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The Perspective Projects Promoting Sustainable Mobility by Active Travel to School on the Example of the Southern Poland Region

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Abstract: The paper presents a discussion concerning the development of projects regarding active travel with the policy of sustainable mobility, with active school transport in southern Poland being taken into special consideration. The implementation of the idea of sustainable school travel planning involves linking several social groups, including traffic planners and organizers, school administrators, governments, parents, and children. This, in turn, requires considering the criteria reported by all parties when choosing a scenario for the region's development in terms of transport solutions. The following study was based on the methodological foundations of multicriteria decision-making analysis. The research purpose of this paper is to identify and classify the actions, policies, and scenarios of active travel projects for the sustainable development of mobility based on the cities of southern Poland. The evaluation was carried out through expert methods with multicriteria decision-making tools based on the MULTIPOL (MULTI-criteria and POLicy) prospective analysis technique. It allowed for the selection of the most probable policy, which covered the six actions considered by the experts to be the most significant for the development of the active school transport system in the analyzed region. Such actions are as follows: identification of walking school bus routes, modernization of crosswalk lines, planning of walking and cycling routes to schools, promoting safety educational programs, distribution of active school transport booklets and cycling, and pedestrian skills training workshops. The paper presents a new method to evaluate the policies and actions regarding promoting sustainable (active) travel to school. The innovative approach results from assembling a mixed group of people (stakeholders) as experts. The mix of experts consisting of users (pupils and parents), practitioners, and scientist experts in this field allowed us to score policies, actions, and scenarios, enabling a wider spectrum of assessment than before.

Keywords: active travel; active school transport; MULTIPOL; sustainable mobility

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1. Introduction

The prevalence of obesity and overweight children and youth has been rising for several decades in Poland, similar to the world trend. As early as 1974, experts from the World Health Organization (WHO) classified obesity as a civilization disease and suggested that it would become one of the most important nutritional diseases of our time. After more than 40 years, it can be said that the predictions have come true. As was presented by Abarca-Gómez et al. [1], the number of obese children (over 5 years of age), and adolescents has increased since 1975 from 11 million to 124 million in 2016. An additional 213 million were classified as overweight. The other elements that can be directly influenced by active transport could be, for example, socialization [2], physical fitness [3], reduction in pollution [4], reducing the incidence of civilization diseases [5], as well as the mentioned obesity and being overweight.

The results of the study presented by Potempa-Jeziorowska et al. [6], and Kruszyna [7], carried out among young primary-aged school children in Poland found that 74.7% of

children had a normal or ideal body mass and 17.1% had excess body weight (overweight or obese). Obesity was found in 6.8% of children and overweight in 10.3%. The study did not reveal any significant differences in the prevalence of obesity among boys versus girls. However, sudden and radical changes in the daily lifestyles and habits of the children occurred with a drastic reduction in any form of socialization and physical activity due to the COVID-19 pandemic. Home isolation strongly impacted everyday life, affecting, in particular, eating habits and everyday behaviors, evoking in effect many cases of obesity [8–10].

For the prevention of chronic non-communicable diseases, such as obesity, coronary artery disease, diabetes, and atherosclerosis as mentioned by Rojas-Rueda et al. [5]), it is essential to promote among adolescents and children proper nutrition as well as physical activity and mobility. Peers, families, schools, and educational institutions play a decisive role in learning and strengthening habits related to physical activity and health. However, it should be noted that providing resources, structures, and organizational standards are adequate to the needs, enabling the implementation of a comprehensive action plan for the prevention and treatment of overweightness and obesity in children and adolescents requiring the cooperation of many parties.

One of the initiatives connecting all these institutions may be the extension of school travel planning programs based on physical activity. Usually, such initiatives are submitted directly by the school's stakeholders in the form of projects, but they need organizational, marketing, and, above all, financial support from local governments and acceptance of the social environment, as was proved in the previous research work prepared by Macioszek and Cieśla [11].

The scientific purpose of this paper is the choice of projects promoting active travel in the southern region of Poland using the MULTIPOL (MULTI-criteria and POLicy) technique, allowing a prospective analysis technique multicriteria decision-making process. The choice of projects was completed by identifying actions, policies, and scenarios of active travel for the sustainable development of mobility based on the cities of southern Poland. This paper considers the most important criteria reported by various community stakeholders: traffic planners and organizers, school administrators, governments, parents, and children. The criteria included: safety of children, costs of implementation, travel comfort, environmental friendliness, and infrastructure improvement.

Such a wide spectrum of problem analysis enables the optimization of decisions in the scope of a sustainable urban mobility plan, supporting the health of its inhabitants. The health of inhabitants is also supported by replacing conventional vehicles with electric vehicles, which translates into a reduction in exhaust emissions and a reduction in noise [12–19].

Therefore, a measurable result of the research presented in this paper is a multidimensional decision support model when choosing the project of active travel initiatives in metropolitan areas, which can be used as a tool for shaping sustainable transport system development.

The overall objective of the paper is to present the possibilities of using the MULTIPOL prospective analysis technique to rationalize decisions in the field of child mobility management for the implementation of sustainable solutions, related to active travel in polish urban transport. Taking the arguments of many stakeholders into account, one can build a consensus on improving the quality of life in the city by reducing the negative impact of transport on the environment and human health.

The paper is organized as follows. Section 2 includes a review of the literature on the aspects of active travel raised in the paper. The problem is discussed with emphasis on school travel planning and school program mobility ideas in the space of transport systems. Section 3 describes the research approach and specifies the applied methods. It also illustrates a diagram presenting the course of research divided into individual three stages. Section 4 includes an essential part of the paper related to the method of active travel policy and action selection regarding sustainable transport system development.

