



THE RELATIONSHIP BETWEEN PEDESTRIAN BEHAVIOR AND PERSONALITY TRAITS

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Abstract

The objectives and hypotheses are focused on evidencing how the personality traits predict the positive behavior as facet of the pedestrian behavior. Method: The participants were 30 pedestrians aged between 20 and 45, Bucharest. Instruments: The Hexaco-Pi-R personality inventory (Ashton and Lee, 2010) adapted on the Romanian population by Burtaverde (2015). The tool has 100 items on Likert scale from 1 (minimum) to 5 (maximum). Pedestrian behavior scale (Marie-Axelle Granié, Marjorie Pannetier, Ludivine Gueho, 2013) with 23 items and 5 dimensions on Likert scale from 1 (minimum) to 5 (maximum). The tools were applied with the keeping of anonymity and ethics in research. Results and Conclusions

The assumptions of the research have been partially confirmed. Personality traits predict pedestrian behavior measured on the dimensions: violation of rules, mistakes, negligence, aggressive behavior, positive behavior. Further studies shall investigate the relationship between the personality traits and rule violation, aggressive behavior, negligence and mistakes.

Keywords: *pedestrian behavior, prudence, organization, consciousness, positive behavior.*

1. INTRODUCTION

Jain, Gupta and Rastogi (2014) were interested in studying the behaviour of the pedestrians at uncontrolled intersections and the effects of the intersection conditions, traffic conditions and pedestrian movements. The collected data methods were the direct and video observations and the pedestrian's interviews. The results evidenced that perpendicular crossing and very reduce waiting time were the pedestrian characteristics for crossing the analysed crossroads.

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Zacharias (2001) presented a literature review based on over 50 studies. The author was interested to evidence how pedestrians tend respond to environment characteristics and how they formulate the walking route.

Zeng, Nakamura & Chen (2014) simulated a pedestrian crossing model based on repulsive and attractive phenomena. The model was validated in the way of avoiding the collision with vehicles and other pedestrians.

Deb, Strawdermana, DuBieb, Smitha, Carruthc & Garrisonc (2017) were focused to validate the self-reporting Pedestrian Behavior Questionnaire (PBQ) on North American population from USA. They were interested in measuring the risky behaviors frequency for pedestrians. The Alpha Cronbach coefficients for the five factors were be reliable at the lower and higher boundaries ($0.7 < \text{Cronbach's alpha } (\alpha) < 0.9$). For the dimension positive behaviours, the Alpha Cronbach in under the lower boundary ($\alpha < 0.6$). The authors encourage the use of this tool for educational and research purposes.

Sankaran & Perumal (2014) conducted a study focused on analysing the pedestrian behaviour at signalized intersections. The authors analysed 775 pedestrians in Mumbai, India. The authors applied a logistic regression model for pedestrian noncompliance and interaction. Mako & Szakonyi (2016) were interested to evidence the effects of the road measures at pedestrian crossings. The measures were focused on introducing traffic lights, roundabouts and refuge islands for pedestrian safety. The pedestrians were interviewed before and after the implementation.

Talking about negligence as part of human behaviour, Owen (2007) tried to delimitate “The Five Elements of Negligence”. As a pedestrian, the people can be careless when crossing intersections, passing vehicles between them. The pedestrian negligence was studied in many articles.

Violation of rules is another pedestrian behaviour dimension. Chen, Xing & Cao (2017) were interested to study the effects of “waiting time on pedestrian violations at signalized intersections”. The authors define the violation of rules as forcing to crossing and illegality to crossing. The study was based on pedestrian behaviour recorded focused on time waiting to rule violation. The authors find out that the frequency of rule violation correlate with the age and gender. Reducing the rule violation correlate with pedestrian group size waiting at the crossroads. Akter (2017) conducted a study presented in the dissertation paper. The study was focused on pedestrian violation rules at crossroads in Bangladesh.

Concluding the findings from the studies, the pedestrian behaviour is the same all around the world when crossing the street and crossroads. There are variables that either increase or decrease the dimensions of the pedestrian behaviour.

2. OBJECTIVE AND HYPOTHESES

2.1. OBJECTIVE

Pedestrians play a fundamental role in road traffic in cities, especially for crossing pass at intersections as well as on various boulevards, streets where there are no pedestrian crossings. Hence the objective of the study is to reveal what personality traits predict the positive behavior as pedestrian behavior dimension.

2.2. HYPOTHESES

1. We assume that consciousness predicts the pedestrians' positive behavior.
2. We assume that organization predicts the pedestrians' positive behavior.
3. We assume the extraversion predicts the pedestrians' positive behavior.
4. We assume that flexibility predicts the pedestrians' positive behavior.
5. We assume the prudence predicts the pedestrians' positive behavior.

6. METHOD

6.1. The participants

The participants were a group of 45 pedestrians, age between 20 and 45 years old, from Bucharest town, Romania. From all the respondents only 30 pedestrians completed both questionnaires. Hence the collected data were analysed in the "results section".

