

Personality Correlates of Accident-Proneness in Auto-Rickshaw Drivers in India

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Objective. We examined the personality correlates of accident-proneness of auto-rickshaw drivers in the Indian city of Ranchi. **Methods.** This was a cross-sectional study in which 50 male drivers aged 18–50 years, selected randomly from a list of licensed auto-rickshaw drivers in Ranchi, were assessed with a Hindi version of Cattell's 16 Personality Factors (16-PF) Questionnaire. **Results.** There was a significantly higher frequency of breaking rules, crossing speed limits, substance use and a trend towards a higher frequency of carrying extra persons (i.e., more than recommended) in accident-prone drivers. There was significant negative correlation of accident-proneness with 16-PF factors such as reasoning, rule consciousness, apprehension and emotional stability. **Conclusion.** Personality characteristics with lower scores of reasoning, rule consciousness, apprehension and emotional stability are common in commercial auto-rickshaw drivers with high accident-proneness.

personality accident-proneness drivers 16-PF

1. INTRODUCTION

In today's context, it is very important to know the traits of automobile drivers who run commercial vehicles for business purposes. Driving involves two distinct concepts: driving skills, which include perceptual motor skills, and driving styles, which define the driving habits of the individual [1]. Driving skills improve day by day with practice, whereas driving style reflects the individual's personal characteristics and attitude [1]. Commercial driving is a cumbersome and hazardous job in many ways; it carries, e.g., an increased risk of accidents, physical ailments and chronic conditions like body aches, great physical workload and psychosocial stress factors [2].

In commercial drivers, personality characteristics such as impulsivity and adventurousness,

aggressiveness, inability to tolerate authority and control hostility, being indifferent to the rights of others, preoccupation with fantasy satisfaction, fear of loss of love and support, inability to tolerate tension, poor self-control and guilt-proneness have been reported to occur frequently [3, 4]. Also, drivers' characteristics such as poor driving attitudes, driving for emotional release, competitiveness, venturesomeness, extraversion, tendency to dominate others, high risk-taking behaviour, social deviation by breaching social norms and rules, and tendency to be assertive lead to higher accident-proneness [5, 6, 7]. Williams, Henderson and Mills found that personality characteristics like impulsiveness, lower social conscience and minor psychiatric symptoms (e.g., anxiety and depression) are common in those drivers who tend to infringe traffic rules and have

traffic accidents [8]. Further, the cumulative effect of substance addiction, personality and attitudinal factors may increase the chance of traffic accidents [9]. Also, drivers with a higher degree of hostility have a higher risk of developing alcohol addiction; moreover, alcohol increases their covert hostility and overt aggression, which may be translated into driving-related aggression, speeding, risk taking and sensation seeking [9]. Studies on personality characteristics of commercial drivers will help in identifying accident-prone drivers and initiating measures to decrease road-traffic accidents. This study was designed with an objective to explore the personality correlates of accident-proneness of auto-rickshaw drivers in Ranchi, India.

2. MATERIALS AND METHODS

2.1. Study Design and Sample

The study was approved by the internal review board of the Central Institute of Psychiatry, Ranchi, India. It was conducted in Ranchi, which is the capital of the state of Jharkhand and the administrative as well as commercial hub of the state. Municipal transport is mainly based on auto-rickshaws and manual rickshaws. Within the city, auto-rickshaws cover routes defined by the Transport Department of Jharkhand. The study sample consisted of 50 male drivers aged 18–50 years, selected randomly from a list of licensed auto-rickshaw drivers obtained from the Transport Department. Those drivers provided their written informed consent after the objectives of the study were explained to them.

2.2. Procedure

Sociodemographic and clinical data were collected with a form developed for the study. Besides the sociodemographic variables, information on driving-related clinical variables such as duration of driving, total number of major and minor accidents, average number of accidents per year, total number of legal prosecutions, vehicle ownership, daily working hours, length of daily driving route, alcohol and smoking history, and job satisfaction was obtained. *Accident-prone* was defined

as history of any major or minor accident. *Major accident* was defined as causing damage to other vehicles or harm to other persons in an accident, whereas *minor accident* was defined as not causing damage to other vehicles or harm to other persons. To assess the personality profile, this study used a Hindi version of Cattell's 16 Personality Factors Questionnaire (16-PF), which is well validated in the Indian population [10]. The 16-PF is a comprehensive measure of normal range personality found to be effective in various settings where an in-depth assessment of the whole person is necessary. It contains five forms, which measure 16 dimensions of personality.

