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# Eating behaviour and emotional eating patterns of urban and long-distance bus drivers – a comparative analysis using the HUEBS, SSES and SEES scales

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## Abstract

**Introduction and Objective.** The health behaviours of professional drivers, including eating habits, directly affect their health, cognitive function, and consequently, road safety. Emotional eating, i.e., the consumption of food in response to stress and emotions, poses a particular threat to this occupational group. However, despite the growing interest in drivers' health, comparative analyses between different groups of drivers in terms of eating behaviour remain scarce. Therefore, this study analyses differences in eating behaviour between urban and long-distance bus drivers and the impact of specific occupational demands on dietary choices.

**Materials and Method.** Urban (N=229) and long-distance (N=271) bus drivers from 14 Polish provinces were surveyed using three tools: the Healthy and Unhealthy Eating Behaviours Scale (HUEBS), Salzburg Stress Eating Scale (SSES) and Salzburg Emotional Eating Scale (SEES).

**Results.** City drivers show healthier eating habits than long-distance drivers ($p < .001$). In stressful situations, long-distance drivers are more likely to reach for food ($p = .011$) and eat in response to anxiety ($p = .001$), despite experiencing lower levels of occupational stress. No significant differences between the driver groups were found in terms of emotional eating related to sadness, anger, and happiness. Moreover, a positive correlation was observed in the whole studied sample between unhealthy eating and stress eating ($r = 0.24$; $p < 0.001$).

**Conclusions.** Occupational context significantly influences bus drivers' eating behaviour, which provides a basis for targeted health-promoting interventions. Hence, the specific needs of various driver groups and the direction of further research are discussed.

## Key words

job demands, professional drivers, eating behaviour, emotional eating, bus drivers, urban driving, long-distance driving

## INTRODUCTION

Professional drivers are a group of workers whose health and well-being have a direct impact not only on their own everyday functioning but also on road safety, which is crucial from a public health perspective. City and long-distance bus drivers, transporting hundreds of passengers daily, bear significant social responsibility. Their health behaviours, including eating habits, directly influence attention levels, reaction time, and overall cognitive functioning [1], ultimately affecting their psychophysical performance during various job duties. Diet represents a fundamental component of these health behaviours and, in the case of professional drivers, is frequently compromised by irregular work schedules and limited access to nutritious meals.

Meanwhile, it is important to note that, as many public health studies have shown [2–5], poor nutrition – that is, a diet high in red and processed meats and ultra-processed foods and low in vegetables, fruit, and whole grains – causes a number of health problems, including, among others, obesity, cardiovascular disease, and type 2 diabetes. These diseases, along with high levels of occupational stress, can represent a dangerous combination of risk factors for drivers. Consequently, high levels of experienced stress and low driver well-being, further enhanced by poor eating habits, pose a serious threat to both driver health and road safety.

The specifics of the work of city and long-distance drivers differ significantly in many respects. Primarily, urban drivers tend to work in shifts, with variable hourly schedules and numerous short breaks at the final stops. The breaks are short but occur regularly. In contrast, long-distance drivers work in longer blocks of time, often spending several days away from home, with irregular and less predictable rest periods. They have longer breaks, but often at random locations and times, depending on the route and road conditions. Further,

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significant differences also exist in access to food. Therefore, urban drivers theoretically have greater access to various food options in an urban environment, including the option of dining at home; however, time constraints may lead them to opt for quick snacks. Long-distance drivers, on the other hand, are mainly limited to the food offerings available along the routes, i.e., at filling stations or roadside bars, which often offer food high in calories and low in nutritional value [6, 7].

Research by Kapica et al. [8] confirms that city and long-distance bus drivers are not a homogeneous occupational group when it comes to the conditions and specifics of their work. A previous study [8] revealed that city drivers work under high-paced conditions, which is often due to the difficulty of meeting schedules in congested cities. Frequent face-to-face interactions with passengers, which involve heightened emotional demands, are also characteristic of this group. As an example, they have to provide information on a regular basis, respond to ongoing conflicts between passengers and deal with complaints, while often hiding their emotions. Generally speaking, all these factors contribute to higher levels of psychological stress, a greater risk of burnout and a stronger sense of job insecurity in this group of drivers. On the other hand, long-distance drivers enjoy a job with a greater variety of tasks and a higher degree of autonomy. In addition, they have a stronger sense of influence over how they perform their duties and better opportunities for professional development. Hence, they perceive greater job satisfaction and a stronger attachment to their employer. They also rate the relationship with superiors and co-workers higher, as well as the quality of management and fairness in the workplace. Nonetheless, despite these positive aspects, long-distance drivers are more likely to struggle with so-called job role conflict, which consists of experiencing discrepancies between various job demands or feeling unclear about the desirability of certain tasks [8]. More than that, differences between the groups were also revealed in the area of health and well-being. Indeed, long-distance bus drivers show a better assessment of their health, lower levels of stress and a lower risk of job burnout compared to city drivers [8].

