

## Article

# Stress from an administrative perspective in public transport drivers in Mexico City: Minibus and metrobus



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## ABSTRACT

Stress is one of the occupational diseases that affect workers worldwide, affecting their own productivity and performance (as well as that of the organizations where they work), and even their physical and mental health. According to the International Labour Organization, Mexican workers suffer from stress the most all over the world, since theirs is one of the most stressful professions. With this in mind, the aim of this research is to study the work stress in bus rapid transit drivers and minibus in Mexico City. The method used is based on an exploratory statistical factorial analysis. It is concluded that the factors which a higher influence in the onset of stress are organizational, environmental (physical/individual), inherent to the position, extra organizational and individual. Although divergent among drivers, minibus drivers are the workers who suffer the most from stress.

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## El estrés desde una perspectiva administrativa en los conductores de transporte público en la Ciudad de México: minibús y metrobús

## RESUMEN

El estrés es una de las enfermedades laborales que más afectan a los trabajadores en todo el mundo, perjudicando su productividad y rendimiento tanto propio como de las organizaciones donde laboran, e incluso su salud física y mental. Según la Organización Internacional del Trabajo son los trabajadores mexicanos quienes mayormente lo padecen a nivel mundial, toda vez que una de las profesiones más estresantes es ser conductor de transporte público. Es por ello que el objetivo de esta investigación es estudiar el estrés laboral en los conductores de autobuses de tránsito rápido y microbuses de la Ciudad de México. El método empleado se fundamenta en el análisis estadístico factorial exploratorio. A partir de lo anterior, se concluye que los factores que más inciden en la aparición de estrés son organizacionales, ambientales (físico/individual), intrínsecos del puesto, extraorganizacionales e individuales. Aunque divergentes entre los conductores, son los de minibús los que más lo padecen.

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## O estresse nos motoristas de transporte público na Cidade do México de uma perspectiva administrativa: Microônibus e ônibus

### R E S U M O

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Estresse no trabalho  
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Motorista ônibus

O estresse é uma das doenças profissionais que mais afetam os trabalhadores em todo o mundo, prejudicando tanto a sua produtividade e próprio desempenho como os das organizações em que trabalham, e até mesmo sua saúde física e mental. Segundo a Organização Internacional do Trabalho, os trabalhadores mexicanos são os que mais sofrem esta doença em todo o mundo, já que uma das profissões mais estressantes é ser condutor de transporte público. Por isso, o objetivo desta pesquisa é estudar o estresse no trabalho em motoristas de ônibus de trânsito rápido e ônibus da Cidade do México. O método baseia-se numa análise estatística fatorial exploratória. A partir do exposto, conclui-se que os fatores que mais afetam a aparência de stress são organizacionais, ambientais (físico/individual), intrínsecos do emprego, extra-organizacionais e individuais. Ainda que sejam divergentes entre os motoristas, são os condutores de ônibus os que mais o sofrem.

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### 1. Introduction

Work stress is a serious social and economic problem, while on the one hand damages the health of workers, on the other decreases the productivity of the companies making them least profitable and competitive in an increasingly globalized market. Stress is product of a reaction that has the individual to labor demands and pressures that do not match their knowledge and skills and test their ability to cope with various situations in their work environment. The work overload, organizational climate, long working hours, salary and the risk of being fired, conform some of the aspects that generate stress to workers (Organización Mundial de la Salud – OMS, 2004).

It is difficult to consider any occupation, profession or trade that does not generate stress given the speed and demands in which people are immersed (Martínez, 2008), one of them is to be the driver of a public transportation vehicle of passengers (Hernández, 2013) especially in developing countries where in most cases, the current state of its transportation system is not based on the needs of the population (Iracheta, 2006). However, it is evident that they provide a service that cannot be suspended for what it represents on the competitiveness of the cities and mobility of citizens and their safety when transported; nevertheless, stress on these drivers has been scarcely studied, ignoring the factors that cause it which is the objective of this study.

The research method of this study was based on the statistical descriptive analysis and exploratory factorial. It is concluded that the factors that cause work stress on drivers of public transportation, although equals in number with six, are divergent. While for the minibus operators the organizational factors are those that most affect them with a 34%, for the metrobus operators are the factors related to the physical environment with a 28%. It was identified that the minibus drivers show higher levels of stress in comparison with the metrobus drivers.

The present article is structured by: a conceptual framework where relevant aspects of the Mexican transport are presented; then a theoretical framework, where studies by authors on the subject of frontier work stress appear; after is presented the research methodology, analysis of results and, finally, the conclusions.

### 2. Contextual framework: the public transportation in Mexico City

In Mexico transportation is an important part of the history of this city which has provided over the years the movement of people, goods, animals and an endless variety of objects. This section

describes the operating conditions they face in their day to day and the average internal and external environment in which they are immersed is addressed.

