ini açıklamakta ve her bir faktör sırasıyla %24,91, %5,22 ve %4,18 oranlarında bu varyansa katkıda bulunmaktadır.

İlk faktör *akıcı ve proaktif hareketlilik* (APH) olarak adlandırılmış olup 33 madde içermektedir. Bu faktör, iki bileşenle karakterize edilir: akıcı hareketlilik ve proaktif hareketlilik. Akıcı hareketlilik bileşeni, trafik akışını destekleyen veya kolaylaştıran davranışlarla ilgilidir. Bunlar, trafik akışının veya düzgün hareketliliğin katalizörleridir denebilir. İkinci faktör, *sürdürülebilir çevresel davranışlar* (SÇD) olarak adlandırılmıştır ve 12 madde içermektedir. Adından da anlaşılacağı gibi, bu faktör, yakıt ekonomisi yapmak, hava kirliliğini azaltmak ve araç ile parçalarının uzun ömürlülüğünü sağlamak gibi çevreyi koruma amaçlı davranışları içermektedir. Üçüncü ve son faktör sekiz madde içermektedir ve *risk iletişimi* (Rİ) olarak adlandırılmıştır. Bu faktör, durumları diğer yol kullanıcılarını trafik için potansiyel olarak tehlike içeren durumlar karşısında uyarma, bilgilendirmeyi amaçlamaktadır.

ÇB-PSDA'nın psikometrik özellikleri çeşitli güvenirlik ve geçerlik parametrelerine göre incelenmiştir. Buna göre faktör analizinde tespit edilen üç faktör için Cronbach alfa iç güvenirlik değerleri .93 ile .83 arasında değişmekte ve tüm faktörler için iyi güvenirlik değerleri göstermektedir. Spearman-Brown katsayısı ve Guttman iki yarım katsayıları, yarıların arasında .96'lık iyi bir korelasyon göstermiştir. Örneklemin %22'si (n = 137 kişi) 2-3 hafta sonraki tekrar test çalışmasına katılmış olup iki farklı zamanda uygulanan anketler arasındaki Pearson korelasyonları, akıcı ve proaktif hareketlilik için .75, sürdürülebilir çevresel davranışlar için .87 ve risk iletişimi için .79 olup bu da iyi korelasyonlar göstermiştir. Geçerlik parametreleri olarak birleşen ve ayırt edici geçerliklere bakılmıştır. PSDÖ ve PASE-Prososyal, pozitif sürücü davranışı yapısını ölçmek için geliştirildikleri için birleşen geçerliliği amacıyla kullanılmıştır. Korelasyonlara göre, yeni geliştirilen anketin tüm faktörleri PSDÖ ile .46 ile .73, PASE-Prososyal ile .34 ile .65 arasında, yani orta ila yüksek derecede anlamlı ilişkiler göstermiştir. Ayırt edici geçerlilik için yeni anket ile SDA arasındaki korelasyonlar incelenmiş olup hatalar ve ihlaller ile -.06 ile -.38 arasında düşük ila orta derecede korelasyonlar gözlenmiştir.

Regresyon Analizleri

ÇB-PSDA faktörleri ile riskli sürücü davranışları ve sürüş öfke ifadeleri arasındaki ilişkiyi araştırmak için hiyerarşik regresyon analizleri yapılmıştır. Önemli sonuçlar Tablo 8'de sunulmuştur. Ek olarak ÇB-PSDA'nın sürüş sonuçları riskli sürücü davranışları ve sürüş öfke ifadesini yordama konusunda artımsal geçerlilik kanıtları araştırılmıştır. Önemli sonuçlar Tablo 10'da sunulmuştur. Ayrıca ÇB-PSDA faktörleri ile güvenlik çıktıları arasındaki ilişki de hiyerarşik regresyon analizi ile incelenmiştir.

