Predictive variables for sleep quality in professional drivers

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Abstract: Professional drivers often have problems sleeping or resting properly. This may be due to various factors, both personal and specific to their working conditions. In this study, we set out to develop a predictive model for the quality of sleep in professional drivers using the following indicators: Age, Gender, Seat Comfort, Seat Suspension, Adjustable Lumbar Support of the Driver’s Seat, Driving Hours, Musculoskeletal Problems, Driver Stress, Irritation, Resistant Personality, Burnout, Safety Behaviors and Impulsivity. Method: The participants were 369 professional drivers from different transport sectors, obtained through non-probabilistic sampling. The SPSS 25.0 program was used for statistical analysis. Results: The predictive capacity of certain variables that affect drivers’ sleep quality is determined. Conclusions: Sleep quality can be predicted by means of certain variables, the best predictor of which is Exhaustion (Burnout). This research contributes to the body of knowledge on sleep quality and on improving the health of professional drivers. Keywords: Sleep quality. Occupational health. Ergonomics. Professional drivers. Psychophysiological disorders. Occupational risks.

Introduction

Sleeping is a neurobiological need that alternates with waking states in predetermined cycles (Gala et al., 2003). When sleep disturbances occur, somnolence deteriorates psychomotor and neurocognitive functional variables such as attention, reaction time, surveillance capacity and information processing. When this happens, drivers may experience an increase in traffic accidents. Drowsiness during driving is a leading cause of accidents and can be reduced if corrective measures are taken (Connor et al., 2002).

Fitness et al. (2014) demonstrated that drowsiness decreases the driver’s ability to maneuver the vehicle and increases the probability of nodding off and falling asleep at the wheel. This leads to dangerous situations for the drivers themselves as well as for other drivers, with high mortality rates and damage to infrastructure (Lyznicki et al., 1998). Some studies have found that bus drivers experience poor sleep quality, which is of great concern for public safety and passengers alike (Chaiard et al., 2019; Diez et al., 2011; Sunwoo et al., 2017).

Professional drivers are a group susceptible to health risks. Taylor and Dorn (2006) claim that apart from the effects on health, stress and fatigue in bus drivers can increase the risk of accidents. Other factors such as long working hours, compliance with schedules, and responsibility for the safety of passengers can also cause stress (Greiner et al., 1998). Work stress produces alterations in the biological markers of stress (cortisol) and in cardiovascular parameters that show a state of physiological hyperactivation (Moya-Albiol et al., 2005). Both interfere with the ability to rest well, as shown by Åkerstedt et al. (2002), who found a significant negative correlation between work stress and sleep quality. Other authors (Gosselin et al., 2005; Miró & Buela-Casal, 2005) have indicated that a lack of sleep or altered sleep generates fatigue, alters mood, worsens performance, gives rise to changes in numerous physiological systems, and affects immunosuppression.

Factors related to work, such as shift work or long working hours, play a substantial role in the loss of sleep. Thus, professional drivers, whose work demands a lot of time, are at higher risk of accidents, and more serious ones, than non-professional drivers (Braeckman et al., 2011; De Pinho et al., 2006; Philip, 2000). Therefore, work such as theirs, which requires sustained surveillance and rapid reaction times, is severely compromised by drowsiness (Braeckman et al., 2011).

Among transport professionals, sleep dysfunctions have been associated with work stress and working hours (Åkerstedt et al., 2002), fatigue (Åkerstedt et al., 2004), and...
The presence of physiological or cognitive arousal when going to sleep is a sign of sleep disturbance (Åkerstedt et al., 2002). Occupational concerns also affect the quality of sleep (Kecklund & Åkersted, 2004), as do the working conditions of professional drivers. Santos and Lu (2016) indicate that bus drivers work an average of 16 hours a day. They perform risky tasks such as fast passenger loading and rushing to stay on schedule, which have been found to affect the mental health of these drivers (da Silva-Júniór et al., 2009; Hilton et al., 2009; van der Ploeg & Kleber, 2003). Gómez-Ortiz, Cendales, Useche and Bocarejo (2018) found that drivers’ mental health problems were associated with work pressure, little support from co-workers, few rewards and high signal conflict while driving. In addition, the static posture and limited freedom of movement to which they are subjected aggravate the muscular tension accumulated during work (Evans, 1994; Tse et al., 2006).