#### 2.1. Mexico City and its public transportation: operating conditions in minibus and metrobus

The population growth and the continued territorial expansion of Mexico City have given rise to one of the most populous metropolitan areas in the world with 20,116,842 inhabitants (Consejo Nacional de Población, 2010) whom mostly are directed to work daily to the center of the city demanding more public transportation and congesting the road network (Secretaría de Transporte y Vialidad – Setravi, 2009). In this way, there is record that in peak hours the average vehicle speed is 20 km/h, and has various negative effects on quality of life and economy of families with loss of millions of work hours and a series social conflicts ranging from automobile accidents, crime, sexual harassment, to problems of social integration and coexistence (Gobierno del Distrito Federal, 2009a). The picture is even more discouraging since the trend of the last 16 years is the increase of 45% of the vehicle fleet which also explains in large part the saturation of the available road infrastructure evidencing an eventual unsustainable mobility in the medium term (Gobierno del Distrito Federal, 2009a).

More even, it is estimated that of the total trips generated in Mexico City 20% occur in private cars and 80% by public transportation. In response as an alternative and as in most of Latin American cities it has been implemented a system of bus rapid transit that has optimized the use of the road network (Gobierno del Distrito Federal, 2010).

Administratively, the passenger transportation system of the city is organized in: Federal District Government public transportation, composed by the Subway Collective Transport System (STCM), the Electric Transportations Service (ETS), the Passenger Transport Network (RTP) and the metrobus and in public transport concessioned consisting of minibuses, buses (metrobus), “combis” and on individual composed by taxis (López, 2011). Although with tripartite participation (Government of the Federal District, Mexico State and Federal) and under concession form, it can be found the Suburban Train which connects the State of Mexico with the Federal District, transporting daily to 150,000 people (Fsuburbanos, 2008). However, it is the Subway Collective Transport System which by its massive capacity serves most of the 20.6 million daily trips in Mexico City and metropolitan area with 18% (Secretaría de Transporte Colectivo Metro – STCM, 2012), while the Electric Transportations

Service attends 1.2% (Servicios de Transportes Eléctricos del DF, 2013), the buses of the RTP cover 3% (Secretaría de Movilidad, 2014) and 250,000 passengers per day are transported by metrobus through 5 lines (López, 2011). While in the concessioned transport the buses and minibuses are those who offer the greatest number of trips made in the city, serving almost 60% of the demand equivalent to more than 12 million passengers transported per business day on 106 routes and 1163 runs (Secretaría de Movilidad, 2014).

### 2.1.1. Operating conditions on the public transport minibuses and metrobus

The collective passenger transportation minibuses is operated by private individual dealers grouped in civil organizations known as routes and with an essentially informal operation. In the case of Mexico City an important part of these transporters are alien to the norms and their vehicles violate the regulations, risking their life, the life of the passengers and pedestrians (Iracheta, 2006), which is largely attributable to the fact that their income depends on the number of passengers transported and by not having a salary or benefits granted by law (Berrones & Rosales, 2011). The dispute for each passenger on the street (penny war) is its business model (Ardila, 2009; Centro de Transporte Sustentable, 2009; Instituto de Políticas para el Transporte y el Desarrollo, 2010); however, there are cases in which it is the owner the operator of the unit, although it is more common that he rents it to another driver setting a daily fee of income that the driver must comply with the delivery of a full tank of gasoline (Lagunas, 2012). In addition, also exist the so-called “posturero” drivers who share the unit with another operator and comply in the same way as the ones who are permanent.

Being the reason why there is no incentive that achieves that a driver respects the norms above the need to bring money back home. The vast majority are family heads, drive an average of 12 h per day, 5–6 days a week to meet the established rent (Aguilar, 2000, 1995) and facing an oversupply of routes and a road network in disrepair and highly congested (Gobierno del Distrito Federal, 2010, 2009a).

Meanwhile, metrobus, unlike minibuses have a unique infrastructure, confined lanes where buses circulate (Centro de Transporte Sustentable, 2009; Instituto de Políticas para el Transporte y el Desarrollo, 2010) separated from other vehicular traffic, they operate under a corporate scheme with public–private participation where the government regulates, controls and provides, in conjunction with the particular, the service (Lámbarry, Rivas, & Trujillo, 2010). In these mercantile societies there is no penny war and drivers are compensated based on the distance driven and not per passenger so they have a fixed income and benefits required by law. However, incentive contracts in quality also exist to ensure and encourage operators to excellence in service, penalizing the deficiencies in the maintenance of the vehicle, in their service to the user, in the consistency on the performance of the driving and security, among others. On the opposite case, they are compensated if they exceed service expectations (Gobierno del Distrito Federal, 2009b; Instituto de Políticas para el Transporte y el Desarrollo, 2010).

## 3. Theoretical framework: stress and its factors

The stress in the course of time has been studied from different perspectives and in different areas of knowledge. As part of the theoretical basis conceptualizations several authors have given the subjects that are presented.

### 3.1. Stress and the organizational factors

Based on social, political, environmental, structural, economic and labor changes that have occurred in organizations over time

various models have been proposed study on occupational stress in different areas highlight three for their recurring citation, the model of Cooper and Cox (1985), Matteson and Ivancevich (1987) and Salas, Driskell, and Hughes (1996), although none of them is directed to the study of stress in the transport sector.