Riskli sürücü davranışları için ilk adımda demografik değişkenler (cinsiyet, yaş, geçen yılki km) kontrol ettikten sonra, ÇB-PSDA faktörleri hatalarda varyansın %8'ini açıklamıştır. Daha yüksek APH, daha az hatalarla ilişkili bulunmuştur. SDA ihlal faktörü için, genel model ihlallerin %23'lük bir varyansını açıklarken ÇB-PSDA, ihlallerin %16'sını açıklamıştır. Özellikle, akıcı ve proaktif hareketliliği teşvik eden davranışlar sergilemek daha az ihlalle, benzer şekilde sürdürülebilir çevresel davranışlar ise daha az ihlalle ilişkilendirilmiştir. Trafikte risk iletişimini sağlamak için sergilenen davranışlar ise daha fazla ihlalle ilişkilendirilmiştir. Buna ek olarak ÇB-PSDA'nın riskli sürücü davranışlarını tahmin etmedeki artımsal geçerlik kanıtlarını araştırmak için, ilk adımda demografikler, ikinci adımda PSDÖ ve PASE-Prososyal kontrol edilmiş, ÇB-PSDA faktörleri ise üçüncü adımda regresyona dahil edilmiştir. Buna göre ilk iki adımın etkileri kontrol edildikten sonra üçüncü adımda ÇB-PSDA faktörleri ihlallerde %8'lik artı varyans açıklamıştı. Diğer bir deyişle, ÇB-PSDA faktörlerinin, demografik değişkenler ve PSDÖ ve PASE-Prososyal kontrol edildikten sonra ihlalleri açıklama konusunda artımsal geçerliliği vardır.

ÇB-PSDA faktörleri ile sürüş öfke ifadesi arasındaki ilişki incelendiğinde, demografik değişkenler kontrol edildikten sonra ÇB-PSDA faktörleri sözel ifade için %7, fiziksel ifade için %8, araç kullanarak sergilenen öfke ifadesi için %11, toplam saldırgan ifade için %11 ve adaptif öfke ifadesi için %15 varyans açıklamıştır. Akıcı ve proaktif hareketliliği teşvik eden davranışları gerçekleştiren sürücüler, öfkenin sözel, fiziksel, araçla ve saldırgan ifadelerini daha az yapma eğilimindedir ve öfkeyi daha çok adaptif

şekilde ifade ederler. Aksine, trafikte risk iletişimi kurmaya çalışan davranışlar sergileyen sürücüler, sürüş sırasında öfkelerini daha fazla saldırgan şekilde ve daha az adaptif şekilde ifade etme eğilimindedirler. İkinci olarak, ÇB-PSDA'nın sürüş öfke ifadesini tahmin etmedeki artımsal geçerlik kanıtları araştırılmıştır. Demografikler ve mevcut pozitif sürücü davranışı envanterleri (PSDÖ ve PASE-Prososyal) kontrol edildikten sonra ÇB-PSDA faktörleri üçüncü adımda sözel ifade için %6, fiziksel ifade için %6, araçla sergilenen öfke ifadesi için %5, toplam saldırgan ifade için %7 ve öfkenin adaptif ifadesi için %4 artı varyans açıklamıştır. Diğer bir deyişle, ÇB-PSDA faktörlerinin, demografik değişkenler ve PSDÖ ve PASE-Prososyal kontrol edildikten sonra sürüş öfke ifadesini açıklama konusunda artımsal geçerliliği vardır.

ÇB-PSDA faktörleri ile güvenlik çıktıları arasındaki ilişki hiyerarşik regresyon analizi ile incelenmiş ve demografikler kontrol edildikten sonra ÇB-PSDA faktörleri son bir yılda meydana gelen ramak kala, hız ihlali ve toplam trafik cezaları için anlamlı sonuçlar göstermiştir. Buna göre ÇB-PSDA faktörleri ramak kalalar için %2 varyans, hız ihlali için %3 varyans açıklama ve trafik cezalarında %1 varyans açıklamıştır. Akıcı ve proaktif hareketliliği teşvik eden davranışlar sergilemek daha az ramak kala ile ilişkilendirilirken daha çok risk iletişiminde bulunmak daha fazla ramak kala ile ilgili bulunmuştur. Hız ihlali çıktı değişkeni üzerinde ise yalnızca sürdürülebilir çevresel davranışların anlamlı bir etkisi vardı, yani sürdürülebilir çevresel davranışlar ile daha çok meşgul olanlar daha az hız ihlali raporlamışlardır.

