Planning for accessibility and sustainable mobilities

The relocation of a circus school from the perspective of mobility of its participants

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Abstract: In spatial planning theory and practice, travel behaviour is often linked to spatial structure (distance, safety…) and neighbourhood characteristics. A lot of mobility research considers also circumstances (age, luggage, weather…). Research in behavioural studies in economics, psychology, marketing… includes personality and choice of individuals in surplus. Empirical evidence of all these theories in real live cases is rather scarce. Using the real-life case of the relocation of a recreation service, we analyse its effects from several theoretical perspectives common in Flanders. We will confront the existing theories applied in materials on a Flemish scale with bottom up information from the case. Circolito is a circus school in Mechelen, a city in Flanders, Belgium, between Antwerp and Brussels. Its aim is to teach toddlers, children, youngsters and adults circus skills on a weekly basis. In the spring of 2018 the school moved from an inner-city location to a suburban location. A year before the move and short after it, all users were invited to fill out a survey concerning their mobility behaviour, trip chaining and perception of the location. The results of the survey will be discussed in relation to tools and practices in spatial planning in Flanders, applied in the city of Mechelen and the area of origin of the circus school participants. Although the case is specific, some of the results can help to formulate new research questions and discussion for policy.

Keywords: travel behaviour, spatial structure, real life case, human perspective, applied theories

Introduction

The reason to start a case research about the move of a circus school is quite simple. One of the authors has children that are active in that circus school. As a mother she was concerned about the new location that is located further away from the city centre, and she was wondering about the effect the relocation will have on the independence of her children and her own trip chaining. Being a spatial planner, she discerns quickly a difference between the two locations: the circus school moves from an inner city location to a suburban one. She was able to count on the support and cooperation of the director of the circus school, which is essential for the kind of research she wants to do.

In the paper we focus in the first paragraph on the spatial situation and context of the case and in the second on the theory that is commonly used in policy development in Flanders. The third paragraph explains the three methods that are used in this research, while the results are discussed in the fourth. In a short conclusion some ideas for further research are given, as well as some suggestions for further action.

Situation of the case of a growing circus school in the city of Mechelen

Mechelen is located between Antwerp and Brussels and is a medium sized to small city in Belgium (86.304 inhabitants 1.1.2018 (FOD statistiek)) with demographical growth on the agenda. Mechelen is also a regional centre with a lot of services for the surrounding area, especially secondary schools, but also a regional hospital, a regional fire brigade,… Demographic growth, together with the reorganisation and organisational upsizing of these kind of services require sooner or later choices regarding the location of these services. They can either expand on the original site or move to another more spacious location. In recent years, Mechelen directed a lot of services out of the city centre to a more suburban location, with more space availability and accessibility as main arguments. Leftover large plots in the city center are transformed into residential space, mixed with small scale services, such as day cares, shops and local services. These spatial strategies are quite mainstream in Flanders and Mechelen is exemplary for medium sized city policy in Flanders.

Figure 1. Circolito in Mechelen: location before (Klein Begijnhof) and after (Douaneplein) the move (Topographic map 1:10000)

Mechelen is the home town of the circus school Circolito. That is a service provider, active in leisure time services. Its aim is to teach toddlers, children, youngsters and adults circus skills on a weekly basis. With the growing popularity of the school, it got short on place. The available space on site had reached its full capacity. Some short term solutions were found (e.g. certain lessons in the sports hall of Mechelen, some new branch offices in the broad area), but in 2018 a more definite proposal was put forward. The circus school was offered to move to a larger, more spacious location, with opportunities for further growth. The original location of the circus school, Klein Begijnhof is a part of a charming heritage site in the city centre of Mechelen. The environment is small-scaled, dense and with mixed use. The new place is located in an industrial shed, called Douaneplein. This is positioned on a former (and partly still used) freight site with customs facilities, and is now converted into a youth cluster under development. The location feels industrial and suburban and has industrial and recreational activities.

The main question of the research is to analyse the effect of the move on the use of space and on the behaviour of the users. Intuitively one would expect a change in modal split in favour of the car: Klein Begijnhof is a city centre location in a walker and cycle friendly environment, whereas Douaneplein is a suburban car environment.

Theory

According to Vleugels et al. (2007) modal choice in trip chaining is determined by demand and supply characteristics and is influenced by perception and trends. On the demand side, they place (1) spatial structure (scatter and distance), (2) travellers characteristics (personality characteristic: age, gender, household, address), (3) resources: physical condition, socio-economic position, car position and skills) and (4) motives (compulsory activities: travel to work, for business, education, services,..; leisure activities: recreation, social,…). On the supply side, they recognise time, comfort, ease and price. Aspects of comfort of the vehicle are among other things privacy, luggage, service and time spending. Comfort of the environment are accessibility, weather resistance, social security and services.