The analysis covered a multicriteria decision with the MULTIPOL prospective analysis technique, which allowed for the presentation of a ranking list of available variants. The results were presented in the form of charts, and additionally, detailed data were presented in tables. Section 5 presents a discussion of the results obtained during the analysis. Finally, Section 6 is devoted to the conclusions.

2. Scientific Literature Review

The paper presents a discussion concerning active travel (AT) among children in the policy of sustainable mobility (SM) projects based on active school transport (AST) in southern Poland. The review of the literature covering these issues identified the most important research directions that relate to the influence of active travel on overall psychical activity and health, analysis related to factors essential for increasing walkability among children, and policies and scenarios to promote healthy behavior related to the activity of traveling.

2.1. Influence of Active Travel on Overall Psychical Activity and Health of Children

According to Fonseca et al. [20], there are two basic categories of walking: recreational walking and utilitarian walking. Recreational walking is done purposefully as exercise, whereas utilitarian walking is undertaken to fulfill routine purposes and tasks. Utilitarian walking often refers to active transport or to walking as a means of transport for rather short trips.

Transportation and planning policies that promote active travel by walking and cycling can contribute to sustainable policy, potentially yielding further co-benefits [21–23]. Although active travel can usually have a positive effect on health outcomes, researchers are still looking for solid evidence of the effectiveness of active transport interventions in reducing obesity among children. The list of the most important research work dedicated to the active travel of Polish children is summed up in Table 1.

Since 2014, when the Active Healthy Kids Global Alliance (AHKGA) organization was established, the methodology of three issues of physical activity is considered among children: organized sport and physical activity, active play, and active transportation. According to Bartosiewicz et al. [24], 47.4% of children in Poland aged 11–17 years go to school and return from school (52.3%) on foot. Only 5.5% of children use a bicycle on the way to school. Generally, 53–57.5% of Polish children are involved in active transportation, which, according to the world AHKGA standards, corresponds to grade C.

Questionnaire results presented by Bergier et al. [25] show that Eastern European adolescents have positive attitudes towards their health regarding their level of physical activity and mobility, with boys being more active than girls. As Wojtyła-Buciora et al. [26] show, it is sometimes a matter of distance and time. The results of the survey show that active commuting (AC) was undertaken by 41% of middle school teenagers and 36% of high school teenagers when walking to school for up to 20 min a day, and by bicycle, only 5% and 3%, respectively.

Table 1. Summary list of most important research work dedicated to Polish children's active travel.

Author (Year)	Purpose	Population	Results
Bartoszewicz et al. [24]	Comparison analysis of the estimated indices of physical activity in Ukraine and Poland, with Active Healthy Kids Global Alliance (AHKGA) standards	12–14 years (n = 1893, 899 boys and 994 girls) 15–17 years (n = 925, 449 boys and 476 girls)	According to AHKGA standards, active among polish children are rated C, based on rating grades from A (the highest level) to F (the lowest level)

Table 1. *Cont.*

Author (Year)	Purpose	Population	Results
Bergier et al. [25]	To evaluate the physical activity level with active mobility of 15–17-year-old boys and girls from Eastern European countries	2425 school adolescents from the Czech Republic, Poland, Slovakia, and Hungary 1148 boys (47.3%) and 1277 girls (52.7%)	Results allowed to conclude that boys are more active than girls in the area of physical activity and mobility
Wojtyła-Buciora et al. [26]	To establish how frequently Polish pupils use active commuting possibilities and other movement activities	3548 pupils from middle school, 4423 from high schools	Active commuting is not popular among pupils in middle school: 41% walk, 5% bike, and in high school: 36% walk, 3% bike
Bergier et al. [27]	The recognition of adolescents' physical activity among Polish adolescents aged 16–18, and the factors which condition this level	2974 school adolescents from various locations in Poland—1790 girls (60.2%), and 1184 boys (39.8%)	More than 60% of Polish adolescents are characterized as highly active with dominating activities related to walking

As suggested by the World Health Organization [28], education and personal responsibility are critical, but they are insufficient elements for increasing levels of active behavior during transportation. Additional interventions are required that involve changes to the surrounding environment, such as bicycle lanes leading to schools, secure bicycle parking facilities, organized walking groups, supervised street crossings, and reduced speed limits near schools. Since existing studies have not simultaneously considered the impact of different infrastructure burdens, it is difficult to determine the features that most strongly affect the activity levels of adolescents during traveling. According to Laxer et al. [29], the three infrastructural obstacles that were the most highly associated with inactivity were unwalkable neighborhoods, the density of cul-de-sacs, and the lack of parking spaces for bicycles.

Therefore, there are many parties involved with the goals and objectives which sometimes conflict with each other. These include the children themselves, their parents, schools, transport organizers, local governments, and the public health community. They should all advocate strongly for effective policies that reduce car use and increase urban active travel [30].

2.2. Factors Essential for Increasing Walkability among Children

Support for active mobility is growing for many reasons, including traffic engineering, land-use planning, health, and improved mobility. Destination accessibility and traffic safety, should be the two most important aspects when creating decisions on new infrastructural and organizational improvements of active transport. As was stated by Giles-Corti [31], traffic safety is one of the most important barriers preventing children to walk/cycle to school. Street networks provide direct routes to school but when designed for heavy traffic, the potential for children to walk to school is reduced. This highlights the importance of carefully considering the school location and, particularly, street design in school neighborhoods.

In the research presented by Zhang et al. [32], it was stated that people often have different perceptions about exercising; however, the green transportation effects, and traffic conditions, that are potentially influencing factors on people's willingness to use bicycles tend to be highly heterogeneous.

Considering child mobility, it should be remembered that parents or other adults are responsible for their communication decisions and travel behavior. It is also their legal duty to ensure that the minor's journey is safe [33].

