



# Potential interventions to improve dietary behaviors among long-haul truck drivers in Germany

## Results of a qualitative study

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### Abstract

Given the particular working conditions, professional long-haul truck drivers who generally have to travel for several days at a time, face particular challenges to follow a balanced diet. The aim of this qualitative study was to examine the dietary behavior of German speaking truck drivers and their opinions regarding possible interventions to improve their dietary behaviour.

Qualitative data was obtained using semi-structured guideline based one-on-one interviews and focus groups. A total of 16 truck drivers participated, eight in the one-on-one interviews and eight in the focus group interviews.

Emerging issues regarding the eating situation of truck drivers were the lack of shopping possibilities, the bad quality and unfavorable cost-benefit ratio of offered meals at truck stops, lack of parking, and long and irregular working days. Truck drivers evaluated the presented intervention ideas differently depending on their working conditions.

The results revealed that the truck drivers were frustrated with the eating situation and meal options while working. Several proposed ideas to improve their diet were met with interest. The emerging typologies to describe separate groups of truck drivers can help to identify their specific problems and needs in order to develop goal-oriented interventions. These typologies should be confirmed in additional, also quantitative, studies.

**Keywords:** Professional truck drivers, eating behaviour, qualitative research, eating situation, health promotion

### Introduction

During the corona crisis another occupational group, besides medical and health care professionals and food retailing personnel, showed its crucial importance for the provision of goods: professional truck drivers. Empty supermarket shelves and the lack of essential supplies in hospitals made it obvious how delivery chains are usually flawlessly streamlined and how freight transport plays a crucial role in making food and other goods available to consumers.

Many of these “system relevant” professions have low wages and are underappreciated. The fact that professional truck drivers are often seen on roads that are frequently congested does not increase their popularity. At the same time, their achievements are great and their workload under the existing circumstances is immense.

Over 70% of the freight transport in Germany is by road [1]. In 2019, trucks drove over 40 billion kilometers on toll roads in Germany [2]. Over half a billion professional truck drivers were registered in 2013 in Germany alone [3], and the need continuously increases while the search for new recruits is becoming a big challenge within the industry. The problem will exacerbate due to the age distribution of the employees within this industry with 30% aged 55 years or older and less than 3% under the age of 25 [4, 5]. Furthermore, truck drivers belonged to the occupational group with the highest sick days with 27.2 days in 2018 [6]. One reason appears to be the unfavorable working conditions [7–10].

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Many of the truck drivers are gone for several continuous days and usually sleep in their trucks during that time [11] which makes a healthy lifestyle even more challenging. A survey among 404 truck drivers in Germany revealed that one third reported at least one chronic illness, 76% were overweight and 30% obese [11]. In a U.S. study, 53% of the truck drivers were reported to have obesity [8], and in Australia, around 60% of the truck drivers indicated obesity [12]. Furthermore, high rates of chronic illnesses associated with an unhealthy lifestyle, such as Diabetes mellitus type 2, chronic back pain and high blood pressure, are also frequently reported [7, 8, 13]. One major contributing factor besides the continuous sitting position seems to be their diet [11, 14, 16]. One recent review of 17 studies on the diet of professional truck drivers in different countries showed low intake of fruits and vegetables, “unhealthy” dietary behavior and frequent restaurant meals [14]. Truck drivers in Germany also reported eating fewer fruits, vegetables, legumes and fish but more canned foods and sugar sweetened beverages during work compared to at home [11]. One mentioned barrier to a more balanced diet appears to be the availability of balanced meals while on the road [11, 17, 18]. Eating practices are a result of various personal and structural conditions. A qualitative study of the daily eating context of truck drivers can potentially reveal unfavorable eating practices and structural barriers in the individual workday context, can examine possible commonalities and differences among the truck drivers, and allows for the development of solutions oriented to specific target groups. Major challenges in the daily eating context of truck drivers include the limited opportunities for food preparation, storage and availability in and around the truck and at the majority of truck stops. So far, only a few interventions to improve the diet of truck drivers have been attempted [17, 19–22]. For this qualitative study, professional truck drivers were interviewed regarding their dietary behavior and daily eating routines. Information on the availability of equipment for food storage and preparation, cooking habits, meal consumption at truck stops and their attitudes regarding their dietary behavior as well as possible problems and desires was obtained. In addition, various strategies to improve nutrition during work were presented and the truck drivers’ feedback, depending on their daily eating situation, was obtained.