Nevertheless, one of the oldest models is the socio environmental proposed by the Institute for Social Research (ISR) of French and Kahn (1962) whom conclude that the work context, the subjective experience the worker and his response are factors that affect work stress with effects on the physical and mental health of the person. A bit later McGrath (1976) concludes that stress is a cyclic behavior caused by the workers' perceptions of danger or threat to the environment and the workplace. Harrison (1978) in his model of mismatch between demands and resources of the worker, on the premise that stress is a mismatch between the demands of the environment and the resources of workers to face them, concludes that the individual resources of the worker, his capacity of perception and the environmental demands, cause it. Payne and Fletcher (1983) in their model of interaction between demands and control, pick up ideas from the Harrison model concluding that stress is the result of the interaction between high psychological demands (productivity) and their scarce freedom in decision making, that is the control (hierarchies of authority, responsibility system, etc.).

Meanwhile Lazarus and Folkman (1984) in their model of cognitive appreciation highlighted that the most important factor is the appreciation that has the individual of his environment, which can lead to disease and occupational dysfunction. Cooper and Cox (1985) coincide with McGrath considering that stress is a process that is developed in four phases: stressors (environmental demands), individual differences (the coping resources and capacity of perception), individual effects (symptoms) and organizational and disease. Meantime Hendrix, Ovalle, and Troxler (1985) conclude that stress is the product of three groups of variables: intra-organizational (clarity of goals, organizational control, individual autonomy, etc.), individual (locus of control, tolerance for change, assertiveness, etc.) and extra-organizational (family relationships).

Nevertheless these factors, Matteson and Ivancevich (1987) consider that the individual factors, such as the cognitive appreciation–perception of the worker, is what causes in a greater extent, physiological, psychological and behavioral outcomes with health consequences on the individual and organizational performance.

Based on this, Del Pino (2006) emphasizes that these factors are evident in four different levels in the organization: (a) individual, characterized by work overload, (b) group, by conflict between staff, (c) organizational, in absence of management processes and (d) extra organizational, where personal problems of the individuals interfere with their work.

Although, it is the individual who distorts his perception of the environment or his own way of being by the discrepancies between what he perceives and his coping behaviors with two types of mechanisms for facing with stress, one of coping and another of defense (Edwards, 1988).

Freese and Zapf (1998) meanwhile, in their transactional and dynamic model consider the social impact and the temporality with consequences in terms of dysfunctions and of a typical process of chronification similar to the burnout syndrome. For Johnson and Hall (1988) and Karasek and Theorell (1990), based on the model of Payne and Fletcher (1983), incorporate the dimension of social support as moderator in the study of stress in a way that a high level of social support at work diminishes the effect of stress, while a low level, increases it. To which Siegrist (1996) in this regard in his effort-reward model postulates that work stress occurs when presented a high effort and a low reward. Concludes that stress is caused by variables: of extrinsic effort (claims and liabilities),

of intrinsic effort (high motivation with coping) and of reward (money, esteem and control of the status).

Some slightly more modern views propose linking the stress with performance for example, Salas et al. (1996) conduct to the formation of expectations of performance that can be positive or negative and determine psychological, cognitive, emotional and social consequences. Karasek (1979) in his model of interaction between demands and control, coinciding with Payne and Fletcher (1983), considers as main variables the labor demands and the personal control, so that stress is a product of the interaction between high psychological demands and scarce freedom in decision making (low control). Finally, it also highlights the perspective of the pressure indicator model (Williams, 1998) that considers the sources of pressure but simultaneously the driving factors to reduce it.

### 3.1.1. Stress in public transport operators

There are few studies on the factors that cause stress oriented to the drivers of public transport and non-existent in the public transport of passengers of minibus or metrobus in Mexico. In the international context only Hernández (2013) evidences that being a taxi driver is one of the most stressful jobs in New York City; while in a first attempt to identify the stressors perceived by drivers of public transport in the State of Morelos in Mexico, Lima and Juárez (2008) conclude with 15 stressors, highlighting traffic, time pressure and pressure to complete the daily rent, that the drivers have. In this regard, Aranda, González, Hidalgo, and Pando (2013) associate the psychosocial risk factors and occupational with the health aspects of public transport workers in Mexico City, concluding that 43.4% has had an illness and the 20% reported to be associated with their work.

## 4. Research method

It is a quantitative research of transversal cut divided in two stages, one of an analytical type where the variables causing job stress were identified focused on the drivers of the transport, in which the evaluative stress questionnaires were designed in the operators of the metrobus and minibus.

A second stage that involved an exploratory factorial analysis and based on this one statistical descriptive. Therefore, to quantify the level of stress on the drivers as a result of the factors of the exploratory analysis a scale was established, where the values from 0 to 21 points correspond to a minimum level, from 22 to 42 points to a low level, of 43–63 points to an average level, of 64–84 points to a high level of stress and a maximum level of 65–105 points.

### 4.1. Sample selection

In the Federal District circulate about 106 routes (Secretaría de Movilidad, 2014) for the application of the instrument a route was chosen randomly turning out to be the 18-2 located in the north of Mexico City which has a vehicle fleet of 259 units and 500 drivers of which a random sample of 40 was taken.

The same criterion of randomness of route selection was applied to the metrobus (of a total of five), turning out to be line 1 which transports 470,000 users daily, have approximately 250 drivers being the longest with 30 km in both directions and operating in the Insurgentes Avenue, one of the most important in the city. The size of the random sample applied to this case was of 50.

