

Impulsivity and Aggressive Driving as Mediators between Self-Esteem and Stress in Mexican Drivers

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Abstract

Individual factors and their influence on behavior in the realm of traffic psychology is not a thoroughly studied relationship. This paper aimed to determine the influence that Self-Esteem has on Impulsivity and Aggressive Behavior, and how these variables have an impact on the Stress an individual experiences in traffic. A sample of 528 participants was comprised, to which 4 Likert-type scales were applied. Statistical analyses showed that there is a moderate relationship between Self-Esteem and Impulsivity, and that Impulsivity and Aggressiveness serve as independent mediators between Self-Esteem and Stress. It is concluded that a person's evaluation of his or her esteem will have an influence on how much control they have over their impulsivity and their aggressive behavior, and this effect has an influence on the amount of stress they experience while driving an automobile.

Keywords: Self-Esteem; Aggressive Behavior; Impulsivity; Stress; Well-Being.

1. Introduction

Population in México exceeds the 106 million mark (INEGI, 2005), and has registered over 27 million vehicles (which amounts up to almost a vehicle for every 4 people), which use 360,000 kilometers of roads (CONAPO, 2008). Ávila-Burgos (2010) points out that lesions caused by traffic accidents in México are the 4th cause of death, and an important factor of economic and social impact. According to numbers reported by the same author, traffic accidents are translated into an economic value that represents 1% of the GDP. During 2007, 13% of emergency room attendees in public hospitals were due to traffic accidents. These represent one fourth of all medical attention required. Average hospitalization for a traffic injury is around 5 days (Cervantes-Trejo, 2009; Ávila-Burgos, 2010). On average, some 17,000 people lose their lives because of traffic accidents in México each year. A third of them were pedestrians. For every person that loses his or her life, there are 17 more that are hospitalized (Pérez-Núñez, 2010).

Other studies carried out in the same context as the present paper regarding Traffic Psychology include a study of stress in Mexican drivers (Dorantes-Argandar, Tortosa-Gil, & Ferrero-Berlanga, 2016), the relationship between stress, aggressive behavior and prosocial behavior (Dorantes-Argandar, Cerda-Macedo, Tortosa-Gil, & Ferrero Berlanga, 2015b), the influence of aggressive behavior in stress, prosocial behavior and accident rates (Dorantes-Argandar, Cerda-Macedo, Tortosa-Gil, & Ferrero Berlanga, 2015a), road traffic injury interventions (Treviño-Siler, Hajar, & Mora, 2011), and stress in public transport drivers (Lima-Aranzaes, Juárez-García, & Arias-Galicia, 2012). Considering the arguments presented, one may conclude that driving in the city of Cueranvaca are significantly aversive towards drivers, so that citizens use a great amount of their collective resources to insure their survival (or at least arriving at one's home without bodily harm), which subjects them to a high quantity of stress, which in turn affects their health and their quality of life.

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Aggressive behavior is defined as (Shinar, 2007): a syndrome comprised of instrumental behaviors that are motivated by frustration, which are manifest in (1) a lack of consideration and a high level of irritability towards other drivers (which is manifest through tail-gating, inadequate use of high-beams, a prevalent use of the car horn), and (2) deliberately driving in a way which endangers the driver and those that surround him with the purpose of saving time at the cost of reducing other's well-being (such as not being respectful of red lights or stop signs, obstructing other car's paths, or swerving as a manner of aggression). It is found that one is independent of the other and do not correlate statistically (Arnau-Sabatés, Sala-Roca, & Jariot-Garcia, 2012).

Aggression in the context of driving a motor-vehicle is not a new idea. Some of the inventoried behaviors by previous researchers include: threatening to collide one's vehicle, excessive use of one's car horn, use of obscene gestures, using high beams to indicate frustration, and driving at high velocities (Houston, Harris, & Norman, 2003). Deffenbacher, Petrilli, Lynch, Oetting, & Swaim (2003) find that aggressive behavior is more related to physical aggression in general and vengeful thinking, and with risk behavior behind the wheel. Consensus revolves around adaptation of the person to its environment and the events that are demanding, threatening, or even dangerous to the individual (Lazarus & Folkman, 1984).

