IMPACT OF CONSUMER VALUE ON THE SELECTION OF A SAFE CHILD SEAT

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Resume

Unfortunately, nowadays, choosing the right child seat is a real problem, especially for new parents. When choosing a child seat, parents have to consider many factors. These include the method of mounting the seat, the mass of the seat, compatibility with a pram and information about crash tests and approvals. The main purpose of the article is to draw attention to the problem of choosing a safe child seat and the purchasing preferences of parents or legal guardians who decide to buy a child seat. For this purpose, a survey was conducted on a group of 950 people with children. The conducted research has shown that the main parameter influencing the choice of a child seat is the price for men and the social opinion and mass of the child seat for women. In addition, research has shown that most people decide to buy a child seat based on the installation system using a standard ISOFIX base.

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1 Introduction

Before the youngest vehicle users started traveling safely, vehicle seats had come a long way. The golden age of producers in this industry has only lasted for about 40 years. The first regulations for the safety of children in a vehicle were approved in 1971 in the USA. Previously, the constructors wanted to implement many ideas, but they did not always put the safety of the child in the first place. Today, it is the protection of the little passenger that is the most important. It took about a hundred years for baby seats to resemble today's vehicle seats. In 1907, Henry Ford launched a vehicle factory and it was the first drivers who tried to invent something that would effectively limit the movements of the youngest family members while traveling [1-3].

The prototypes of current vehicle seats certainly include a structure resembling a swing seat from the 1930s. The "child seat" of that time was mounted on handles to the rear seat and effectively limited the movements of a small passenger. Some models were even equipped with a steering wheel so that the child could feel like a real driver. Another interesting concept in the 1940s was the creation of a metal box in which a child would sit. Of course, there was no mention of seat belts yet, and the "seat" itself still did not increase safety while driving [2, 4-5].

The breakthrough came in the 1950s. Roger Grisswold designed the 3-point vehicle belt for the first time in the world. After a few years, they became standard equipment in every vehicle that left the factory [2, 6].

In 1964, Swedish professor Bertil Aldman discovered the protective effects of rear-facing vehicle seats after watching an American television program showing the location of astronauts in the Gemini space capsule. He designed the first rear-facing vehicle seat. Thanks to Aldman's research and the pressure of researcher Thomas Turbell, Sweden set a "T standard" that was so strict that it was almost impossible to get past a forward-facing vehicle seat. This started the tradition of transporting children in a rear-facing vehicle seat until the age of 4, which continues to this day. Thus, less than 10 years after the invention of the seat belt, the first prototypes of the current rear-facing vehicle seats - RWF - were created. Yes, the constructors already knew that such a setting would increase the safety of the passenger and, in accordance with the laws

of physics, reduce possible injuries in the event of an accident [7-9]

The first regulations regarding the safety of children transported in a vehicle were approved in the USA in the 1970s. The first designs of vehicle seats did not resemble those that are installed in modern vehicles. Their construction and appearance resembled a swing, which was attached to the backrest of the driver's or passenger's seat. After the three-point seat belts were patented, they began to be installed en masse, which also made them mandatory equipment in every vehicle. After about a decade, they were also fitted to vehicle seats [4-6].

The first safety tests were performed by the Swedes in the 1980s. Then the T-Standard was created. The tests involved the force of the body on the child's neck during a collision. The results of the tests allowed to refine vehicle seats and increase the safety of small passengers. The models designed at that time most resemble those currently used by children around the world [10-12].

However, this does not mean that manufacturers have stopped looking for new solutions, since already in the 90s, American and Canadian experts, after a decade of work, created Isofix - a system for quick and safe installation of vehicle seats for children. This modern system reached the old continent before 2000. It was implemented by the Britax Romer brand. With the passage of time, every company wanted to offer seats with the Isofix system, and the trend towards safety continues to this day [8-9, 12].

Over the years, the purpose of vehicle seats and their prototypes has changed. Their shape, materials used for production and range of functions have evolved. At first, their task was only to immobilize the child so that it would not disturb the driver and would not damage the vehicle. It was only later that the vehicle seat began to be used to protect the little passenger. The advantages of traveling in a rear-facing vehicle for children have been known almost since the first vehicles in the world were created. To this day, it is considered the safest position from birth to about 4 years of age. The Isofix system is still the most popular method of installing a vehicle seat in the vehicle [2, 6, 9].

Approval tests for child seats are focused on the assessment of protection against the harmful effects of collisions [13-15]. To this day, this type of research does not include the impact of vibrations on the body of a child transported in a child seat. It is worth paying attention to the fact that today's society is increasingly traveling with small children. A child seat is not used as an element of a passenger vehicle to transport a child in emergency situations, but is an element used every day. Vibrations transferred from the vehicle body to the seat of the child seat during long journeys have an impact on the child's body and have a negative impact on their health [7-8, 12].

Over the years, the amount of time spent in vehicles has increased drastically, which is why people are increasingly looking for more comfortable vehicles. Manufacturers of vehicle seats have become interested not only in the safety of the child seat, but also in its functionality and relative comfort (partly in vibration comfort and thermal comfort) [16-18]. Therefore, the quality of vehicle seats is very important for vehicle users. Vibrations while driving can cause many pathological symptoms of the digestive system, pain in the lumbosacral region and the cervical spine, kyphosis and lordosis of the spine, joint and muscle pain, vertigo symptoms (motion sickness), headaches [16, 19-20]. They can also contribute to the limitation of mobility, vision, free communication, weakening of memory processes and perception. The safest way for children to travel in vehicles is to transport them in vehicle seats that should be adjusted to both the mass and dimensions of the child. The dimensions of the vehicle seat are very important because the rapid anthropometric changes in body dimensions of young children require a good fit [17, 19-20].