2.3. Statistical Analysis

Statistical analysis was carried out with SPSS version 10.0. Independent sample *t* test and Pearson's χ^2 test were used to study the group differences in sociodemographic and driving-related variables as well as personality factors. Pearson correlation coefficient was used to assess bivariate relationship between driving-related variables and personality characteristics. Scatter plots were used to study the relationship between 16-PF factors and accident-proneness. The level of significance was kept at $p < .05$.

3. RESULTS

Table 1 summarizes the characteristics of the sample. The mean age of our sample was 29.08 years (SD 7.31) and the mean number of years of formal education was 9.44 (SD 3.49). Substance users accounted for 74% of the sample ($n = 37$); the most common substance was nicotine, followed by cannabis and alcohol. Both accident- and nonaccident-prone drivers were comparable in terms of age, education, marital status, average driving speed, average distance covered per day, vehicle ownership and number of legal prosecutions. There was a significantly higher frequency of breaking rules ($p = .001$), crossing speed limits ($p = .005$), substance use ($p = .026$) and a trend towards higher frequency of carrying extra persons (i.e., more than recommended; $p = .077$) in accident-prone drivers.

Table 2 summarizes the drivers' personality characteristics as measured with the 16-PF. There was no difference in the scores between the two groups ($p > .05$).

Pearson correlation between the total number of accidents and 16-PF scores showed significant negative correlation with reasoning ($r = -.283$, $p = .046$) and apprehension ($r = -.350$, $p = .004$), whereas there was significant positive correlation with emotional stability ($r = .403$, $p = .004$). There was also a trend towards negative correlation between rule consciousness of the 16-PF and the total number of accidents ($r = -.275$, $p = .053$). A further examination of the scatterplots with the relationship between these personality factors and

accident-proneness in Figure 1 showed that a single case had a very high number of accidents (over 100). A repeat analysis of the data, after excluding the outlier, showed significant negative correlation between the total number of accidents and reasoning ($r = -.389$, $p = .006$); emotional stability ($r = -.283$, $p = .049$); sensitivity ($r = -.359$, $p = .011$) and abstractedness ($r = -.360$, $p = .011$) of the 16-PF. There was also a trend towards a negative relationship with rule consciousness ($r = -.238$, $p = .099$). There was no correlation between age and the total number of accidents, whereas the number of years of formal education was significantly correlated negatively ($r = -.311$).

TABLE 1. Characteristics of Accident-Prone ($N = 32$) and Nonaccident-Prone ($N = 18$) Drivers

Variables	Drivers		t	p
	Accident-Prone (M ± SD)	Nonaccident-Prone (M ± SD)		
Age (years)	29.13 ± 7.93	29.00 ± 6.28	0.06	.954
Formal education (years)	8.97 ± 3.75	10.28 ± 2.91	-1.28	.207
Duration of driving (years)	7.41 ± 6.34	8.33 ± 6.03	-0.51	.616
Driving speed (km/h)	42.81 ± 8.88	39.44 ± 6.62	1.40	.167
Distance covered (km/day)	130.00 ± 29.60	111.94 ± 45.31	1.70	.095
Legal prosecutions	4.69 ± 9.25	2.56 ± 4.71	0.91	.367
	n (%)	n (%)	χ²	p
Marital status				
single	12 (37.5)	6 (33.3)	0.08	.768
married	20 (62.5)	12 (66.7)		
Vehicle ownership				
own	16 (50.0)	10 (55.6)	0.14	.706
rented	16 (50.0)	8 (44.4)		
Breaking rules ^a				
yes	28 (87.5)	8 (44.4)	10.59**	.001
no	4 (12.5)	10 (55.6)		
Crossing speed limits ^b				
yes	14 (43.8)	1 (5.6)	8.00**	.005
no	18 (56.2)	17 (94.4)		
Carrying extra persons				
yes	19 (59.4)	6 (33.3)	3.13	.077
no	13 (40.6)	12 (66.7)		
Substance use ^c				
yes	27 (84.4)	10 (55.6)	4.97*	.026
no	5 (15.6)	8 (44.4)		

Notes. * $p < .05$, ** $p < .01$ (two-tailed); a = Cramer's $V = .46$; b = Cramer's $V = .40$; c = Cramer's $V = .32$.