According to Pratt [34], many children's active travel projects are related to the improvement of traffic safety of pedestrians and cyclists, which can also positively affect the

safety of the neighborhood. Less activity in traveling may arise from a perception of the neighborhood environment as being unsafe because of road traffic, lack of infrastructure security means, walkability, traffic speed and volume, land-use mix (proximity of homes and school destinations), and other factors [35–37]. According to active travelers, it could be parents that perceive that built environment features, such as neighborhood safety, access to recreation facilities or schools, and crime, limit their child's physical activity, including active transportation, and this has been found in other studies [38–43].

Many different factors affecting children's active travel to school have been identified in various cities around the world [44–46], including also in Polish cities [47]. For example, narrow pavements along the route are one of the barriers for parents to allow their children to walk to school [48].

It is therefore important to combine safety and ecological environmental initiatives with rail and road traffic engineering [49–52] into safety improvement programs.

2.3. Policies and Scenarios to Promote Children's Active Commuting

The European Commission [53,54] recommended the Sustainable Urban Mobility Plans (SUMP) as a helpful tool for planning and implementing transport policies in cities. Many of them involve promotional, coordinated travel policies and interventions to increase walking and cycling [55,56]. The programs which already exist (e.g., "Safe way to school", "Gambit program", "Stay safe on the road", and many others) have been proven to work extremely well. They include better facilities for walking and cycling (sidewalk improvements), traffic calming of residential neighborhoods, restrictions on motor vehicle use in cities, urban design sensitive to the needs of non-motorists, rigorous traffic education, and strict enforcement of traffic regulations protecting pedestrians and bicyclists.

Since the adults or parents are responsible for the children's travel behavior [57], the role of citizens in active transport improvement was underlined [58]. It usually enables making public policies based on the improvement of decision-making by making them sustainable, bearable, and reflecting society's values, earning credibility, and improving the rapid implementation of plans and projects.

Moreover, school policies influence the potential of active school commutes [59], and the travel behaviors of pupils. This is why a series of School Travel Plan (STP) initiatives among many schools in urban cities of New Zealand [60], Canada [61,62], and USA [63] were implemented. The initiatives on STP usually incorporate educational and promotional campaigns to promote active transport, cycle training for pupils, parking restrictions, the building of traffic-calming measures, and the improvement of roads and footpaths [64,65]. Some concrete solutions such as a Walking Bus scheme [66], and the Active and Safe Routes to School (ASRTS) promotion initiative are presented as case studies in the scientific literature [67]. As Buliung et al. [68] emphasized, the STP intervention involves the mobilization of key community stakeholders (children and their parents, governments, teachers, and school administrators) for promoting and enabling active school transport AST.

An interesting study presented by Deligianni [69], applies a low-cost and risk-reducing approach that first determines existing travel behavior within a school context, and then measures the responses of parents to a range of potential solutions for STPs before they are adopted.

Some research works [70–72] suggest adopting a transport system to the new challenges of society and development, considering active transport, different possible levels of social collaboration must be considered. Additionally, the importance of aligning processes and institutions, such as schools, towards sustainable mobility, and public participation processes are important [73]. Ogilvie et al. [74] suggest that comprehensive multi-level interventions, including infrastructure improvements, walking, and cycling-friendly environments, combined with promotional may have the biggest potential for success to improve active transportation.

Summing up, the promotion of projects and initiatives including creating more, safe outdoor facilities, restructuring urban and education environments to facilitate active

transport, and incentives to promote physical activity or discourage sedentary behavior, specifically among children, is very much needed and desired. However, there is a lack of knowledge involved in methods supporting the selection of initiatives that meet many criteria when reported by representatives of various stakeholders.

3. Materials and Methods

The findings presented in this paper covered theoretical and research analyses. They were carried out through three main stages presented graphically in Figure 1.

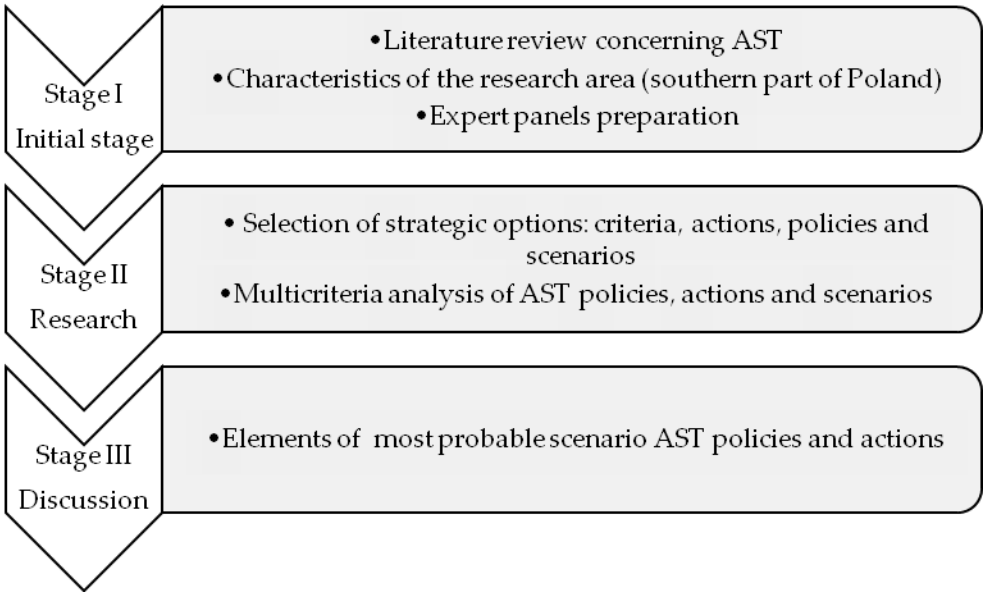

Figure 1. Three stages of theoretical and practical research presented in the paper.