### 4.2. Exploratory factor the questionnaire design

The basis questionnaire was based on three models: the Salas et al. (1996), the Matteson and Ivancevich (1987), and the Cooper and Cox (1985), and resulted in principle in a total of 65 items (Annexes, Table A1) debugged through Cronbach's alpha coefficient

eliminating those items with low coefficients Alfa  $<0.5$  (George & Mallery, 2003); based on this the exploratory factor analysis (of principal components with varimax rotation) was performed to identify those items that were not attached to their dimension and the SPSS version 22 software was used.

For the adapted questionnaire to the minibus drivers the exploratory factorial analysis showed a KMO of 0.689 and a Bartlett's test of sphericity with a chi square of 497.250; g.l. 210;  $p < 0.000$ . The results in this test indicate six components which explain the 74.38% of the total variance. So it was decided to build these components respecting in a greater extent the dimension to which the items originally belonged and in other cases and according to the dominion which represented majority.

However, in some items that did not reflect adherence to its original factor of procedence, it was observed that it was possible to include it on two additional categories; thus, the environmental factors were subdivided in physical and individual and the organizational in intrinsic of the work position under a process of reflection and careful analysis that gave a better fit to the instrument (Table 1) and considering the proposed on the environmental case of Del Pino (2006).

Similarly, in the case of the metrobus drivers the KMO of the exploratory factor analysis was of 0.738 and Bartlett's test of sphericity with an chi square of 412.626; g.l. 210;  $p < 0.000$ . It turned out dimensioning the stress into six components explaining the 65.89% of the total variance. It should be mentioned that some items do not match the same component as the minibus, which is because not all items apply to both cases (Table 1).

According to the principal component analysis applied to drivers of minibus and metrobus we observed that both proposals require an adjustment in the number of factors that influence in stress. The final proposal was composed of six factors that explain for both cases more than 65% of the total variance of stress:

1. Organizational factors, consisting of the stressors: workload, salary, time pressures and organizational climate.
2. Intrinsic factors of the position, containing: issues of the internal regulation, hours of work, wages, and workplace violence.
3. Factors of the physical environment formed by: tours, external noise to the unit, urban geography and climate.
4. Individual environmental factors that consider: workspace, user attitude, lighting and temperature of the unit.
5. Extra-organizational factors constituted by family and economic situations.
6. Individual factors conformed by personality, coping and control of emotions.

## 5. Analysis and results

The minibus drivers under study are characterized by the fact that half of them are aged between 18 and 30 years, 35% of 31–42 years; 60% are married; 85% have basic education and only 15% completed high school.

Regarding their work 54% of drivers operate a unit that is not theirs and have to pay rent, the 36% operate a borrowed unit where the account terms can be negotiated and only 10% operate their own unit where they establish the time conditions to work. 45% of them has more than 8 years working on the route and have higher levels of stress compared to those who have worked less than 4 years. The 82% are permanent drivers, 15% is "posturero" meaning that many times they must share the unit with another driver and the 3% have another position meaning that they only get to drive the unit when any of the above cannot; of these drivers are the "postureros" those who show a higher stress levels, however, of all drivers the 46% show levels to be considered of which 13% in high.

**Table 1**  
Exploratory factorial analysis.

Minibus drivers				Metrobus drivers			
Factor	Item	Factorial weight	Explained variance (%)	Factor	Item	Factorial weight	Explained variance (%)
Organizational	EOCT.1.2	0.745	34.286	Physical environment	EADR4.1	0.507	28.488
	EOSA.4.1	0.733			EAR2.2	0.710	
	EOSA.4.2	0.732			EAGU3.1	0.743	
	EAPT.3.1	0.526			EACT6.2	0.769	
Intrinsic of the position	EEXPL.3.3	0.897	46.568	Intrinsic of the position	EAR2.1	0.633	39.267
	EOSA.4.3	0.318			EACT6.1	0.708	
	EOEV.2.3	0.217			EHIA.4.3	0.598	
	EOCT.1.4	0.468			EEXPL3.2	0.086	
Physical environment	EACT.7.2	0.168	54.680	Individual environment	EOEV2.1	0.713	47.568
	EAR.2.1	0.102			EAIL5.1	0.035	
Individual environment	EAR2.3	0.767	62.227	Organizational	EAET7.1	0.214	54.685
	EAP.1.2	0.834			EAET7.2	0.565	
	EAP.1.3	0.659			EACT6.3	0.408	
	EAPT.3.2	0.655			EOCO3.1	0.731	
Extra organizational	EAET.8.2	0.135	69.088	Extra organizational	EOCO3.2	0.204	60.759
	EEXRF.1.2	0.484			EOSA4.3	0.431	
	EEXRF.1.3	0.885			EEXRF1.2	0.291	
Individual	EHIFE.2.3	0.630	74.380	Individual	EEXPE.2.2	0.042	65.891
	EHIAF.5.1	0.839			EHICO1.1	0.646	
	EHICO.1.1	0.125			EHICO1.3	0.674	
	EHICO.1.4	0.340			EHIFE2.1	0.089	

Source: Own elaboration.

Based on the results obtained in the exploratory factor analysis it was found that the organizational factors are those that most stress the drivers of minibus with 34% followed by the intrinsic factors of their work position with about 12% and those with least weight are the individual that have about 5%. Specifically, the indicators with more factorial weight (greater than 0.7), that are the ones that explain the most the changes in stress of the drivers are: having few passengers, earn little, the relationship with their partner which is affected by work, problems with law by imprudence in the way of driving and that the passengers do not meet the recommendations requested.