We note that it is difficult to find research that comprehends all these above mentioned aspects. Depending on the field of the research, certain aspects are highlighted. In spatial planning research and practice for example in Flanders, a lot of emphasis is laid on the relation between spatial structure, infrastructural factors and mobility behaviour (Van Meeteren et al., 2013, Verachtert et al., 2016, Van Den Bergh et al., 2018). Mobility, health and environmental research will recognize more the influence of psychological variables, personal motives, comfort of the vehicle, attitude and perception (Saelens et al., 2003, Hunecke Marcel et al., 2007, Zwerts et al., 2010, Reumers et al., 2017, GfK Belgium, 2018). At last, perception and mobility go together when we look at the mobility of children: the role of traffic and social unsafety, as perceived by the parents, is taken into account, especially regarding the decision of children's independent travel (Zwerts et al., 2010). But research that connects spatial structure or other spatial changes to behaviour is rather scarce: it is not easy to find a case where you can measure change or difference in behaviour as a part of a controlled (spatial) intervention (Saelens et al., 2003). In most research, mobility choices are studied in several case areas with different spatial characteristics (e.g. city, rural,…) and then compared with each other. These researches mainly deal with the mobility of inhabitants of a certain neighbourhood. Some Flemish researchers have also studied mobility in other kind of places or zones, such as shopping malls (Ronse Ward et al., 2013) and schools (Zwerts et al., 2010, D'Haese Sara et al., 2011, Boussauw et al., 2013). Often a survey is used to get insight into the mobility behaviour (Saelens et al., 2003), or observation is another possibility (Choi, 2014).

This research has a different study object. It is about a real-live intervention: the circus school Circolito moves to another location and the characteristics of the location change. For each pupil the route and probably the distance of the trip to get there change. How it affects behaviour and perception is researched with two surveys: one is held a year before and one shortly after the move. In order to focus on the change of the mobility behaviour, caused by the change in spatial characteristics, it is important that the other characteristics that could influence that behaviour remain constant. In our case research the aim of the journey, the activities at Circolito, is identic: the research population has not changed and the offer of lessons (hours, types) stayed the same.

We should note though, that this case is really specific. The circus school attracts a specific public that is not representative for Belgian, Flemish or Mechelen population. However, if the response on the surveys is large enough, our research can give an interesting insight into the effects of the move for the involved people.

Methodology

In this research we investigate the relation between spatial structure, distance, perception and mobility behaviour. The data for this aspects are collected with different techniques. We used a survey, distance-calculation in GIS and existing models of spatial structure in Flanders.

A survey about mobility behaviour and perception of the location

A year before the move and shortly after it, all members of Circolito were invited to fill out a survey concerning their mobility behaviour, trip chaining and perception of the location. With the collaboration of the circus school, the survey was sent to the contact email of each pupil. In most cases this is a parent. When several persons of the same household followed lessons, one email per pupil was sent to the contact email. Parents were asked to fill it out themselves or to send it to their older children.

The first part of the survey is meant to identify the respondent and the corresponding pupil by year of birth, activities in the circus school and address. In 2017 and 2018 more than 80% of respondents were parents. The only way to have some idea of the representativity of the research is to sort the respondents out by year of birth of the pupil. The age distribution of the research sample is comparable to the total population, with slightly more adults and less toddlers.

To study the mobility behaviour, the main research component is a specific trip chain of a specific pupil. The entire trip chain consists of several possible trips and stops and is structured as follows: possible trips before the stop at Circolito, the stop at Circolito (which is as well the aim of the trip), possible trips and stops during the lessons (which is meant for the possible accompanying parent) and at last, trips after the lesson. Questions about the activity and the location/address were asked for each stop in the chain. Questions about the means of transport between the stops and accompanying person were included as well.

The questions in the survey of 2018 were dealing in detail about the last trip to Douaneplein (new location) and the last trip to Circolito before the move, to Klein Begijnhof. In 2018 there was also a question about the weather and about the ‘normal’ or ‘usual’ transport choice.

In both surveys a part of the questions concerned the perception of both locations. The questions were meant to gain knowledge about the appreciation of the location, the layout, the pleasantness and the safety of the route used to reach the location. In 2017 respondents could make a forecast of the changes that the move would bring to their behaviour. In 2018 a question about the perception of the new and the old infrastructure was added, and some questions about the use of infrastructure in the building and the nearby area.

Distance objectivation

Distance is an important criterion in mobility behaviour. The surveys enquired about the time spent travelling and the change in distance. However, for analysis' purposes, more precise data were needed, and so we used the addresses of the stops. All addresses were converted into XY-coordinates by means of the CRAB system of Flanders Geographical Information Agency (FGIA), which allowed for spatial mapping. The points were used to generate routes with Arc GIS Network Analyst using a street network reference. This delivered distances for further analysis in relation with data from the survey.

Spatial structure objectivation

Policy research in Flanders has put a lot of effort into developing three models that relate mobility to spatial structures. The policy question is more or less the same in three researches: 'in which places or area's in Flanders is it interesting to develop more housing?' Three different scores are calculated to define places where 'to intensify in existing built environment, especially in terms of housing': (1) 'transit node value and service level' (Verachtert et al., 2016), (2) 'mobiscore' (Van Den Bergh et al., 2018) and (3) 'walkability-score' (VIGEZ, 2018, Vervoort et al., 2018, Vervoort et al., 2019).