Aggressive driving as a field that is widely studied (Benfield, Szlemko, & Bell, 2007; Berdoulat, Vavassori, & Sastre, 2013; Chai & Zhao, 2016; Clapp et al., 2011, 2011; Danaf, Abou-Zeid, & Kaysi, 2015; Deffenbacher, Deffenbacher, Lynch, & Richards, 2003; Deffenbacher, Filetti, Lynch, Dahlen, & Oetting, 2002; Deffenbacher, Lynch, Oetting, & Swaim, 2002; Eugenia Gras et al., 2006; Ge et al., 2014; Harris et al., 2014; Havârneanu, Jilavu, & Havârneanu, 2014; Jovanovic, Stanojević, & Stanojević, 2011; Leal & Pachana, 2009; Lennon & Watson, 2015; Miles & Johnson, 2003; Millar, 2007; Nesbit & Conger, 2012, 2012; Özkan, Lajunen, Chliaoutakis, Parker, & Summala, 2006; Sârbescu, 2012; Shahar, 2009; Shinar & Compton, 2004; Smith, Waterman, & Ward, 2006; Villieux & Delhomme, 2010). Proposing that impulsivity is related to aggressive behavior isn't either (Constantinou, Panayiotou, Konstantinou, Loutsiou-Ladd, & Kapardis, 2011; de Schutter, Kramer, Franken, Lodewijx, & Kleinepier, 2016; Heinz, Makin-Byrd, Blonigen, Reilly, & Timko, 2015; Leal & Pachana, 2009; Orue, Calvete, & Gamez-Guadix, 2016; Panayiotou, 2015; Smith et al., 2006; Venables, Patrick, Hall, & Bernat, 2011), nor is it new to driving behavior (Bachoo, Bhagwanjee, & Govender, 2013; Bergeron, Langlois, & Cheang, 2014; Bıçaksız & Özkan, 2016; Constantinou et al., 2011; Le Bas, Hughes, & Stout, 2015; Leal & Pachana, 2009; Marengo, Settanni, & Vidotto, 2012; Møller & Gregersen, 2008; Pearson, Murphy, & Doane, 2013; Smith et al., 2006; Starkey & Isler, 2016; Tabibi, Borzabadi, Stavrinou, & Mashhadi, 2015). However, its relationship to self-esteem and stress was hard to come by during the bibliographical research phase of this paper.

A study carried out in psychiatric patients found that personality variables such as alexithymia and impulsivity were consistent predictors of aggressive behavior (de Schutter et al., 2016). This serves as an argument towards characterizing overly aggressive drivers as people in need of psychiatric care, or at least treatment in personality issues. It is particularly worrisome due to the fact that all of these elements can be described as fundamental components of psychopathy (Panayiotou, 2015). Another study (Hahn, Simons, & Hahn, 2016) found that impulsivity was related to antisocial and borderline personality disorders. Although the present study is definitely not of a clinical psychology nature, an argumentative pathway appears to be in construction in characterizing an antisocial, or overtly impulsive driving style. There is research supporting this argument. A study carried out in Italian adolescents (Marengo et al., 2012) characterized three different subgroups of drivers, where there is a pattern of high risk, high sensation-seeking, high impulsivity, and low scores of altruism and anxiety, such as Dorantes-Argandar (2016) proposed. Additionally, Panayiotou (2015) posits that there is a driver profile that self-centeredness and a lack of concern of other's well-being is based on a high level of impulsivity and a lack of self-control, which again points to a distinct driver profile of an antisocial nature. Drivers with higher levels of sensation seeking, impulsivity, and risk-taking, in general show a lack of concern for other people's well being and their personal safety, as well as an openness to participate in activities that put their lives in danger (Marengo et al., 2012), which suits Shinar's (2007) definition of aggressive driving.

Aggressive behaviors such as overtaking a slow driver on the inside or in a risky situation (narrow streets or high traffic), close following, chasing another driver and manifesting his or her annoyance and irritation through hostility with whatever means available towards other drivers occur in part because of impulsivity (Tabibi et al., 2015).