Tartışma

Ana çalışmada, ilk olarak Çok Boyutlu pozitif Sürücü Davranışları Anketi'nin faktör yapısı ve psikometrik özellikleri incelenmiş, bu amaçla yeni anketin güvenilirlik ve geçerlik kanıtları araştırılmıştır. Buna göre ÇB-PSDA'nın güvenilir ve geçerli bir ölçüm olduğunu gösterilmiştir. ÇB-PSDA, 53 maddeden oluşmaktadır ve sürücülerin pozitif sürücü davranışları eğilimlerini üç ana boyutta, yani akıcı ve proaktif hareketlilik, sürdürülebilir çevresel davranışlar ve risk iletişimi olarak ölçmektedir. ÇB-PSDA'nın 3

faktörlü yapısı, pozitif sürücü davranışlarının, literatürdeki tek faktörlü ölçümlerin aksine aslında çok boyutlu olduğunu göstermektedir.

İlk faktör, pozitif sürücü davranışlarının düzgün trafik akışıyla ilişkilendirildiğini ortaya koymaktadır. Literatürde Doğan ve ark. (2011) zaman tasarrufunun ve McKnight ve Adams (1972, s.7) sürüşün temel bir hedefi olarak verimliliğin önemini belirtmiştir. Benzer şekilde, düzgün trafik akışı çevresel kirliliği azaltır, yol kullanıcılarının yaşam kalitesini artırır ve tasarruf sağlar (Markakis vd., 2022). Ayrıca proaktif hareketlilik, kaza riskini önlemek için yapılan pozitif sürücü davranışlarını ifade etmektedir. Reason'ın (1990) İsviçre peyniri modelinde olduğu gibi, trafikteki pozitif sürücü davranışları, sistemde potansiyel olarak istenmeyen olayları önleyen bariyerler/savunmalar/korunmalar olarak işlev görmektedir. Dolayısıyla sistemde bu savunmaların oluşturulması, trafik olaylarının etkilerini azaltmak için proaktif bir önlemdir. Bu, McKnight ve Adams'ın (1972, s.7) bahsettiği ulaşımın güvenlik hedefiyle örtüşmektedir.

ÇB-PSDA'nun ikinci faktörü, sürdürülebilir çevresel sürücü davranışları sergilemek ile ilgilidir. Örneğin, sabit bir hızda sürmek yakıt tasarrufu ve çevresel kirliliği azaltma ile ilişkilidir, ki bu da McKnight ve Adams'ın sorumlu sürüş tarzı için verdiği örnekle uyumludur. Mevcut çalışma sürdürülebilir çevresel davranışları pozitif sürücü davranışlarının bir parçası olarak literatüre kazandırarak sürüşte insan faktörleri literatürüne de katkı sağlamıştır.

Son faktör olan risk iletişimi, örneklemimizde pozitif sürücü davranışlarının ayrı bir boyutu olarak ortaya çıkmıştır. Bu faktör, diğer yol kullanıcılarını potansiyel tehlikeli trafik durumları konusunda proaktif bir şekilde uyarmayı amaçlamaktadır, güvenlik ve diğer yol kullanıcılarını düşünmeyi/gözetmeyi içerir. Bu faktör trafikteki kayıpları en aza indirmeyi amaçlayan güvenli ulaşım hedefiyle (McKnight ve Adams, 1972, s.7) örtüşmektedir.