Professional drivers can experience high physical loads due to the high density of traffic and the constant stops they must make (Rayo et al., 2007), in addition to the simultaneous performance of numerous and frequent tasks while exposed to vibrations and noise (Göbel et al., 1998; Rayo et al., 2007). Fatigue at work is related to the number of hours worked (Fletcher & Dawson, 2001). Thus, fatigue and the need for recovery are mediating variables in the association between work stress and risky driving, and between social support and risky driving (Useche et al., 2017). In addition, fatigue has been found to be a major contributing factor to truck accidents (Castro et al., 2004; Chen & Xie, 2014; Muñoz-Escobar, 2018).

Driving has also been related to burnout (Arias et al., 2013; Couto & Lawoko, 2011; Olivares et al., 2013; Sanchez, 2016). McVicar (2003) suggests that the absence of sleep may be a precursor to burnout. In fact, it has been shown that the most powerful predictor of mental fatigue (burnout) is the alteration of sleep (Åkerstedt et al., 2004). In this research, we have taken into consideration the importance of personal factors in the resilience and vulnerability of professional drivers. Hardiness is closely related to workers’ health, as it reveals that people with resilient personalities perceive fewer stressful situations as stressful, and therefore approach them more actively (Kobasa, 1979, 1982). This has led us to formulate the following hypothesis:

Hypothesis: If sleep quality is influenced by Age, Gender, Seat Comfort, Seat Suspension, Adjustable Lumbar Support of the Driver’s Seat, Hours Driven, Musculoskeletal Disorders, Driver Stress, Irritation, Resistant Personality, Burnout, Safety Behaviors and Impulsivity, then a standard for relaxed driving can be derived from a model that incorporates these predictors.

Basantes et al. (2017) found that the most common risks faced by professional drivers include traffic accidents, long hours of driving without rest, physical agents (dazzle, vibrations and exposure to adverse weather); and the physical, visual, and mental load caused by factors such as the number of hours worked, nocturnality, isolation, monotony and stress. In addition, Sunwoo et al. (2017) found that the most prevalent risk factor for sleepy driving was depression.

In Spain, the General Directorate of Traffic (DGT, 2006) carried out an advertising campaign to prevent accidents due to sleep, in which it indicated that drivers were at great risk because they suffer from chronic drowsiness. This campaign aimed to help drivers detect drowsiness by explaining that the main symptoms of sleep are difficulty maintaining a safe distance, moving a lot in the seat and problems with maintaining attention and it recommended that drivers go to the doctor.

According to the press release published by the Ministry of the Interior (DGT, 2018), the most important factors involved in traffic accidents were alcohol and/or illegal drugs (42% of cases), distraction (36%), tiredness or falling asleep (22%) and inadequate speed (19%), the latter three being due to lack of sleep, so in view of the data shown it is necessary to have indicators that can help prevent drowsiness. According to the General Directorate of Traffic (DGT, 2018), in Spain sleep and fatigue were the main cause in 2017 of 2,722 traffic accidents with specifically 177 deaths and 4,063 injured victims, of which 589 required hospitalization.

Sleep is a basic need, the study Awake Europe (DGT, 2013) showed that driving while sleepy had affected 70% of the participants, indicating that if they also suffer from sleep apnea they are up to 2 or 3 times more likely to have an accident.

An important piece of information is that shown by Williamson and Feyero (2000), which indicates that being awake for 19 hours causes cognitive impairment compatible with having a blood alcohol content of .05 and if it goes beyond 24 hours it is comparable to a .10%. At the moment the limit in our country blood alcohol limits are: drivers in general .05 gr/l, professional drivers .3 gr/l and novice drivers .3 gr/l (Real Decreto 1428/2003, 2003).