## Methods

The dietary behavior of individuals is understood as implicit, routine, and habitual activities from which one’s knowledge about food is formed [23]. To better examine the daily “eating practices” of truck drivers, a qualitative study design was chosen. This scientific method is particularly useful to gain new insights into daily eating habits of truck drivers since not much is known. Furthermore, the qualitative approach allows typologies to be established as well as behavior patterns, without already knowing the relevant characteristics or dimensions. Data was obtained by semi-structured guideline based face-to-face interviews and focus group interviews. The study was conducted in collaboration with the Daimler Truck AG.

## Procedures and Recruitment

Face-to-face interviews were conducted over four days from May through July 2019 at a rest stop and a truck stop in Baden-Württemberg, Germany. Two research assistants of the University of Hohenheim approached truck drivers at their parked vehicles while walking through the parking lots. They explained the study background and aim and, if eligible, asked for their willingness to participate. Interested truck drivers were given written information regarding the project and a consent form to sign. The interviews were conducted at available seating on site. Drivers’ lack of the German language and locked trucks with closed drapes made recruitment difficult which resulted in only around two interviews per day. Based on the restrictions in recruitment and the lack of knowledge regarding drivers’ characteristics, theoretical sampling was not possible. Interviews continued until a theoretical saturation for the main research questions was reached, meaning that no new dimensions or characteristics could be added to the already existing information/data. A total of eight face-to-face interviews were conducted.

Two focus group discussions were conducted in September 2019. They were conducted in the facilities of two logistic companies which were contacted by phone and email with an invitation to participate. Upon the agreement to participate, the companies invited their drivers and helped with setting up a time for the focus groups of three and five participants. In order to encourage discussion topics a discussion guide was followed by a variety of balanced to go meals were shown and other ideas for a balanced diet while driving were presented in both groups. All participants were allowed to take the meal samples home and they also received a snack bag containing balanced snacks. All participants, including those that were interviewed face-to-face, received a travel bag sponsored by the cooperation partner (Daimler AG) as a thank you.

For both interview types, inclusion criteria were: employed as a truck driver and mostly sleeping in the truck during the working week, as well as a sufficient knowledge of the German language. The interviews were recorded using a digital voice recorder. All participants received information regarding study aim, recording and data assessment procedures, data analysis and data protection. Written consent was obtained from all participants. Data with the potential to identify the data subject were



anonymized. The study was approved by the ethical committee of the University of Hohenheim.

### Material and discussion topics

The guideline for the one-on-one interviews contained questions and narration prompts regarding dietary patterns during the working week including snacks, food planning, preparation and storage options, meal times and available infrastructure on site, and eating with others. In addition, the participants were asked if they had any requests and improvement ideas for meals available at truck stops, for their companies or for stakeholders considering the existing infrastructure and legal requirements of their job situation. After each interview day, the guideline was adapted based on the information, knowledge and experiences shared. In addition, age, body weight and height were assessed via self-report.

The focus group discussions were planned and developed based on the results obtained from the one-on-one interviews. General questions about dietary patterns, food preparation and storage, meal options while traveling were also added, however, they were not as detailed as in the one-on-one interviews. Furthermore, several possible nutrition interventions specifically tailored to truck drivers were presented and described and the drivers' opinion regarding their attractiveness and feasibility was obtained. For instance, for each driver to be provided with a snack bag by their employer at the beginning of the working week. An example was presented, containing food items such as fruit, snackable vegetables, granola bars and nuts. Another example consisted of several combinable to go meals which can be stored without cooling, are easy to prepare, and represent more balanced alternatives to the meals mentioned during the one-on-one interviews. Alternatives included, for instance, instant rice, mashed potatoes, couscous or pea soup. Lastly, the idea of adding a tailored cooking class to the existing training seminars required for truck drivers was introduced and discussed before closing the group interview with the opportunity for the participants to offer further ideas or opportunities for improvement.