Bütün boyutlar bir arada değerlendirildiğinde, ÇB-PSDA'nun bu üç faktörünün araç sürmenin ana hedefleriyle ilişkili olması, pozitif sürücü davranışlarının ulaşımın günlük

işleyişinin bir parçası olduğunu doğrulamaktadır. Pozitif sürücü davranışları verimli, sorumlu ve güvenli ulaşımı kolaylaştırır. Ayrıca sistemde karşılaşılan çeşitli trafik durumlarına karşı telafi edici, kolaylaştırıcı, sorumlu, koruyucu ve düşünceli bir yaklaşım sağlayarak trafik güvenliğine doğrudan veya dolaylı olarak katkıda bulunurlar. Bu anlamda pozitif sürücü davranışları günlük sürüş için çok önemlidir. Pozitif sürücü davranışlarının bu işlevleri, trafik sisteminin tehlike karşısında dayanıklı ve esnek olmasına, dolayısıyla daha güvenli olmasına katkıda bulunur.

Bulguların Ampirik Tartışması

ÇB-PSDA ile ölçülen pozitif sürücü davranışları güvenlik çıktıları ile doğrudan bir ilişki ortaya koymasına rağmen gözlemlenen ilişkilerin gücü kesin sonuçlara varmaya yetecek kadar güçlü değildir. Açıklanan en yüksek varyans, SÇD ile hız cezası arasındaki %3'lük oran hâlâ küçüktür. Dolayısıyla bu çalışmada ÇB-PSDA faktörleri ile kritik güvenlik sonuçları arasında mevcut literatürle uyumlu olarak zayıf bir doğrudan bağlantı olduğu sonucuna varılmıştır (Harris ve diğerleri, 2014; Matović ve diğerleri, 2020; Wang ve diğerleri, 2018).

ÇB-PSDA faktörleri ile güvenlik sonuçları arasındaki ilişkiyle kıyaslandığında, ÇB-PSDA faktörleri ile sürüşle ilgili değişkenler arasında nispeten daha güçlü ilişkiler (yani orta dereceli korelasyonlar) gözlemlenmiştir. Spesifik olarak, pozitif sürücü davranışları güvenlik becerileri ve algısal motor becerilerle pozitif yönde ilişkilidir. Özellikle, pozitif sürücü davranışlarının güvenlik becerileri ve algısal motor beceriler ile pozitif bir ilişkisi bulunmaktadır. Güvenlik becerileri ile ÇB-PSDA faktörleri arasındaki güçlü korelasyon, pozitif davranışların güvenliyle bağlantısına işaret etmektedir (Öztürk vd., 2018; Üzümcüoğlu vd., 2020; Xu vd., 2018). Literatürde güvenlik becerileri ile ihlal sayısı (Üzümcüoğlu vd., 2020) ve güvenlik becerileri ile kazalara karışma arasındaki negatif yönlü ilişki sunulmuştur (Özkan vd., 2006). Buradan hareketle pozitif sürücü davranışlarından, ihlalleri ve yol trafiği kazalarını azaltmak için güvenlik becerileri ile etkileşim içinde faydalanılabilir.

ÇB-PSDA faktörleri ile ihlaller arasındaki ilişki literatüre paraleldir (Qu ve diğerleri, 2022), genel olarak pozitif sürücü davranışları sergileyenler daha az ihlal ile ilişkili bulunmuştur. İhlallerinin karayolu trafik kazalarıyla bağlantılı olduğu göz önüne alındığında (De Winter ve Dodou, 2010) her ne kadar kurulan ilişki nedensel olmasa da, çalışma bulguları pozitif sürücü davranışlarının ihlaller ile kazalar arasındaki bağlantıyı zayıflatmak için bir tampon görevi görebileceğini ima etmektedir.