In the initial stage I, all activities related to the preparation for research on the multicriteria analysis of projects promoting sustainable mobility in the policy of active school transport among children in southern Poland were introduced. The literature review covered the most important research directions that relate to the influence of active travel on overall physical activity and health, analysis related to factors essential for increasing walkability among children, and policies and scenarios to promote healthy behavior related to the activity of traveling. This part allowed us to verify the necessity of research in this area and the potential of implementing world-best practices in the Polish transport system. The analysis of the testing ground allowed us to understand the needs of southern Poland cities in the area of sustainable mobility. Preparations for expert panels allowed us to select a group of 20 experts: 4 representatives of primary schools, 4 of high schools, 4 pupils, 4 parents, and 4 representatives of local self-governments of southern Polish cities, performing advisory functions in the field of mobility and organization of the transport system. The group of experts were selected in such a way that it was possible to present the opinions of individual stakeholders equally, and were derived from their involvement in projects in the field of transport systems in the area of analysis. As shown in the research works of Gwo-Hshiung [75], Awasthi et al. [76], and Trucco et al. [77], the number of experts participating in similar analyses in transport studies usually ranges from one to several experts. The responsibility of the expert group was to make a consensus on the list of strategic options and the subsequent evaluation of AST policies, actions, and scenarios.

Stage II was the research on the multicriteria analysis of AST projects that could be implemented in southern Poland. First, the lists of measurement criteria, policies, actions, and scenarios were prepared and evaluations by experts were gathered. It allowed MULTIPOL computer program software use to select the most probable scenario to implement the most favorable AST policy, helping to verify which actions have no chance of development in the assessment of stakeholders.

Stage III covered the discussion of the results obtained. It also contains a summary and conclusions resulting from the selected prospective policies and actions of the AST system development in the analyzed region.

3.1. Characteristics of the Research Area

The issue of the child's journey from home to school and back again is regulated in Poland by the Act on the Education system [78]. It stated that the network of public schools should be organized in such a way as to enable all children to fulfill their compulsory education. It also has to do with the question of the distance to the nearest school. The distance that the child takes from home to school must not exceed 3 km for pupils in grades 1–4 of primary school and 4 km for pupils in higher grades of primary school. The obligation to organize pupils transport occurs when the path of the pupil to the school exceeds the above-mentioned distance. In this case, the commune must provide free transport and care during the child's transport or reimburse the child's travel costs by public transport, if the parents provide transport, and until the child reaches 7 years of age—also to reimburse the child's travel costs by public transport.

The obligations of the territorial commune regarding the organization of pupils' transport with special educational needs are slightly different. The commune must provide disabled pupils with free transport and care during transport to the nearest primary school, and pupils with motor disabilities, including aphasia, with moderate or severe intellectual disability, to the nearest secondary school up to 21 years of age.

The specificity of the southern region of Poland, which is the area of analysis in this paper, is a very large metropolitan urban density, and thus contains a large number of cities and schools (Figure 2). The main organizer of public transport in the GZM Metropolis is the Metropolitan Transport Authority (Zarząd Transportu Metropolitalnego ZTM in Polish), which entitles children and adolescents from 7 to 16 years of age to travel free of charge.

Due to the high density of public transport and schools, getting to them is not a problem, but often parents decide to transport their children to school by their car. Undertakings of joint projects and collaborative actions to promote healthier travel alternatives and cooperation between school representatives, public transport providers, and parents is negligible. There are, however, visible initiatives to modernize the existing system for more sustainable solutions for the mobility of residents.

3.2. Research Methods

The objective of the research was to propose a method for the selection of strategic projects on children's active mobility in an urban transport system in an example of southern Poland communities through the development of guidelines aimed at achieving sustainable mobility in the region. To emphasize and strengthen the strategic objectives of active transport, the MULTIPOL prospective analysis technique was used among the expert group to identify and evaluate actions, criteria, and policies that apply to the scenarios to promote radical structural changes in decision-making in the local communication system. The results were obtained with the MULTIPOL computer program software, developed by the LIPSOR organization, to select which actions must be applied to reach the most probable scenario to improve the quality of life of children through active commuting, increase the efficiency of the transport system, and implement these strategic projects to achieve sustainable mobility in the region.

MULTIPOL allows for the evaluation of policy actions, taking into consideration each criterion based on the experts' consensus. Policy action evaluation enables us to consider different contexts related to the objective. The methodology includes a qualitative method, based mainly on the results of the analysis and interpretation of future trends evaluated by specialists (experts), enabling the interpretation of a cause-and-effect relationship [79]. Experts assign a weight for every policy, based on the criteria ensemble to allow enclosing different value systems for decision-makers, strategic options, multiple scenarios, and evaluations [80,81]. For every policy, MUTLIPOL helps to assign an average score to

actions, which allows for the creation of a table of classification profiles compared to actions related to policies. Risk awareness related to uncertainty or conflicting hypotheses is attained via the action classification map, which is created from the mean and standard deviation of scores obtained for every policy.

Figure 2. Location of the research area against the background of Poland.

4. Strategic Projects on Children's Active Mobility Selection with MULTIPOL Method

For the selection of strategic projects on children's active mobility in urban transport systems in an example of southern Poland, the MULTIPOL method was used, which is a technique supporting prospective research. The research was carried out in two main phases, which concerned the selection of strategic options among the expert group and then the evaluation of policies, activities, and scenarios considering the criteria.