Regarding metrobus drivers 75% of them have less than 51 years; 84% are married. In terms of educational level 88% have basic education and 12% have completed high school. In labor terms 92% are employed indefinitely (base) and only 8% are employed on a temporary basis; 76% has more than 7 years working for the company; 92% work 8 h a day, 6% less than 8 h and 2% works overtime that is more than 8 h a day. 52% of the drivers present a low level of stress, 42% a medium and 6% a high level.

In the exploratory factorial analysis was found that the factors of the physical environment are those that cause more stress to the metrobus drivers with 28% followed by the intrinsic factors of the work position with about 11% and those who have less weight are, as for the minibus drivers, the individuals with about the 5%. Particularly, the indicators with more factorial weight (greater than 0.7) that generate stress in the drivers in greater degree are: job insecurity, the policies of the organization regarding performance, that the cars invade the bus lane, the discomfort of the steering wheel and physical environmental issues such as heat and rain.

## 6. Conclusions

A first conclusion to be drawn from this study is that the factors that cause work stress on drivers of public transport either in minibus as in metrobus and even though being equal in number with six are divergent. While for minibus operators are the organizational those who most affect on them for of the metrobus operators are those related to the physical environment.

There are so many sources of pressure and few modulators of this phenomenon that it was possible to find drivers with stress. For

the metrobus drivers those that presented high stress levels were aged between 36 and 43 years old, married with children, that have been laboring between 4 and 6 years, 5 days a week. In consideration with the minibus the most stressed drivers are aged between 18 and 27 years old, married with children, who are “postureros” and those who drive a borrowed unit full time, although they have been working on the route for more than 8 years.

It is not difficult to think that the different working conditions between these drivers generate stress on them, the business scheme of metrobus with statutory benefits and fixed income against precariousness of the ones of the route, in which drivers besides working 8–16 h a day, their income depends on number of passengers transported and have no legal benefits (Instituto de Políticas para el Transporte y el Desarrollo, 2010; Lámbarry et al., 2010).

Therefore, comparatively minibus drivers are more stressed 13% of them (more than double) than the metrobus. In this regard a second conclusion that can be delineated of this study is that for the drivers of minibus the number of passengers transported, their income, the infractions for their driving way, the complications with their partner due to their work and the passengers that do not meet the recommendations requested are the indicators with greatest influence on their stress coinciding with Berrones and Rosales (2011), Lagunas (2012) and Aguilar (2000, 1995).

In contrast, the metrobus drivers are stressed by the insecurity at work (violence), the policies of the organization regarding their performance, that cars invade the bus lane, discomfort on the steering wheel and physical environmental issues such as heat and rain.

It is necessary to bring close the service of minibuses to business schemes that will improve organizational aspects as their workload and salary and educate them in customer care, good driving and knowledge of transit law as well as rewarding with incentives or paid leave for drivers with minimal infractions.

Meanwhile to reduce the stress in metrobus drivers it is required to develop security strategies that would allow eradicating violence that may well be through an increase in police surveillance and the reviewing of the organizational policies regarding their performance. Training that will enable them to control their feelings of anger against the weather and to the cars that invade their lane.

Given the damage that can cause stress it is necessary that both transport organizations (metrobus and minibus) encourage motivation in their employees, allowing them to become involved in the decision-making, encouraging social interaction through meetings or recreational spaces that enable them to exercise and eat properly with the intention of strengthening their coping resources to stress.

The results of this research should be considered as an incentive and a challenge for accomplish further studies on the subject: confirm those factors that generate stress to drivers at their work, examine in a deeper way unhealthy eating habits that could

influence in being prone to stress as well as their consequences on the physical and mental health so that they can be, as much as possible, regulated and controlled for the benefit of the drivers, for the organizations to which they belong and for the security of the passengers transported.

### Conflict of interest

The authors declare not to have any conflict of interest.