First of all, one of the final products of the three researches is a map, showing several areas in Flanders with different scores. The map of the 'transit node value and service level' and 'walkability-score' are meant to be used by policymakers on a high scale, at the Flemish level. The 'mobiscore' is developed as an information-widget for immo-practice: people searching for a new home can get insight into the environmental cost of that location. Secondly, the three scores use the same dataset to define the service levels, namely the dataset collected by Verachtert et al. (2016), but a different selection or categorisation of services is made. Lastly, regarding the mobility-focus, the three researches use a different approach. 'Transit node value and service level' searches for points in Flanders where walking, biking and public transport are seen as a feasible means of transport. 'Walkability-score' only takes walking and biking into account. The 'mobiscore' uses the transport mode that is most likely to be used (based on probability), taking into account transport motive and distance.

The service level in 'transit node value and service level' is the most comprehensive, using 50 different kinds of services. They are classified in service category (education; culture and sports; residential support; health and social care) and service level (basic, regional and metropolitan)(Verachtert et al., 2016). The transit node value comprises different values to define several aspects, such as the ease to use the public transport, whether or not there are people living close enough to use it and the accessibility on foot or by bike. The score includes population density in combination with distance decay.

The walkability-score is developed from a health perspective. It draws attention on places where people are more likely to use an active means of transport. It combines street connectivity with population density and service mix. All aspects are calculated as z-scores, normalised to other locations in Flanders. Street connectivity is a way to measure how easy or difficult is it to walk from one point to another: a good street connectivity suggests that people are more likely to walk, than with

a bad street connectivity. Intersections per ha are used to calculate it. The service mix-function of the walkability-score uses almost all the services from the dataset, but it is categorized in another way than in the 'transit node value and service level', in order to stay as close as possible to the definition of the entropy score of Frank (2010) (Vervoort et al., 2018). The service categories are retail, entertainment, office and institutional. Not the total amount of functions, but the quality of the mix is taken into account. Although the score is developed from perspective of walking, Vervoort et al. (2018) presumes that a high walkability score is likely to encourage cycling.

'For Mobiscore the service categories are translated to travel motives form the 'Research Travel Behaviour Flanders'(Reumers et al., 2017). For each motive the probability of using a specific transport mode for a specific distance is taken into account. Used motives are those that are most relevant in terms of frequency share of all transport motives during one day for the entire Flemish population (ordered by share, descending: shopping, leisure, sports, culture; follow education; services (doctor, bank ...)). The motive 'work' is the second most important motive but only the mean distance for Flanders could be included. (Van Den Bergh et al., 2018). For each location in Flanders the distance to the nearest service and to the closest activities of each motive is considered. The focus on all transport modes is used to calculate the environmental cost. The environmental cost is a score from 1 (high cost) to 10 (low cost), with 5/10 a mean environmental cost for Flanders.

In this research we use the maps/scores to objectivate the differences in spatial structure of the different circus locations.

Results

In order to discuss the relation between spatial structure, distance and mobility behaviour, we first give the results of the different parts, starting with the survey, where we focus on behaviour and perception. We secondly confront these results with an objectified distance and lastly, with the spatial structure according to the three scores. In the final paragraphs, we combine the three aspects by giving some conclusions.

Mobility behaviour and perception of the location according to the survey

In this part we describe some facts and values, given by the respondents. We start with the difference between the expectation respondents had in 2017 before the move and reality in 2018 after the move. Then we take a look at changes concerning means of transport and the relation between perceived change in distance and change in mobility behaviour. Last paragraph deals with the perception of the different locations.

Expected change

The question 'do you expect that your/your child's mobility behaviour will change" in the 2017 survey was answered by 118 respondents. More than half of them (62) expected no change. The respondents who expected a change in their mobility behaviour, could answer in a comment field what they thought would change. All pedestrians thought they would change their means of transport, most of them would go by car. A quarter of the cyclists reported they would go by car and some of the motorists by bike. 11 respondents expected problems regarding the combination of the circus lessons with other activities.

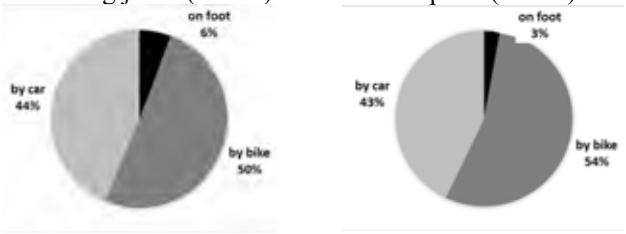
In the 2018 survey a parallel question ‘did anything change due to the move?’ was answered by 115 respondents and strikingly 81 (or 70%) reported no change. Of the respondents who reported a change, 22 said that something changed ‘for the pupil’ (means of transport, travel company and / or activities before and after) and 12 for ‘the accompanist’.

The effect of the move is a lot smaller than respondents expected.

Change in means of transport

The ‘change for the pupil’ can be the means of transportation used to go to the circus school.