All in all, the varied psychosocial working conditions described above and the different levels of occupational stress experienced by city and long-distance bus drivers may have implications for their well-being and health, including their behaviour and eating habits, as well as the coping strategies used to deal with emotional strain. One such coping mechanism for dealing with stress induced by work conditions and demands, particularly relevant from the perspective of this study, is emotional eating.

Emotional eating is defined as, mostly, an increase in food intake in order to cope with different emotions, especially negative ones, such as tension, stress and anxiety [9, 10]. This mechanism is related to the use of food as an emotion-regulation strategy – the consumption of foods, especially those with high-calorie and rich in simple sugars, can temporarily alleviate unpleasant emotional states by activating the brain's reward system. Thus, one study conducted on a group of city bus drivers in Istanbul [11] noted the existence of a link between negative emotions and eating habits, and showed that drivers working in shifts had difficulty maintaining a healthy body weight, revealed lower physical activity, and also had lower rates of a healthy diet. Interestingly, research on emotional eating has also been conducted in the Polish military population [12] which revealed that this problem does not bypass the military environment.

On the other hand, when it comes to professional drivers, also exposed to occupational stress, emotional eating may be an easily accessible, although in the long term harmful, coping strategy. This is because different emotions, i.e., mainly negative, such as anger, anxiety, and sadness, as well as positive emotions, such as happiness, can trigger different eating behaviour patterns ranging from overeating to restricting food [10]. Therefore, the long-term health consequences of emotional eating include, among others, weight fluctuations, weight maintenance problems, obesity, and worsening psychological problems related to the lack of effective emotion regulation strategies. In the context of drivers' work, this is of importance because, according to studies [13], excessive body weight can negatively affect psychomotor performance and attentional functions, including levels of alertness and concentration necessary for safe driving which, in turn, increases the risk of road accidents.

In conclusion, despite the growing interest in driver health, there are still only a few studies focusing on the analysis and comparison of nutritional behaviour between different groups of professional drivers, and as already outlined above, are not homogeneous. To be honest, the authors of the present study are not aware of other studies, not only on Polish territory, in which comparisons of the nutritional behaviour of city and long-distance bus drivers have been made.

## OBJECTIVE

Hence, the main aim of this study is a comparative analysis of eating behaviours and emotional eating patterns, including stress eating, in urban and long-distance bus drivers, with particular reference to the following:

- relationship between the specificity of the job and the prevailing dietary patterns in drivers;
- level of healthy and unhealthy eating behaviours in both groups of bus drivers;
- tendency of drivers to reach for food in reaction to stress;
- differences between the two groups of drivers in responding to different emotional states through food.

Accordingly, a comparison of eating behaviour patterns between urban and long-distance bus drivers will allow a better understanding of the interaction between working conditions and health behaviour. For this reason, the results of the study may provide a basis for the development of targeted health-promoting interventions tailored to the work specificity of each study group which, in turn, may contribute to improving the health and well-being of bus drivers.

## MATERIALS AND METHOD

**Participants and procedure.** The study was conducted on a group of urban (N = 229) and long-distance bus drivers (N = 271), consisting of 30 women and 465 men (In the case of 5 participants, data on gender were missing or the respondents declined to answer). Participants ranged in age from 21 (minimum legal age to work as a bus driver in Poland) to 65 years (the official retirement age in Poland).

**Table 1.** Demographic characteristics of the studied sample of urban and long-distance bus drivers

| Variable | | Group | | | Group Comparison | | |
|---|---|---|---|---|---|---|---|
| | | Total Sample | Urban drivers | Long-distance drivers | χ2 (df) | p | |
| N | | 500 | 229 | 271 | 3.528 (1) | 0.060 | |
| Gender | | | | | χ2 (df) | p | V |
| | Female N (% within group) | 30 (6%) | 24 (10.5%) | 6 (2.2%) | 15.0 (1) | < 0.001 | 0.17 |
| | Male N (% within group) | 465 (93%) | 203 (88.6%) | 262 (96.7%) | | | |
| | | | | | t (df) | p | d |
| Age | M (SD) | 43.01 (10.57) | 44.0 (9.81) | 42.2 (11.1) | 1.98 (497) | 0.049 | 0.18 |
| Seniority [in years] | M (SD) | 20.36 (10.56) | 21.3 (10.79) | 19.5 (10.3) | 1.85 (498) | 0.066 | 0.17 |

*df* – degrees of freedom; *V* – Cramer's V; *t* – t-Statistic; *d* – Cohen's d

The mean age in the study groups, respectively, for city bus drivers – 44.0 (SD=9.81) and long-distance drivers – 42.2 (SD=11.1). The participants were drawn from 14 provinces in Poland and 30 towns and cities, with Warsaw being the most represented location (N=30). The drivers were employed by 52 different organisations.