4.1. Selection of Strategic Options

As a first step, a workshop with a group of experts was held. The workshop was carried out in 2021. During a workshop, the purpose and importance of defining policies, actions, scenarios, and measurement criteria were clarified, which were then processed using the MULTIPOL method in order to select strategic options. The measurement criteria, policies, actions, and scenarios selected by the expert group are listed in Table 2.

Table 2. Measurement criteria, policies, actions, and scenarios selected by the expert group.

Criteria	C1. Safety of children (safety) C2. Cost of implementation (costs) C3. Travel comfort (comfort) C4. Environmental friendliness (environ) C5. Infrastructure improvement (infrastruc)
Actions	A1. Promoting safety educational programs (edu.prog) A2. Distribution of AST booklets (book) A3. Cycling and Pedestrian skills training workshops (skill) A4. Planning of walking and cycling routes to schools (plan.route) A5. Creating reward systems for actively commuting pupils (reward) A6. Promoting action "walk to school day" or similar (walk.day) A7. Identification of walking school bus routes (bus.route) A8. Establishing competitions with active mobility promotion (compet) A9. Creating seasonal pedometer challenges for schools (pedom) A10. Modernization of crosswalk lines (cross.mod) A11. Improvement of walking and cycling routes around schools (imp.route) A12. Increasing street patrolling near schools (patrol) A13. Changing the organization of road traffic near schools (traffic) A14. Ensuring proper walking and cycling route maintenance (main.route)
Policies	P1. Educational Policy (EP) P2. Developing Activities and Events Policy (DAaEP) P3. Infrastructure Development Policy (IDP) P4. Enforcement Policy (EnP)
Scenarios	S1. Most Probable Scenario (MPS) S2. Probable Scenario (PS) S3. Improbable Scenario (IS)

The authors of this paper prepared the materials for the expert group. Each expert received a document containing a list of key strategic indicators, key strategic actors, and related key strategic goals, as well as possible scenarios, previously developed based on the literature and analysis of regional activities in the field of active school transport. The workshop ended with the definition and selection of a common consensus on a list of measurement criteria, policies, actions, and scenarios, which allowed for the subsequent selection of strategic options. The common list of parameters obtained in the course of the brainstorming allowed for the implementation of the input data to the MULTIPOL program, which is illustrated by the example of entering the criteria in Figure 3.

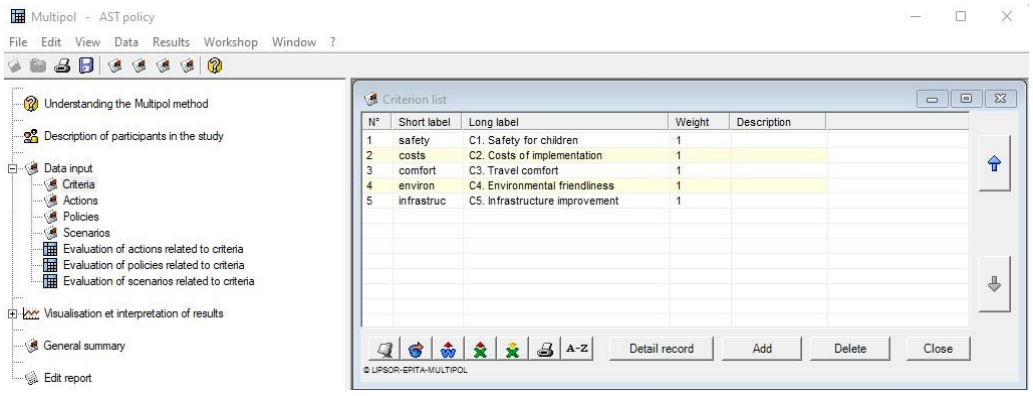

Figure 3. Implementation of criteria list into MULTIPOL application.

Data inputs for actions, policies, and strategies have been introduced similarly, along with established abbreviations of individual elements.

4.2. Multicriteria Analysis of AST Policies, Actions, and Scenarios

In the second phase of the research, further consultations with the group of experts took place. Three matrices for the evaluation of policies, actions, and scenarios for each measurement criterion were presented, because of which the policies and actions with the most perspective of the envisaged scenarios have been identified through brainstorming and a final consensus between the experts.

Experts were asked to jointly assess, by consensus, each action against each criterion using a simple notation scale (0–20). The results of the MULTIPOL analysis of the scores for each action versus policy and the mean score, as well as the standard deviations obtained, are shown in Table 3. The higher the position number, the better the performance of activities related to the AST policy.

Table 3. Evaluation of actions related to AST policies.

Action	AST Policies				Mean	Standard Deviation	Position
	P1: EP	P2: DAaEP	P3: IDP	P4: EnP			
A1. Edu.prog	11.9	13.8	10.3	12.7	12.2	1.3	8
A2. Book	9.3	12.1	8.3	10.5	10.1	1.4	7
A3. Skill	9.9	9.4	6.6	10.3	9.1	1.5	5
A4. Plan.route	12.8	12.6	11.8	14.2	12.9	0.9	9
A5. Reward	6.6	9.9	6.6	8.1	7.8	1.4	1
A6. Walk day	7.0	10.5	7.0	8.5	8.2	1.4	2
A7. Bus.route	14.9	14.4	14.4	16.1	14.9	0.8	**14**
A8. Compet	7.2	11.4	7.6	9.1	8.8	1.6	4
A9. Pedom	7.6	12.3	8.2	9.7	9.4	1.8	6
A10. Cross.mod	14.8	10.6	13.7	15.3	13.6	1.8	11
A11. Imp.route	15.1	11.2	14.1	16.0	14.1	1.8	**12**
A12. Patrol	9.1	8.6	5.8	11.4	8.7	2.0	3
A13. Traffic	14.4	10.4	13.3	15.0	13.3	1.8	10
A14. Main.route	15.3	12.8	14.5	16.5	14.8	1.3	**13**

Matrix values shown above allow us to evaluate and classify actions concerning policies. The three actions ranked as the highest positions are: identification of walking school bus routes (bus.route), ensuring proper walking and cycling route maintenance (main.route), and improvement of walking and cycling routes around schools (imp.route). The graph in Figure 4 presents the policy score for every action corresponding to the matrix.