Therefore, it is important to identify those factors that may affect the quality of sleep, since the possible results that emerge from this research would help to understand the factors involved, allowing individual interventions to improve those relevant aspects in each person.

Method

Participants

The study participants were 369 Spanish professional drivers (93.3 % male, 6.7 % female). The mean age was 41.3 (SD = 11.01). The drivers work in public passenger transportation (33.1%), taxi driving (35.1%), freight transport (27.2%) and ambulance driving (4.6%). The average years of experience was 9.6 (SD = 11.05), and the average length of time working as a professional driver was 11.16 (SD = 12.15). The civil status distribution was married or cohabiting (71.7 %), single (20.8 %), divorced/separated/widowed (7.5 %).
The education level of the subjects was as follows: professional training-I or upper secondary school (54.4%); professional training-II, lower secondary school or prep school (22.3%); primary education certificate or less (21.1%) and university studies (2.2%).

**Instruments**

The Groningen Sleep Scale (SSQ-8; Serrano-Fernández, Boada-Grau, Robert-Sentís, et al., n.d.) is the Spanish adaptation of the GSQS-15 (Meijman et al., 1988) and evaluates the subjective quality of sleep such as the general quality of sleep, lack of sleep, difficulty in falling asleep, problems sleeping and not resting. Its structure is unifactorial (α = .90) and responses are recorded on a six-point scale (1. Strongly disagree to 6. Strongly agree). An example of an item would be, “1. Last night I slept soundly.”

The Musculoskeletal Problems Scale (MP-9; Robb & Mansfield, 2007), in the version adapted to Spanish by Robert-Sentís (2016), evaluates musculoskeletal problems and vibrations and consists of nine items. Its structure is bifactorial: “F1. Musculoskeletal aspects” (referring to the trunk, e.g., shoulders (α = .72); and “F2. Extremities” (e.g., knees). The vibrations considered are those that affect the comfort of the seat and the lumbar adjustment (α = .70). It is answered on a five-point Likert scale (1. Never to 5. Always).

In order to evaluate stress in driving we used the Trans Driver Stress Scale (TDS-15; Serrano-Fernández et al., 2018). This refers to the driver's state of relaxation or tension before, during, and after driving. “F2. Preventing Hazards” (PH; α = .71) indicates the effort that is made while driving and the possible dangers that may be encountered while driving on the road. “F3. Alertness and Surveillance” (AS; α = .70) refers to the ease with which the driver can relax while or after driving. “F4. Thrill Seeking” (TS; α = .76) refers to the manner in which the driver drives (risky vs. prudent). “F5 Fatigue and Anxiety” (FA; α = .70) indicates the fatigue and nervousness of the professional driver. These items are rated on a six-point Likert scale (from 1. Strongly disagree to 6. Strongly agree).

The Dickman’s Impulsivity Inventory Scale (Dickman, 1990), in its Spanish version (Chico, Touet, Lorenzo-Seva, & Vigil-Colet, 2003), is made up of 23 items and 2 subscales “F1. Functional impulsiveness” assesses impulsiveness that is beneficial and that can help one to adapt to unexpected situations which require a quick response (11 items; α = .77; e.g., “9. I like to take part in quick conversations where there really isn't much time to think before I speak”). “F2. Dysfunctional impulsiveness” refers to impulsiveness that, as opposed to being advantageous, can be counterproductive (12 items; α = .76; e.g., “11. I often don’t spend a lot of time thinking about a situation before acting”). The response format is dichotomous (1 = true / 0 = false).