It would be interesting to observe how select items of an aggressive behavior scale correlate and predict other select and individual items of an impulsivity scale. During the bibliographical research phase for this study, only one Impulsivity Scale validated for Spanish was found. However, the only validation available was for Chilean adolescents (Salvo & Castro, 2013). This prompted the need for a scale that was valid for the city of Cuernavaca, in México.

Army veterans who suffer of post-traumatic stress syndrome (PTSD) report having problems with impulsivity and its relation to aggressive behavior, and statistically controlling the effect of PTSD permitted impulsivity to account for far more variance in aggressive behavior (Heinz et al., 2015). Impulsivity is found associated to a great number of mental health issues, and is not a target variable in diagnostic and treatment of aggressive behavior (Heinz et al., 2015), this is why mapping and studying it is of great relevance to understanding its relationship to aggression.

Drivers that have been reprimanded by authorities for their behavior perceive their behavior as less violent and less serious, when compared to non-offenders (Smith et al., 2006). It appears that impulsivity is a better predictor of risky driving than sensation seeking as a variable (Pearson et al., 2013). Young adults have higher rates of risk taking and impulsivity when compared to their elders (Starkey & Isler, 2016). Impulsivity is related to driving lapses, driving errors and driving violations (Pearson et al., 2013). Drivers that have been deemed offenders of the law have a general tendency to behave more impulsively than those that have not been deemed so (Smith et al., 2006).

Pedrero Pérez (2009) reminds us that a high level of impulsivity is not an exclusive predictor of aggressive behavior; it is also related to a dysfunction of executive function, attention deficit and hyperactivity disorder, neurological issues in the prefrontal and frontal lobes, and substance abuse. Furthermore, there are studies that show no difference in impulsivity between vulnerability groups within the same age groups (Starkey & Isler, 2016), or a lack of predictive value between impulsivity and sensation seeking and risk behavior (Bergeron et al., 2014).

Narcissists and individuals with a high level of self-esteem perceive provocations by others (intended or unintended) as personal insults and provocation for aggressive response (Edwards, Warren, Tubré, Zyphur, & Hoffner-Prillaman, 2013). This is somehow consistent with Ouimet et al. (2013), who conclude that drivers with lower levels of self-esteem tend to pay less attention towards hazards and have lower levels of performance. Przepiorka, Blachnio, & Wiesenthal (2014) study both narcissism and self-esteem separately and their influence towards driver aggression. They find that narcissism is a predictor of driving anger, vengeance and aggression; however, they refer to self-esteem in terms of “stability”, where lower levels of self-esteem relate to driver aggression. This also feeds the argument of a particular antisocial driving style, or driver personality. Narcissism and driving anger are predictors of aggressive driving (Edwards et al., 2013), although there should be a difference between narcissism and self-esteem, this is consistent with Shinar’s (2007) definition.

Although the study of self-esteem and aggression is thoroughly reported (Babakhani, 2011; Hardaker & Tsakanikos, 2014; Locke, 2009a, 2009b; Matsuura, Hashimoto, & Toichi, 2010; Ostrowsky, 2010; Paisi-Lazarescu, 2014; Przepiorka et al., 2014; Sandstrom & Jordan, 2008; Talbot, Babineau, & Bergheul, 2015; Teng, Liu, & Guo, 2015; Wang et al., 2013; Webster, 2007; Zeigler-Hill, Enjaian, Holden, & Southard, 2014), it is not a thoroughly revised one in the realm in driving psychology (Edwards et al., 2013; Ouimet et al., 2013; Przepiorka et al., 2014). This gives weight to the argument held by this cumulus of bibliographical material. There is a need of understanding how self-esteem fits into driving behavior, specifically in driver aggression and stress. This is why this study has the main objective of determining how Self-esteem and Impulsivity determine Aggressive Behavior and Stress in drivers from Cuernavaca, Morelos, Mexico.

2. Method

2.1. Procedure

The participants were selected through a non-probabilistic method and were approached through a variety of settings. A team of volunteers was composed from Psychology students, which were trained and supervised by the main researcher involved in this study. These then sought out people in streets, stores, shops, and squares in downtown Cuernavaca, Mexico.