As shown in Figure 4, the walking school bus routes identification actions are superior in all types of policies. In the Developing Activities and Events Policy (DAaEP), it has a similarly high score combined with the actions related to promoting safety educational programs (buss.route). In Educational Policy, as well as the Infrastructure Development Policy (IDP) and the Enforcement Policy (EnP), the next action so highly evaluated is related to the modernization of crosswalk lines (cross.mod). Creating reward systems for actively commuting pupils (reward) was evaluated as the weakest according to almost every AST policy.

Figure 5 presents the results of MULTIPOL in the form of a closeness map or closeness between programs (actions) and policies (policy) derived from correspondence analysis. The correspondence analysis on the matrix is evaluated from the actions related to policies, with the action score on the x-axis and the standard deviation on the y-axis. As shown in the closeness map, there are five actions (together with the three highest ranked) mostly related to the Infrastructure Development Policy (IDP). Changing the organization of road traffic near schools (traffic) actions are closest to the Enforcement Policy (EnP). The Educational Policy (EP) gathered two actions, but one was more correlated: cycling and pedestrian skills training workshops (skill). The Developing Activities and Events Policy (DAaEP) gathered six actions.

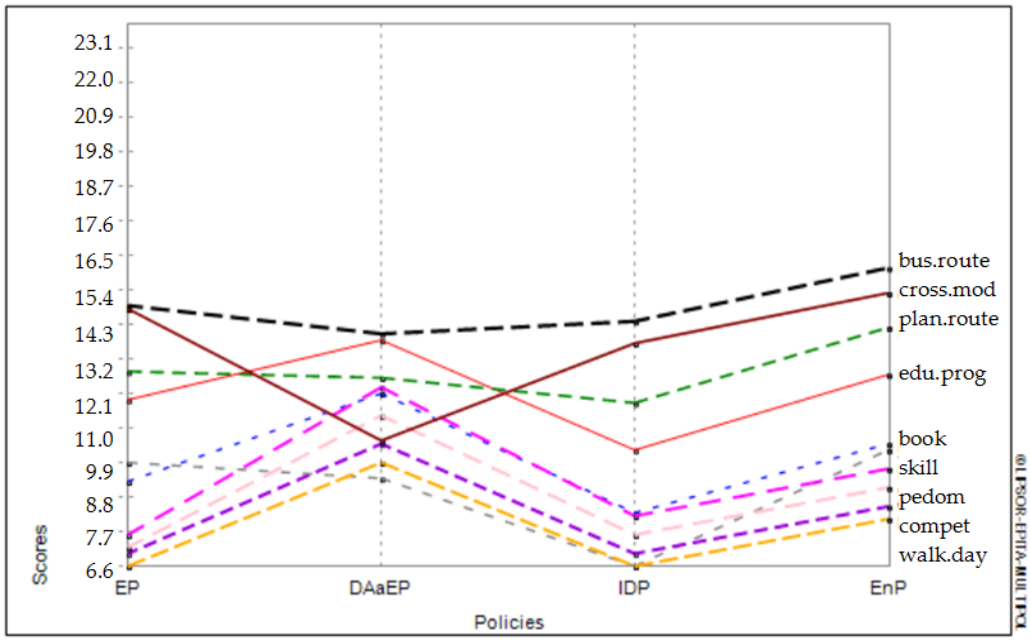

Figure 4. Profile map of actions concerning AST policies.

All policies and each scenario were assessed with the criteria by the expert in the way that the weight per row of the interaction was 100. The MULTIPOL application allowed for the presentation of a graphical interpretation of the policies related to the scenarios matrix profile map, as shown in Figure 6. It presents calculations of the set of weights of the matrix evaluation of policies related to the criteria of the matrix of scenarios.