### Data Analysis

The recorded data was transcribed using f4 (Version 7, dr. dresing & pehl GmbH). The interviews were copied in German without shortening any context or correcting any grammatical errors. Data sequencing and structuring followed the qualitative content analysis [24]. In addition, the methods of Grounded Theory [25] were used to elaborate on possible categorization and dimensions emerging from the data set. Two central dimensions that could be determined among the participants regarding their dietary practices were detected. To clarify those dimensions, four fictional ideal types were constructed [26]. The four fictional ideal types do not represent actual real people's behavior but are meant to illustrate stereotypical characteristics with extreme behavioral patterns that are not or are only rarely shown in real life. Data was analyzed using MAXQDA (Version 20.0.1, VERBI GmbH).

## Results

Interviews were conducted with 15 truck drivers between the ages of early 20s to around 70 years old who were all working in the national and/or international long-haul transportation business. Generally, the drivers were working the entire week and sleeping in their trucks overnight. The weekends, however, were mostly spent at home. The participants' average Body Mass Index (kg/m<sup>2</sup>) was 26.8 (min. 22.4 – max. 33.9) kg/m<sup>2</sup>. The eight face-to-face interviews ranged from 31 to 49 minutes, while the two group discussions lasted 55 and 80 minutes.

### Storage Equipment and Food Preparation

All interviewed truck drivers had a cooling option in their vehicle that, according to their reports, had enough space to cool foods for the working week. They also all had a canister with drinking water in their trucks. Nine of the participants owned an electric kettle, only four participants indicated having a coffee machine. The majority of truck drivers (10 participants) had a gas cooker on board and only one driver replied to have neither a gas cooker nor an electric kettle in his vehicle. Depending on the season, drivers also used a charcoal grill or a disposable grill (3 participants). One driver indicated having a microwave and another one owned an electric grill.

### Description of the working day

#### Daily routine and meal structure

On the one hand, the daily routine of the truck drivers, due to the job and legal requirements, is very structured. On the other hand, route planning, traffic and delays during loading and unloading require the driver to adapt their schedule daily.

Depending on the start of their shift and their preferences, the drivers eat breakfast before starting to drive. Breakfast mainly consists of a sandwich with varying toppings. Rarely a sandwich or sausage is bought at a gas station or truck stop. Some of the participants only consume coffee or nothing at all before their drive, particularly if it is very early in the morning. Those drivers usually snack later during the drive or on one of the required breaks.

*"We cannot eat based on time, that is not possible. Um, at least not me, yes. Colleagues probably also can't. Um, you have to eat if you stand at the loading dock for instance. There you have nothing to do as the driver because your truck gets loaded. I often use the time to eat then, right."*



*You take something out of the fridge, whatever fits with the time of the day and the time you have, right.” (B04, 63-70)*

The drivers’ main meal occurs in the evening. During the day, the drivers mostly lack the time to cook or stop for a meal. Instead they consume snacks such as sandwiches or fruit. Some eat while driving, others eat during their break – the legally required breaks of 45 minutes – or during the waiting time once they have reached their destination.

Drivers reported being able to prepare a meal with the available equipment or eat at a restaurant/truck stop only when their scheduled daily route is done.

*“Of course to be honest, if I only have a nine hour break because I’m somewhere / I’m in a hurry. And I would use two, three hours to cook, then of course / that goes away from my sleep. Of course you make sure it goes fast. That means if I now have a nine hour break and I know I need to be on time the next morning, I would probably prefer a fast meal rather than take out the gas cooker [“Kocherle”] and warm up a schnitzel and everything else.” (B06, 537-546)*

Many participants mentioned high time pressure during their working routine to complete their assignments. The working days are often quite long. The driving time is legally regulated but this is only part of the working hours. Other assignments include loading and unloading of the goods, securing and checking the goods, book keeping and organizational tasks such as route planning, and making phone calls to supervisors or clients. In addition, there are the required breaks that are difficult to use effectively. Besides food intake, the breaks also need to be used for hygiene. Some of the drivers mention these reasons for not having the time to prepare (laborious) meals. However, some of the drivers also indicate that they are not under time pressure while working.