The TRANS-18 Scale evaluate psychophysiological disorders and safety behaviors, both personal and in the vehicle (Boada-Grau et al., 2012). It is made up of 18 items and three dimensions. “F1. Psychophysiological Disorders”, its refers to disorders that the driver may suffer, such as stress, anxiety, depression, musculoskeletal disorders, digestive disorders and hypertension. (α = .81; e.g., “14. My work has produced some muscular and / or skeletal disorder (for example, low back pain, tendinitis, etc.).” “F2. Personal Safety Behaviors”, its refers to not drinking after driving alcohol or having a large meal. Also to the fact of not eating or drinking while driving (α = .80; e.g., “4. I avoid driving while drinking a soda”). “F3. Vehicle Safety Behaviors”, has to do with putting on work gloves to perform job tasks, knowing how to use extinguishers, being alert while driving and resting the mandatory hours (α = .70; e.g., “9. I use caution when getting out of my vehicle”). The responses are recorded on a five-point Likert scale and range from 1. Never to 5. Always.

The Hardy Personality scale (CPR; Moreno-Jiménez, González, & Garroso, 2001) is made up of 21 items and three dimensions with seven items each one. “F1. Control” is about the subjects’ own sense of their influence on events (α = .74; e.g., “3. I do everything I can to ensure control of the results of my work.”). “F2. Commitment” is defined as the tendency to develop behaviors that entail personal involvement, the tendency to identify with what one does (α = .79; e.g., “10. My daily work satisfies me and makes me totally dedicate myself to it”). “F3. Challenge” indicates that potentially stressful stimuli are perceived as opportunities for growth (α = .83; e.g., “8. In my professional work I am attracted to those tasks and situations that imply a personal challenge”). The responses are recorded on a four-point Likert scale (from 1. Totally disagree to 4. Totally agree).

The Burnout scale (MBI-GS; Salanova, Schaufeli, Llorens, Peiró, & Grau, 2000) evaluates burnout and comprises 15 items (3 subscales). The subscale of “Exhaustion (α=.87)” is made up of five items (e.g., “6. I feel 'burned out' by work.”). “Cynicism (α=.85)” consists of five items (e.g., “9. I have lost enthusiasm for my work”) and “Professional Efficiency (α=.78)” comprises six items (e.g., “12. I have achieved a lot of worthwhile things in this position”). Responses are given on a seven-point Likert-type scale ranging from 0. Never / At no time to 6. Always / every day.

The Irritation Scale (A. Mohr, 1986; G. Mohr et al., 2006), adapted to Spanish by Merino, Carbonero, Moreno-Jiménez and Morante (2006), has eight items and two subscales. The first subscale is called “Factor 1. Emotional Irritation” (5 items (Cronbach's alpha =.86) e.g., “6. I get angry easily”) and the second is called “Factor 2. Cognitive Irritation” (3 items (Cronbach's alpha =.87) e.g., “4. Even on vacation sometimes I cannot stop thinking about work problems”). It makes use of a six-point Likert scale (from 1. Strongly disagree to 6. Strongly agree).

We also collected other data on age, seat comfort, seat suspension, driver’s seat adjustable lumbar support, and weekly hours of driving.
Procedure

The sample was obtained by non-probability sampling (Hernández et al., 2004), also known as accidental-random sampling (Kerlinger & Lee, 2004). To collect the data, the directors of several transport companies were initially contacted by telephone and asked the most opportune time to access the drivers. They were also given a booklet, which they had to answer in their usual working place, which included a cover letter, informed consent and questionnaires to answer. The participants were informed that the data obtained is completely confidential and anonymous. The response rate was approximately 80% and corresponds to those drivers who voluntarily and without receiving any kind of payment agreed to participate in the study.