Basic descriptive statistics relating to the characteristics of the two study groups of bus drivers are presented in Table 1.

The results presented in Table 1 indicate no statistically significant difference in the number of participants between the two groups of drivers (229 vs. 271; $p > 0.05$). However, the proportion of women was significantly higher among urban drivers compared to long-distance drivers. Moreover, urban drivers were significantly older than long-distance drivers, although the effect size was small. Simultaneously, no significant differences between the groups were found in terms of work experience ($p > 0.05$).

In the group of city bus drivers, 97 participants (42.4%) declared working in a shift system that includes night shifts, while the remaining drivers worked only during the day. Among long-distance bus drivers, 137 participants (50.6%) reported working at night. A chi-square test revealed no statistically significant difference in the proportion of day-only versus day-and-night work between the two groups ($\chi^2(1)=3.35$; $p=0.067$; $\Phi=0.08$).

The study was conducted using the paper-and-pencil method; data collection was carried out by a team of trained interviewers; the research was voluntary, anonymous, and conducted following the guiding principles of the Declaration of Helsinki. The drivers were informed about the purpose and nature of this scientific research, including the possibility of withdrawing at any time without giving any reason, and signed an informed consent to participate in the study. After each participant completed the questionnaire, it was sealed in an envelope. All participants' data were kept confidential. The study itself was been approved by the Ethics Committee at the Cardinal Stefan Wyszyński University in Warsaw (KEiB-31/2020, dated 10 June 2020).

**Measures.** Questionnaire, self-report methods were used to assess eating behaviour and emotional eating patterns in urban and long-distance bus drivers.

The bus drivers' eating behaviours, both healthy and unhealthy, were evaluated using the Healthy and Unhealthy Eating Behaviours Scale (HUEBS), developed by Guertin et al. [14]. This tool can be used to assess the overall consumption of different types of food products. On a scale ranging from 1 (never) to 7 (always), participants are asked to rate how much they typically consume of each of the 22 food products/items on the scale – 11 of which correspond to healthy foods and 11 which correspond to foods that should be consumed in moderation in accordance with Canada's Food Guide [14]. Among the choices of examples of nutritious and healthy foods were 'I eat fruits' and 'I eat vegetables', and the following were instances of foods that ought to be eaten in moderation, i.e., unhealthy food: 'I eat refined grains' (e.g., white rice, white bread, white flour), and 'I eat snack foods, such as chips, chocolate, and/or sweets' [14].

Moreover, in order to measure eating in response to experienced stress, the 10-item Salzburg Stress Eating Scale (SSES), by Meule, Reichenberger and Blechert [15], was used. In this questionnaire, the response categories range from 'I eat much less than usual' to 'I eat much more than usual' and are scored on a 5-point Likert scale, i.e., a score from 1 – 5. Therefore, higher scores obtained in the questionnaire indicate that the respondent eats more when stressed, whereas lower values indicate that he or she eats less in situations in which stress is experienced.

Furthermore, the Salzburg Emotional Eating Scale was also used to assess emotional eating, i.e., food intake in response to various emotions experienced. This 20-item scale consists of four subscales, which concern self-reported eating in response to positive emotions: 1 – happiness, negative but low-arousal emotions; 2 – sadness, 3 – anger, negative but high-arousal emotions, and 4 – anxiety. Indeed, increased food intake is represented by higher scores, unchanged food intake by medium values, and decreased food intake by lower scores.

**Statistical analyses.** Preliminary analyses included the assessment of missing data, identification of outliers, and evaluation of the distributions of the variables. Although Shapiro-Wilk tests indicated statistically significant deviations from normality for all variables, inspection of the distribution plots, alongside skewness values within the range of -1 – 1, and excess kurtosis values within -2 – 2, justified the use of parametric analytical methods [16].

The analyses included assessment of the internal consistency of the instruments using McDonald's Omega (which in many cases is recommended over Cronbach's Alpha) [17, 18]), testing of relationships between variables using Pearson's correlation coefficient (*r*), comparison of urban and long-distance driver groups using Student's t-test, and Latent Profile Analysis (LPA). A threshold of.70 was adopted for the Omega coefficient [18]. Before the t-tests, the assumption of homogeneity of variances was tested. When

Levene's test yielded a significant result, Welch's t-test was applied. A significance level of $p < .05$ was adopted. For group comparisons, statistical significance was accompanied by effect size indicators [19, 20].