### **Preparation for the journey**

Most participants go shopping on the weekend to buy all necessary foods for the working week. Only a few indicate that they regularly go grocery shopping during their working week. Bread, spreads and lunch meats as well as yogurt, muesli, fruit, salad or vegetables are the main foods stored in the truck. Besides self-cooked meals, mainly leftovers from meals cooked during the weekend, canned foods such as ravioli, goulash, and meals that can be warmed up easily in a pan such as eggs, sausages, schnitzel or meatloaf, were mentioned the most as warm meals taken to work. The view on canned or dried packaged foods (e.g. “five minute soups”) was not always positive but some participants reported these as emergency or makeshift solutions in case eating as usual was impossible when all parking spots were taken at the end of the day.

Chocolate and nuts, fruits and vegetables, such as apples or carrots, and also yogurt were mentioned often as snacks. Snacks were considered a good distraction while driving or a way to stay awake, particularly in the evening and during the night. However, snacks were also seen as a way to satisfy hunger when there was no time to stop for a meal. Some drivers avoided snacking on too many unhealthy foods and therefore were eating, for example, sunflower or pumpkin seeds as snacks.

*“That is a small portion, you keep busy with it. And yes, you simply stay awake and you have something to do while driving, otherwise it is quite monotonous.” (G2-1, 931-934)*

### **Meal preparation**

Meal preparation mainly occurs in the afternoon or evening when the drive for the day is over. The variety of prepared meals is wide – ranging from freshly prepared salad to fried potatoes to fried meat loaf or warmed up canned meal. Canned food was mentioned the most by the participants. Whether somebody prepares their own meal depends on their individual preferences and varying circumstances. One topic is the difficulty of finding a parking spot. If parking can only be found in an industrial area or a public parking lot, the drivers’ stocked foods have to be used. But also the truck stops’ menus were in part considered unacceptable, especially in the evening. Another topic/issue is the fact that the use of a gas cooker in the cabin of the vehicle is not allowed which makes the weather conditions a crucial factor in the decision to use it for meal preparation or not.

*“It always depends on the temperatures, the outside temperatures. Because I have a gas cooker with me. [...] And then I make myself, if the wind is somewhat calm (laugh), then I make myself something to eat.” (B04, 20-24)*

Besides the danger and the legal ban, the smell when using gas cookers is another reason for not cooking with it in the truck cabin. Some drivers occasionally meet up to grill together if their itineraries allow it. However, this was only mentioned rarely and seems to be a rather special event.

### **Shopping on the go**

Shopping options are limited for truck drivers. Besides certain gas stations, truck stops usually do not have groceries in their assortment. Depending on the transported goods, the roads may go through areas with supermarkets. To reach grocery stores, vehicles usually have to get off the highway which can cause parking problems for trucks since many supermarkets prohibit them to use their parking lot. Therefore, buying fresh groceries while working is unfeasible for this occupational group and the necessities for the week need to be taken from home.

### **Eating on the go**

The option to eat on the road is perceived very differently. Some participants perceive the cost-effectiveness at truck stops as unacceptable. It is mainly the quality and freshness of the meals that are criticized. The selection is also often limited and hardly contains fresh ingredients. In addition, the available meal choices



hardly differ between different locations and regions within Germany. Also, the prices are too high considering the current allowable expenses.

*"[...] but if you go inside now or in the evening at eight o'clock or nine, [...] the offer is minimal and everything is simply kept warm. You can already see it, from the look, right, if the fish is already turning upwards and the fried potatoes start to curve, for instance." (B02, 280-285)*

Regarding food quality, a large difference was noted between truck stops and motorway service stations. The latter were more comparable with "normal" restaurants – you order your food which is then freshly cooked. Many participants gave positive feedbacks about the food, for instance regarding fresh ingredients, price or variety. It is important to note that a fee is required for parking at a truck stop (around 10 Euro per night) – and a part of the cost can often be redeemed as a food voucher for the truck stop restaurant.