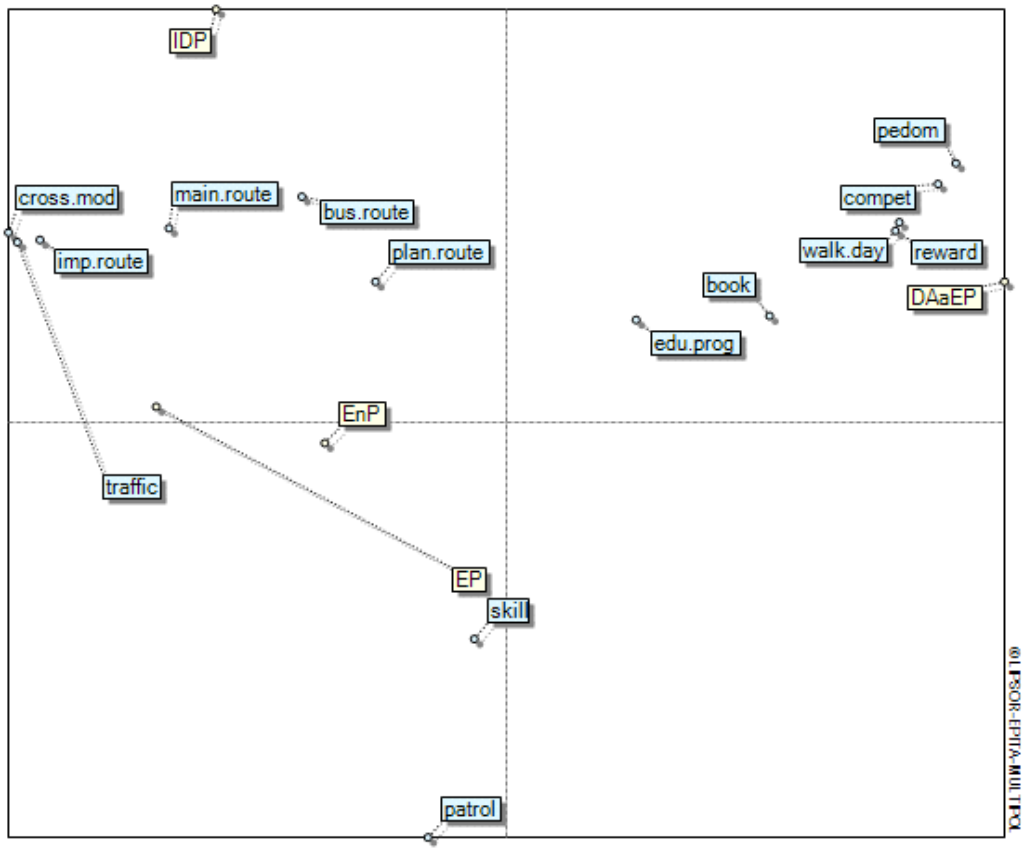

Figure 5. Closeness map between AST policies and actions.

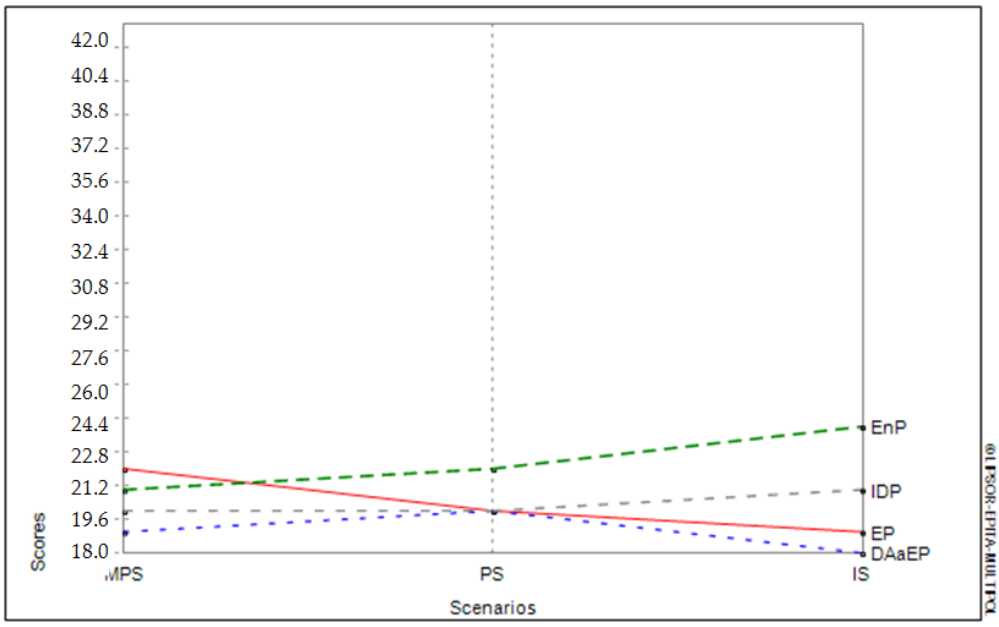

Figure 6. Profile map of AST policies related to scenarios.

In the Most Probable Scenario (MPS), the Educational Policy (EP) is most likely to be implemented. In the Improbable Scenario (IS), the Enforcement Policy (EnP) would have the highest possibility of implementation.

5. Discussion

The MULTIPOL prospective analysis technique enabled the optimization of multi-criteria decisions regarding the choice of projects promoting active travel in the example of the southern Poland region. The analysis was based on the identification and evaluation of 14 actions, 5 criteria, and 4 AST policies that apply to the three scenarios.

According to the research results, in the Most Probable Scenario (MPS), the Educational Policy (EP) gained the highest score for successful implementation when taking the criteria into account. An investigation into the effectiveness of active travel interventions on children's physical activity showed that there are several activities that can be undertaken immediately under the indicated policy. Similarly, Jones et al. [82] indicated that the idea of identification of walking school bus routes (bus.route) was found to be the most effective for increasing the active mobility of children. McDonald [83] evaluated this solution as very cheap regarding cost savings. Unfortunately, the walking school buses (WSBs) idea needs to tackle significant barriers, such as: the influence of weather variability on the functioning of the bus, the impact of pollution exposures [84], time constraints, volunteer recruitment problems [85], and parents' safety concerns [86]. These issues must be considered when implementing this policy. That idea particularly underlines the necessity of cooperation between the school environment, pupils, and parents.

In this policy, the necessity of crosswalk line modernization (cross.mod) was also underlined. It is one of the solutions for improving the safety of children as pedestrians. During the trip to school, pupils use different crosswalks, and decisions are made based on different aspects: safety, convenience, crossing time, accessibility, and personal security [87]. However, in the case of taking actions in the educational policy, it is more related to the drivers' behavior when approaching places frequented by pedestrians. The estimated effects of enforcement by drivers yielding to pedestrians in crosswalks are shown by Sandt et al. [88,89]. According to Pichayapan et al. [90], sometimes reducing the number of road accidents in these places may be the result of minor modernization, such as crosswalk repainting, installing additional lighting to improve visibility, or the use of speed bumps,

and additional information signs. It should be emphasized that reducing traffic speed and traffic volume increases pedestrian safety.

