

The Investigation of the Dynamics between the Resilience and Climate of Traffic System and Driver Behaviours

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BACKGROUND

- Aberrant Driver Behaviours:** Errors and violations related to accidents (de Winter & Dodou, 2010).
- Traffic System Resilience:** Resilience is defined as «the capacity/ability of the system to absorb shocks without catastrophic changes in its basic functional organisation» (Reggiani, 2013). Calvert and Snelder (2018) defined as «the ability of a road section to resist and to recover from disturbances in traffic flow».
- The Resilience of Traffic System: General structure of the traffic, near misses and accidents, sudden changes in density, connections between different modes of transportation etc.
- Traffic Climate:** «the road users' (e.g., drivers') attitudes and perceptions of the traffic in a context (e.g., country) at a given point in time» (Özkan & Lajunen, 2011) and related to various driving outcomes such as driver behaviours and accidents (Chu et al., 2019; Gehlert et al., 2014; Üzümcüoğlu et al., 2019).
- Macro levels factors related to fatalities, injuries and accidents at country level (Özkan & Lajunen, 2015).
- The Question:** What is the relationship between drivers' perceptions of the traffic system and driver behaviours?

AIM

- Investigating traffic system resilience and traffic climate in relation to aberrant and positive driver behaviours

METHOD

- Sample:** 228 drivers (91 Female and 138 Male) between 19 and 32 years old ($M = 22.91$, $SD = 2.35$) from Turkey

- Materials:**
 - Demographic Information Form:** Age, gender and kilometres driven in the last year
 - Traffic System Resilience Scale:** The evaluation of resilience of the traffic system based on 7 criteria (reflectiveness, resourcefulness, robustness, redundancy, flexibility, inclusiveness, and integration; Güner et al., 2019).
 - Traffic Climate Scale:** The evaluation of the characteristics of a country's traffic system on three dimensions (Özkan & Lajunen, unpublished).
 - Driver Behaviour Questionnaire and Positive Driver Behaviour Scale:** Self-reported aberrant (Reason et al., 1990) and positive (Özkan & Lajunen, 2005) driver behaviours
- Procedure:** Ethical approval from Middle East Technical University, Online survey
- Analyses:** SPSS v26, Correlations, Hierarchical regression

RESULTS

- Traffic resilience correlated positively with functionality and negatively with external affective demands and internal requirements
- Aberrant driver behaviours
 - positively associated with traffic system resilience and external affective demands
 - negatively associated with internal requirements
- Positive driver behaviours
 - positively associated with internal requirements

		Lapses	Errors	Aggressive Violations	Ordinary Violations	Positive Behaviours
1st Step	Age	n.s.	-	n.s.	n.s.	n.s.
	Gender (1: Female, 2: Male)	n.s.	+	n.s.	+	n.s.
	Last year km	n.s.	n.s.	+	n.s.	n.s.
2nd Step	Traffic Resilience	+	+	+	+	n.s.
	External Affective Demands	+	+	+	n.s.	n.s.
	Functionality	n.s.	n.s.	n.s.	n.s.	n.s.
	Internal Requirements	-	-	-	-	+

Table 1: Hierarchical regression analyses on driver behaviours

DISCUSSION / CONCLUSIONS

- The more externally demanding or resilient the traffic system is, the more frequent aberrant driver behaviours are observed
- The more skill and ability demanding the traffic environment is, the more frequent positive behaviours and less frequent aberrant driver behaviours are observed
- Strong relations between macro level (traffic system resilience and traffic climate) and micro level (driver behaviours) factors
- Design and structure of the traffic system and how they are perceived are closely related to driver behaviours
- Limitations:** Self-report measurement & perceived evaluation of macro level factors
- Future Research:** Do drivers show aberrant driver behaviours more when the traffic system is perceived to be more resilient and/or to be more demanding?