Latent Profile Analysis (LPA [21, 22]) is a statistical technique designed to reveal hidden subgroups (referred to as profiles) within a given population, based on individual response patterns across continuous variables. In contrast to standard methods focused on variables (such as regression analyses), which assess associations at the level of the entire sample, LPA employs a person-centred framework. This approach highlights differences between individuals by classifying them by similar response characteristics. In the current research, LPA was used to distinguish unique configurations of eating behaviour, which were subsequently analysed for their distribution across urban and long-distance drivers. Models specifying between two and five latent profiles were estimated using the *maximum likelihood* method, with each one tested across three different covariance assumptions. Model fit and selection were guided by minimising the values of the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC), alongside maximising entropy (optimal values exceed.80, acceptable levels are above.60; [22]). For LPA, a minimum sample size of approximately 500 participants is recommended, which was achieved in in the current study [22]. To conduct the LPA, the variables were standardised. All statistical analyses were conducted in R (version 4.3.2); the LPA was performed using the *tidyLPA* package, and visualisations were created with the *ggplot2* package available within the R environment.

## RESULTS

**Descriptive statistics and correlations between variables.** Table 2 presents the descriptive statistics of the variables, along with the reliability estimates of the applied measures and the correlations among them.

The lowest internal consistency was observed for the eating in response to happiness subscale; however, the omega coefficient was close to the acceptable threshold of.70. All other subscales demonstrated high internal consistency.

The results of Pearson's r correlation analysis showed that both age and work experience were significantly negatively correlated with healthy and unhealthy eating behaviours, although the associations were weak. At the same time, no significant relationships were found between age or seniority and eating under stress or eating in response to emotions.

In addition, Pearson's r correlation analysis revealed that drivers' consumption of unhealthy and nutritionally poor foods was positively associated with the tendency to eat when stressed ($r = .240$; $p < .001$), as well as with the use of food to regulate emotions, such as happiness ($r = .167$; $p < .001$), anger ($r = .131$; $p < .01$), and anxiety ($r = .130$; $p < .01$). Conversely, eating healthy food was negatively correlated with eating in response to sadness ($r = .089$; $p < .05$) and anxiety ($r = .150$; $p < .001$). Furthermore, eating under stress was positively correlated with eating in response to all measured emotions, including happiness.

Finally, it was investigated whether the participants' gender influenced the variables under study. Mann-Whitney U tests were used due to unequal group sizes. No significant differences were found between men and women in terms of eating under stress (Men: $M=2.93$; $SD=0.54$; $Me=3.00$ vs. Women: $M=2.97$; $SD=0.52$; $Me=3.00$; $U=6889$; $p=0.908$; $r_g=0.012$), happiness (Men: $M=3.13$; $SD=0.31$; $Me=3.00$ vs. Women: $M=3.14$; $SD=0.29$; $Me=3.00$; $U=6873$; $p=0.897$; $r_g=0.013$), sadness (Men: $M=3.00$; $SD=0.46$; $Me=3.00$ vs. Women: $M=3.04$; $SD=0.60$; $Me=3.00$; $U=6896$; $p=0.930$; $r_g=0.009$), anger (Men: $M=2.86$; $SD=0.51$; $Me=3.00$ vs. Women: $M=2.79$; $SD=0.61$; $Me=3.00$; $U=6225$; $p=0.321$; $r_g=0.104$), and anxiety (Men: $M=2.90$; $SD=0.56$; $Me=3.00$ vs. Women: $M=2.78$; $SD=0.53$; $Me=3.00$; $U=5971$; $p=0.175$; $r_g=0.140$). A statistically significant difference was observed only for healthy eating (Men: $M=4.42$; $SD=0.76$; $Me=4.36$ vs. Women: $M=4.73$; $SD=0.77$; $Me=4.77$; $U=5348$; $p=0.033$; $r_g=0.232$), indicating that women reported more frequent healthy eating habits. However, the effect size in this case was small. No gender difference was found for unhealthy eating (Men: $M=4.23$; $SD=0.78$; $Me=4.18$ vs. Women: $M=4.11$; $SD=0.69$; $Me=4.05$; $U=6460$; $p=0.498$; $r_g=0.074$).

**Analysis of differences between urban and long-distance bus drivers in relation to eating behaviour and emotional eating patterns.** Figures 1 and 2 present a comparison of eating behaviours (HUEBS scale results), eating under stress (SSES scale results), and eating in response to experienced emotions (SEES scale results) between urban and long-distance driver groups. Table 3 shows the results of comparing the groups by t-test.

The bars represent the mean, while the error bars indicate the standard error of the mean.