Fast food chains are seldom used as a meal options and also rated rather negatively, except for their coffee, regarding visits and quality. Some drivers report to eat there "in emergencies" or in exceptional cases, others avoid it completely. Additional food options do not play a role in the daily life of most drivers since they mainly are not on the way or are hard to reach or to find parking. If circumstances allow it, for instance when routes go via country roads, drivers are happy to stop at bakeries or butchers to buy a sandwich. Other snack options, such as curry sausage or French fries are unfortunately harder to find compared to in the past.

*"B1: snack stands have simply closed. They simply don't exist anymore. [...]"*

*B5: No, nothing anymore.*

*B1: Gone for a long time.*

*B4: At the most, the police control stands there.*

*B1: Exactly.*

*B3: But they don't offer curry sausage. (Laughter)" (G2, 322-367)*

## Proposed support

### Snack bag

A provided snack bag as proposed support for a balanced diet seems to be useful to the drivers only under certain circumstances. Some drivers start their working day directly from home and cannot pick up the snack bag before work, others start their day so early on Monday morning that the snack bag would have to be made available already on Sunday. For these circumstances and for an easy storage in the cabin, the snacks need to last without having to cool them. The participants mentioned several times that because of allergies and taste preferences, the food choices within the snack bag should be personalized. Small portions were also seen as useful, e.g. chocolate or nuts in amounts that were not unbalanced, but meaning they would not have to be bought by the driver.

*"The problem with those things. [If you] open a pack, it is gone." (G2-1, 848 f.)*

### Presentation of various to go meals

Several focus group members knew some of the products, other products were mainly unknown. The participants were surprised by the range of available products, offered additional ideas related

to the products and proposed combination possibilities. It seems to be useful to further explore this topic in order to increase meal plan options.

*"I have to admit that I am very repetitive and you now gave me the idea again that I could buy those products more often, yes, that's right. As I said, I buy very repetitively. I have my routine, I / fridge, therefore and also I am very repetitive. [...] As I said, it is simple, // you get tunnel vision, because you're on the move. You simply don't look right or left. Simply you know THAT, it goes fast, it's ok and that is the main problem I think." (G2-1, 2862-2867; 3649-3653)*

*"Great, you have to be honest, you walk through the store, you always look at the same stuff." (G1, 1961-1963)*

The focus group members' feedback related to the presented products and its substitution with other products. Opportunities to be provided with new meal products to change their purchasing and consumption routines were welcomed.

### Continuing education workshops

According to German qualification laws (Berufskraftfahrer-Qualifikations-Gesetz), truck drivers have to attend regular continuing education workshops. Within this context, modules regarding the health of drivers are also scheduled. However, nutrition is rarely part of the discussed health topics and if so, is hardly applicable to their daily routine.

*"B1: I would say it is talked about briefly for five minutes and that was it. But I don't think that it was ever a real topic, right?"*

*B3: A little bit of content.*

*B1: Yes, I would say yes.*

*B3: You are not supposed to eat late, and not too much.*

*B1: Not too greasy, yes. But that was it." (G2, 3204-3216)*

The idea to put more emphasis on this topic was rated by all participants as very positive. The drivers would appreciate more information, ideas, and suggestions, maybe using a guided group seminar. Some participants are critical of the idea of a cooking class since they perceive the way of the actual preparation process as less of a problem.

### Nutrition education

The data also revealed additional interesting aspects that might be best approached using goal-oriented nutrition education to increase the drivers' awareness of a healthy lifestyle and to promote healthy dietary alternatives



while driving. The interviews showed that the truck drivers are very well connected with each other through social media platforms which could help with this approach. In addition, there are several magazines specific to this occupational group that are read by many of focus group participants.

### Dimensions of constructed types

Based on the data, two dimensions were extracted that show the differences among the interviewed truck drivers (Fig. 1). The constructed types should be considered as ideal-type descriptions of extremes of a two-dimensional range of driver types that will be explained further below. A real-type assignment of drivers can be made all along the dimensions. Based on the type of driver, different daily issues are apparent.