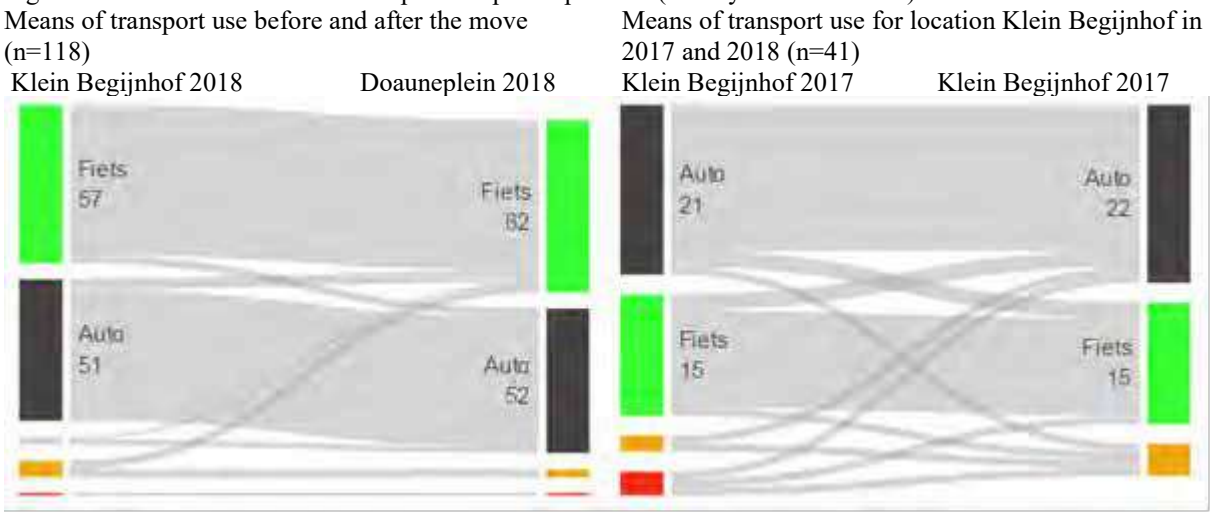
Figure 2. Means of transportation used to come to the lesson at both locations of the circus school (Survey 2018)



The graphic in figure 2 shows the reported means of transport at the arrival at the circus school (old and new location) for all the Circolito members from the survey 2018. It was intuitively expected that after the move less pupils would come on foot (from 6% to 3%), but it is striking that there is no increase in car use. It even slightly decreases (from 44% to 43%). After the move, the bike is still far more used than the car.

However, the differences are small. The Sankey diagram in figure 3 uses the two surveys and shows more details.

Figure 3. Evolution in means of transport use per respondent (Survey 2017 and 2018).



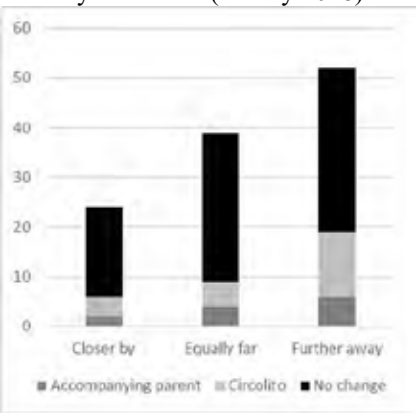
Colors used: green “by bike”, black “by car”, orange “on foot”, red “public transport”.

There are just 10 respondents out of 115 reporting change in means of transport choice, resulting in the small change in modal split we noticed before (see figure 3). There is more variation in the answers of the respondents, when we compare both surveys (Sankey diagram on the right) than when we compare the parallel questions in the same survey (Sankey diagram on the left).

Perceived change in distance

In the 2018 survey a question tried to assess the change in distance for the pupil, by comparing the new to the old location: 'Has the distance to reach the circus school changed for the pupil/you?'

Figure 4 Perceived change in distance in relation to reported change in mobility behaviour (Survey 2018)



As there was no mention of a locational point of reference (e.g. home, stop before), the answer is merely an appreciation or a perceived change in distance. Around 45% of the respondents (circa 50) thinks the new location is "further away" than the old one, around 1/3 of the respondents (circa 40) estimates it is "equally far" and for 1/5 (circa 23) it seems closer by.

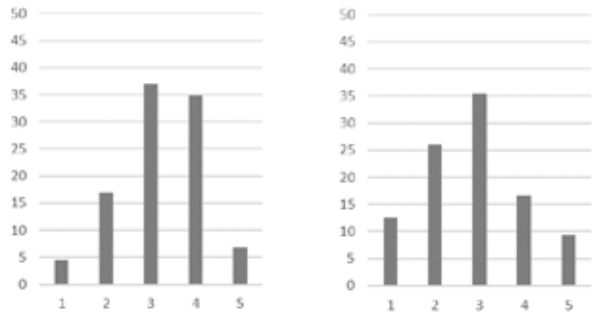
We combined these results with the perceived change in mobility behaviour (figure 4). The biggest change is reported by people who think circus school is "further away" (37%), but also around 25 % of the other respondents report change. So we can conclude that the (perceived) distance is not the only argument to change behaviour.