Data Analysis

First, the Kolmogorov-Smirnov test was used to check the normality of the data, showing this to be a good fit. The next step in the analysis consisted of calculating the correlations between the predictor variables and the criterion variables using Pearson’s correlation coefficients. We then performed multiple regressions using IBM SPSS Statistics 25 software with the stepwise option (Hinton et al., 2014). This method incorporates the variables into the regression model. There were twenty-six variables corresponding to Age, Gender, Seat Comfort, Seat Suspension, Adjustable Lumbar Support, Hours Driven per Week, Musculoskeletal Problems, Driver Stress, Irritation, Resistant Personality, Burnout, Safety and Impulsivity Behaviors. This method begins by selecting the independent variable that, in addition to exceeding the input criteria, has a higher correlation (in absolute value) with the dependent variable. It then selects the independent variable that, in addition to passing the input criteria, has the highest partial correlation coefficient (in absolute value). With this procedure, each time a new variable is incorporated in the model, the previously selected variables are evaluated again in order to check if they meet the exit criteria. The variable of the model is excluded when it meets the exit criteria. The process ends when there were no more predictive variables that met the entry criteria and no selected variable that met the exit criteria. Through this procedure, we can explain the maximum variance with the minimum possible number of predictive variables.

Results

Reliability analysis

Table 1 shows the instruments used in the present investigation. The indices for internal consistency are appropriate given that they range between .87 (Exhaustion) and .70 (Relaxed Driving).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
<th>α</th>
</tr>
</thead>
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<tr>
<td>GSQS8</td>
<td>4</td>
<td>36</td>
<td>6.23</td>
<td>8.85</td>
<td>.80</td>
</tr>
<tr>
<td>ME.Trunk</td>
<td>4</td>
<td>20</td>
<td>9.84</td>
<td>3.22</td>
<td>.72</td>
</tr>
<tr>
<td>ME.Extrem</td>
<td>5</td>
<td>20</td>
<td>8.18</td>
<td>2.99</td>
<td>.71</td>
</tr>
<tr>
<td>TDS15.RD</td>
<td>3</td>
<td>12</td>
<td>4.98</td>
<td>3.39</td>
<td>.70</td>
</tr>
<tr>
<td>TDS15.PH</td>
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<td>18</td>
<td>15.92</td>
<td>2.51</td>
<td>.71</td>
</tr>
<tr>
<td>TDS15.AS</td>
<td>3</td>
<td>18</td>
<td>14.54</td>
<td>3.13</td>
<td>.72</td>
</tr>
<tr>
<td>TDS15.TS</td>
<td>3</td>
<td>18</td>
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<td>.75</td>
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<tr>
<td>TDS15.FA</td>
<td>3</td>
<td>18</td>
<td>7.36</td>
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<td>.71</td>
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<tr>
<td>IE</td>
<td>5</td>
<td>35</td>
<td>11.05</td>
<td>5.33</td>
<td>.82</td>
</tr>
<tr>
<td>IC</td>
<td>3</td>
<td>21</td>
<td>7.15</td>
<td>4.17</td>
<td>.83</td>
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<tr>
<td>CPR.I</td>
<td>10</td>
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<td>22.14</td>
<td>3.63</td>
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</tr>
<tr>
<td>CPR.R</td>
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<td>28</td>
<td>20.69</td>
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<td>CPR.C</td>
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<td>22.08</td>
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<td>9.40</td>
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<td>MBL.C</td>
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<td>6.21</td>
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<td>T18.TP</td>
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<td>30</td>
<td>11.32</td>
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</tr>
<tr>
<td>T18.SP</td>
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<td>30</td>
<td>22.36</td>
<td>4.90</td>
<td>.75</td>
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<tr>
<td>T18.SV</td>
<td>14</td>
<td>30</td>
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<td>3.80</td>
<td>.74</td>
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<tr>
<td>IMP.F</td>
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<td>11</td>
<td>5.65</td>
<td>2.44</td>
<td>.75</td>
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<td>IMP.D</td>
<td>0</td>
<td>11</td>
<td>3.12</td>
<td>2.50</td>
<td>.74</td>
</tr>
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</table>

Correlation analyses

The correlational study shown below (Table 2) only displays the correlations between the criterion variables and the predictor variables in this study. We extracted the following correlations from the study and found a positive correlation between Sleep Quality (GSQS8) and nine variables: ME Trunk, ME Extrem, Thrill Seeking (TDS15.TS), Fatigue and Anxiety (TDS15.FA), Emotional Irritation (IE), Cognitive Irritation (IC), Implication (CPR.I), Challenge (CPR.R), Control (CPR.C), Exhaustion (MBL.E), Cynicism (MBL.C), Professional efficiency (MBL.EP), Psychophysiological Disorders (T18.TP), Personal safety behaviors (T18.SP), Vehicle safety behaviors (T18.SV), Functional impulsivity (IMP.F), Dysfunctional impulsivity (IMP.D), Age, Gender, Seat comfort, Seat suspension, Adjustable lumbar support, Hours driven a week.

