

## COVID-19 PANDEMIC AS A FACTOR INCREASING TRUCK DRIVERS' STRESS

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**Purpose:** The questionnaire-based study investigated whether the COVID-19 pandemic increased stress in busy truck drivers' jobs.

**Design/methodology/approach:** The sample of 239 drivers was examined in March-August, 2021.

**Findings:** The study revealed that most drivers were resilient to COVID-19-related stressors. Some stressors, such as age, seniority, recovering from COVID-19, and worsening family financial conditions, were found to have more impact on some respondents than others. Age and seniority were related to anxiety about increased occupational activities. Those whose economic conditions worsened were afraid of job loss. People who recovered from COVID-19 felt overworked more often than others and tended to be scared of safety on the road and being alone in the truck. They more often required psychological support.

**Research limitations/implications:** The study is based on a sample of drivers observed conveniently in 2021. Monitoring them in two or three waves is recommended to compare the impact of other processes that could affect responses.

**Practical implications:** The outcomes are valuable in practice twofold. Firstly, the knowledge is acquired directly from the drivers who proved to be pretty resilient to COVID-related issues; however, some were more sensitive than others. That means the drivers as an occupational group cannot be considered uniform. Some needed psychological support, and such cases should be identified at the enterprise level. Secondly, the results show that COVID-related stressors with other accompanying issues increase the impact on drivers' health.

**Originality/value:** The empirical results revealed the most significant stressors. They were justified by using several stress definitions and psychological theories, particularly the Conservation of Resources Theory. They can be considered in the drivers' management process.

**Keywords:** stressor, truck driver, COVID-19, economic conditions, support implications.

**Category of the paper:** research and conceptual paper.

## 1. Introduction

The COVID-19 pandemic caused enormous complications related to the road transport of passengers and goods. In the first phase of the pandemic announced in March 2020, the European borders were blocked by many trucks waiting for border crossing despite the Schengen zone regulations. As a result, drivers were exposed to coronavirus infections, accompanied by high uncertainty about its consequences. Many restrictions were imposed and introduced all over Europe. The most important included strict hygienic requirements (IRU, 2020), travel restrictions, often accompanied by quarantine requirements for cross-border travelers, border controls reintroduced within internal European Union borders, and heavy goods transport (Osińska and Zalewski, 2020). All those unprecedented events caused truck drivers many difficulties, primarily imposed on the COVID-19 occupational group due to transporting goods for considerable distances. While driving long distances, drivers interact with other people, which leads to a contagious corona effect.

The road transport industry is a human-related area of economic activity. Karanina et al. (2020) identified the main issues related to human capital in the transport industry. They identified three problems resulting from insufficient human capital in most road transport companies. They are: ignoring advanced technologies and tools for working with personnel, lack qualified and trained managers, and lack social and psychological support for employees. Such a picture has been confirmed in many studies (Kucharčíková and Mičiak, 2018; Zalewski, 2019). However, the pandemic, which started in 2020, enforced using the IT technologies in transport and consequently increased IT literacy among both drivers and office workers. At the same time, the number of tasks in transport has increased and, together with the risk of virus infection, has led to an increase in stress at work, particularly among drivers. Long-distance drivers experience many stressing situations related to their occupations. Many papers related stress to hours of service on-road (Jensen and Dahl, 2009) and work organization and sleep (Hege et al., 2019). Da Silva-Júnior et al. (2009) found that such factors as low educational level, use of stimulants, and wage-earning, as opposed to self-employment, increased the risk for depression among truck drivers. The age of over 45 was the protective factor. Van der Beek (2012) provided an exhaustive overview of drivers' duties on the road, emphasizing that they spend from 50% to almost 100% of working time behind the wheel, depending on the driver category. The result of heavy job conditions, dramatically observed at present, is the truck drivers' shortage experienced in Europe during the pandemic. The shortage of heavy goods vehicle drivers reached 400,000 across the whole EU ([https://www.ft.com/...](https://www.ft.com/)) and is associated with the aging, stress, and difficulties related with the job.

The paper aims to determine the areas of truck drivers' occupational activity in which the COVID-19 pandemic increased their stress. The paper's novelty lies in the original data obtained using a designed questionnaire in which drivers directly answered the questions related

to their stress or anxiety reactions to several potential factors. Furthermore, they were asked during the pandemic, often before vaccination, which allows revealing the most urgent aspects and effects of stress during pandemic. The study consisted in answering the following research questions:

RQ1. Are truck drivers vulnerable to the health, social, economic, and organizational disturbances related to the pandemic?

RQ2. What are the most critical stressors faced by drivers during the COVID-19 pandemic?

RQ3. Can the stress factors be explained from a psychological standpoint?

RQ4. What are the key indications for management in the road transport industry?

The remainder of the paper is organized as follows. In Section 2, the literature review was presented. In Section 3, the data and a questionnaire are described, while in Section 4, the empirical results are presented and discussed. In the last section, we conclude.

## 2. Literature review

The literature on drivers can be divided into publications related to stress and those on the COVID-19 pandemic.

The first strand argues that drivers' professional road transport performance is strongly linked to emotional stress, which is related to dynamic and often unpredictable situations. In particular, the relationship between emotional stress and drivers' reactions is significant. While the relationship between these variables is well described in the literature, mainly by Hebb's (1965) optimum activation theory, the content aspect of emotions such as anger, fear, positive feelings, and satisfaction has not yet been clearly interpreted. In general, drivers' emotional states arise from their extra-occupational lives and situations occurring on the road.

A stress study conducted in 1992 on a population of 318 drivers of a US trucking company indicated that truck drivers scored well above the comparative norm resulting from other occupations (Orris et al., 1997). The so-called Global Severity Index, as a single summary measure of psychological stress in the SCL 90-R indicated a T-score for drivers of 64.20. This group perceived significantly more daily stressful events than occupational groups in other industries. As a result, the researchers concluded that work stress was a health risk for the drivers studied.