Perception of the locations and routes to reach the location

From a scale of one to five stars, respondents could evaluate how the circus school location performs in terms of: (1) accessibility, (2) situation to combine activities, (3) pleasantness of the road and (4) road safety. In 2017 there were also questions about the quality of infrastructure for walkers, bikers and car users. Those questions were not repeated in 2018 because the site was not yet fully furnished when the survey took place. But there was in 2018 an extra question about the interior space.

About the interior space, Douaneplein seems to score better than Klein Begijnhof: the low scores 1 or 2 are given to the Klein Begijnhof, but not to the Douaneplein. For that aspect of the move is a success. However, we are more interested in the location from spatial perspective.

Figure 5. Percentage of the respondents per given stars on safety of the route to the location. (survey 2018).
Klein Begijnhof (n=89) Douaneplein (n=96)



According to the respondents, the accessibility of Doauneplein is better than the accessibility of Klein Begijnhof: the results between 2017 and 2018 do not differ much. Research of the 2017 data (Pennincx, 2018) revealed a big difference in perception of accessibility, according to the respondents' usual means of transport. Bike users give high scores to the location Klein Begijnhof while car drivers give more low scores to Klein Begijnhof. The perception of Douaneplein differs barely.

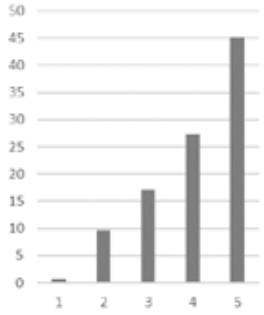
In 2018, the safety of the route to Klein Begijnhof is given less frequently 1 and 2 stars, than Douaneplein. A few more respondents give five stars to Douaneplein, but 4 and 5 stars combined, give a better result for Klein Begijnhof. So according to the survey, the routes to Klein Begijnhof have

a slightly safer name than those to Douaneplein. Pleasantness of the road gives almost the same results Most comments in the free field next to the question about safety concern the traffic safety of cross points and the bicycle route from the city centre to Douaneplein. Some respondents comment social safety.

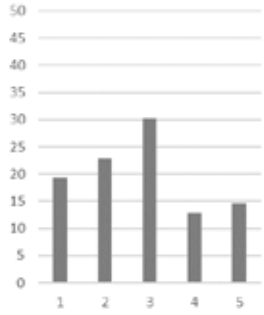
Figure 6. Percentage of the respondents per given stars on the question how well the location is situated to combine activities.

(survey 2017).

Klein Begijnhof (n=135)

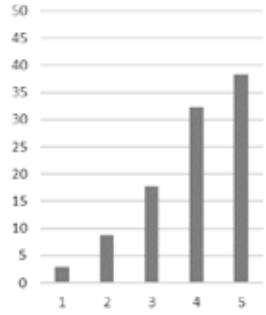


Douaneplein (n=109)

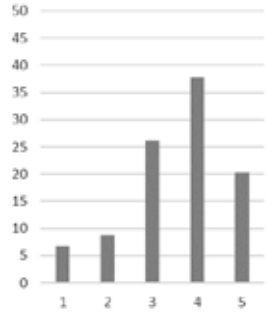


(survey 2018).

Klein Begijnhof (n=102)



Douaneplein (n=103)



Concerning the possibility to combine activities, the results for both locations differ quite a lot according to the 2017 survey. Begijnhof scores high, with a peak of 45% of the respondents giving it 5 stars. The stars for Douaneplein are more evenly distributed, with 30 % selecting 3 stars, and few people giving it 4 or 5 stars. It seems clear that the perception of Klein Begijnhof is far more positive than that of Douaneplein. However, this perception changes, according to the 2018 survey. Begijnhof is has still a positive score, but the graph is flatter. Douaneplein has somewhat grown in popularity: more respondents give now 3, 4 or 5 stars. The fact that in the survey 2017 the location Douaneplein was not yet known, had probably had an effect on the given stars in the perception research.

In conclusion of the perception part, we notice that from spatial perspective the location of Klein Begijnhof is more appreciated than the location Douaneplein. But Douaneplein is not too bad. The differences are less pronounced in the survey 2018 than in 2017, when Douaneplein was still unknown.

Conclusion of the respondents perspective

A year before the move respondents overestimated their own behavioural change. A lot of respondent thought they would use the car, but stayed with the bike. The effective change can only partly be associated with the perceived change in distance, but it is very likely that the diminished amount of walkers is due to that change in distance. The lower perception on safety of Douaneplein than of Klein Begijnhof, especially for bikers, does not seem to have an effect. The fact that the new place was not yet developed and less known can be a part of the explanation of the wrong estimate the respondents made.

Distance

One of the hypotheses is that the move resulted in a change of distance for the pupils, mostly an increase. Literature teaches us that modal split is related to distance and that increase in distance will reveal more motorised transport. In this part we focus on the difference in distance.

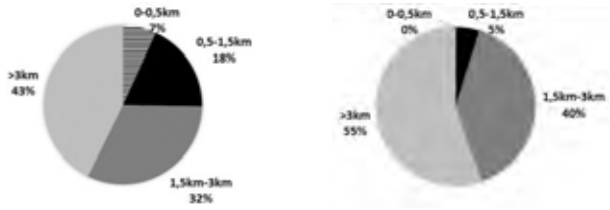
We described above the relation between perceived distance and change in mobility behaviour. In this part we use the calculated distance and the change.