Variables used in the research: Sleep quality (GSQS8), Relaxed driving (TDS15.RD), Preventing Hazards (TDS15.PH), Alert and Surveillance (TDS15.AS), Thrill Seeking (TDS15.TS), Fatigue and Anxiety (TDS15.FA), Emotional Irritation (IE), Cognitive Irritation (IC), Implication (CPR.I), Challenge (CPR.R), Control (CPR.C), Exhaustion (MBL.E), Cynicism (MBL.C), Professional efficiency (MBL.EP), Psychophysiological Disorders (T18.TP), Personal safety behaviors (T18.SP), Vehicle safety behaviors (T18.SV), Functional impulsivity (IMP.F), Dysfunctional impulsivity (IMP.D), Age, Gender, Seat comfort, Seat suspension, Adjustable lumbar support, Hours driven a week.

<table>
<thead>
<tr>
<th>Model</th>
<th>Variables</th>
</tr>
</thead>
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<tr>
<td></td>
<td>Age, Gender, Seat comfort, Seat suspension, Adjustable lumbar support,</td>
</tr>
<tr>
<td></td>
<td>ME.Trunk, ME.Extrm, TDS15.RD, TDS15.AS, TDS15.TS, TDS15.FA, MBI.C,</td>
</tr>
<tr>
<td></td>
<td>MBI.EP, IMP.F, IMP.D, T18.TP, T18.SP, T18.SV, IMP.F and IMP.D.</td>
</tr>
</tbody>
</table>

Multiple regression

A multiple regression model was performed to test the effects of predictor variables (twenty-six) on criterion variables in connection with the Sleep Quality. This statistical technique provides an objective way to evaluate the predictive ability of a set of independent variables (Hair et al., 1999). To reduce the type I error rate, the Bonferroni correction is applied, considering in our case .002 as a significant level. The data corresponding to the adjusted $R^2$ indices and significant type II coefficients between the criterion variables and predictive variables in this study are shown in Table 3. Two multiple linear regression models were used for this purpose.

The model aimed to identify the degree to which these predictor variables were capable of predicting Sleep Quality (Figure 1). Table 3 presents a summary of the model and shows that the predictor variables were Exhaustion (MBI.E), Functional Impulsivity (IMP.F), Implication (CPR.I), Alertness and Surveillance (TDS15.AS) and Fatigue and Anxiety (TDS15.FA) account for 36.1% of the criterion variable's variance. They have analyzed the diagrams for all the regressions and they have not observed problems of homoscedasticity or excess residuals. The Exhaustion variable stands out as the best predictor, accounting for 21.9% of variance. The beta coefficient values are among the most telling aspects, and illustrate that the predictor variables which were found to be statistically significant were Exhaustion ($\beta = .480; p = .000$), Functional Impulsivity ($\beta = -.766; p=.001$) and Emotional Irritation ($\beta = .307; p = .019$). The linear regression assumption that the residual variances have a Gaussian distribution was verified using a post hoc power calculation based on the observed effect size. According to a multiple regression post hoc power calculation, we found that in all powers the power is above 80% with a type I error rate of .05.

Table 3

Summary of the models, variables and coefficients of regression analysis (stepwise method) for the Sleep.