Öz et al. (2010) investigated stress reactions, speeding, number of penalties, and accident involvement among different driver groups like taxis, minibuses, heavy vehicles, and non-professional drivers. The results of the empirical study revealed differences between other driver groups in terms of both risky driving behaviors and stress reactions in traffic.

Fort et al. (2016) found that specific socio-occupational categories figured significantly more often among exposed employees: professional drivers (PCS 64), skilled workers (PCS 61), private-sector intermediate administrative and commercial professions (PCS 46), and company executives (PCS 36). Truck drivers are by far the main category exposed to work-related road risk and had the largest number of work-related road accidents as reported by the *Rhône administrative département* of France. On the other hand, however, they are less at risk of road accidents than different occupational categories after adjustment to exposure duration (in hours or mileage), with a rate of 1.3 accidents per 100,000 km driven for work, compared to 8 for skilled construction workers and post and telecoms workers, around 12 for security agents and 18 for skilled workers in the metallurgy and mechanics sectors.

Useche et al. (2017) indicated that professional driving a truck or bus is highly demanding. Reducing stress levels and improving driver quality can be achieved through the use of infrastructure solutions. A study on the application of Bus Rapid Transit (BRT) conducted on a group of 361 Colombian drivers working in both traditional public transport and BRT companies indicated that the incidence of stress was highly correlated with a factor called job burnout. The results showed that BRT drivers perform significantly better concerning stress or job burnout than their counterparts working in public transport.

Tucker et al. (2018) investigated the interactive effects of three roles stressors on employee strain (psychological strain and sleep disturbances) and employee morale (job dissatisfaction and turnover intentions) among 443 Australian road transport and logistics workers. Regression analyses revealed significant three-way interactions among role overload, role ambiguity, and role conflict, showing that when both role ambiguity and role conflict were high, psychological strain, sleep disturbances, job dissatisfaction, and turnover intentions remained high, regardless of the level of role overload.

Montoro et al. (2018) point out that the monotony of the tasks performed in urban and intercity public transport is closely related to driver behavior. Furthermore, there are significant relationships between work-related factors and measures of stress, anger, and the impact of these factors on risk predisposition concerning, for example, traffic sanctions. Research has shown a clear relationship between driving experience, hourly driver intensity, and stress during transport processes.

Belzer (2018) investigated the relationship between road safety and pressure to complete transport tasks. While not confirming a cause-and-effect relationship, the results suggest that economic factors significantly influence the occurrence of truck road accidents. This conclusion can be indirectly related to the pandemic situation when transport companies influenced drivers in terms of delivery times due to numerous restrictions.

Musselwhite, Avineri, and Susilo (2021) pointed to essential changes observed in transport regarding pandemic-related conditions. One of these is a drastic reduction in human mobility, especially in the early phase of the pandemic. The authors cite data from Google (Google, 2021), according to which car use in the UK fell by 30% and bus use decreased by 76% between

March and December 2020. However, the authors conclude that many of these changes may be temporary, as behavioral norms and habits are harder to change than thought. It may also be that individual governments have not done enough to maintain these changes. The introduced restrictions, according to the researchers, encourage a shift towards more sustainable and healthy mobility on the one hand and increased use of public transport, mainly based on electromobility, on the other hand. Unfortunately, this does not apply to goods transport, which in its essence is the primary source of supply for citizens.

The behavior of drivers carrying out transport tasks both locally and internationally is also influenced by the World Health Organization (WHO) recommendations to all countries and participants in public and economic life. BBC, 2020 reminds us that restrictions differed much across the countries. As Dam et al. (2020) point out, the practice of total and partial blocking has been undertaken as an essential strategy to limit the spread of the COVID-19 virus among the populations of different countries. Moreover, individuals commuting to the borders of other countries were isolated, and quarantine was imposed on them.

During the pandemic, many ways of preventing contagion were introduced, in particular, hygiene and disinfection requirements and electronic forms of communication and document transmission. Road transport had to be implemented given the possibility of a complete breakdown of supply chains and the need to implement processes to distribute goods, especially essential goods. In addition, the requirements for widespread testing of truck drivers were a burden (IRU, 2021). These represent additional activities and require extra time to be taken into account in the drivers' existing work, which increases stress in certain situations.

Lemke et al. (2020) ask how truck or bus driving conditions during a pandemic affect driver stress and how to mitigate these impacts. Emerging evidence suggests that the COVID-19 pandemic exacerbates existing stressors and introduces new ones, potentially more significant implications on driver health and safety disparities. As COVID-19 exerts several multi-level stress elements on commercial drivers, syndemic symptoms may arise, which indicate substantial correlations of the Sars-Cov2 virus with mortality. The co-occurrence of ailments may also result in a deterioration in the level of road safety or the certainty of transport orders. The authors conclude that the effects of the COVID-19 pandemic on professional drivers cannot be adequately understood or analyzed in isolation from the endemic chronic stressors and health and safety disparities that characterize the profession. However, this will only be possible after post-data analysis due to the still too limited knowledge of the effects of the virus.

Road transport is a critical branch in delivery processes, especially where it is difficult to find a substitute in the form of other modes of transport (rail, inland waterway, air). In anticipation of health, including mental health, measures have been introduced for truck drivers in South Africa to access health care along the transport corridors of the sub-Saharan corridor. A study conducted (Lalla-Edward et al., 2018) clearly indicated that the introduction of such arrangements, which can provide *ad hoc* as well as structured assistance to transport drivers, significantly/ affects their well-being and productivity. Following the example of

medical facilities located in Western Europe, especially in motorway areas, it should also be recommended to introduce benefit models based on wireless communication and satellite systems allowing the driver to be in contact with the point of delivery of health services.

It is worth noting that COVID-19-related stressors were empirically considered from a more general perspective. Ermasova and Rekhter (2021) investigated how perceived vulnerability to COVID-19 at the early pandemic stages is related to perceptions of stress and accompanying health issues among different population groups. Their study found the top five stressors for the sample population: difficulties/problems with work, social media news, emotional issues, non-social media news, and financial matters. It shows that the stressors impacted female respondents more than male respondents. Also, young adults had higher mean values in the perception of emotional problems, family problems, difficulties/problems with work, and unemployment.