**Table 2.** Descriptive statistics of the studied variables, internal consistency, and Pearson's *r* correlation coefficients

| Variable | M | SD | ω | Pearson's r correlation coefficient | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1) Age | 43.01 | 10.57 | - | - | | | | | | | |
| 2) Seniority | 20.36 | 10.56 | - | 0.93*** | - | | | | | | |
| 3) Healthy Eating Behaviours | 4.43 | 0.76 | 0.82 | -0.10* | -0.09* | - | | | | | |
| 4) Unhealthy Eating Behaviours | 4.21 | 0.78 | 0.82 | -0.10* | -0.10* | -0.04 | - | | | | |
| 5) Eating under stress | 2.93 | 0.54 | 0.92 | 0.01 | -0.05 | -0.08 | 0.24*** | - | | | |
| 6) Eating in response to happiness | 3.13 | 0.31 | 0.69 | -0.01 | <0.01 | 0.09 | 0.17*** | 0.12* | - | | |
| 7) Eating in response to sadness | 3.01 | 0.47 | 0.79 | 0.04 | -0.03 | -0.09* | 0.03 | 0.54*** | -0.02 | - | |
| 8) Eating in response to anger | 2.86 | 0.52 | 0.84 | <0.01 | -0.04 | -0.05 | 0.13** | 0.67*** | -0.02 | 0.55*** | - |
| 9) Eating in response to anxiety | 2.89 | 0.56 | 0.82 | 0.02 | -0.04 | -0.15*** | 0.13** | 0.69*** | <0.01 | 0.53*** | 0.71*** |

ω – McDonald's Omega; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

**Table 3.** Results of the t-test for independent samples, i.e., urban and long-distance bus driver groups, in relation to eating behaviours, eating under stress and eating in response to experienced emotions

| Dependent Variable | Group | | t (df) | p | d |
|---|---|---|---|---|---|
| | Urban bus drivers | Long-distance bus drivers | | | |
| | M (SD) | M (SD) | | | |
| Healthy Eating Behaviours | 4.56 (0.74) | 4.33 (0.76) | 3.528 (498) | < 0.001 | 0.32 |
| Unhealthy Eating Behaviours | 4.14 (0.84) | 4.27 (0.73) | -1.797 (453) | 0.073 | -0.16 |
| Eating under stress | 2.86 (0.52) | 2.99 (0.54) | -2.554 (498) | 0.011 | -0.23 |
| Eating in response to happiness | 3.14 (0.33) | 3.12 (0.29) | 0.445 (498) | 0.656 | 0.04 |
| Eating in response to sadness | 2.98 (0.48) | 3.03 (0.46) | -1.112 (498) | 0.267 | -0.10 |
| Eating in response to anger | 2.83 (0.52) | 2.89 (0.52) | -1.300 (498) | 0.194 | -0.12 |
| Eating in response to anxiety | 2.81 (0.50) | 2.97 (0.59) | -3.199 (498) | 0.001 | -0.29 |

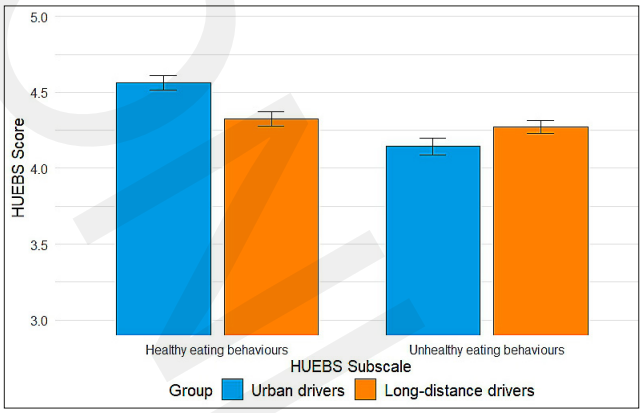


**Figure 1.** Mean HUEBS scores in urban and long-distance driver groups

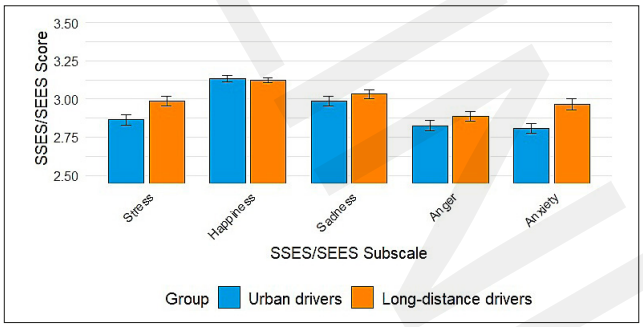


**Figure 2.** Mean SSES and SEES scores in urban and long-distance driver groups

The data in Table 3 and illustrated in Figures 1 and 2 show that urban bus drivers reveal healthier eating behaviour compared to long-distance bus drivers ($p$ <.001). Conversely, in difficult and stressful situations, long-distance bus drivers are more likely to reach for food ($p$ =.011). For this group of drivers, eating in response to experienced anxiety is also more frequent ($p$ =.001). However, regarding eating in response to happiness, anger, and sadness, the study found no statistically significant differences between the two bus driver groups studied.

**Latent Profile Analysis.** To identify distinct latent profiles corresponding to eating behaviour styles, a Latent Profile Analysis (LPA) was conducted. Table 4 presents the fit statistics for the different profile solutions.