Other actions within the analyzed policy that should be considered are related to the planning of walking and cycling routes to schools (plan.route). The implementation of this project is again a common issue related to obtaining a database from schools, understanding parents' decisions regarding the choice of school (not always the closest one), and representatives of the territorial administration who adapt the infrastructure elements to the needs of residents. As it was considered by Rahman et al. [91], creating safe walking and cycling routes to schools is a promising strategy to increase the rates of active transport. When modeling the paths, various elements related to traffic safety factors (traffic volume and speed, safe road crossings, and quality of path surface) and built environment features (land use mix, pedestrian/cycling infrastructure, neighborhood aesthetics, and accessibility to local facilities) need to be considered.

Promoting safety in educational programs (edu.prog) activities should also include improving safety in terms of school transport. Buttazzoni et al. [92] supported the thesis that the STP programs are successful in significantly reducing children's and parents' perceptions of AST barriers and awareness. The research of Chen et al. [93] shows that pupils' active travel to school has increased over the years due to promotional programs.

Another interesting proposal for an activity increasing the active transport of children in the southern region of Poland is increasing the skills of pedestrians and cyclists through cyclical workshops [skill]. Such classes are very often carried out with the participation of the police, for even the youngest children attending kindergarten, as preventive actions against road accidents. Barton et al. [94] proved that indicating brief training can produce at least short-term improvements in the pedestrian behavior of children. The problem of cycling and pedestrian skills is also complex, as it depends on many factors: gender [95], age, or even socioeconomic status [96]. These factors also need to be considered when creating an educational program.

The research also revealed that the Developing Activities and Events Policy (DAaEP), and some of the actions with a low probability of success, can be implemented in the considered area. According to the experts' evaluation, one of them is creating reward systems for actively commuting pupils (reward). The findings of Tsirimpa et al. [97] indicate that reward-based instruments can contribute to the promotion of sustainable and emerging transport services. In addition, Scheepers et al. [98] positively reviewed the effectiveness of economic intervention tools (subsidy, reward system, penalty) designed to stimulate a shift from car use to cycling or walking. However, participants usually spent more time on public transport usage and walking only during the reward-based period. So, this solution should not be considered if considering long-term, prospective, and strategic policy plans.

Similarly, promoting actions, like "walk to school day" (walk.day) seem to be very popular only during the period of the event. According to Eyler et al. [99], all AST policy initiatives start with an annual Walk to School day event and are also a part of national campaigns. This is an effective tool in moving schools toward more systematic active transport initiatives.

Actions related to establishing competition on active mobility promotion (compet), similar to the reward system, should not become the basis of long-term modeling of the transport system. They can, however, become a good marketing element starting the implementation of other, more far-reaching activities.

6. Conclusions

As indicated in the WHO report [28], overweightness and obesity are determined by numerous social, economic, environmental, political, cultural, and commercial factors. Therefore, coordinated work and long-term collaboration with different stakeholders are required. Without such shared responsibility in decision-making and concerted effort,

interventions may only have a limited impact. To realize the full potential impact of projects toward sustainable mobility, engagement is required from as many sectors as possible.

One of the possibilities to improve children's health and decrease the number of obesity among them is implementing more activity in everyday life, such as healthier trips to school. There are many projects and undertakings to develop the area of active school transport as an alternative to motorized transport for short trips to schools, but they usually reflect the arguments of one interested party: parents, representatives of schools, pupils, municipalities, or transport system organizers. Therefore, there is a need to create tools enabling the assessment of the issues in a multi-aspect manner, such as multicriteria decision-making.

In this paper, the MULTIPOL prospective analysis technique was used among the expert group to identify and evaluate:

- 14 actions;
- 5 criteria;
- 4 policies;
- 3 scenarios to promote radical structural changes in decision-making in the local communication system.

The results of the research indicate that Educational Policy (EP) is one of the most probable to be successfully implemented in the region of southern Poland, taking into account the accepted criteria. Four main actions should be undertaken in the form of project implementation, recommended according to the multicriteria analysis: identification of walking school bus routes, modernization of crosswalk lines, planning of walking and cycling routes to schools, and promoting safety educational programs.

This information can be significant for decision-makers providing grants for new ventures in the region because they meet the expectations of many stakeholders. The projects in the indicated areas may facilitate changes to patterns of school travel. It can expand a school's capacity to address transportation issues through the mobilization of diverse community resources. Future AST initiatives may benefit from addressing convenience, and safety, and by examining how schools can be supported in implementing infrastructure improvements.

Future research directions may be targeted at new forms of initiatives to promote active mobility and their development opportunities in terms of the transport policy of individual regions.

The contribution of this study may be useful for urban planners, school managers, and decision-makers on encouraging active school travel in the southern region of Poland. The presented findings can help them in shaping active school travel policies. For health and wellness, the WHO [28] recommends to all adults at least 150–300 min of moderate–intense aerobic exercise per week (or the equivalent amount of vigorous activity), and all children and adolescents have an average of 60 min of moderate–intense aerobic exercise. Hence, the active transport can be regarded as a means to achieve this goal.

The active travel contributes to many health benefits, such as the prevention of obesity and overweightness, chronic non-communicable diseases, coronary artery disease, diabetes, atherosclerosis, and many others. In addition, it supports socialization, physical fitness, reduction in pollution, reducing the incidence of civilization diseases, and many other benefits. All of these benefits prove how important in the modern world the need is for promoting policies and measures to promote active travel to school.

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Abbreviations

AC	Active Commuting
AHKGA	Active Healthy Kids Global Alliance
ASRTS	Active and Safe Routes to School
AST	Active School Transport/Active School Travel
AT	Active Travel
MULTIPOL	MULTI-criteria and POLicy
SM	Sustainable Mobility
SUMP	Sustainable Urban Mobility Plans
STP	School Travel Plan/School Travel Planning
WSB	Walking School Bus

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