Graupensperger et al. (2022) examined associations between COVID-19-related stressors (i.e., job-related, financial-related, social/relational, and illness-related stressors) and indices of mental health and well-being in the initial phase of the pandemic (April/May 2020) while accounting for participants' pre-pandemic levels of these outcomes in January of 2020. They found that COVID-19-related stressors were generally stronger in earlier months and decreased linearly across the pandemic. They found that social/relational stressors were most strongly related to increased symptoms of anxiety/depression, and financial stressors were most strongly associated with decreased satisfaction with life.

### **3. Sample characteristic**

Due to the occurrence of the pandemic and the maintenance of social distance, and other constraints occurring at a time of relatively low vaccination rates, it was challenging to conduct the driver survey and difficult to implement the study in its full scope. The main issues to solve were the definition of the target group and the possibility of making a structural division of the study group. Therefore, the focus was on the group of available drivers of professional trucks with a permissible weight above 3.5 T, which corresponds in most cases to heavy transport performed mainly in Europe and Asia.

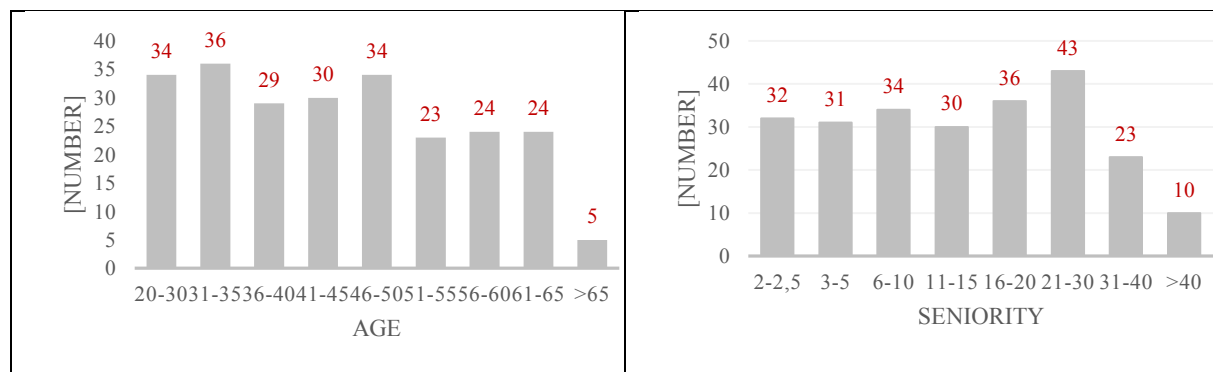
The study was conducted between March and August 2021, based on a survey questionnaire containing 14 main questions, with in-depth questions used for four questions. A total of 239 respondents participated in the survey, including five women. Drivers answered the questions in online (203) and traditional (36) versions. The drivers filled in the questionnaires at the headquarters of transport companies and during their car park stopovers. They were informed about the aim and scope of the survey, the possibility of refusing to participate, and the complete anonymity of the data provided. The list of questions is shown in table 1.

**Table 1.**  
*Questions and scale of observations*

Question	Scale	Remarks
Gender	Nominal	
Age [in years]	Metric	
Seniority [in years]	Metric	
Destination of transport services	Ordered	Domestic/domestic and international/international
Did you suffer from COVID-19?	Nominal	Yes, no, I don't know
Were you on sick leave?	Nominal	Yes, no
Does the current pandemic impact the deterioration of the family's financial conditions?	Nominal	Yes, no
Feeling stress/anxiety	Likert (5)	Details in Table 2
Impact of stress anxiety on health	Likert (5)	Details in Table 2
Demand for professional support	Nominal	Yes, no, I don't know
What form of support do you need?	Qualitative	
Have your working conditions changed compared to before the pandemic?	Nominal	Yes, no
How have the conditions changed?	Qualitative	Details in Figure 4

Note: The Likert scale is defined as a five-point scale, allowing individuals to express how much they agree or disagree with a particular statement (Likert 1932; Jamieson 2004).

The structure of the respondents across age and work seniority is presented in Figure 1.



**Figure 1.** Age and seniority structure of the respondents [in years].

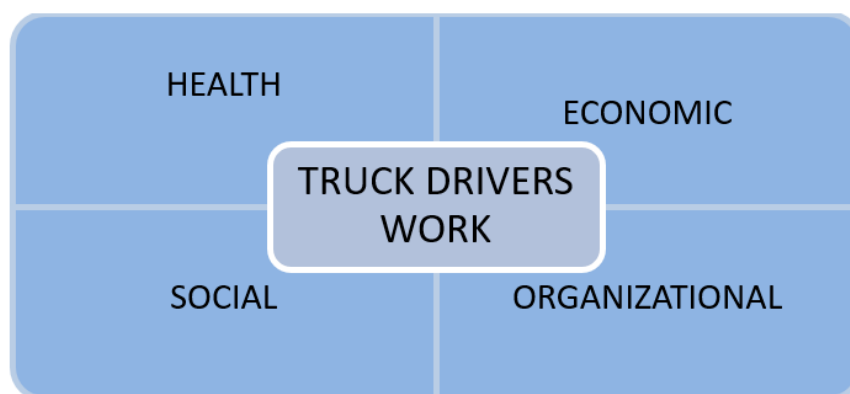
More than 140 respondents were over 40 years of age, representing nearly 59% of the respondents. At the same time, nearly half of the drivers had more than 15 years of professional driving experience, and almost 60% had over a decade. The average age was 44.21 years, while the average length of service was 16.36 years. Age and time of service are essential for studying drivers' behavior who have thoroughly familiarised themselves with the specifics of their tasks and working conditions in this profession. Thanks to their experience, they are able to regulate their emotions related to the stress associated with their occupation. It is in line with the strength and vulnerability integration (SAVI) model (Zacher & Rudolph, 2022), which states that development across the adult lifespan is accompanied by improvements in emotion regulation and declines in physiological flexibility. Due to these age-related changes, emotional well-being is expected to be higher among older (vs. younger) adults who experience no or only minor stressors. In contrast, more intense stressors should lead to lower well-being among older adults.