### Annexes.

**Table A1**  
Initial instrument.

Dimensions	Indicators	Minibus drivers items	Metrobus drivers items
Organizational (EO)	Workload (EOCT) Matteson and Ivancevich (1987)	1.1 I make the same amount of trips every day <sup>a</sup>	1.1 I perform the same amount of daily trips <sup>a</sup>
		1.2 Having few passengers stresses me	1.2 I have the benefits provided by law (bonuses, health insurance, day off per week) <sup>a</sup>
		1.3 It is part of your job to perform mechanical activities, cleaning or administration <sup>a</sup>	1.3 You work overtime <sup>a</sup>
		1.4 If the unit breaks down I have to make up time with overtime	
	Exposure to violence (EOEV) Salas et al. (1996)	2.1 I've been a victim of crime in working hours <sup>a</sup>	2.1 I am frightened by the insecurity in my job
		2.2 I feel fear to do my job <sup>b</sup>	2.2 I have been physically beaten during working hours <sup>a</sup>
	Organizational climate (EOCO) Matteson and Ivancevich (1987)	2.3 I receive physical aggression from users	3.1 The relationship with my colleagues is good in the law
		3.1 I receive some sort of benefits established in the law	3.2 The organizational policies impede my performance at work
		3.2 The general policies of the route impede my performance at work <sup>a</sup>	3.3 We support each other between colleagues <sup>b</sup>
		3.3 The relationship with my colleagues is good <sup>a</sup>	
3.4 My colleagues are disorganized <sup>a</sup>			
3.5 We assist each other between colleagues <sup>a</sup>			
Salary (EOSA) Matteson and Ivancevich (1987)	4.1 Earn so little generates me anguish	4.1 My salary is fixed <sup>a</sup>	
	4.2 I give some contribution to third parties	4.2 I am satisfied with my salary	
	4.3 I am concerned to complete the money of the account		
	4.4 From my salary I have to pay for fuel and maintenance for the unit <sup>a</sup>		
Extra organizational (EEX)	Family relationships (EEXRF) Matteson and Ivancevich (1987)	1.1 The relationship with my family influences my work <sup>a</sup>	1.1 The relationship with my family influences my work <sup>a</sup>
		1.2 Family problems have come to affect my work	1.2 The family problems affect my work
		1.3 My couple relationship is affected due to my job	1.3 Do I feel supported by my family? <sup>a</sup>
		1.4 When I feel support from my family and friends my job is better <sup>a</sup>	
	Economic problems (EEXPE) Matteson and Ivancevich (1987)	2.1 My salary is enough to cover the basic needs of my family and mine <sup>a</sup>	2.1 My salary is enough to meet the needs of my family and mine <sup>a</sup>
		2.2 Commonly I have debts because my salary is reduced <sup>a</sup>	2.2 Commonly I have debts due to not earning enough
	Legal problems (EEXPL) Matteson and Ivancevich (1987)	3.1 In the last month I have received more than one infraction <sup>a</sup>	3.1 I have been called attention because of my driving <sup>a</sup>
		3.2 I have my license and documents of the unit in order <sup>a</sup>	3.2 In the last month I have received one or more than one infraction emitted by the metrobus.
		3.3 I have serious problems with the law because of imprudences at work	
		3.4 I'm very careless in the way of driving <sup>a</sup>	
Individual (EI)	Control (EHICO) Cooper and Cox (1985)	1.1 I lose control of my emotions easily	1.1 During work, I lose control of my emotions easily
		1.2 I have a proper control in situations of traffic danger in my work <sup>a</sup>	1.2 I have a proper control in situations of danger in my work <sup>a</sup>
		1.3 I control my temper in difficult situations <sup>a</sup>	1.3 My temper is explosive with my colleagues or supervisors
		1.4 My character is explosive with the users	1.4 I control my character <sup>a</sup>
	Personality (EHIPE) Cooper and Cox (1985)	2.1 I am a person who always sees the positive side of things <sup>a</sup>	2.1 I am a person who always the you positive side of things
		2.2 I consider myself a sentimental person <sup>a</sup>	2.2 I consider myself a sensitive person <sup>a</sup>
		2.3 Sometimes I am a person who gets angry easily	2.3 I tend to be a person who gets angry easily <sup>b</sup>
		2.4 I am a calm person <sup>b</sup>	2.4 I am a calm person <sup>a</sup>
Individual (EHI)	Perception (EHIPC) Salas et al. (1996)	3.1 I find easy to perceive the things that are going wrong in my work <sup>a</sup>	3.1 I find it easy to perceive the things that are going wrong in my work and in my life <sup>a</sup>
		3.2 I detect when is going to be problems with the users <sup>a</sup>	
		3.3 I perceive thieves easily <sup>a</sup>	
		3.4 The contact with the users irritates me <sup>a</sup>	

Table A1 (Continued)

Dimensions	Indicators	Minibus drivers items	Metrobus drivers items
Environmental (EA)	Alimentation (EHIA) Contribution	4.1 I have a fixed schedule to feed myself <sup>a</sup>	4.1 I have a fixed schedule to feed myself <sup>a</sup>
		4.2 My diet is balanced <sup>a</sup>	4.2 My diet is balanced <sup>a</sup>
		4.3 I eat while working <sup>a</sup>	4.3 I have noticed that during working hours I am hungrier
		4.4 I generally get from the street the foods that I eat <sup>a</sup>	4.4 The foods that I consume are generally acquire on the street <sup>b</sup>
	Coping (EHIAF) Salas et al. (1996) Passengers (EAP) Contribution	5.1 I find it easy to deal with any situation that is presented at work	5.1 I find it easy to deal with any situation that arises at work <sup>a</sup>
		1.1 Users are attentive to the service I provide	1.1 I would like to interact with users <sup>a</sup>
		1.2 It bothers me that the passengers do not address my recommendations	
		1.3 It annoys me that the passengers (go up/go down) at a stop that is not set	
	Noise (EAR) Salas et al. (1996)	2.1 The noise bothers me when I drive	2.1 The noise bothers me when I drive
		2.2 I listen to music during my work day <sup>a</sup>	2.2 It is difficult for me to listen to the auditory signals of my unit (ex. ring, motor, etc.)
2.3 It is difficult for me to listen to the auditory signals of my unit (ex. ring, motor, etc.)			
Time pressure (EAPT) Contribution	3.1 I drive fast to cover my share	Does not apply	
	3.2 I feel time pressure when I need to check		
	3.3 I try to win passengers overtaking <sup>a</sup>		
Urban geography (EAGU) Contribution	4.1 It bothers me that there is a lot of traffic during market days <sup>a</sup>	3.1 It bothers me that the cars invade my lane	
	4.2 I worry when the holiday season for children arrives <sup>a</sup>		
	4.3 I feel damaged when the taxis or any other car make a double row <sup>a</sup>		
Travel distances (EADR) Lighting (EAIL) Salas et al. (1996)	5.1 The distances I travel are long <sup>b</sup>	4.1 I travel the same distance every day	
	6.1 The lighting of the city allows me to recognize hazards and/or receive information clearly <sup>a</sup>	5.1 The lighting in my unit is appropriate	
	6.2 The lighting in my unit is appropriate <sup>a</sup>	5.2 The lighting of the city allows me to recognize hazards while working <sup>a</sup>	
Temperature/climate (EACT) Salas et al. (1996)	7.1 The rain season affects my work day <sup>a</sup>	6.1 The rain season affects my work day	
	7.2 The heat causes a bad mood	6.2 The heat causes a bad mood	
	7.3 The temperature in my unit makes me enjoy my work <sup>a</sup>	6.3 The temperature of my unit is suitable to perform my job	
Workspace (EAET) Salas et al. (1996)	8.1 My seat is comfortable <sup>a</sup>	7.1 My seat is comfortable	
	8.2 My driving spot is uncomfortable	7.2 The wheel of my unit is comfortable to use	
	8.3 The wheel of my unit is comfortable to use <sup>a</sup>		