Unfortunately, the vehicle seat classification system only refers to the age and mass of the child, not the dimensions. When designing child seats, the materials from which they are made play an important role. One of the innovations that improve the safety of products such as vehicle seats or baby carriers is the use of ultra-light, expanded polypropylene (EPP) [21-23].

Vehicle seats must meet stringent federal crash test regulations, which are also constantly evolving. Child seats also have an expiration date. Additionally, parents are taking safety product recalls seriously. These days, parents do extensive research on vehicle seat options. Many people take the extra step of having their vehicle seats checked for proper fit by a child safety technician. It should be noted that no one had heard of such a possibility to check the vehicle seat 25 years ago [24-26].

Road safety in the EU has improved over the last decade. The number of road accidents and fatalities in road accidents is decreasing [27-28]. Unfortunately, it should be noted that even the safest child seat, when it is poorly selected for a passenger car and poorly attached, will not fully protect the child.

2 Research methodology

The subject of the study was an analysis of the indications of purchase preferences of child seats made by parents or legal guardians. The results of the survey show the purchasing preferences of parents or legal guardians in the context of choosing a child seat. The aim of the research is to draw attention to the problem of choosing child seats and to draw attention to the purchasing preferences of child seats. The survey was carried out at the Department of Motor Vehicles and Transport at the Kielce University of Technology in

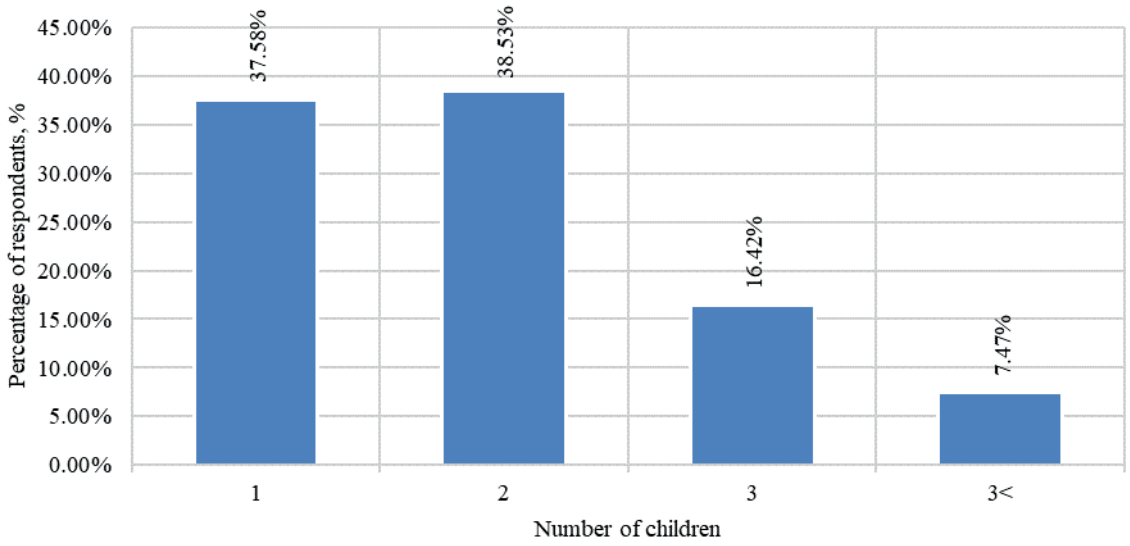

Figure 1 *Characteristics of the respondents in terms of how many children they have*

the period from October 1, 2020 to October 1, 2022. The survey was aimed at finding out the respondents' shopping preferences in terms of child seats.

The survey was created using the google survey form. The link assigned to the survey questionnaire was disseminated on social media and thematic forums on child seats. The survey was fully anonymous and consisted of closed-ended questions. Before entering the survey, respondents accepted voluntary participation in the survey and were then asked to indicate whether they had children. If the respondent did not have children, he or she could not take part in the further study procedure. At the beginning of the form, respondents were asked to indicate their gender, age, place of residence and the number of children they had. They could then move on to questions about their purchasing preferences for child seats. A total of 1752 interested people took part in the study. It should be noted that as many as 802 respondents did not have children, so they did not participate in the questions regarding their purchasing preferences for child seats. The study involved 950 respondents with children. Respondents were diverse in terms of gender and age. 521 women (55% of all respondents) and 429 men (45% of all respondents) participated in the study.