Furthermore, the initial analysis of the answers revealed that:

- The answers given by women did not differ from those provided by men.
- 56.1% of the respondents were involved in international transport and 28% in international and domestic transportation. This result suggests that many respondents had to face temporary border restrictions, detailed inspections, and operate under pressure to fulfill a transport task in a pandemic situation.
- When asked if they were infected with COVID-19, 154 respondents (64.4%) gave a negative answer, 67 respondents answered in the affirmative (28%), and the rest answered 'don't know.' The implication is that the drivers were trying to comply with the sanitary authorities' requirements and take care of their health in order not to endanger other people operating in transport.
- Only 49 respondents to the survey said that they had to take sick leave as a result of the illness and recorded absences from work.
- In response to the question on the impact of the pandemic on the deterioration of the living conditions of the driver's immediate family, the majority, i.e., 141 respondents (58%), said that the state had no impact on the deterioration of their material situation. At the same time, 97 people indicated that their living conditions had deteriorated due to COVID-19. One person had no opinion on this issue.

#### 4. Results

The convenience sample indicated some potential factors of stress the truckers faced during the COVID-19 pandemic, which could have impacted their work. The assumed stress factors were socio-demographic primarily, such as age and seniority, COVID-19-related, i.e., sick due to COVID-19, sick leave, organizational, i.e., destination (driving routes), and economic, such as family financial conditions. The scheme of assumed relations is shown in figure 2.



**Figure 2.** Relations between stress factors and truck drivers' work during the pandemic.



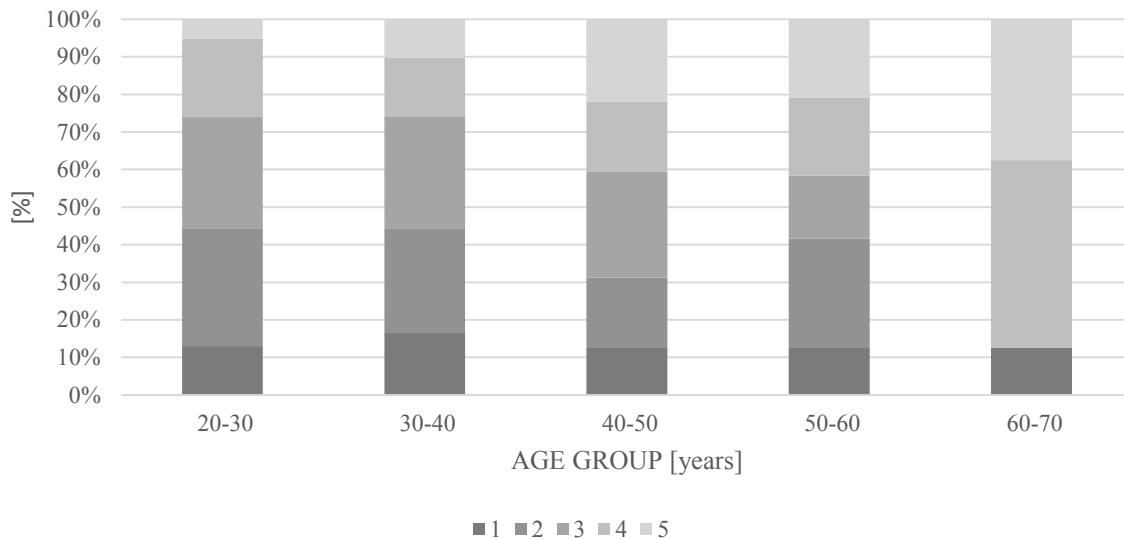
It is worth emphasizing that the majority of respondents (71-92%) showed no anxiety or slight stress increase related to the period of the pandemic. Therefore, it is necessary to focus on minorities, which indicates some issues. The first question was about anxiety accompanying the driver in different circumstances, and the second one referred to anxiety's impact on the driver's health. The percentages of the answers provided are shown in Table 2.

**Table 2.**  
*Respondents' answers about COVID-19-related stress [in % (numbers)]*

<b>Feeling stress/anxiety</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
I feared losing my job	15% (37)	36% (87)	20% (47)	18% (42)	11% (26)
I had no one to turn to in order to talk about professional matters	30% (72)	44% (104)	15% (35)	9% (22)	3% (6)
I felt anxious about overwork	26% (61)	40% (95)	18% (42)	14% (33)	3% (8)
I felt anxious about the increasing difficulty of carrying out my job tasks (apart from driving)	28% (66)	38% (90)	15% (36)	15% (36)	5% (11)
The greatest anxiety I felt was when I was alone on the road	28% (68)	35% (84)	17% (40)	11% (26)	9% (21)
I felt other anxiety	27% (64)	34% (82)	19% (45)	14% (34)	6% (14)
<b>Impact of stress anxiety on health</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
It influenced the subjective willingness to work	30% (70)	39% (92)	17% (41)	10% (23)	4% (9)
I began to experience physical ailments (headaches, back pain, others)	35% (83)	38% (89)	11% (26)	9% (21)	7% (17)
Increased concerns about road safety related to driving	35% (83)	39% (91)	11% (25)	9% (22)	6% (14)
The anxiety about whether I will be able to carry out my professional tasks properly has increased	31% (73)	41% (97)	14% (32)	10% (24)	3% (8)
I do not feel like and do not want to meet and talk to anyone	44% (104)	34% (81)	11% (25)	6% (14)	5% (11)
Sometimes I feel anxious, but it does not affect my health	25% (60)	34% (81)	16% (38)	16% (38)	8% (9)

While analyzing the data in Table 2, it should be noted that in most situations in which a road transport driver may have found himself, he did not feel anxious about the pandemic. Only in the case related to the fear of losing one's job did respondents indicate answers 4 'rather yes' in 18% and 5 'definitely yes' in 11%, making a total of 29% of responses. Responses to the question about the impact of pandemic stress on health had a similar distribution, with a predominance of responses 1 'definitely not' and 2 'rather not'. Drivers sometimes felt anxiety, but it did not affect their health; 16% of 'rather yes' responses and 8% of 'definitely yes' answers, respectively. The number of affirmative responses, corresponding to options 4 and 5 on the Likert scale, ranged between 11 and 29% for feeling stress/anxiety and 11 and 16% for the impact of stress on health. The answers suggest that a particular group of drivers was more vulnerable to stress and anxiety during the pandemic.