Source: Own elaboration.

<sup>a</sup> Items deleted for having an alpha less than 0.400.

<sup>b</sup> Items deleted by the method of principal components lower than 0.500.

Note: The unmarked items were re arranged according to the results of the exploratory factorial analysis (Table 1).

## References

- Aguilar, J. (1995). *Choferes, antropología y vida cotidiana notas de un viaje por la ciudad de México*. México: Departamento de Antropología, UAM-Iztapalapa.
- Aguilar, J. (2000). Las culturas del volante en la ciudad de México. Aproximación etnográfica a los choferes del transporte público. *Estudios sobre las Culturas Contemporáneas*, 6(12), 85–110.
- Aranda, C., González, R., Hidalgo, G., & Pando, M. (2013). Factores de riesgo psicosocial laborales, apoyo social y síndrome de burnout en médicos de familia de tres instituciones públicas de salud, Guadalajara, México. *Revista Científica Salud Uninorte*, 29(3), 487–500.
- Ardila, A. (2009). *Transit planning in Curitiba and Bogotá. Roles in interaction, risk and change*. Massachusetts: The MIT Press.
- Berrones, L., & Rosales, R. (2011). *Condiciones laborales y de salud de los choferes de taxi y microbús del Distrito Federal*. México: UACM.
- Centro de Transporte Sustentable. (2009). *Metrobus: Una fórmula ganadora*. Distrito Federal: Centro de Transporte Sustentable. Retrieved from: <http://www.movilidadadable.org/recursos/item/metrobu-s-una-formula-ganadora>
- Consejo Nacional de Población. (2010). *Delimitación de las Zonas Metropolitanas de México 2010*. Retrieved from: <http://www.conapo.gob.mx/en/CONAPO/Zonas-metropolitanas.2010>
- Cooper, C., & Cox, T. (1985). Occupational stress among word processor operators. *Stress Medicine*, 1, 87–92.
- Del Pino Peña, P. (2006). *Estrés ocupacional en complejos petroleros marinos de producción*. Ciudad de México: Secretaría del Trabajo y Previsión Social.
- Edwards, J. (1988). The determinants and consequences of coping with stress. In C. Cooper, & R. Payne (Eds.), *Causes, coping and consequences of stress at work* (pp. 233–266). Chichester: John Wiley and Sons.
- Freese, M., & Zapf, D. (1998). Methodological Issues in the study of work stress: Objective vs. subjective measurement of work stress and the question of longitudinal studies. In C. Cooper, & R. Payne (Eds.), *Causes, coping and consequences of stress at work* (pp. 375–412). Chichester: John Wiley and Sons.
- French, J., & Kahn, R. (1962). A programmatic approach to studying the industrial environment and mental health. *The Journal of Social Issues*, 18, 1–47.
- Fsuburbanos. (2008). *La empresa. Presentación*. Retrieved from: [http://www.fsuburbanos.com/secciones/la\\_empresa/presentacion.php](http://www.fsuburbanos.com/secciones/la_empresa/presentacion.php)
- George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference. 11.0 update*. Boston: Allyn & Bacon.
- Gobierno del Distrito Federal. (2009a). *Programa general de desarrollo del Distrito Federal 2007–2012*. Retrieved from: <http://www.jovenes.df.gob.mx/>
- Gobierno del Distrito Federal. (2009b). *Aviso por el que se aprueba el corredor de transporte público de pasajeros "Metrobus Eje 1 Poniente" y se establecen las condiciones generales para su operación*. *Gaceta oficial del diario del Distrito Federal Décimo Séptima Época*, pp. 722. Retrieved from: <http://cg.servicios.df.gob.mx/prontuario/vigente/r249201.htm>
- Gobierno del Distrito Federal. (2010). *Programa integral de transporte y vialidad*. *Gaceta oficial del diario del Distrito Federal 2007–2010*. Retrieved from: <http://www.setravi.df.gob.mx/wb/stv/programa.integral.de.transportes-y.vialidad>
- Harrison, R. (1978). Person–environment fit and job stress. In C. Cooper, & R. Payne (Eds.), *Stress at work* (pp. 175–208). Chichester: John Wiley and Sons.
- Hendrix, W., Ovalle, N., & Troxler, G. (1985). Behavioral and physiological consequences of stress and its antecedent factor. *Journal of Applied Psychology*, 70(1), 188–201.
- Hernández, V. (2013). *Los trabajos más y menos estresantes de 2013*. International Business Times. Retrieved from: <http://campusmexico.mx/2013/01/09/los-trabajos-mas-y-menos-estresantes-de-2013/#sthash.NVDzHY77.dpuf>
- Instituto de Políticas para el Transporte y el Desarrollo. (2010). *Bus rapid transit planning guide*. Retrieved from: <http://www.itdp.org/wp-content/uploads/2014/07/02-BRT-Guide-Spanish-Introduccion.pdf>
- Iracheta, A. (2006). *La necesidad de una política pública para el desarrollo de sistemas integrados de transporte en grandes ciudades mexicanas*. El Colegio Mexiquense. Retrieved from: <http://www.scielo.cl/pdf/invi/v26n71/art06.pdf>
- Johnson, J., & Hall, E. (1988). Job strain, workplace social support, and cardiovascular disease: A cross sectional study of a random sample of Swedish working population. *American Journal of Public Health*, 78(10), 1336–1342.
- Karasek, R. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly*, 24, 285–308.