Ayrıca ÇB-PSDA ve DAX faktörleri arasında biraz daha az güçlü ancak yine de anlamlı korelasyonlar gözlemlenmiştir. Risk iletişimi dışında pozitif sürücü davranışları sergilemek, önceki literatür tarafından da desteklenen agresif öfke ifade düzeylerinin azalması ve adaptif öfke ifadesinin artmasıyla ilişkili bulunmuştur (Dorantes Argandar ve diğerleri, 2019; Özkan ve Lajunen, 2005; Qu ve diğerleri, 2022). Sürüş öfkesi, artan agresif sürüş, riskli sürücü davranışları ve kazaya karışma ile ilişkilidir (Demir vd., 2016; Wickens vd., 2016). Dolayısıyla sunulan sonuçlar, pozitif sürücü davranışlarının, agresif öfke ifadesinin azalması ve adaptif öfke ifadesinin artması yoluyla kazaya karışmalara karşı koruyucu bir faktör olabileceğine işaret etmektedir.

Genel Tartışma

Pozitif sürücü davranışları, literatürdeki çalışmalarda trafik çevresine dikkat etmek ve nezaket (Özkan & Lajunen, 2005), prososyallik (Harris et al., 2014) ve özveri/fedakârlık (Nandavar et al., 2019) gibi farklı temel motivasyonlarla ele alınmıştır. Ancak bugüne kadar, bu konseptin derinliğini ve geniş kapsamını vurgulayan birleştirici bir tanım önerilmemiştir. Bu nedenle, bu çalışma kapsamında ortaya çıkan bulgular ışığında pozitif sürücü davranışları şu şekilde tanımlanmıştır: *... kişi, çevre, iklim ve araç bileşenlerinin etkileşimi içerisinde belirli bir bölgeye özgü olarak gelişen ikincil "resmi olmayan/yazılı olmayan davranış kodlarıdır". Pozitif sürücü davranışları, proaktif bir sürüş tarzıyla kaza olasılığını önlemek, trafiğin akışını teşvik etmek, sürüş sırasında sürdürülebilir çevresel davranışlarda bulunmak ve trafik ortamındaki riskler ile ilgili diğer yol kullanıcılarıyla*

iletiřim kurmak ile karakterize edilir. Pozitif sürücü davranıřlarında bulunma niyeti, önceden bir niyetin olması ile önceden bir niyetin olmaması arasında deęiřir.

Pozitif sürücü davranıřlarında bulunma niyeti davranıřı önceden planlama veya davranıřı spontane olarak sergileme uç noktaları arasında deęiřkenlik gösterebilir. Örneęin yol verme niyeti, bir aracın aniden kiřinin yoluna girmesi durumunda spontane olarak ortaya çıkabilir (önceden niyet yok, spontane) veya sürücünün bir araca yol vermek için belli bir mesafeden yavaşlaması durumunda daha kasıtlı/bilinçli bir řekilde (önceden niyet var, planlı davranıř) kendini gösterebilir. Alternatif olarak, bir sürücünün açıkça sollama niyeti belirtmedięi halde yaklaşan bir araç tarafından sollanacaęını öngördüğünü varsayalım. Bu durumda sürücü, yaklaşan araçtan uzaklaşmak için řerit deęiřtirmeyi düşünebilirler. Bu durumda, yol veren sürücünün niyeti tamamen önden planlanmadıęı gibi tamamen spontane de deęildir, daha ziyade niyet ikisinin arasında yer alır. Dolayısıyla davranıřlardaki kasıtlılık düzeyi, bağlamsal koşulların bir fonksiyonu olarak deęiřebilir, denebilir. Bu nedenle niyetin, Reason'un algoritmasında (yani evet veya hayır formatında) tasvir edildięi gibi ikili bir kavram olarak ele alınmak yerine bir süreklilik olarak düşünölebileceęini öne sürmek makul olabilir. Bu görüş Şekil 1'de sunulmuřtur.