Change in distance from home to circus location for the respondents

We produced a graphic with reference values that refer to realistic distances for Flemish children of 10-12 years old to walk or bike (D'Haese Sara et al., 2011). Children of that age can walk as far as 1,5 km and bike as far as 3 km. We put in an extra reference for shorter distances (0-0,05km), because the circus school population includes also younger children.

Figure 7. Calculated distance between home and both locations of the circus school (Survey 2018, Arc GIS Network Analyst)

Klein Begijnhof (n=103) Douaneplein (n=105)



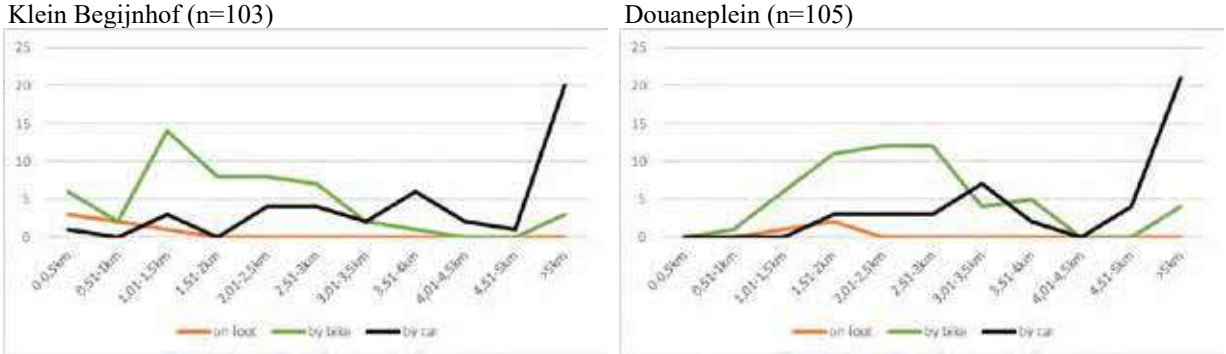
The change in distribution of the respondents according to the distance to both locations is considerable. As expected, there is nobody living closer than 500m to Douaneplein, whereas that was 7% to Klein Begijnhof. The respondents living on walkable distance (0-1,5 km) for 10-12 years old drops down from 25 to 5%. There is an increase of 12% of respondents, who live more than 3 km away from the circus school. According to literature, this distance is more likely to be travelled by car. But as we have seen above, the car is not used more often.

Relation between distance and means of transport choice

A more detailed categorisation of the distance, combined with the means of transport to get to the old and new location shows some interesting trends for the different means of transport.

Figure 8. Calculated distance of the trip from the location where the Circolito member was before the lesson (stop 1 / 2) and both locations of the circus school (stop 3) related to means of transport used at arrival (Survey 2018, Arc GIS Network Analyst)

Klein Begijnhof (n=103) Douaneplein (n=105)



When we used the distance from home, we noticed that some members walked a distance that is beyond 5 km. Therefore, we used for this analysis the location where the member was before the lesson. This is more accurate, since 25% of the members do not depart from home, but from another location (hobby, school,…).

Clearly, to get to the new location, more respondents travel longer distances by bike.

Spatial structure according to the three scores

Spatial structure of the locations

Both locations belong to the same category of 'transit node value and services' and have a value that stands for a very good transit node and a very good service level (A1 in the legend). For 'mobiscore', the site Klein Begijnhof (9,8) scores slightly higher (meaning lower environmental cost), than Douaneplein (9,7): this is because that Douaneplein is less accessible with public transport, than Klein Beginhof. According to the walkability score, there is a wide gap between both locations: with 13,94 Klein Begijnhof belongs to the third highest category, with -0,57 Douaneplein to the lowest category but one (out of 10, figure 13).

Figure 9 Extract of the 'spatial development potential map of Flanders and Brussels Capital Region, combining transit node value and total service level' for the main recruitment area of Circolito circus school, Mechelen and surroundings.