3 Survey research

According to the data of the Central Statistical Office, in 2022, 305,000 children were born in Poland. This result is lower by 26.5 thousand children as compared to 2021. A total of 1,367,300 were born in Poland in the last 4 years. Each of these children will need a child seat so that they can travel safely in a passenger vehicle. One will need a carrier-type child seat, which is designed for newborns, in addition, after about 12 months, the child will have to change from a carrier-type seat to a child seat for children from 12 kg to 36 kg. Each of the newborn children must be transported rear-facing. Manufacturers of child seats for infants and newborns, when designing the seat, do not allow it to be installed facing the direction of travel. This is mainly due to the provisions of Polish law, which clearly state that in vehicle seats designed for a mass of 0-13 kg, children can only be transported rear-facing. This applies to children up to about 15 months of age. In the case of older seats, if the seat is mounted on the ISOFIX base, they have the option of transporting the child rear-facing. Specialists agree that if a toddler can still drive rear-facing, a forward-facing FWF vehicle seat should appear in our vehicle as late as possible. The forces acting on a child's body during a collision or collision are extremely strong. Specialized tests confirm that RWF vehicle seats protect children better, and traveling rear-facing is much safer than when we have a forward-facing vehicle seat.

Only people with at least one child participated in the study. The respondents are diverse in terms of age, the survey involved 487 people aged 18 to 25, 275 people aged 26 to 35, 112 people aged 36 to 45, 55 people aged 46 to 60 years of age and 21 persons over 60 years of age. Figure 2 shows the characteristics of the respondents in terms of age. The largest group of respondents were people with 2 children (38.53 %). Moreover, 37.58 % of the respondents had one child, 16.42 % of the respondents had three children. Only 7.47 % of the respondents had more than three children. The characteristics of the respondents in terms of children they have is presented in Figure 1.

In the next question, respondents were asked about the frequency of travel of a child in a child seat. This question uses a 5-point Likert scale. The respondents' answers are presented in Figure 2. The frequency of

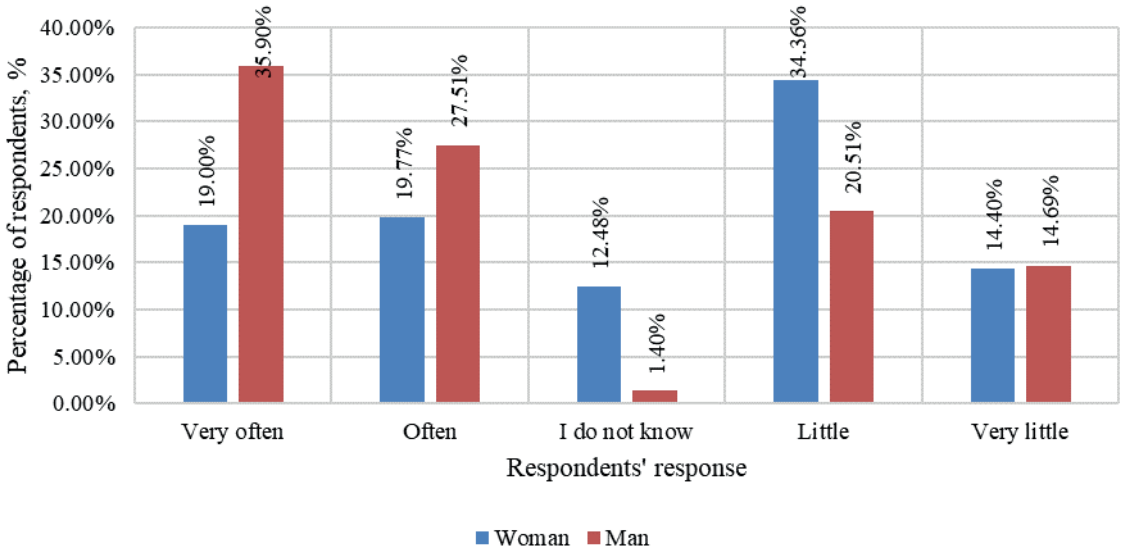

Figure 2 *Frequency of travel of a child in a child seat with one parent driving the vehicle*

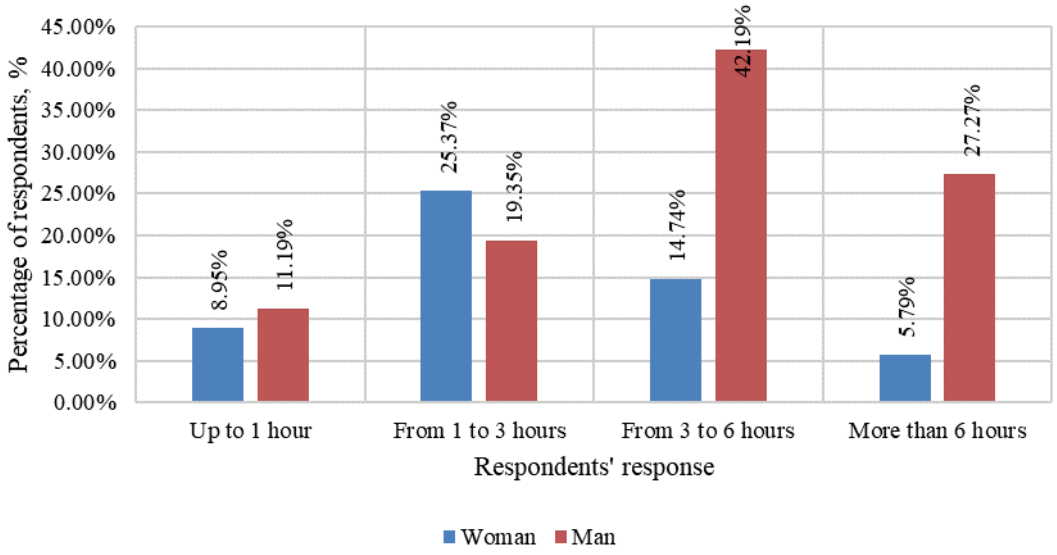

Figure 3 *Total time of transporting a child during the week*

children traveling in child seats is very diverse in terms of the respondents' gender. It should be noted that 19% of women and 35.90% of men travel with a child very often, and 19.77% of women and 27.51% of men travel often with a child. A different opinion is held by 14.40% of women and 14.69% of men who travel very little with a child, and 34.36% of women and 20.51% of men who travel a little with a child. At the same time, it should be noted that as many as 12.48% of women did not give a clear decision. The survey results suggest that men are more likely to travel with children than women. This may be due to the fact that men drive more often than women.