#### 1. Dimension: Level of self-sufficiency

The interviewed truck drivers differed strongly in their habits, choosing either to buy meals or cook self-prepared warm meals. Although all kinds of habits are described, most participants report one of two meal types the most. Some participants usually take their own meals along to be prepared at the truck and they only go out as an exception. Others usually eat in a truck stop restaurant and they only cook if they could not find parking at a designated parking lot close to the truck stop. One interesting aspect to consider is the financial aspect. While some drivers mention that they cannot afford to eat at a restaurant regularly, others do not seem to have the same problem. One influencing factor seems to be whether or not the logistic companies pay for parking. The majority of the participants that report that the price is no problem also indicate that their logistic company pays for parking. Since the parking fee also often includes a food voucher for the nearby restaurant, the drivers' company indirectly also pays for parts of their meal. However, some of the participants report that they get reimbursed for the parking fee but not the food voucher cost. Others receive no reimbursement for parking and therefore try to avoid truck stops with paid parking.

*"Well and then you just go to the restaurant in the evening, order something so the food voucher gets used. And you sometimes manage to eat for four, five Euro and you have a complete meal where everything is included. [...] So we get, um, those, um, those parking fees, that we need to pay*

*at truck stops, those we, um, get back at the end of the month."* (B05, 225-230; 539-541)

It is important to mention that companies have to pay fixed allowable expenses.<sup>1</sup> The drivers, however, indicate that the expenses are not enough to pay for the food.

*"Because, let's say you have 24 Euro daily expense allowance. I don't know what you pay here as parking fee. But yesterday I actually paid 15 Euro parking fee, 10 Euro was for food, five Euro was pure parking fee. If I then pay 3.49 more Euro for the shower. If I then go eat, for ten Euro I don't get anything. If I add a tenner. Then you just avoid it."* (B07, 149-156)

#### 2. Dimension: Level of flexibility

The second dimension describes the handling of the daily challenges related to food independent of the individual position within the first dimension. The data shows that the individual perception of problems as well as the flexibility to overcome problems varies widely. This is independent of whether the meal is cooked personally or whether a restaurant is chosen.

As an example, the effort to cook was considered too high for some of the drivers due to the lack of time or being tired at the end of the working day while others perceived cooking as a form of relaxation.

*"Yes, so I think, I don't know, but I think it is cozy to sit in front of my gas cooker in the evening when I'm done with work and I turn on the TV or search the internet a bit and cook a little on the side. That is simply to chill."* (G2-1, 3035-3039)

*"But nobody does that, make a salad in the truck in the evening, because they don't feel like it or don't have the time."* (B07, 424-425)

Another example is the shopping behavior while on the road. Many participants comment on the parking restrictions at supermarket parking lots as reason not to shop during the trip, while other participants seem to regularly shop while on the road.

*"Parking is banned everywhere for trucks. And where you MIGHT find a way to shop, they put huge stones there to make sure that no truck can park there, right. I was already fined 15 Euro for parking in a no-parking zone and I said "I only need to go inside to get some food" but nobody was interested. It says no parking, 15 Euro."* (B02, 131-138)

*"Well to me // nobody ever said anything. Nobody ever showed up and said that the truck needs to go or anything. Never had any issues."* (G2-1, 2197-2199)

### Ideal types

The following ideal types are extreme in their characteristics. They do not necessarily occur in real life but are supposed to serve as explanation for the dimensions. The majority of real cases are mixed forms of those types and can be found along the entire spectrum of the dimensions.

#### The happy eating out type

Within this type are only drivers that frequently visit truck stops, which is possible because their companies pay for these expenses.

<sup>1</sup> At the time of the interviews (2019), the allowable expense was 24 Euro per day. For 2020, the expense allowance was increased to 28 Euro.