Volunteers were instructed to stratify their collection, paying attention to include as much men as women in the sample, and to keep track of the age of participants so as to maintain the age quota of the sample as close to population distributions as possible. Instruments were available in a paper and pencil format, and then keyed in by hand into the SPSS version 21 and AMOS graphics version 20, which were subsequently used to carry out statistical analyses, such as: Cronbach's Alpha to determine internal consistency of the items, Exploratory Factor Analysis to determine the factorial distribution of the items that composed the scale, Pearson's Correlations to determine relationship of the factors that were drawn, linear regressions to determine the direction of relationships, and structural equations to fit the model.

2.2. Participants

The sample was comprised of 528 participants (64.6% men, 33.8% women, age mean 33.4 years old, std. dev. 12.73) who were selected by a non-probabilistic method. Again, inclusion criteria consisted of (1) having a driver's license, and (2) living within the municipal limits of Cuernavaca, Morelos (Mexico). The age mean for years of schooling was 14.75 with a standard deviation of 3.14, which means that the sample level is mostly above highschool. Educational level is a bit high in this sample as well when compared to local standards, but being able to drive a motor vehicle may be correlated to the level of education an individual has.

2.3. Instruments

The instruments used in this study were the following:

(1) The Inventory of Stressful Situations in Traffic (Dorantes Argandar, Tortosa Gil, & Ferrero Berlanga, 2016). This instrument allows evaluating how stress is manifest in drivers in the context of operating an automobile. It has 3 factors that explain 53% of variance, has an Cronbach's Alpha of .94, and uses 22 Likert scale items that measure frequency (1 = never, 5 = always).

(2) The Inventory of Aggressive Behaviors in Traffic (Dorantes-Argandar et al., 2015a, 2015b). This instrument allows evaluating aggressive behaviors that are more frequent amongst drivers in the context of operating an automobile. It has 3 factors that explain 51% of total variance, has a Cronbach's Alpha of .93, and uses 21 Likert scale items that measure frequency (1 = never, 5 = always).

(3) The Coopersmith Self-Esteem inventory for adults, validated for Mexican population (Lara-Cantú, Verduzco, Acevedo, y Cortés, 1993) which had a Cronbach's alpha of .74 for this study. This instrument allows evaluating self-esteem in adults. It has two factors which explain 51.7% of variance, and has 10 Likert scale items that measure frequency (1 = never, 5 = always).

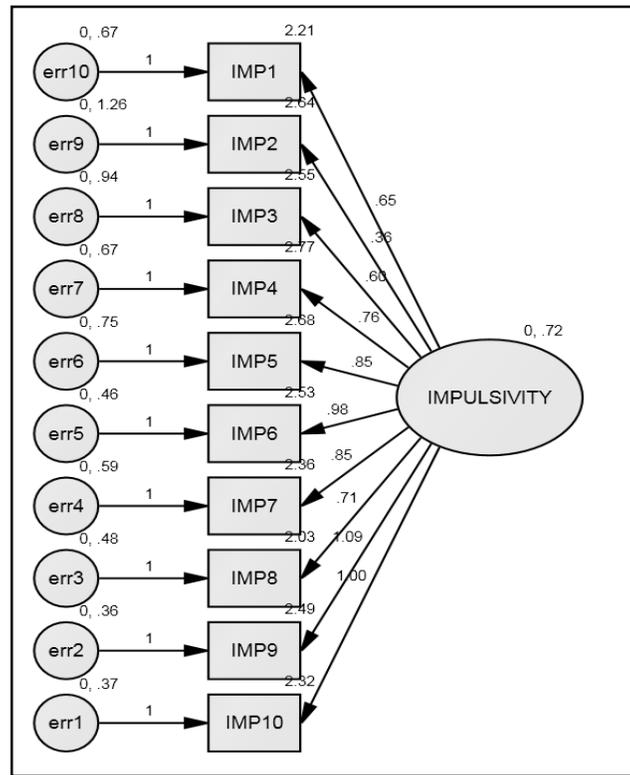
(4) A scale designed explicitly for this study with the purpose of evaluating impulsivity, because a valid instrument for Mexican population could not be found. Following definitions from the DSM-IV (American Psychological Association (APA), 2002) and the DSM5 (American Psychiatric Association, 2013), a list of 10 items was comprised in a Likert scale that measure frequency (1 = never, 5 = always). It had a Cronbach's alpha of .87, and arranged itself in a single factor that explained 48.82% of variance. This setting had a Kaiser-Meyer-Olkin measure of sample adequacy (KMO) of .92 and passed Bartlett's sphericity test ($X^2=2005.62$ $gl=45$ $p \leq .001$). It was named Impulsive Behavior Inventory (ICI for its initials in Spanish). The factor loadings are presented in table 1. The scale was constructed in Spanish, but is presented in English for purpose of this paper.