In the next question, respondents were asked about the average travel time of a child in a vehicle seat. The respondents' answers are presented in Figure 3. It should be noted that men travel with a child longer than women during the weeks. The data shows that during the week only 14.74% of women travel together with a child placed in a vehicle seat for 3 to 6 hours, compared to 42.19% of men. In addition, in the case of the total time of transporting a child in a child seat over 6 hours during the week, there are more men (27.27% of men and 5.79% of women). In the case of persons transporting a child between 1 and 3 hours per week, there are more women.

Respondents were asked in the next question about the type of fastening of the child seat currently in the respondent's vehicle. The answer to this question is presented in Figure 4. 27.26% of the surveyed women and 23.08% of the surveyed men have a vehicle seat fastened with standard seat belts. A child seat with an ISOFIX base is used by 41.65% of the surveyed women and 55.48% of the surveyed men. It is worth noting that

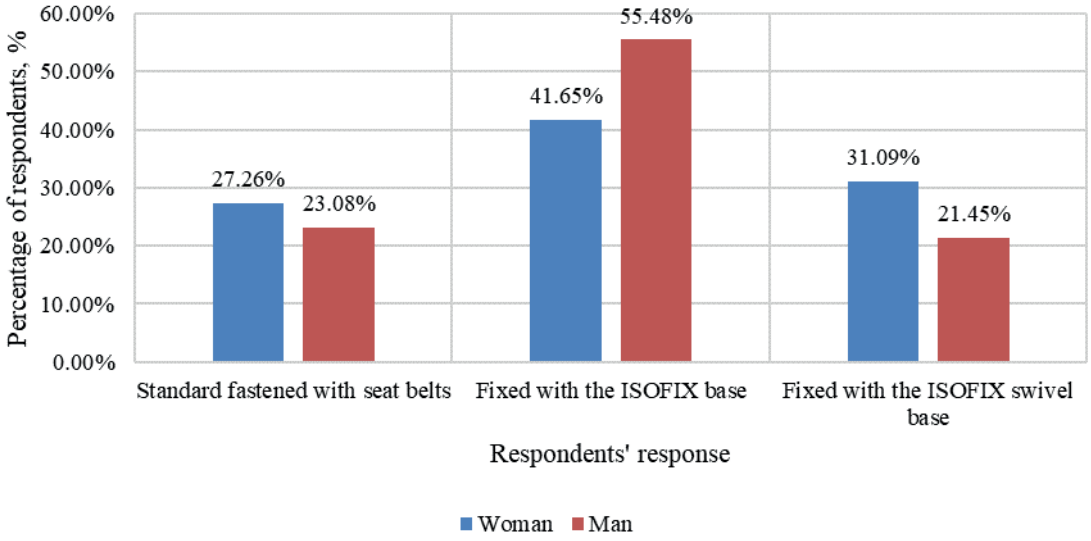

Figure 4 *Type of child seat attachment*

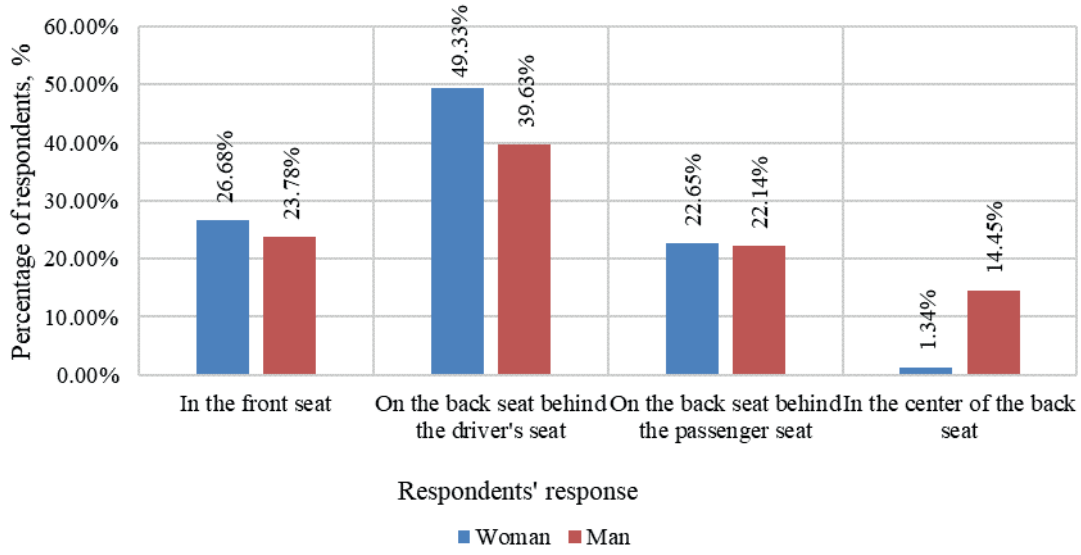

Figure 5 *Place of mounting a child seat*

a vehicle seat with an ISOFIX swivel base is used by 31.09 % of women and 21.45 % of men. At the same time, it can be seen that the most popular type of child seat mounting is the ISOFIX base and the ISOFIX swivel base.