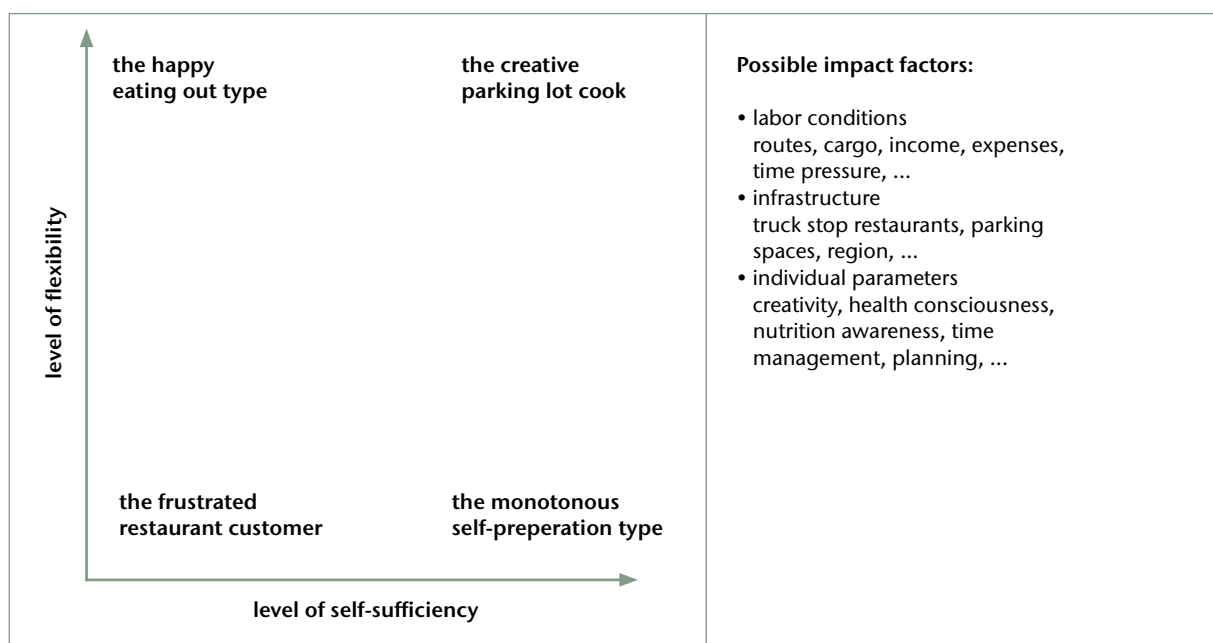


Fig. 1: Distinguishing dimensions across truck drivers in relation to their daily eating practices.

Nevertheless, the driver also needs the financial possibilities to pay their personal share if required. A preference for hearty and classic dishes such as schnitzel with french fries or goulash soup is often observed in this type.

#### *The creative parking lot cook*

This type likes to cook at his truck after work and enjoys cooking more than one food type in the gas cooker. Ready to eat meals are unavoidable but fresh food is bought during the trip.

#### *The monotonous self-preparation type*

This type of driver simply cooks in the pot or pan, whatever is the most convenient and fills up the stomach the fastest.

#### *The frustrated restaurant customer*

Given that he feels that he does not have another option, this type of driver continues to eat the same, badly prepared, too expensive, unhealthy and dried up meals at the truck stop restaurants. He doesn't like to cook and only does it when it is absolutely necessary.

## Discussion

The qualitative study revealed detailed insights into the daily eating practices of truck drivers taking individual circumstances and preferences into account. As confirmed in other studies, truck drivers reported long and irregular working days, time pressure and few opportunities for a balanced diet while driving [14].