Şekil 1'deki gösterimin mantıęı Michon'un yol kullanıcısı görevine iliřkin hiyerarřik yapısıyla zaman açasından örtüşmektedir. Davranıřı gerçekleřtirmek için önden bir niyete sahip olmak planlama için daha uzun süre gerektirdięinden Michon'un gösterimindeki stratejik seviyeye karřılık gelir, öte yandan önden bir niyete sahip olmamak, daha kısa süre gerektiren ve otomatik davranıřlar sergilemekle bağdařan kontrol düzeyine karřılık gelir. Bu iki uç arasındaki kalan bölge, bir görevi gerçekleřtirmek için kontrol seviyesinden daha uzun, stratejik seviyeden daha kısa süre gerektiren, taktik seviye veya manevra seviyesine karřılık gelmektedir (Michon, 1985). Bu gösterimin sürücü davranıřı çalışmalarında yol güvenlięi arařtırmacılarına yol gösteren bir temel oluřturması hedeflenmektedir. Davranıřın altında yatan niyetin türü ve bu davranıřın sergilenmesinden ne kadar süre önceden planlandıęı bilgisi geliřtirecek yol güvenlięi müdahaleleri için biliřsel ve davranıřsal bir teorik zemin sunmaktadır.

Öte yandan içinde bulunulan trafik kültürünün bir ürünü olarak ortaya çıkan pozitif sürücü davranışlarının nasıl ifade edileceği yine içinde bulunulan kültürle ilişkilidir. Örneğin, Türkiye'deki trafik iklimi, İsveç'teki trafik iklimine göre daha talepkâr (zihinsel ve duygusal olarak talepkâr) ve daha az işlevsel olarak algılanmıştır (Öztürk et al., 2022). Bu tür bir trafik ortamının, resmi olmayan trafik veya davranış kurallarının ortaya çıkmasını, benimsemesini ve ifade edilmesine elverişli bir ortam sağladığı düşünülebilir. Ayrıca risk iletişimi boyutunun Türkiye'de ayrı bir faktör olarak ortaya çıkmasının, Türkiye'deki kaotik, talepkâr ve daha az güvenli ve uyumlu trafik ortamında güvenliği sağlama çabalarının bir gerekliliği olarak açıklanabileceği söylenebilir. Sonuç olarak içinde bulunulan ülkenin kültürü ve trafik iklimi, trafikte sergilenen davranışlar üzerinde önemli bir role sahiptir.

Bu çalışmanın sonuçlarından yol güvenliğini sağlamayı hedefleyen çeşitli müdahalelerin geliştirilmesinde faydalanılabilir. Örneğin, saldırgan sürüşü azaltmaya veya yol öfkesi ve ihlallere bağlı davranış değişikliği yaratmaya odaklanan müdahale programları, pozitif sürücü davranışlarından faydalanabilir. Bu programlar, yeni geliştirilen ölçekte, ÇB-PSDA'da örneklenen pozitif sürücü davranışlarını veya boyutlarını içeriklerine entegre edebilir (bkz. Haustein et al., 2021). Benzer şekilde, ÇB-PSDA'daki geniş davranış örnekleri, müdahale programları için eğitim materyali olarak kullanılabilir. Örneğin, trafikte sıkça karşılaşılan gerçek çatışma ve anlaşmazlıklara yanıt olarak sürücülere pozitif sürücü davranışları sergilemek öğretilir. Sürücülerin davranışsal repertuarları, onlara bir trafik durumunda en uygun yanıtı seçmeyi öğretmek için genişletilebilir. Bu şekilde, pozitif davranışlar, kazaları telafi eden (örneğin, proaktif hareketlilik, risk iletişimi) ve trafik akışının katalizörleri olarak (akıcı hareketlilik) davranarak yol öfkesinin üstesinden gelmek için bir işlev gösterebilir. Benzer şekilde ÇB-PSDA faktörleri, ihlal yapan sürücülerin rehabilitasyonunu hedefleyen benzer müdahale programları geliştirmek için kullanılabilecek bir araç sunmaktadır.