In the next question, the respondents were asked to indicate the place of fixing the child seat in a passenger vehicle. The answer to this question is presented in Figure 5. It should be noted that as many as 26.68 % of the surveyed women and 23.78 % of the surveyed men have a child seat mounted on the front seat. 49.33 % of the surveyed women and 39.63 % of the surveyed men have a vehicle seat installed on the back seat of a passenger vehicle behind the driver's seat. As many as 22.65 % of the surveyed women and 22.14 % of the surveyed men have a child seat installed on the back seat of a passenger vehicle behind the passenger seat. Only 1.34 % of the surveyed women and 14.45 % of the surveyed men have a child seat installed on the rear seat of a passenger vehicle in a central position.

In the next question, the respondents indicated their own shopping preferences for a child seat. The characteristics of the respondents' shopping preferences are presented in Figure 6. Undoubtedly, it should be noted that choosing the right vehicle seat is a difficult decision for parents and legal guardians. A lot of information presented by sellers, manufacturers of child seats, scientists, can be contradictory. In addition, the lack of awareness of parents about crash tests, materials used, and how to install a child seat can lead to wrong decisions. The collected survey data show that 78.55 % of men and 41.07 % of women, when choosing a child seat, are guided by its price. The mass of the child seat is suggested by 52.39 % of women and 37.06 % of men;