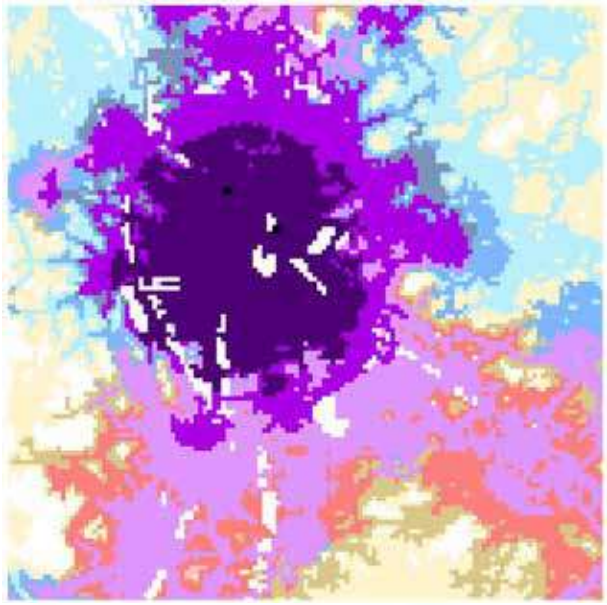
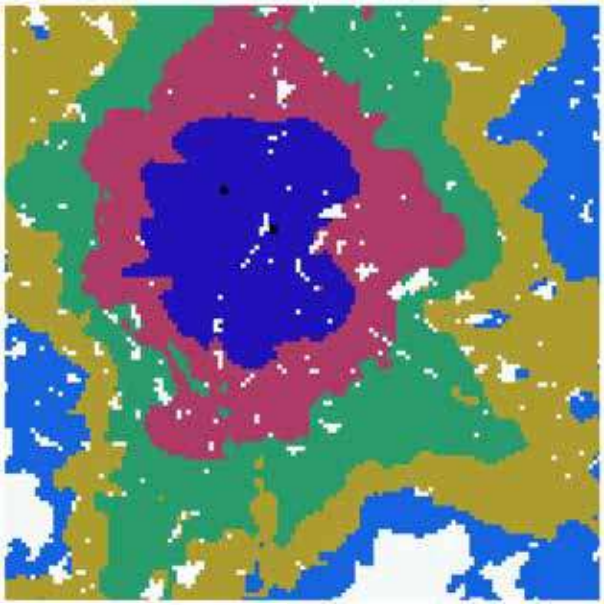


Figure 10 Mobiscore mapped integer for the main recruitment area of Circolito circus school, Mechelen and surroundings.



We conclude that the locations are totally different from the perspective of walkability, but they do not differ much on 'transit node value and service' and 'mobiscore'. This means that one should

expect less walkers and possibly cyclers at the Douaneplein, but the chance of public transport or car use should be more or less the same for both locations.

However, it is important to note that none of the three scores was developed with the location of a service as starting or reference point: they were developed from the perspective of a home location, and this was then seen in reference to possible services or other activities.

Spatial structure of the recruitment area

Figures 9, 10 and 13 show the spatial structure, by using maps of the three scores presented above. Both locations of the circus school are indicated.

The 'transit node value and service level' (figure 9) is given in a raster legend, combining different levels of services, with different levels of transit node value. On the map we notice that a central zone of Mechelen has the highest level of services and transit value possible. This zone comprises the centre, the subcentres of the agglomeration and includes some sparsely built up zones, especially in the south-east of the railway station. The further away from the centre of Mechelen, the higher the differentiation in score. In northern, southern and south-eastern direction, we notice how the railway structures space. Along the railway we also find places with a high transit node value and mediocre services. The west and the north-east have both a mediocre level of services and a mediocre level of transit node value.

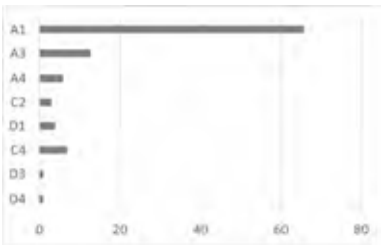
The mobiscore shows a concentric pattern on the map (figure 10). The mobiscore is 9 or higher (low cost) for the centre of Mechelen, the subcentres of the agglomeration and the city centre circle include some sparsely built up zones. The next belt of score 8 or higher comprises villages and less structured settlements and the agricultural land and nature reserves in between. Settlements further away show a lower score.

The walkability-score gives us a more diverse pattern on the map (figure 13), where almost all the categories can be seen. The highest values are situated in the centre of Mechelen and the nearby built up zones. The circular structure is less visible. The less built up spaces have very low scores. Some small sized settlements further away from Mechelen have a medium score in their centre.

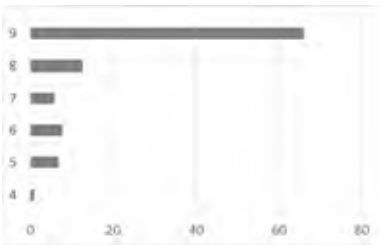
Spatial structure of the home environment and mobility behaviour

Figure 11 Percentage of the home location of Cicolito's pro value of the score (Survey 2018)

Transit node value and total service level



Mobiscore



The results of the move of the circus school show a change, though modest, in modal split in favour of the bike. So far, there is no real explanation for this, and the three scores do not seem to provide more answers. However, the scores were developed from the perspective of the locations of people's homes. This implies that there should be a relation between the score of the home's locations of the respondents and the means of transport used. Therefore, we combine the

above mentioned scores of the homes of the respondents with their chosen transport mode (figures 11 and 12).

Most of the Circolito members live in places with a high 'transit node value and service level' (A1) and a high mobiscore (9+). The biggest share of bike users, almost two out of three, lives at a location that belongs to the A1 category of 'transit node value and service level'. However, looking at the other categories of that score, the difference is modest. More than three out of four members that lives in locations with mobiscore 9+, use a bike. With lowering mobiscore, the share of car users increases.

The walkability score is more independent from the distance to Mechelen, the regional centre, in comparison with the other scores. There are not many addresses in the classes with very high and very low walkability score, but all classes in between count 13 to 18 addresses.