TABLE 2. Personality Characteristics of Accident-Prone (*N* = 32) and Nonaccident-Prone (*N* = 18) Drivers as Measured With 16-PF Questionnaire

Variables	Drivers (<i>M</i> ± <i>SD</i>)		<i>t</i>	<i>p</i>
	Accident-Prone	Nonaccident-Prone		
A (warmth)	5.19 ± 2.26	4.61 ± 1.65	0.95	.349
B (reasoning)	7.03 ± 2.83	8.11 ± 2.65	-1.32	.192
C (emotional stability)	4.03 ± 1.69	4.00 ± 1.49	0.07	.948
E (dominance)	6.19 ± 2.16	5.44 ± 1.95	1.21	.233
F (liveliness)	4.69 ± 2.07	4.33 ± 2.03	0.59	.561
G (rule-consciousness)	5.59 ± 2.12	5.11 ± 1.88	0.80	.426
H (social boldness)	5.16 ± 1.97	4.56 ± 1.82	1.06	.293
I (sensitivity)	5.31 ± 2.28	6.22 ± 1.44	-1.53	.133
L (vigilance)	5.34 ± 2.24	6.28 ± 2.65	-1.33	.191
M (abstractedness)	4.91 ± 2.19	5.78 ± 1.70	-1.46	.152
N (privateness)	5.84 ± 2.22	5.67 ± 1.85	0.29	.775
O (apprehension)	6.16 ± 2.10	6.89 ± 1.57	-1.29	.203
Q1 (openness to change)	4.72 ± 1.97	5.11 ± 1.81	-0.69	.490
Q2 (self-reliance)	5.72 ± 2.00	6.11 ± 1.91	-0.68	.502
Q3 (perfectionism)	5.59 ± 2.15	5.28 ± 1.96	0.51	.610
Q4 (tension)	5.63 ± 2.06	5.78 ± 1.39	-0.28	.781

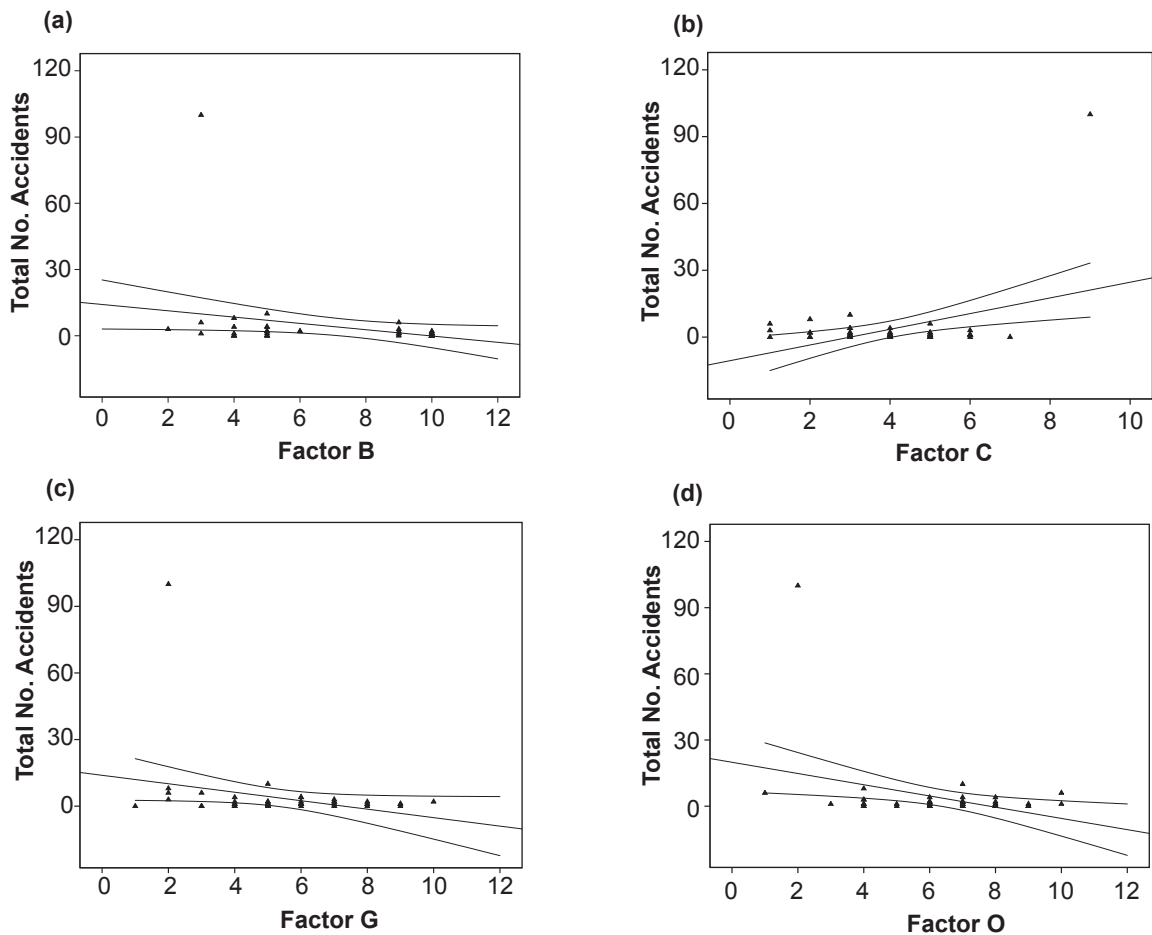


Figure 1. Scatterplots of accident-proneness (total number of accidents) with 16-PF factors: (a) B (reasoning), (b) C (emotional stability), (c) G (rule-consciousness) and (d) O (apprehension) with regression line and 95% confidence interval (*N* = 50).