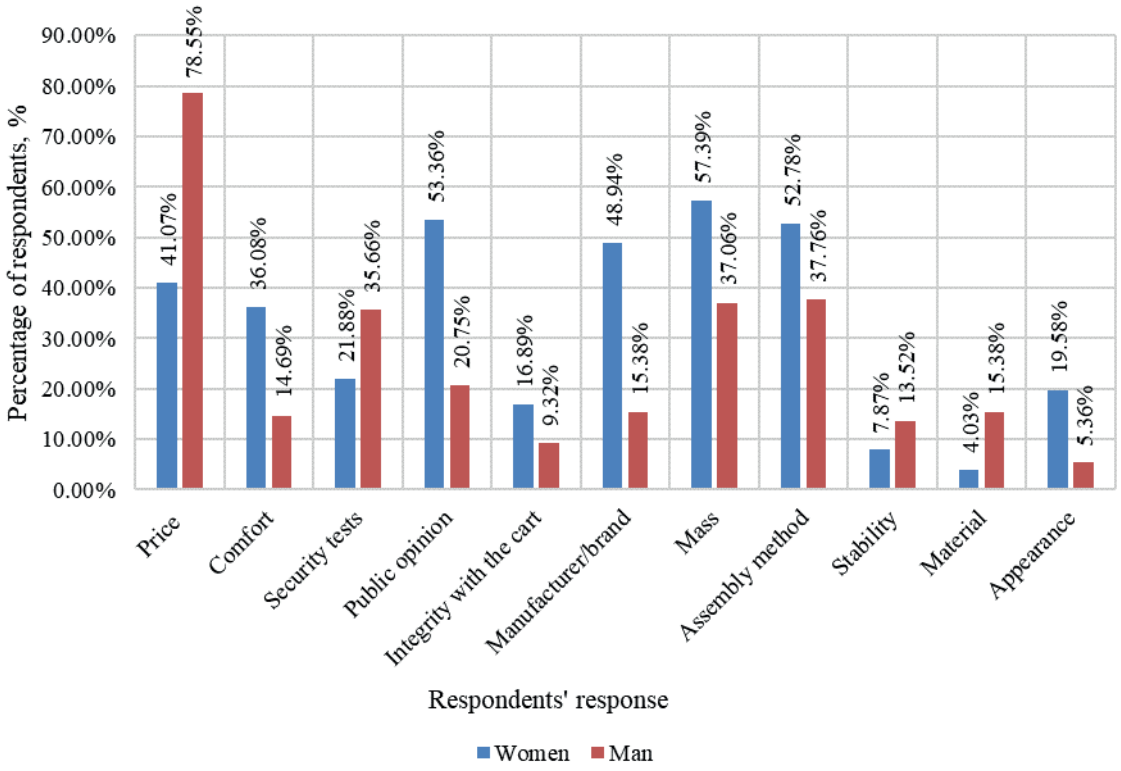

Figure 6 *Characteristics of respondents' shopping preferences*

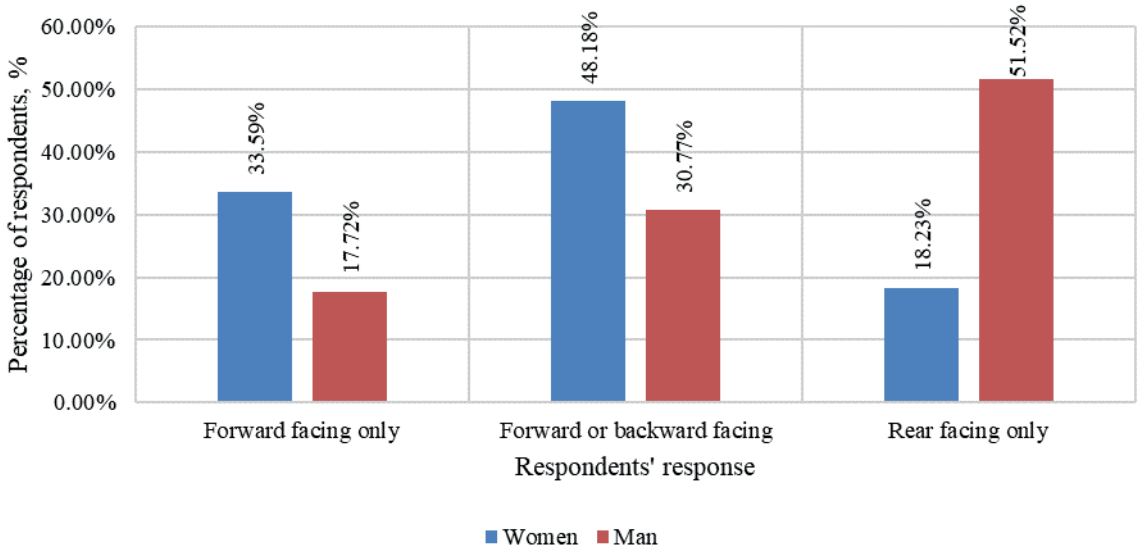

Figure 7 *Possibility of a child seat in the direction of transporting a child*

52.78% of women and 37.76% of men are interested in the method of installing a vehicle seat in a passenger vehicle. The public opinion on the child seat is suggested by 53.36% of women and 20.75% of men. Only 21.88% of women and 35.66% of men are interested in crash tests of a child seat. Undoubtedly, it should be noted that when choosing a child seat, men pay more attention to the price, crash tests, stability of the seat after assembly and the materials used. On the other hand, women are more likely to pay attention to the comfort of the child in the child seat, public opinion, integration of the child seat with the stroller, the brand of the child seat, the mass of the child seat, the method of assembly and the overall appearance.

In one of the questions, the respondents were asked to specify the possibility of transporting a child in their child seat according to the direction of travel. The answer to this question is presented in Figure 7. It should be noted that 33.59% of surveyed women and 17.72% of surveyed men have the option of transporting a child in a child seat only facing the direction of travel. Only rearward facing 48.18% of surveyed women and

30.77% of surveyed men. At the same time, it should be noted that 51.52% of the surveyed men and 18.23% of the surveyed women have a child seat that can transport a child both rearward and forward facing.

In the next question, the respondents were asked "Did the seller offer to try the vehicle seat on when buying the vehicle seat". The respondents' answers to this question are presented in Figure 8. It should be noted that as many as 39.35% of the surveyed women and 14.92% of the surveyed men, when purchasing a child seat, had the opportunity to try the seat directly on a passenger vehicle. Moreover, 10.56% of women and 16.32% of men declare that they probably had such a possibility. Lack of such possibility is declared by 17.66% of women and 8.16% of men. In addition, as many as 30.90% of women and 55.01% of men declare that they did not have such a possibility. The collected data shows that very few people try on a child seat in their vehicle before making a purchase.

In the next question, the respondents were asked to indicate the presence or absence of a system that monitors the correct installation of a child seat. The respondents' answers to this question are presented in Figure 9. It should be noted that 48.18% of the surveyed women and 21.21% of the surveyed men declare that such a system is present in their child seats. In addition, 19.39% of women and 27.97% of men declare that such a system is rather present in their purchased child seat; 20.15% of women and 31.70% of men probably do not have such a system in the purchased vehicle seat. Certainly, there is no such system in the purchased child seat by 10.56% of women and 16.32% of men.

In the last question, respondents were asked to indicate the frequency of crying of a child in a child seat. The respondents' answer to this question is presented in Figure 10. It should be noted that an incorrectly selected vehicle seat may be the cause of frequent crying of a child when traveling in a child seat. However, these reasons may be more and may be related to incorrect installation of the seat, the place of attachment or the method of attachment. The collected data show that the child usually always cries in the child seat