Despite increasing the number of iterations, estimation problems occurred for Model 2 with two to five profiles. Based on the fit indices presented in Table 4, Model 3 with four profiles was selected for further analyses. This model demonstrated a satisfactory entropy value (> 0.80) and yielded the lowest AIC and BIC values. The BLRT result was statistically significant when the fourth profile was added to Model 3, whereas adding a fifth profile did not result in a statistically significant improvement. The mean scores on the analysed variables obtained by participants within each profile are presented in Figure 3.

**Table 4.** Fit statistics for the estimated LPA models

| Model | Classes | AIC | BIC | Entropy | BLRT p |
|---|---|---|---|---|---|
| 1 | 1 | 9900.57 | 9959.49 | - | - |
| 1 | 2 | 9177.49 | 9270.08 | 0.94 | 0.01 |
| 1 | 3 | 8912.07 | 9038.33 | 0.92 | 0.01 |
| 1 | 4 | 8765.89 | 8925.82 | 0.92 | 0.01 |
| 1 | 5 | 8753.48 | 8947.07 | 0.92 | 0.02 |
| 2 | 1 | 9900.57 | 9959.49 | - | - |
| 3 | 1 | 8901.54 | 9048.84 | - | - |
| 3 | 2 | 8739.43 | 8920.40 | 0.93 | 0.01 |
| 3 | 3 | 8705.42 | 8920.06 | 0.93 | 0.01 |
| 3 | 4 | 8634.24 | 8882.54 | 0.93 | 0.01 |
| 3 | 5 | 8657.75 | 8939.73 | 0.60 | 0.67 |

Model 1 – equal variances, no covariances between variables within each profile; Model 2 – unequal variances allowed, no covariances between variables within each profile; Model 3 – equal variances, covariances between variables allowed within each profile; AIC – Akaike Information Criterion; BIC – Bayesian Information Criterion; BLRT $p$ – $p$ value of Bootstrap Likelihood Ratio Test.

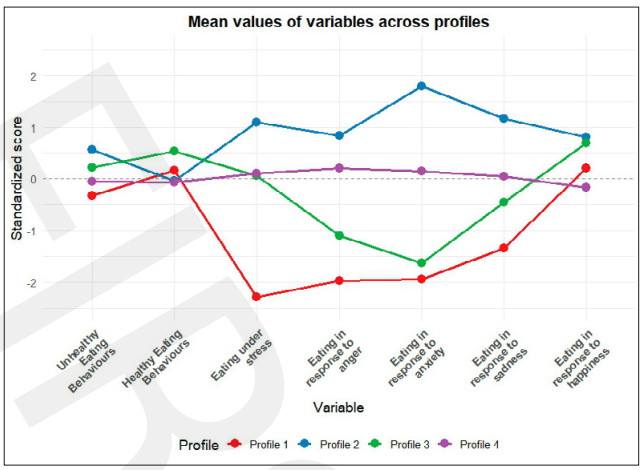


**Figure 3.** Mean scores of the analysed variables across the identified latent profiles

**Table 5.** Frequencies of groups of bus drivers identified by latent profiles

| Profile | Description | N (% within group) | | | χ2 (1) | p | Φ |
|---|---|---|---|---|---|---|---|
| | | Total Sample | Urban drivers | Long-distance drivers | | | |
| 1 | Drivers who avoid unhealthy products and eat less under the influence of stress, anger, anxiety, and sadness | 40 (8.0%) | 17 (7.4%) | 23 (8.5%) | 0.19 | 0.66 | 0.020 |
| 2 | Drivers who consume unhealthy products and overeat under the influence of stress and emotions | 45 (9.0%) | 10 (4.4%) | 35 (12.9%) | 11.07 | <0.001 | 0.149 |
| 3 | Drivers who eat healthy products, avoid eating under the influence of anger and sadness, and eat more than usual in response to happiness | 34 (6.8%) | 24 (10.5%) | 10 (3.7%) | 9.03 | <0.01 | 0.134 |
| 4 | Drivers with scores close to the mean in all subscales | 381 (76.2%) | 178 (77.7%) | 203 (74.9%) | 0.55 | 0.46 | 0.033 |

Table 5 presents the sample sizes of the groups identified through latent profiles. The most numerous group consists of individuals assigned to Profile 4. This profile is characterised by scores close to the sample mean across all analysed variables, indicating an average dietary pattern and a lack of significant changes in eating behaviour in response to stress or emotions. Individuals in Profile 2 (9.0% of the sample) exhibited the highest levels of unhealthy eating, along with increased food intake in response to both stress and emotions, including happiness. In contrast, participants classified in Profile 1 (8.0%) displayed the lowest scores for unhealthy eating and reported very low levels of eating in response to stress and negative emotions, suggesting an avoidance of food in these situations. However, their scores on eating in response to happiness were at a moderate level.