It is difficult to say what factors of increased anxiety were most important. Still, we found that stress related to difficulties with occupational requirements is growing with age and occupational seniority (Figure 3).



Note: numbers 1-5 correspond to the responses on the Likert scale.

**Figure 3.** The relationship between age and anxiety of not meeting occupational requirements.

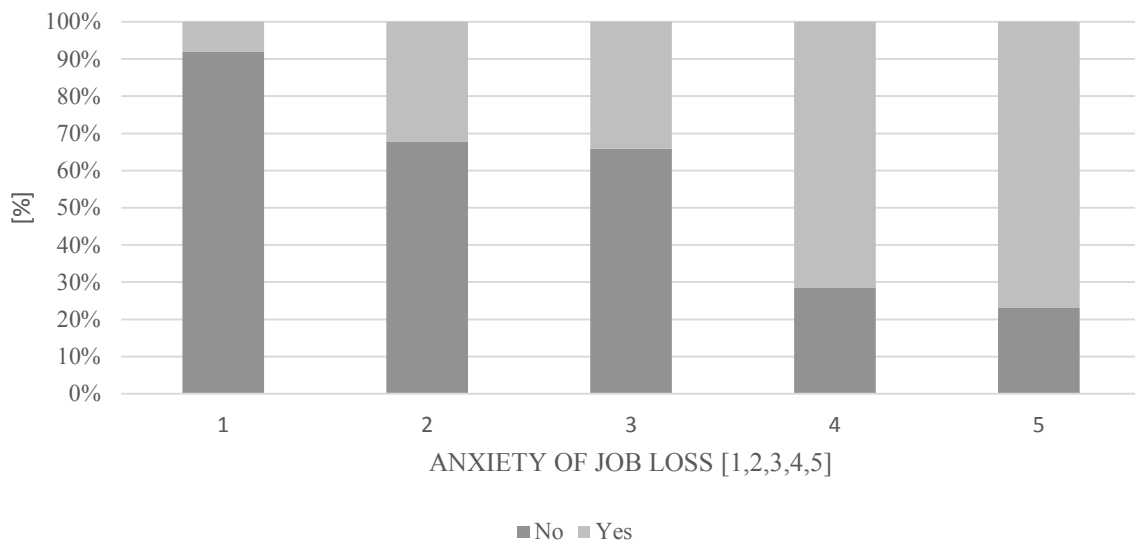
It is easy to notice that the highest share of answers '4' is for ages between 60 and 70, then for 20-30 and 50-60. The percentage of replies '5' increases with age. The Yule's phi coefficient equals 0.318, showing a relatively low association. Like age, the fraction of positive responses increased to seniority as a driver, with Yule's phi equaling 0.349. Yet, the overall nominal value of responses '4' and '5' was deficient and amounted to 13% of respondents.

Age and seniority were also important when answering the question about psychological support: 16 out of 30 'yes' replies come from drivers over 40 years old. It is not expected to organize individual support – only seven respondents out of 239 were interested in the personal approach. The respondents were almost equally distributed when saying if their work conditions changed during the pandemic: 100 said 'no' and 139 answered 'yes'. The destination was significant when drivers were asked about being overworked. The most overworked felt those driving on international routes. The same group indicated that their work conditions changed during the pandemic period.

People who recovered from COVID-19 felt overworked more often than others. Furthermore, they tended to be afraid of safety on the road and being alone in the truck. The group of drivers who recovered from COVID-19 changed their subjective attitude toward work and more frequently felt some physical and mental ailments, like headaches, spinaches, and feeling alone on the road. They more often required psychological support from the company and other individuals (Yule's phi 0.239). A similar impact was noticed in the case of respondents who were on sick leave. Among 49 respondents on sick leave, 18 suffered from COVID-19.

Another factor of stress and anxiety defined in the study relates to lowering financial conditions in the driver's family during the pandemic. Those who answered 'yes' (97 respondents) were more likely to be afraid of job loss (answer '4' was selected by 30 and

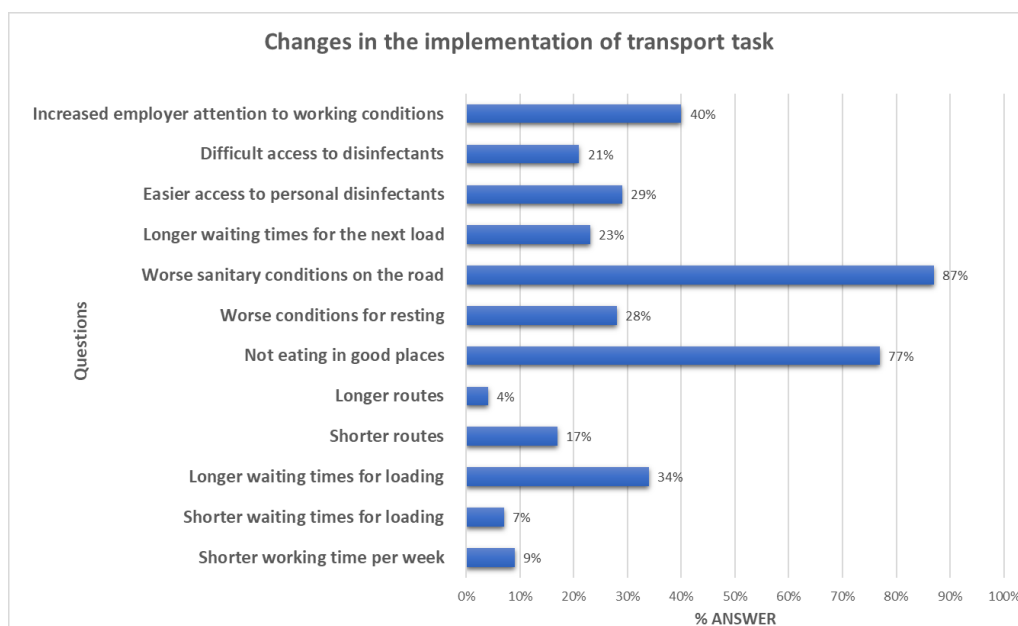
'5' by 20 persons, respectively) (Figure 4). The value of Yule's phi coefficient is the highest and amounts to 0.479.