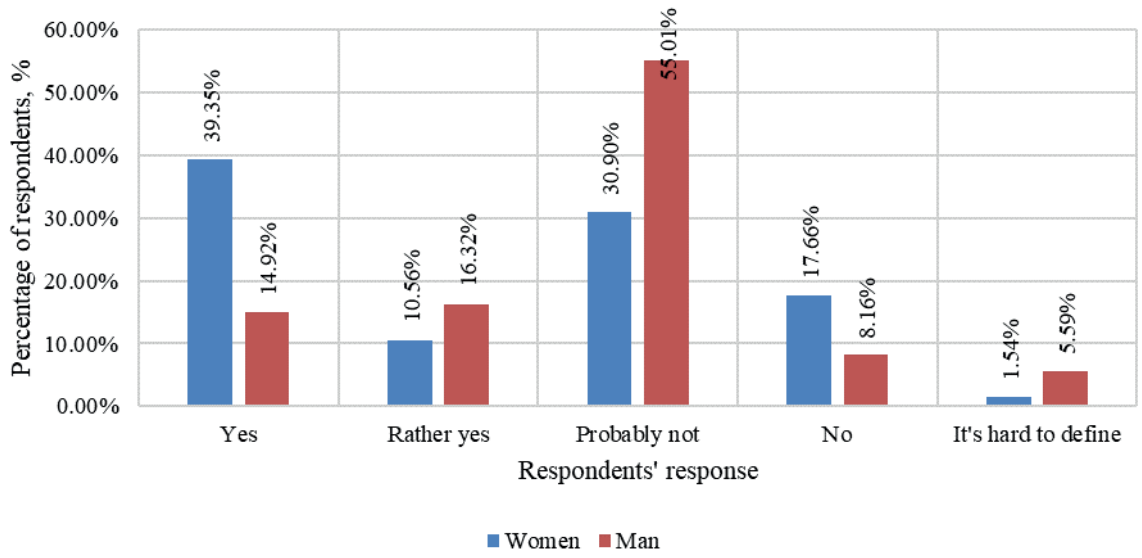

Figure 8 *Possibility of trying on a child seat before buying it for a passenger vehicle*

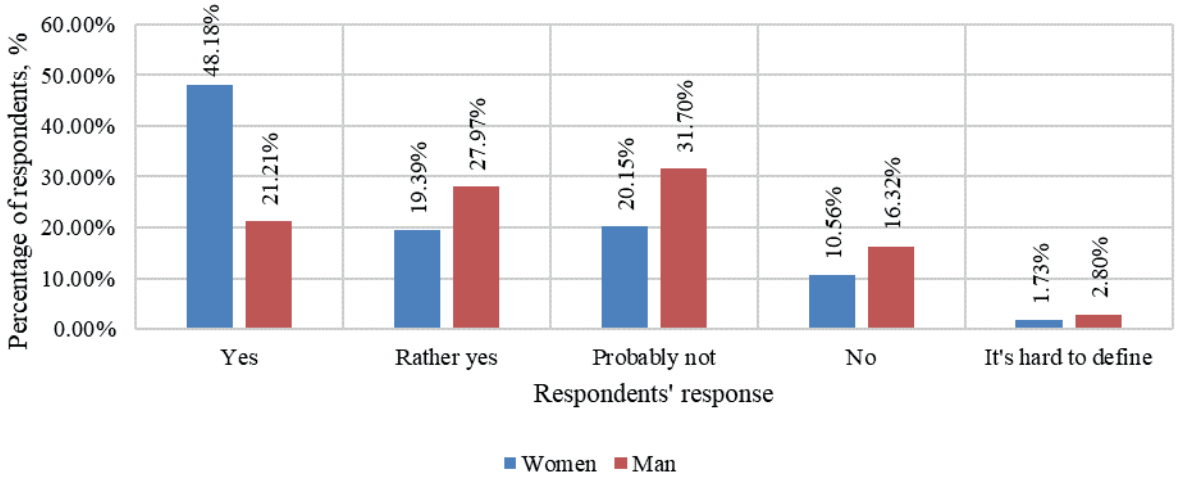

Figure 9 *Possibility of a system informing about the correct installation of a child seat*

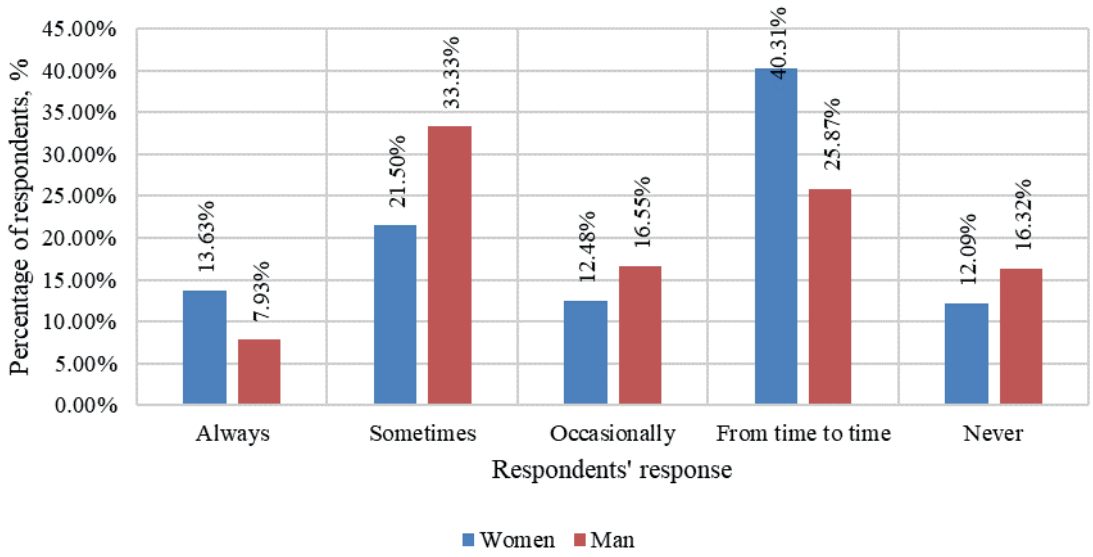

Figure 10 *Crying frequency of a child placed in a child seat during a vehicle journey*

during the journey in 13.63% of surveyed women and 7.93% of surveyed men. In addition, crying of a baby is sometimes declared by 21.50% of women and 33.33% of men. Occasional baby crying is declared by 12.48% of surveyed women and 16.55% of surveyed men. Crying of a baby occurring from time to time while traveling is declared by 40.31% of the surveyed women and 25.87% of the surveyed men. Total lack of crying is declared by 12.09% of surveyed women and 16.32% of surveyed men.