The association between profile membership and type of driver (urban vs. long-distance) was also examined, with a statistically significant result: $\chi 2\ (3)=16.87$; $p < 0.001$; $V=18.42$. Therefore, Table 5 also includes the distribution of participants across driver groups within each profile.

The data presented in Table 5 indicate that among long-distance bus drivers, there is a significantly higher percentage of individuals assigned to profile 2 (12.9% vs 4.4%) and a lower percentage of individuals in profile 3 (3.7% vs 10.5%).

## DISCUSSION

The main aim of the present study was to compare eating behaviours and patterns of emotional eating, including those in reaction to stress, in urban and long-distance bus drivers. Consequently, the analyses revealed statistically significant differences in eating behaviours and emotional eating patterns between the study groups of bus drivers.

Thus, according to the results, long-distance drivers, compared to city drivers, show a stronger tendency to overeat in response to stress and to regulate the emotion of anxiety with food. This observation is particularly relevant in the context of the study by Kapica et al. [8], cited earlier in this paper, which indicates that long-distance drivers have generally lower levels of occupational stress. Thus, paradoxically, while Kapica et al. [8] reported better overall health assessment and lower levels of experienced stress among long-distance bus drivers, the findings of the current study show they are more likely to cope with stress and negative emotions through food. An explanation for this phenomenon may be precisely the nature of the work of long-distance drivers, who spend long hours in a kind of social isolation, away from family and friends, with limited opportunities for physical activity, and access mainly to high-calorie food offered along the routes. The long periods of monotony and boredom while driving may just foster the treatment of food as a form of entertainment or reward. In addition, a certain irregularity of the drivers' work and difficulties in planning meals, including self-preparation, may lead to a disruption of the natural mechanisms of appetite control. Therefore, in stressful situations and when negative emotions, such as anxiety arise, eating may be an easily accessible emotional regulation strategy. Moreover, the higher levels of work role conflict found in this group may represent an additional source of stress, potentially reinforcing emotional eating patterns.

Furthermore, an interesting result obtained in this study is that there were no significant differences between the driver groups in terms of emotional eating related to sadness, anger and happiness. This result may suggest that these specific emotions are not as strongly related to the drivers' occupational context as stress or anxiety, which can be directly triggered by situations encountered at work, such as conflicts with passengers, time pressure, dangers faced on the road, etc.

Moreover, in the current study, urban drivers obtained higher scores on the healthy eating scale, which may be related to the better availability of varied food in the urban environment and a more regular working rhythm, enabling better meal planning. More frequent, albeit shorter, breaks at work, may be favourable for more regular eating, including, for example, eating smaller portions. What should also be noted is that city bus drivers, unlike cruise bus drivers, have the opportunity to dine at home and prepare their own meals, which only encourages the development of healthy eating habits.

It is also worth recalling at this point that research by Kapica et al. [8] indicates that urban drivers function in an environment with high emotional demands, an intense work pace, and the need to frequently hide emotions in interactions with passengers. They also experience higher levels of psychological stress, job burnout and job insecurity. Hence, paradoxically, these adverse working conditions may induce them to be more health-conscious, which would explain the healthier eating patterns observed in this group in the presented study.

It is noteworthy that while gender distribution differed between groups, with a higher percentage of women among urban bus drivers (10.5%), additional analyses revealed that gender had a limited impact on the main findings of the current study. Although women showed slightly higher scores in healthy eating habits, the effect size was small. Moreover, this gender distribution reflects the current trends in the professional driver population, particularly in urban transport.

Additionally, the positive relationship observed in the study between unhealthy eating and stress eating, and the tendency to regulate emotions of anger and anxiety with food, confirms previous scientific reports indicating that emotional eating tends to be associated with the choice of high-calorie foods, rich in simple sugars and saturated fats, which may include, for example, frozen meals, sweets, fizzy drinks, cakes, cookies or salty snacks, i.e., so-called 'comfort foods' [23]. It is also important to note that highly processed and high-calorie foods can provide a temporary sense of relief and alleviate emotional tension by activating the brain's reward system, while their regular, long-term consumption contributes to weight gain and the development of diet-related diseases, including obesity, type II diabetes and cardiovascular disease, among others, as indicated by numerous studies in this area [24–26].