Note: the answer 'no' corresponds to the case of not lowering financial conditions, and 'yes' means the opposite.

**Figure 4.** The relationship between worse financial conditions and anxiety of job loss.

Respondents indicated detailed issues related to the worsening of the job condition due to the COVID-19 pandemic (Figure 5). The group, who experienced the worse financial situation in the family due to the COVID-19 pandemic, was particularly vulnerable to a lack of direct talk about the job and actual job difficulties, like being overworked or being alone on the road. Their subjective attitude towards driving changed mainly among all subgroups of drivers being investigated.



**Figure 5.** Respondents' answers on 'How have the conditions changed?' [in %].

The respondents indicated that the conditions of their work changed during the pandemic. They felt they could not meet occupational requirements and needed professional support. However, they did not feel depressed. This group mostly demanded psychological support, with Yule's phi coefficient equal to 0.311.

## 5. Discussion

In the study, we assumed that the COVID-19 pandemic had caused many negative consequences for truck drivers' physical and mental health since its very beginning. However, the results of the conducted research have shown that the relationship we assumed is not so obvious.

Respondents mostly denied that they felt increased anxiety during the pandemic period. Concern about the threat of losing their job was reported by 29% of respondents, while only 12% indicated that they felt anxious because they had no one to turn to for work issues. Anxiety about the increasing number of tasks was reported by 20% of respondents. Similarly, 20% of respondents also indicated feeling anxious on the road alone. Only 16% of the respondents (38 people) demonstrated a clear need for support, and only eight persons stated that it could be psychological support. These data suggest that despite the objectively high risk of falling ill, experiencing numerous difficulties related to longer waiting times for loading, increased discomfort due to problems in accommodation and eating places, and the threat of losing work or lack of orders, most respondents did not show extreme symptoms of anxiety and stress.

Our findings related to age as a factor of drivers' vulnerability confirmed that most drivers were pretty resilient to COVID-19-related stressors. However, in-depth cross-correlation analysis identified factors responsible for stress that affected a significant minority of respondents. Ages 20-30 and over 50 and long work experience were factors that increased anxiety about job loss, while age over 40 was a factor that increased the need for pandemic support. As the drivers' average age was 44.2 years and for seniority 16.36 years, the respondents were expected to overcome most stressors and achieve emotional stability. It should be emphasized that the age distribution among the examined drivers was 34 years for 25%, 44 for 50%, and 53 for 75%. It means that 25 percent of the drivers were over 53.

Overwork and deterioration of social conditions on the routes proved to be substantial stress factors, which mainly affected drivers working in international transport, traveling for long periods and over long distances. The incidence of COVID-19 was also a significant stressor. Although the number of drivers who became ill during the study period was only 18, they showed more physical and psychological complaints related to loneliness on the road and reported the need for psychological support. A significant proportion of respondents (40.5%) indicated that their family's material conditions deteriorated during the pandemic period.

These individuals were particularly vulnerable to hardship because they had experienced material problems. They missed talking about difficulties at work, feared difficulties fulfilling their professional obligations, felt overworked and lonely, and expected professional support.

The findings partly align with Zacher et al. (2014) results when concerns 20-30 years old. They showed that employees in their late 20s to early 40s had lower job satisfaction and higher emotional exhaustion than younger and more senior employees. In their study, time pressure and co-worker support fully mediated the U-shaped relationship between age and job satisfaction and the inversely U-shaped relationship between age and emotional exhaustion. In our study, drivers over 50 could be worried about new responsibilities related to electronic document exchange and other limitations due to the pandemic.

Ross (1998) provided the general framework for managing mental health in the work context. What relates to road drivers is high workloads and taking risks without making mistakes. Evidently, the latter is crucial for the drivers' and other road users' safety.

The empirical results can be discussed using several psychological theories. One is the stress definition proposed by Lazarus and Folkman (1984). They defined stress as a specific relationship between a person and the environment, which the person assesses as aggravating or exceeding his resources and threatening his well-being. Among our respondents, this transaction probably did not exceed their rich resources in such a way as to lead to very negative consequences.

Another explanation can be the process of coping with stress in the context of Stevan Hobfoll's Conservation of Resources Theory (COR) which used a combination of two other approaches: role theory (Kahn et al., 1964) and resource conservation theory (COR) (Hobfoll, 2001). In that context, Tucker et al. (2018) investigated the interactive effects of three roles stressors on employee strain (psychological strain and sleep disturbances) and employee morale (job dissatisfaction and turnover intentions) in road transport and logistics workers in Australia. They showed that the combinations of various stressors, their intensity, and duration create opportunities to alleviate or aggravate mental tension and employees' approach to work in the transport and logistics industry. Tucker et al. (2018) suggest that keeping stressors low does not turn an obstacle stressor into a challenge stressor for transport and logistics workers. This difference in findings may be due to the different occupations studied. The work carried out by managers and clerks in these studies differs much from the heart of transport and logistics work. Suppose transport and logistics workers' jobs are clearly defined, and there are no conflicts in reporting lines or responsibilities. In that case, the negative impact of a busy workload may be alleviated by psychological strain, sleep disturbances, job dissatisfaction, and turnover intentions.