4 Discussion

Many parents wonder which vehicle seat to choose for their child. Choosing the right vehicle seat model is very important. After all, it is an accessory that keeps child safe during everyday vehicle journeys. Different models of vehicle seats are available in stores, which does not make it easier to make the right purchase decision. There is a lack of scientific publications in the scientific literature informing what aspects should be paid attention to when choosing a child seat, as well as how the process of selecting and installing a child seat in a passenger car should be carried out. In scientific articles, we can find a division of child seats according to categories and the method of installation. In the articles [4, 16, 19] the authors were focused on the vibrational comfort preferences of a child transported in a child seat. The results of the study confirmed that the child is more uncomfortable when travelling when transported in a child seat placed on an ISOFIX base. The survey showed that 27.26% of the surveyed women and 23.08% of the surveyed men transport their children in a child seat installed with standard seat belts.

Based on the results of a survey conducted on a group of 900 respondents, the author [29] presented that more than 80% of respondents pay special attention to the safety certificates of the child seat when making purchasing decisions about a child seat. Unfortunately, our own research has shown that over the last 3 years, parents' shopping preferences have changed significantly. Our own research has shown that the main feature determining the purchase of a child seat is the price, while 21.88% of women and 35.66% of men pay attention to the safety certificates of child seats. At the same time, it should be noted that our own research has shown that men pay attention to the technical aspects of child seats more often than women.

In the articles [17, 25], the authors discuss the topic of installing a child seat in a passenger car before buying. It should be noted that this option can only be available to people who buy a car seat in a stationary store. In addition, not every brick-and-mortar store will offer such a service. Surveys showed that only 39.35% of the women surveyed and 14.92% of the men surveyed had the opportunity to try the seat directly on a passenger car when buying a child seat. In addition, it should be noted that most manufacturers of child seats recommend that before buying a child seat, try it on a passenger car in order to check whether it will fit the back seat of a passenger car. Despite the fact that manufacturers treat such an activity before buying, most buyers do not have such a possibility, because most often sellers do not offer such a service. Most often, they only allow the installation of a child seat on a specially prepared viewing stand in a stationary store.

Manufacturers of child seats, on the other hand, often point out the advantages of their own child seats. To this end, they focus the buyer's attention on additional aspects such as seat belt applications or the use of magnets in the seat belts to make it easier to fasten the child [8, 13]. Unfortunately, additional things added to a child seat distract buyers from the basic function that a child seat is supposed to fulfil. The seat

is to ensure maximum safety for the child, so the most important issue for the buyer should be the results of the crash tests of the child seat and the materials used in the child seat, taking into account the aspect of the child's comfort in the child seat.

The problem of parents and legal guardians with choosing the right child seat for their car is visible on various forums and online groups. Unfortunately, public opinions most often concern the usability of a child seat, its compatibility with a stroller or its weight. Unfortunately, the safety aspect of a child seat is often overlooked. The priority is given to the price, accessories to the seat and its brand, while what is most important, i.e., the level of safety, is the secondary element among the surveyed respondents.

5 Conclusions

The article draws attention to the problem of choosing a child seat and the purchasing preferences of child seats. In addition, the surveys showed differences in the purchasing preferences of child seats between men and women. Men are more likely than women to pay attention to the technical aspects of child seats, such as the method of installation and crash test certificates, while women are more likely to be influenced by public opinion, brand and weight of the seat when buying a child seat.

The results of the research showed that the most common factor determining the choice of a child seat was the price. Other important factors influencing the shopping preferences of the respondents were the mass of the child seat and the method of its assembly. Based on the collected data, it should be noted that parameters such as safety certificates or the level of comfort (including vibration comfort) are important only for almost 30 % of buyers of child seats. The collected data from the survey showed existing differences in shopping preferences for child seats that depend on the gender of the parents or legal guardians of children. Studies show that men pay most attention to the price of child seats, and women more often than men suggest social opinion, the mass of the vehicle seat or compatibility with a pram. However, only 21.88 % of women and 35.66 % of men pay attention to crash tests of child seats. Unfortunately, in the case of children, this parameter should be considered more often because, above all, the child seat is designed to protect the child during a possible collision.

Survey studies show a problem in the society of adults with a child resulting from the lack of information about the safety of children in a child seat. Price should not be the main criterion when choosing a child seat. A dangerous situation is the small percentage of people looking at the safety certificates of child seats. In addition, it should be noted that the correct choice of a child seat should be based on the comfort of the child. A vehicle seat that is not adapted to the dimensions and size of the child will not fulfil its function. In addition, the child in such a seat will feel uncomfortable, which may cause the child's reluctance to transport. In further works, the authors will pay attention to the selection of a vehicle seat for a passenger vehicle and the types of crash tests that determine the safety level of a child seat.

Undoubtedly, the authors believe that the safety of transported children should be a priority when transporting them. Therefore, to ensure the safety of transported children, one must first select the child seat correctly and then install it correctly. In further works related to child seats, the authors will present the scope of activities necessary for the parent to purchase a properly selected and safe child seat.

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Conflicts of 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.

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