The Latent Profile Analysis (LPA) provided a nuanced perspective on the heterogeneity of eating behaviours and emotional eating patterns within the studied bus driver groups. While the t-test comparisons highlighted differences between urban and long-distance drivers, the LPA revealed four distinct profiles that transcended these occupational categories, underscoring the importance of individual variability in dietary and coping strategies. Notably, Profile 2 – characterised by unhealthy eating and heightened emotional/stress-related overeating – was significantly more prevalent among long-distance drivers (12.9% vs. 4.4% in urban drivers). This aligns with earlier findings regarding their limited access to nutritious food and prolonged isolation, which may exacerbate reliance on high-calorie 'comfort foods' as a coping mechanism. Conversely, urban drivers were over-represented in Profile 3 (10.5% vs. 3.7%), which combined healthy eating with reduced emotional eating in response to anger and sadness but increased consumption during happiness. This suggests that some urban drivers, despite their high-stress work environment, may leverage social support or regular meal routines to maintain healthier habits, using food as a reward in positive contexts rather than a stress-relief tool. The predominance of Profile 4, representing average eating behaviours across all variables, indicates that most drivers do not exhibit extreme dietary patterns. However, the presence of smaller, distinct profiles (including Profile 1 – avoidance of food under stress) highlights the need for personalised interventions. These findings suggest an interplay between occupational context and individual psychological resilience in shaping dietary behaviours.

To the best of the authors' knowledge, this is the first study to employ LPA to identify emotional eating profiles among bus drivers. This contribution is particularly valuable, as Spurk et al. [22] note that despite the growing popularity of LPA in occupational and organisational research, its application remains under-utilised, compared to variable-centred approaches such as structural models assuming a homogeneous population distribution.

Finally, the lack of a relationship observed in the study between unhealthy eating and the treatment of food as a regulator of the emotion of sadness, seems to be an interesting result, as it may indicate that sadness, unlike stress, anger, anxiety or feelings of happiness, may elicit different patterns of eating behaviour or more varied individual responses. Thus, it would be worthwhile for future research to look at this particular emotion in the context of eating behaviour revealed by drivers.

Limitations of the study. Given the limitations of this research, it is important to note that questionnaire methods, based on self-reporting, were used to assess eating habits and behaviours. Hence, the variable of social approval and the desire to present oneself in a better light, as well as the poor insight of the drivers surveyed into their behaviour, may have affected the results obtained. On the other hand, this limitation is typical of questionnaire studies and is due to their specificity; hence, the results should be interpreted with caution, along with generalising the conclusions to the entire population of drivers which, as presented in this study, is not a homogeneous group in terms of job specificity.

Another limitation of the study is the lack of detailed data on work organisation patterns. While information was collected about night work engagement, no comprehensive data was collected about daily, weekly, and monthly working hours, shift patterns, or specific break schedules. These organisational aspects of work might significantly influence drivers' eating behaviours and food choices. For instance, different shift patterns could affect meal timing and food availability, while varying break schedules might impact food choice opportunities. Hence, future research should incorporate these detailed work organisation variables to better understand their relationship with drivers' dietary habits.

Notwithstanding the above, it should be pointed out that a strength of this paper is the presentation of research that, to the best of the authors' knowledge, has not to date been conducted on the population of urban and long-distance bus drivers. Therefore, it seems that it may be a contribution to further research on health behaviours, including dietary habits, of different groups of drivers carried out in favour of road safety and public health.

## CONCLUSIONS

In conclusion, the specific work characteristics of the two groups of drivers, i.e., city and long-distance bus drivers, create different psychosocial environments that may differentially influence stress and emotion coping strategies, including eating behaviours. Understanding such relationships is crucial for designing effective health-promoting interventions tailored to the specific needs of each professional group. Hence, the following final conclusions were drawn based on the results of the study:

1) the different characteristics and working conditions of urban and long-distance bus drivers translate into varied eating patterns and strategies for coping with stress and emotions;
2) long-distance bus drivers show a stronger tendency to over-eat in response to stress, and to reach for food when feeling anxious, compared to city drivers, despite having generally lower levels of occupational stress;
3) urban bus drivers present healthier eating habits, which may be related to greater regularity of work and better availability of varied food;
4) unhealthy eating behaviours are strongly linked to emotional eating, particularly in response to stress, anger and anxiety, confirming the detrimental and maladaptive nature of this emotion regulation mechanism;
5) preventive health programmes aimed at professional drivers should be differentiated and adapted to the specific work of each group and target the following areas:

- For long-distance drivers: paying attention to stress-coping strategies alternative to eating, education on healthy food choices available along the routes, and learning meal-planning options and techniques for irregular working conditions and when away from home.
- In the case of city drivers: learning techniques for the quick preparation of healthy meals adapted to short breaks and increasing knowledge of stress management strategies and principles of effective interpersonal communication due to intense social interactions.

Employers should take into account in the organisation of drivers' work the availability of healthy meals and the possibility to eat regularly, which can contribute both to improving the health of employees and increasing the level of safety in public transport.

Further research in different groups of professional drivers is needed to better understand the mechanisms linking the specifics of their work to the health behaviours they undertake, including eating habits, and to develop effective health-promoting intervention programmes devoted to precisely identified groups of professional drivers.

The identification of four latent eating behaviour profiles underscores the diversity of coping strategies and dietary patterns among professional drivers, which are not fully captured by occupational category alone. Hence, tailored interventions should consider both driver type (urban vs. long-distance) and individual risk profiles.

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