The Conservation of Resources COR (Tucker, 2018) predicts that resource loss is a significant component of the stress process. In turn, the increase in these resources is presented as being more and more critical in the context of losses. As resources are also used to prevent resource loss, people are increasingly susceptible to the adverse effects of stress at each stage

of the stress process, which, if they persist, lead to rapid and significant spirals of losses. The COR theory is perceived as an alternative to assessment-based stress theories (Lazarus, 1990). It relies more on the environment's objective and culturally understood nature than on an individual's personal interpretation in determining the stress process. Therefore it is helpful in HR management in road transport. It turns the managers' attention to the loss of drivers' resources resulting from increased stress and burnout, enhancing the role of different forms of support such as peer support, support from superiors, support from the company, and psychological support.

## 6. Conclusions

The paper analyzed the truck drivers' occupational activity areas where the COVID-19 pandemic increased their stress. The sample of 239 drivers was examined in the period March-August, 2021. The study revealed that most of them were pretty resilient to COVID-19-related stressors. Some stressors, such as age, seniority, recovering from COVID-19, and worsening family financial conditions, were found to have more impact on some respondents than others. Age and seniority were related to anxiety about increased occupational activities. Those whose economic conditions worsened were afraid of job loss. People who recovered from COVID-19 felt overworked more often than others and tended to be scared of safety on the road and being alone in the truck. They more often required psychological support.

The study allowed answering the research questions. Firstly, truck drivers, in general, were not vulnerable to the health, social, economic, and organizational disturbances related to the pandemic. The group is resilient to stress because their occupation is among the most stressful professions. Furthermore, they are periodically examined by a psychologist to verify their workability. Secondly, the study allowed identifying several stressors such as age and seniority related to introducing new duties into the drivers' jobs. Also, some drivers were vulnerable to the aftermath of recovering from COVID-19 and worsening families' financial conditions. Those who drove on international routes were more inclined to change their working conditions. Thirdly, the psychological standpoint, particularly the Conservation of Resources Theory, helps explain the roots of the stress impact on the drivers' jobs. Furthermore, the results identified the crucial issues and allowed the formulation of several recommendations related to various forms of driver support.

This study has some limitations. Firstly, the sample is relatively small and limited to drivers employed in Poland. Therefore it is unclear whether drivers employed in other countries faced other problems than those shown in the paper. Following their individual experience, they could also express different needs related to working conditions. Secondly, comparing the results in time to observed changes in individual perceptions of the most urgent issues may be interesting.

Even so, this paper provides significant evidence that drivers were mainly resistant to increased stress caused by the pandemic and allows indicating several crucial stressors. As the results are very fresh, the study should be continued to evaluate changes in the medium and long-term horizon. Also, intertemporal and intercountry comparisons are necessary to formulate more general conclusions.

## Ethics

The Committee for Ethics in Research at The Faculty of Economic Sciences and Management Nicolaus Copernicus University approved the research based on decision no. 2/2022/FT.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## References

1. BBC (2020). *Coronavirus: the world in lockdown in maps and charts*. <https://www.bbc.com/news/world-52103747>, 10.01.2022.
2. Belzer, H.M. (2018). Work-stress factors associated with truck crashes: An exploratory analysis. *The Economic and Labour Relations Review*, 29(2), <https://doi.org/10.1177%2F1035304618781654>.
3. da Silva-Júnior, F.P., de Pinho, R.S.N., de Mello, M.T., de Bruin, V.M.S., & De Bruin, P.F.C. (2009). Risk factors for depression in truck drivers. *Social psychiatry and psychiatric epidemiology*, 44(2), 125-129. <https://doi.org/10.1007/s00127-008-0412-3>.
4. Dam, P., Mandal, S., Mondal, R., Sadat, A., Chowdhury, S.R., & Mandal, A.K. (2020). COVID-19: Impact on transport and mental health. *Journal Transport & Health*, 19, <https://doi.org/10.1016/j.jth.2020.100969>.
5. Ermasova, N. & Rekhter, N. (2021). COVID-19 stress, health issues, and correlations with different genders and age groups. *Journal of Gender Studies*, <https://doi.org/10.1080/09589236.2021.1941815>.