4. DISCUSSION

In our study, age was not related to accident-proneness. However, there was negative correlation with education, implying that a poor level of education was related to drivers with higher rates of accidents. Substance use, specifically alcohol, has been associated with higher rates of accidents in drivers [11, 12, 13, 14]. In our study, too, substance use was more common in accident-prone drivers; the effect size was moderate. Besides nicotine, the most commonly used substances were cannabis and alcohol. Bédard, Dubois and Weaver associated cannabis with a higher risk of a potentially unsafe driving, even after controlling for age, gender and prior driving record; *OR* (odds ratio) 1.29; 99% CI (confidence interval) [1.11, 1.50] [15]. Donovan and Marlatt reported that alcohol-using drivers had personality correlates like driving-related aggression, competitive speed, sensation seeking, hostility and irritability, which contributed towards accident-proneness [16]. In a recent study from India, Poulouse and Srinivasan observed greater rates of high-risk behaviour such as road traffic accidents, violence, and self-injurious and risky sexual behaviour following episodes of heavy drinking in male patients with an alcohol dependence syndrome [17]. Risky driving and violations of traffic regulations were reported more often in drivers involved in fatal accidents [18]. Our study had similar findings: breaking rules, crossing speed limits and carrying extra persons (i.e., more than recommended) were more frequent in accident-prone drivers. The effect size of these findings was moderate.

Tillman and Hobbs found that some personality characteristics of drivers made them more or less likely to be involved in crashes [3]. Further, Conger, Gaskill, Glad, et al. concluded that crash-involved drivers had typical personality characteristics such as less ability to control hostility, indifference to the rights of others, preoccupation with fantasy satisfaction, and fear of loss of love and support [19]. In our study, personality correlates of accident-proneness included factors B, C, G and O of the 16-PF. Factor B (reasoning) significantly negatively correlated with the total number of accidents implying that lower scores,

which describe concreteness, low mental capacity and poor judgement, tend to increase accident-proneness. Similarly, negative correlation was found with factor G (rule consciousness; lower scores suggest expedient and nonconforming attitude) and factor O (apprehension; lower scores suggest self-assured, complacent and unworried individual). There was a positive relationship with factor C (emotional stability), which suggests emotionally stable and adaptive individuals to be accident-prone; this is counterintuitive. This finding was reversed after a single case was excluded from analysis; there was significant negative correlation suggesting emotionally unstable or reactive individuals were accident-prone. Also, a negative relationship with accident-proneness was found for factor I (sensitivity; lower scores represent a tough, objective and unsentimental person) and factor M (abstractedness; lower scores suggest a practical and down-to-earth person). After using the 16-PF, Hilakivi, Veilahti, Asplund, et al. reported that impulsivity and adventurousness (high score in factor H), naïveté and excessive trustfulness (low score in factor L), poor self-control (low score in factor Q3) and guilt proneness and depression (high score in factor O) significantly predicted accident-proneness in military conscripts [4]. Similarly, Jin, Araki, Wu, et al. reported lower psychological performance and higher neuroticism, psychoticism and extraversion in accident-prone drivers [20]. In a study, which used the path analytic approach, Sümer found that personality factors such as sensation seeking and aggression had an impact on road accidents via their effect on actual driving-related behaviour in professional drivers [21]. Pestonjee and Singh reported a significantly higher extraversion in a multiaccident group of participants compared to those without that trait on Eysenck's Maudsley Personality Inventory [22]. In another study, which used the 16-PF, Pestonjee, Singh and Singh found drivers involved in multiple accidents had personality traits such as happy-go-lucky, impulsive, happy, enthusiastic, shy, restrained, diffident, timid, tenderminded, dependent, overprotected, sensitive, apprehensive, worrying, depressive, troubled adequacy, anxiety and introversion [23].

5. CONCLUSION

In summary, we found that personality characteristics with lower scores of factors such as reasoning, rule consciousness, apprehension and emotional stability were common in commercial auto-rickshaw drivers with high accident-proneness. Therefore, it is possible that causing traffic accidents is related rather to personality traits than to the kind of vehicle. Our study was limited by small sample size and inclusion of male drivers only, which limits generalizability. Also, psychiatric morbidity, which could contribute towards accident-proneness, was not screened in this population. Further studies in this area are necessary to help in formulating prevention strategies in accident-prone drivers.

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