- Karasek, R., & Theorell, T. (1990). *Healthy work stress productivity and reconstruction of working life*. New York: Basic Books.
- Lagunas, I. (2012). *El fin de la Guerra centavara*. Retrieved from: <http://www.reporteindigo.com/reporte/df/el-final-de-la-guerra-centavera>
- Lámbarry, F., Rivas, A., & Trujillo, M. (2010). Institutional aspects on bus rapid transit systems implementation. *Journal of Management and Strategy*, 1(1), 130–143.
- Lazarus, R., & Folkman, S. (1984). Coping and adaptation. In W. Gentry (Ed.), *The handbook of behavioral medicine* (pp. 282–325). Nueva York: Guildford.
- Lima, C., & Juárez, A. (2008). Estudio exploratorio sobre estresores laborales en conductores de transporte público colectivo en el estado de Morelos, México. *Ciencia y Trabajo*, 10, 126–131.
- López, M. (2011). *El transporte de pasajeros y el sistema vial en la ciudad de México*. México: Instituto de Investigaciones Jurídicas de la UNAM.
- McGrath, J. E. (1976). Stress and behaviour in organizations. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology*. Chicago: Rand McNally.
- Martínez, G. (2008). *Todas las profesiones son estresantes*. Centro de estudios especialistas en trastornos de ansiedad. Retrieved from: <http://quasarcomunicacion.com.ar/ceeta/0423profesiones.htm>
- Matteson, M., & Ivancevich, J. (1987). *Controlling work stress. Effective human resource and management strategies*. San Francisco: Jossey-Bass Publishers.
- Organización Mundial de la Salud – OMS. (2004). *La organización del trabajo y el estrés. Estrategias sistemáticas de solución de problemas para empleadores, personal directivos y representantes sindicales*, 3. pp. 1–6. Ginebra: Serie protección de la salud de los trabajadores.
- Payne, R., & Fletcher, B. (1983). Job demands, support and constraints as predictors of psychological strain among school teacher. *Journal of Vocational Behavior*, 22, 136–147.
- Salas, E., Driskell, J., & Hughes, S. (1996). Introduction: The studio of stress and human performance. In J. Driskell, & E. Salas (Eds.), *Stress and human performance* (pp. 1–45). Mahwah, NJ: LEA.
- Secretaría de Movilidad. (2014). *Transporte Público de Gobierno*. Retrieved from: [http://www.semovi.df.gob.mx/wb/stv/cinco\\_siglos\\_de\\_transporte\\_en\\_la\\_ciudad\\_de\\_mexico](http://www.semovi.df.gob.mx/wb/stv/cinco_siglos_de_transporte_en_la_ciudad_de_mexico)
- Secretaría de Transporte Colectivo Metro – STCM. (2012). *Afluencia por tipo de acceso*. Retrieved from: <http://www.metro.df.gob.mx/operacion2/cifrasoperacion.html#5c>
- Servicios de Transportes Eléctricos del DF. (2013). *El Tren Ligero*. Retrieved from: <http://www.ste.df.gob.mx/servicios/trenligero.html>
- Secretaría de Transporte y Vialidad – Setravi. (2009). *El transporte, factor de cohesión social*. Retrieved from: <http://www.cgma.df.gob.mx/wb/stv/transporte>
- Siegrist, J. (1996). Stress work, self-experience, and cardiovascular disease prevention. In K. K. Orth-Gomér, & N. Schneiderman (Eds.), *Behavioral medicine approaches to cardiovascular disease prevention* (pp. 3–315). Mahwah, NJ: LEA.
- Williams, S. (1998). Measuring occupational stress: Development of the pressure management indicator. *Journal in Occupational Health Psychology*, 3(4), 306–321.