<table>
<thead>
<tr>
<th>Variables</th>
<th>R</th>
<th>$R^2$</th>
<th>$R^2$ Adjusted</th>
<th>R Chgp</th>
<th>F Chgp</th>
<th>sig</th>
<th>B</th>
<th>SE</th>
<th>$\beta$</th>
<th>t</th>
<th>sig</th>
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<tr>
<td>Model-1</td>
<td>.472</td>
<td>.223</td>
<td>.219</td>
<td>.223</td>
<td>52.012</td>
<td>.000</td>
<td>.674</td>
<td>.094</td>
<td>.472</td>
<td>7.212</td>
<td>.000</td>
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<tr>
<td></td>
<td>MBI.E</td>
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<tr>
<td>Model-2</td>
<td>.522</td>
<td>.272</td>
<td>.264</td>
<td>.049</td>
<td>12.170</td>
<td>.001</td>
<td>.658</td>
<td>.091</td>
<td>.461</td>
<td>7.244</td>
<td>.000</td>
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<tr>
<td></td>
<td>MBI.E</td>
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<tr>
<td></td>
<td>IMP.F</td>
<td>- .802</td>
<td>-.230</td>
<td>-.222</td>
<td>-3.489</td>
<td>.001</td>
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<td>.022</td>
<td>5.580</td>
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<td>.480</td>
<td>.117</td>
<td>.337</td>
<td>4.102</td>
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<td></td>
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<td></td>
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<td>-.212</td>
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** The correlation is significant at the level .01 (bilateral).
* The correlation is significant at the level .05 (bilateral).
Discussion

The results presented above are consistent with the notion that certain variables have predictive power over factors related to Sleep Quality in professional drivers.

The hypothesis is partially supported since it can be seen that the best predictive model for Sleep Quality problems is that which includes three variables as positive predictors: Exhaustion, Functional Impulsivity and Emotional Irritation. This could be because these factors cause stress in drivers (Boada-Grau et al., 2013). This is manifested by work stress altering the biological markers of stress (cortisol) and physiological hyperactivation (Moya-Albiol et al., 2005) both incompatible with good rest, as documented in Åkerstedt et al. (2002). These authors found a negative and significant correlation between work tension and sleep quality. Other authors (Gosselin et al., 2005; Miró & Buela-Casal, 2005) indicate that a lack of sleep (or altered sleep) generates fatigue, disturbs mood, worsens performance and produces changes in numerous bodily systems and immunosuppression, and this can become a cycle. We must bear in mind that Exhaustion is shown as the best predictor, which is caused by the stress that is generated in drivers when driving in conditions in which they perceive they might fall asleep at the wheel (Filtness et al., 2014; Sabbagh-Ehrlich et al., 2005).

On the other hand, we found that Functional Impulsivity act as negative predictor. Some researchers have shown that involvement in work reduces the impact of work demands and stress (Bakker et al., 2005; Bbalucci et al., 2011; Van de Ven et al., 2013). While functional impulsivity is favorable...
and helps one to adapt to unexpected situations that require rapid response (Dickman, 1990). Thus, functional impul-
sivity and involvement in work, being negative predictors, facilitate the quality of sleep by not favoring the presence of
stress.
In conclusion, the results highlight the importance of de-
signing individual interventions to reduce the incidence of
drowsiness in professional drivers, which would provide greater comfort to the driver and the consequent reduction
of accident risks. It has been observed that the variables Ex-
hauation, Functional Impulsivity and Emotional Irritation
are positive predictors, so individual interventions should be
aimed at reducing the levels of exhaustion and emotional ir-
ritation that may be the result of the nature of the work; the
interventions found in the literature are aimed at getting
drivers to stop, have a drink, move about and even sleep a
little, which for some is not possible due to the nature of
their work (for example, having to meet certain schedules)
for that reason each case must be analyzed and individually
requests must be made.
This study is not without limitations. In the first place, in
the population studied here, the number of women who
drive professionally is very small, so it would be advisable
to conduct a study in a sample with a greater representation
of females. In addition, the data was obtained through self-
reports. The use of self-reporting can produce biases that
can range from social desirability to lack of sincerity (Razavi,
2001).

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