6. Fort, E., Ndagire, S., Gadegbeku, B., Hours, M. & Charbotel, B. (2016). Working conditions and occupational risk exposure in employees driving for work. *Accident Analysis & Prevention*, 89, 118-127, <https://doi.org/10.1016/j.aap.2016.01.015>.
7. Google (2021). *Community Mobility Reports*. <https://www.google.com/COVID-19/mobility>, 8.01.2022.
8. Graupensperger, S., Calhoun, B.H., Patrick, M.E., & Lee, C.M. (2022). Longitudinal effects of COVID-19-related stressors on young adults' mental health and well-being. *Applied Psychology: Health and Well-Being*, 1-23. <https://doi.org/10.1111/aphw.12344>.
9. Hebb, D.O. (1965). Drivers and the CNS. In: H. Fowler (Ed.), *Curiosity and exploratory behaviour*. New York: McMillan.
10. Hege, A., Lemke, M.K., Apostolopoulos, Y., & Sönmez, S. (2019). The impact of work organization, job stress, and sleep on the health behaviors and outcomes of US long-haul truck drivers. *Health Education & Behavior*, 46(4), 626-636. <https://doi.org/10.1177/1090198119826232>.
11. Hobfoll, S.E. (2001). The Influence of Culture, Community, and the Nested-Self in the Stress Process: Advancing Conservation of Resources Theory. *Applied Psychology*, 50, 337-421. <https://doi.org/10.1111/1464-0597.00062>.
12. IRU (2020). *COVID-19 Impacts on the Road Transport Industry – Executive summary*. <https://www.iru.org/>, 18.01.2021.
13. IRU (2021). <https://www.itf-oecd.org/iru-report-covid-19-impact-road-transport-industry-update-june-2021>, 11.11.2021.
14. Jamieson, S. (2004). Likert scales: How to (ab) use them? *Medical Education*, 38(12), 1217-1218. <https://doi.org/10.1111/j.1365-2929.2004.02012.x>.
15. Jensen, A., & Dahl, S. (2009). Truck drivers hours-of-service regulations and occupational health. *Work*, 33(3), 363-368. <https://doi.org/10.3233/WOR-2009-0884>.
16. Kahn, R.L., Wolfe, D.M., Quinn, R.P., Snoek, J.D., & Rosenthal, R.A. (1964). *Organizational stress: Studies in role conflict and ambiguity*. London: John Wiley.
17. Karanina, E., Kotandzhyan, A., Vershinina, N., & Davydova, J. (2020). Development and improvement of HR policy in the transport industry. In *E3S Web of Conferences (164*, p. 10018). EDP Sciences.
18. Kucharčíková, A, Mičiak, M. (2018). Human Capital Management in Transport Enterprises with the Acceptance of Sustainable Development in the Slovak Republic. *Sustainability*, 10(7), 2530. <https://doi.org/10.3390/su10072530>.
19. Lalla-Edward, S.T., Matthewb, P., Hankinsc, C.A., Ventera, C.D. & Gomezc, G.B. (2018). Healthcare for truck drivers: Assessing accessibility and appropriateness of South African Roadside Wellness Centres. *Journal of Transport & Health* 8, 63-72. <https://doi.org/10.1016/j.jth.2018.01.007>.
20. Lazarus, R.S. & Folkman, S. (1984). *Stress, appraisal, and coping*. Cham: Springer.



21. Lazarus, R.S. (1990). Theory-Based Stress Measurement. *Psychological Inquiry* 1(1), 3-13. <http://www.jstor.org/stable/1449700>.
22. Lemke, M.K., Apostolopoulos, Y. & Sonmez, S. (2020). Syndemic frameworks to understand the effects of COVID-19 on commercial driver stress, health, and safety. *Journal Transport & Health*, 18, 100877, <https://doi.org/10.1016/j.jth.2020.100877>.
23. Likert, R. (1932). A Technique for the Measurement of Attitudes. *Archives of Psychology* 140, 1-55. [https://legacy.voteview.com/pdf/Likert\\_1932.pdf](https://legacy.voteview.com/pdf/Likert_1932.pdf).
24. Montoro, L., Useche, S., Alonso, F. & Cendales, B. (2018). Work Environment, Stress, and Driving Anger: A Structural Equation Model for Predicting Traffic Sanctions of Public Transport Drivers. *National Library of Medicine* 15(3), <https://dx.doi.org/10.3390%2Fijerph15030497>.
25. Musselwhite, C., Avineri, E. & Susilo, Y. (2021). Restrictions on mobility due to the coronavirus COVID-19: Threats and opportunities for transport and health. *Journal of Transport & Health*, 20, 101042, <https://doi.org/10.1016/j.jth.2021.101042>.
26. Orris, P., Hartman, E.D., Strauss, P., Anderson, R.J., Collins, J., Knopp, C., Xu, Y. & Melius, J. (1997). Stress among package truck drivers. *American Journal of Industrial Medicine* 31(2). [https://doi.org/10.1002/\(sici\)1097-0274\(199702\)31:2<202::aid-ajim10>3.0.co;2-5](https://doi.org/10.1002/(sici)1097-0274(199702)31:2<202::aid-ajim10>3.0.co;2-5).
27. Osińska, M., & Zalewski, W. (2020). Effectiveness of the Anti-Crisis Policy in the Period of COVID-19 Pandemic in the Road Transport Industry. *European Research Studies Journal, Special Iss. 2*, 40-57. <https://doi.org/10.35808/ersj/1807>.
28. Öz, B., Özkan, T., & Lajunen, T. (2010) Professional and non-professional drivers' stress reactions and risky driving. *Transportation Research, Part F: Traffic Psychology and Behaviour*, 13(9), 32-40. <https://doi.org/10.1016/j.trf.2009.10.001>.
29. Ross, F.M. (1998). Occupational bliss or occupational stress: Managing mental health in work contexts. *Journal of Occupational Science*, 5, 3, 155-160, <https://doi.org/10.1080/14427591.1998.9686444>.
30. Tucker, M.K., Jimmieson, N.L., & Jamieson, J.E. (2018). Role stressors in Australian transport and logistics workers: *Psychosocial implications*, *Safety Science*, 109, 12-19, <https://doi.org/10.1016/j.ssci.2018.05.007>.
31. Useche, S., Cendales, B., Alonso, A. & Serge1, A. (2017). Comparing Job Stress, Burnout, Health and Traffic Crashes of Urban Bus and BRT Drivers. *American Journal of Applied Psychology*, 5(1), 25-32. <http://dx.doi.org/10.12691/ajap-5-1-5>.
32. Van der Beek, A.J. (2012). World at work: truck drivers. *Occupational and environmental medicine*, 69(4), 291-295. <http://dx.doi.org/10.1136/oemed-2011-100342>.
33. Zacher, H., & Rudolph, C.W. (2022). Strength and vulnerability: Indirect effects of age on changes in occupational well-being through emotion regulation and physiological disease. *Psychology and Aging*, 37(3), 357-370. <https://doi.org/10.1037/pag0000671>.

34. Zacher, H., Jimmieson, N.L., & Bordia, P. (2014). Time pressure and co-worker support mediate the curvilinear relationship between age and occupational well-being. *Journal of Occupational Health Psychology, 19*(4), 462-475. <https://doi.org/10.1037/a0036995>.
35. Zalewski, W. (2019). Telematics systems in road transport. *Journal of Positive Management, 10*(1), 3-20. <http://dx.doi.org/10.12775/JPM.2019.001>.