Ayrıca, yol güvenliği mesajlarının içeriği oluşturulurken, bu çalışmanın bulgularından yararlanılabilir. Trafikte istenir yönde davranış değişikliğini sağlamak için, sürücülerin istenilen niteliklerini vurgulamak bir yöntem olarak kullanılabilir. Örneğin, sürücülerin

iyi, güvenli, sorumlu, sürdürülebilir bir çevreyi önceleyen, düşünceli ve kibar sürücüler gibi özellikleri, güvenli ve sürdürülebilir sürüş uygulamalarına pozitif bir şekilde etki etmek için yol güvenliği mesajlarında tanıtılabilir (Armitage et al., 2022; Dewhurst et al., 2023; Harré, 2000). Sürücülerin trafikte sergilediği ve kazalarla ilişkilendirilen tehlikeli sürüş davranışlarını ve istenmeyen sonuçlarını vurgulamak yerine, ÇB-PSDA'da sunulan pozitif sürücü davranışlarından örnekler, diğer yol kullanıcılarına yol vermek, diğer yol kullanıcılarına yardım etmek, trafik akışını hızlandırmak, istenmeyen olayların meydana gelmesini önlemek, yakıt tasarrufu yapmak ve çevre dostu ve sürdürülebilir sürüş tarzını benimsemek gibi pozitif örnekler sunabilir. Bu şekilde, yol güvenliği mesajları, sürücülerin pozitif davranışlarına odaklanarak onları sürüşleri sırasında pozitif davranışlar sergilemeye teşvik edebilir.

Sonuç

Mevcut çalışma, pozitif sürücü davranışlarına ilişkin gelişmekte olan literatüre kavramsal, metodolojik ve ampirik olarak katkıda bulunmuştur. Pozitif sürücü davranışlarının çok boyutlu doğası araştırılmış ve yeni, güvenilir ve geçerli bir anket olan Çok Boyutlu Pozitif Sürücü Davranışı Anketi geliştirilmiştir. ÇB-PSDA tarafından ölçülen pozitif sürücü davranışları ile sürüş ve güvenlikle ilgili değişkenler arasındaki ilişki ampirik olarak kanıtlanmıştır. Kritik sürüş ve güvenlikle ilgili değişkenleri yordamada ÇB-PSDA'nın artımsal geçerliliği gösterilmiştir. Son olarak, pozitif sürücü davranışlarının kavramının kapsamlı bir tanımlaması yapılmıştır.

ÇB-PSDA ile pozitif sürücü davranışları yalnızca nezaket veya prososyal/toplum yanlısı vurguyla değil, aynı zamanda güvenli bir sistem için kritik öneme sahip proaktif bir bakış açısıyla (Avrupa Komisyonu, 2022) ve iklim eylemleri için kritik öneme sahip çevresel açıdan sorumlu bir bakış açısı ile tanımlanmış ve ölçülmüştür. Akıcı ve proaktif hareketlilik ve risk iletişimi boyutları yapının güvenlik yönünü kanıtlarken çevre/iklim bilincine sahip bakış açısı, sorumlu sürüş tarzı ve sürdürülebilir hareketlilik yönünü vurgulamıştır. Sonuç olarak pozitif sürücü davranışlarının, bu davranışları yalnızca nezaket

ve yardımlaşmayla ilişkilendiren önceki anlayışın ötesinde, çok boyutlu doğası literatürde ilk kez gösterilmiştir.

Ayrıca literatürde ilk kez sürücü davranışlarının spontane doğası araştırılmıştır. Mevcut çalışmanın pozitif sürücü davranışlarına odaklanması doğrultusunda, literatürde ilk kez spontane, pozitif sürücü davranışları karayolu güvenliği bağlamında kavramsallaştırılarak davranışsal örnekler elde edilmiştir. Sürücü davranışları için önerilen kasıtlı davranış gösterimi (Şekil 1), bu bağlamda gelecekteki araştırma girişimleri için bir alan sağlamaktadır. Sürücü davranışlarının değişen seviyelerinin anlaşılmasının, insan-çevre-aracı etkileşimine odaklanan etkinliği artırılmış özel karayolu güvenliği müdahalelerinin geliştirilmesine katkıda bulunacağına inanılmaktadır.