6.2. The instruments

The Hexaco-Pi-R personality inventory (Ashton and Lee, 2010) adapted on the Romanian population by Burtaverde (2015). The tool has a number of 100 items measured on Likert scale from 1 (minimum) to 5 (maximum).

Pedestrian behavior scale (Granié, Pannetier, Gueho, 2013) with 23 items and 5 dimensions measured on Likert scale from 1 (minimum) to 5 (maximum). The pedestrian behaviour scale measures the dimensions: violation of rules, mistakes, negligence, aggressive behavior, positive behavior.

6.3. Procedure

The tools were applied with the keeping of anonymity and ethics in research. Also, the GDPR legislation was respected. The instruments were applied in the parks and on the streets with the respect and the anonymity of the pedestrians.

7. RESULTS

After data collection the hypotheses were tested using the simple linear regression model. In table 1 can be see the R and R Square values for the prediction model.

Table 1 – Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.398 ^a	.159	.129	9.35969

a. Predictors: (Constant), Conscientiousness

b. Dependent Variable: Positive behavior

In the table 2 can be seen the F and significance values.

Table 2 – ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	462.563	1	462.563	5.280	.029 ^b
	Residual	2452.904	28	87.604		
	Total	2915.467	29			

a. Dependent Variable: Positive behavior

b. Predictors: (Constant), Conscientiousness

In the table 3 can be seen the Constant, the Unstandardized Coefficients and the Standardized Coefficients of the regression model.

Table 3 – Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	33.888	9.573		3.540	.001
	Conscientiousness	.591	.257	.398	2.298	.029

a. Dependent Variable: Positive behavior

Hence, the hypotheses regarding the Conscientiousness as predictor for the positive behavior has been confirmed at the significance $p=.029<.05$. The regression equation according the presented model is the following:

$$\text{Positive behavior} = 33,888 + .591 * \text{Conscientiousness}$$

Testing the hypotheses regarding the prudence as predictor for the positive behavior of the pedestrian, the R and R Square values can be seen in the table 4.

Table 4– Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.494 ^a	.244	.217	8.87299

a. Predictors: (Constant), Prudence

b. Dependent Variable: Positive behavior

In the table 5 can be seen the F and the significance values.

Table 5 – ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	711.026	1	711.026	9.031	.006 ^b
	Residual	2204.441	28	78.730		
	Total	2915.467	29			

a. Dependent Variable: Positive behavior

b. Predictors: (Constant), Prudence

In the table 6 can be seen the Constant, the Unstandardized Coefficients and the Standardized Coefficients for the regression model with the Prudence as personality trait predictor for the positive pedestrian behavior. Hence, the hypothesis has been confirmed.

Table 6 – Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	36.591	6.508		5.623	.000
	Prudence	1.827	.608	.494	3.005	.006

a. Dependent Variable: Positive behavior

The regression equation is the following:

$$\text{Positive behavior} = 36,591 + 1.827 * \text{Prudence}$$

Testing the hypothesis that the organization as personality trait is predictor for the positive behavior, the following three tables reveal the results. In the table 7 can be seen the R and R Square values for the regression model.

Table 7 – Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.361 ^a	.131	.100	9.51432

a. Predictors: (Constant), Organization

b. Dependent Variable: Positive behavior

In the table 8 can be seen the Constant, the Unstandardized Coefficient and the Standardized Coefficients values.

Table 8– Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	44.737	5.543		8.071	.000
	Organization	1.652	.806	.361	2.051	.049

a. Dependent Variable: Positive behavior

According to table 8 the regression equation is the following:

$$\text{Positive behavior} = 44,737 + 1,652 * \text{Organization}$$

Hence, the hypothesis has been confirmed.

The hypotheses regarding the flexibility and extraversion predictors for the positive behaviour were not confirmed.

8. CONCLUSIONS

Personality traits (Ashton & Lee, 2010) play a key role in predicting workplace behavior and road traffic. In the present research, the fundamental objective is to establish statistically significant relationships between the personality traits and pedestrian behavior. Pedestrians play a fundamental role in road traffic in cities, especially for crossing pass at intersections as well as on various boulevards, streets where there are no pedestrian crossings.

The present study wants to highlight the personality traits that predict the positive relations and attitudes of the pedestrian in traffic. In addition to the negative dimensions of pedestrian behavior measured using the Pedestrian behavior scale tool (Marie-Axelle Granié, Marjorie Pannetier, Ludivine Gueho, 2013) positive behavior is shown in the items: I thank a driver who stops to let me cross, I stop to let the pedestrians I meet by.

Five hypotheses have been tested regarding personality traits that predict pedestrian positive behavior. Thus, as evidenced by the results obtained conscientiousness, prudence and organization predict statistically significant pedestrian positive behaviour ($p < .05$).

The study represents a starting point for many studies on pedestrian behaviour. The variables positive behaviour, violation of rules, mistakes, negligence and aggressive behaviour represents variables that may be the cause of accidents in traffic.

Received at: 12.09.2019, Accepted for publication on: 18.09.2019

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