It could not be determined that there was general dissatisfaction with the eating situation among all the truck drivers, however, the majority of the participants saw an urgent need for improvement in some areas. As also described in other studies [17, 18], this

was mainly related to shopping opportunities – either better offer at truck stops or better parking options at supermarkets – and meal offers at truck stop restaurants. Some drivers also proposed improvement for more storage options and working space in the truck cabin, but also reported that the storage space for food for one week is sufficient. The majority of the drivers did not see the need for more technical equipment such as a microwave. Furthermore, the data showed that the group of professional truck drivers is not homogeneous and the challenges for following a balanced diet vary based on structural prerequisites or individual habits. This should be considered both in the analysis of general working conditions and problems as well as in the development of interventions. Also, drivers' habits are not static but can change when changes occur in the working conditions which might lead to moving to another dimension type. A driver who is used to eating at the truck stop restaurants could turn into the occasional cook with new preparation ideas. A driver that cooks for himself could become someone eating at the truck stops if the logistic company starts paying the expenses. Which type should be considered most beneficial regarding health is hard to determine. All types allow a healthy and an unhealthy dietary style. In fact, a high degree of flexibility does not ensure a balanced diet but this aspect appears to have a positive impact on following a balanced diet.



Improvement options can be identified on a personal and structural level. The problem is the infrastructure around the truckers' "working space", as was also described in other studies [17, 18]. Besides improvements on the legislative level (labor legislation, infrastructure such as parking lots) and economic level (meal options at truck stops and shopping choices), structural improvements can also be initiated by the employer. Examples could be the snack bags discussed in the focus groups or the reimbursement of the parking fees in addition to the allowable expenses mentioned in the one-on-one interviews. The snack bags could be helpful for all driver types since all drivers snack independently of the degree of self-sufficiency, which was also shown in other studies [11, 27]. The provision of balanced snacks could be beneficial as long as they replace unhealthy snacks. Other improvements could entail the attractiveness of eating out. This would be advantageous for those that already tend to eat out and also for those that avoid eating out due to financial limits or due to the as badly perceived meal choices [18].

On the individual level, nutrition related intervention possibilities are more diverse since no political willpower needs to be in place. Here, it is the primary aim to provide the truck drivers with new ideas and ways to eat a more balanced diet. The mentioned "tunnel vision" while grocery shopping is probably not only the case for this occupational group but, given their limited shopping opportunities, it might have a greater impact than for other occupational groups. Besides resource intensive individually conducted interventions that require experts in nutritional therapy or psychology [19, 28, 29], sharing ideas with each other on how to eat a balanced and diverse diet might be easily accomplished during the required continuing education training, during workshops organized by the logistic companies, in group specific magazines or on social media platforms. Products or a combination of products including their preparation and cooking could be recommended and shared. These actions could be particularly beneficial for the "monotonous self-preparation type" but also for the "creative parking lot cook". The "happy eating out type" could benefit as well since cooking more often might lead to more variety and even saves money.

Overall, it can be noted that the interviewed drivers showed great interest in nutrition as a topic and were open towards the suggested

ideas. The main critical issues reported by the drivers were related to meal and shopping opportunities. Mentioned barriers for a balanced self-prepared meal were time pressure, lack of motivation or ideas and missing equipment.

## Limitations

The recruitment approach could have influenced the sample. It is possible that the truck drivers who agreed to participate were particularly interested in nutrition. Furthermore, the sample of drivers only included German speaking drivers that usually drive five days a week and spent the weekend at home. The majority of the truck drivers that drive in Germany, however, are on average longer than five days on the road [11]. Drivers based out of Eastern Europe, who drive over several weeks, would probably face even bigger challenges regarding their diet not only because of the long tour but also because of the low wages they receive. Since the personal background of the drivers, such as the working conditions or the family background, was not specifically investigated and the sample size was small, only a few conclusions can be made regarding the influences of individual and workplace factors on dietary practices and presented dimension types.

## Further questions

The elaborated dimensions should be confirmed regarding their potential to explain different aspects of eating behavior in future studies, particularly in quantitative studies. In addition, health related differences between types of drivers and along the dimensions should be examined further to determine whether individual and structural circumstances determine the type or manifestation of a dimension. Research should also be conducted with drivers that travel for longer than one week at the time and also with drivers who have a lower income. The travel route and the transported goods might also play a role in regards to the meal choices. Using a larger sample size, perhaps by administering a questionnaire, the actual influence of a parking fee reimbursement by the employer could be examined. Lastly, the proposed intervention ideas should be further elaborated and their effectiveness need to be tested.





#### Financial disclosure and conflict of interest

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