Bu çalışmada, ÇB-PSDA'nun, pozitif sürücü davranışlarına ilişkin mevcut ölçümlerin ötesinde artımsal geçerliliğe sahip, güvenilir ve geçerli bir ölçüm olduğu kanıtlanmıştır. Pozitif sürücü davranışlarının ihlaller ve sürücü öfkesi ile olan bağlantısı, güvenlik bağlantılarına kıyasla güçlüdür. Bu bulgu, pozitif sürücü davranışlarının, istenmeyen sürücü davranışlarını azaltarak yol güvenliğinin artırılmasına katkıda bulunabileceğini ortaya koymuştur. Bu şekilde, mevcut çalışma bulgularına dayanarak, pozitif sürücü davranışlarının, kurallara aykırı davranan sürücülerin ve sürücü öfkesi gösteren sürücülerin güvenliğini artırmaya yönelik bir müdahale aracı olarak kullanılması önerilmektedir.

Bu çalışma, literatürdeki pozitif sürücü davranışları ile ilgili anlayışı ve bilgi birikimini geliştirmiş ve iletlemiştir. Geliştirilen anket, ÇB-PSDA ve önerilen kavramsallaştırma sayesinde mevcut çalışma gelecekteki araştırmalara yol göstermektedir. Gelecekteki karayolu güvenliği müdahaleleri ve sürdürülebilir karayolu güvenliği yönetimi için pozitif sürücü davranışlarına ilişkin araştırmalar teşvik edilmelidir (bkz. Wegman, 2017).

R. THESIS PERMISSION FORM / TEZ İZİN FORMU

ENSTİTÜ / INSTITUTE

Fen Bilimleri Enstitüsü / Graduate School of Natural and Applied Sciences ☐

Sosyal Bilimler Enstitüsü / Graduate School of Social Sciences ☒

Uygulamalı Matematik Enstitüsü / Graduate School of Applied Mathematics ☐

Enformatik Enstitüsü / Graduate School of Informatics ☐

Deniz Bilimleri Enstitüsü / Graduate School of Marine Sciences ☐

YAZARIN / AUTHOR

Soyadı / Surname : Yılmaz Demirok

Adı / Name : Şerife

Bölümü / Department : Psikoloji / Psychology

TEZİN ADI / TITLE OF THE THESIS (İngilizce / English): Reconceptualization of Positive Driver Behaviors: Developing the Multidimensional Positive Driver Behavior Questionnaire (M-PDBQ) and Examining its Relationship with Driving and Safety Related Variables

TEZİN TÜRÜ / DEGREE: Yüksek Lisans / Master ☐ Doktora / PhD ☒

1. **Tezin tamamı dünya çapında erişime açılacaktır.** / Release the entire work immediately for access worldwide. ☒
2. **Tez iki yıl süreyle erişime kapalı olacaktır.** / Secure the entire work for patent and/or proprietary purposes for a period of **two years**. * ☐
3. **Tez altı ay süreyle erişime kapalı olacaktır.** / Secure the entire work for period of **six months**. * ☐

* Enstitü Yönetim Kurulu kararının basılı kopyası tezle birlikte kütüphaneye teslim edilecektir. / A copy of the decision of the Institute Administrative Committee will be delivered to the library together with the printed thesis.

Yazarın imzası / Signature

Tarih / Date

doldurulacaktır.)

(Kütüphaneye teslim ettiğiniz tarih. Elle

(Library submission date. Please fill out by hand.)

Tezin son sayfasıdır. / This is the last page of the thesis/dissertation.