Table 1: Factor loadings for the Impulsive Behavior Inventory

Item	Factor loading
I behave impulsively.	.625
I am sorry for the consequences of my actions.	.330
My emotions control my actions.	.542
I feel stressed.	.693
I find it hard to wait for someone or something.	.691
I am easily angered.	.802
I find other people frustrating.	.722
I have conflicts with other people.	.726
I am easily exasperated.	.844
I find it hard to tolerate other people.	.816

A confirmatory factor analysis was carried out for this scale, which is presented in Figure 1.

Figure 1: CFA for the Impulsive Behavior Inventory



The CFA showed an adequate level of fit ($X^2=103.52$, $gl=35$, $p\leq.001$, $CFI=.97$, $RMSEA=.06$, $TLI=.95$). This allows for the use of the Impulsive Behavior Inventory as a valid tool for this sample.

3. Results

All scales were reduced to indexes using a simple reduction process: adding up the values obtained for each item, and dividing the result into the number of items included in each individual scale. This permitted to formulate values that were all in a 1 to 5 format, with which inferential analyses were carried out. First, Pearson’s correlations were calculated amongst the main variables of this study, which are presented in Table 2.

Table 2: Pearson’s correlation analyses for the main variables of this study

	Aggressiveness	Stress	Self-Esteem
Stress	.25**		
Self-Esteem	.3**	.17**	
Impulsive Behavior	.28**	.37**	.4**

Correlation analysis shows that there is a moderate level of relationship between the four main variables of this study. This prompted regression analyses to determine the direction of said relationships. These analyses were constructed into Table 3.

Table 3: Linear regression analyses for the variables included in this study

Relationship	R ²	F	p	B
Self-Esteem→Impulsivity	.16	85.15	.001	.48
Impulsivity→Stress	.13	68.88	.001	.5
Agressiveness→Stress	.06	28.43	.001	.36
Self-Esteem→Stress	.03	12.8	.001	.28
Self-Esteem→Aggressiveness	.09	42.38	.001	.36
Impulsivity→Aggressiveness	.08	36.96	.001	.28
Impulsivity→Stress	.16	40.48	.001	.24
Aggressiveness				.42

This provides insight on how elements within the individual have an influence on the very process of evaluation (Lazarus & Folkman, 1984), and how they have an impact on their experience and well-being. The city of Cuernavaca was a good place to carry out this study because of the amount of stress generated by traffic within its limits (Dorantes Argandar et al., 2016; Dorantes-Argandar et al., 2015a, 2015b; Lima-Aranzaes, Juárez-García, & Arias-Galicia, 2012). This paper provides theoretical insight onto how psychological constructs within individuals themselves have an impact on their driving styles and behaviors, such as was found in other studies (de Schutter et al., 2016; Hahn et al., 2016). It also paves the road towards the conception of a fixed set of driving styles or driver personalities in Mexico, such as Marengo et al.(2012)propose in Italy.

4.1. Conclusions and limitations

This article concluded that the higher and individual's self-esteem is, the more impulsive and more aggressive their driving will be, which will in turn enhance the levels of stress said individual experiences while driving an automobile in the city of Cuernavaca, Morelos. These findings, however, must be limited to said city because of methodological restraints concerning sample size and the fact that one of the scales used had not been previously validated. It is recommended to carry out similar studies in other cities of the same region, with larger samples to provide a more comprehensive generalizability of findings. It is also recommended further testing of the Impulsivity Scale to provide greater forms of validation, so that it can be used in different settings.

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