Figure 12. Walkability-score of home-locations combined with means of transport at arrival at Klein Begijnhof (KB) and Douaneplein (DP) (Survey 2018, Arc GIS)

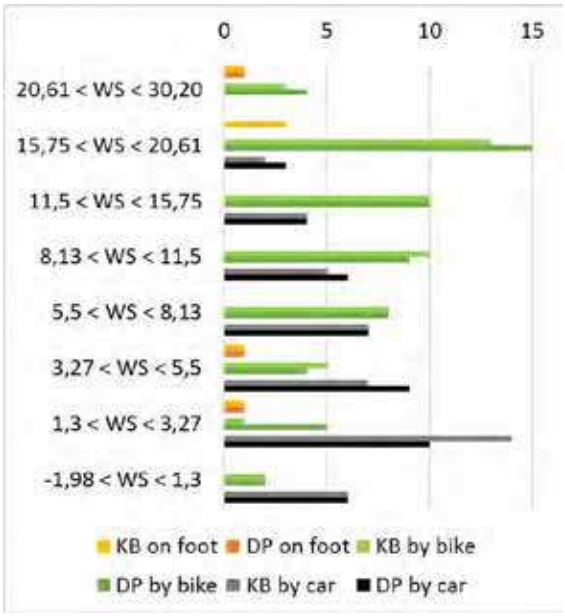
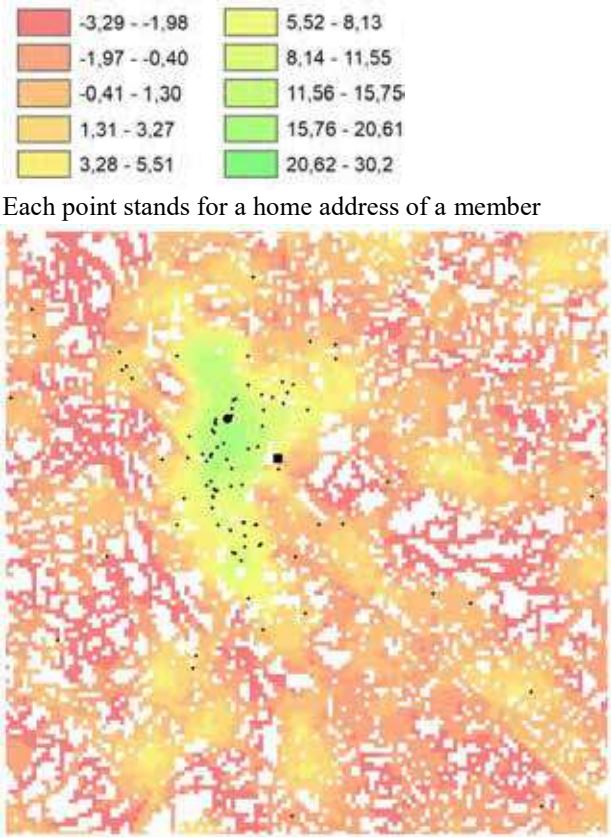


Figure 13. Map of walkability-score and of home-locations (Survey 2018, Arc GIS)



The classification on the map and the graphic uses natural breaks (Jenks) in 10 classes (using Arc GIS).

When we combine the scores with the means of transport in figure 12 we notice that a higher walkability score gives a higher chance of bike use. The turning point is a score of 5,5 to 8,13. Lower scores reduce the chances of bike use. However, we did not research the relation between distance and the score in detail. The location of Douaneplein still convinces four people living in places with low walkability of 1,3 to 3,27 to come by bike instead of coming by car. For at least two of them the new location is closer than the old one, because they come from the south-east.

Conclusion on use of the scores to explain mobility behaviour

The three scores are developed to encourage spatial development in places that are the least dependent on car use. For the case of the circus school they are relevant.

The people living in places with high values for 'transit node value and service level' and 'mobiscore' are more likely to use another means of transport than a car. Most of them use a bike. The walkability score gives us insight in places where people are stimulated to walk and seems useful to objectivate characteristics of the location. The new location is far less walkable then the old one, so there are less pupils coming on foot. We also see indications that higher walkability scores at the living environment of the pupils relates with more bike use.

Conclusion

The spatial planning theories we used, such as the 'walkability score' and 'transit node value and services', emphasise the relation between spatial structure, infrastructural factors and mobility behaviour on the one hand and mobility behaviour on the other hand. It made us expect that the move would reveal a change in modal split in favour of the car. A lot of changes associated with less bike use are found in the data: higher distance, lower safety perception, lower functional mix and lower street connectivity. But bike use does not decrease. We notice an increase in biking distance (figure 8), that the collected data and used theories cannot explain. Although it might be interesting for Flemish spatial policy to develop and test a bikeability score and to do research on other cases, we do not think this will give us an explanation for the minor change in our circus school case.

Schwanen (2012) recognises in this mainstream research the believe in the 'homo economicus': individuals that actively make rational choices. However he and others researchers (Bambust, 2015) also recognise the role of less conscious aspects in the process of choices. So is habit one of them.

In our circus school case, we may find a small indication of the role of habit. Habit is typically understood as more or less automatic behaviour that is acquired through repetition and positive reinforcement (Schwanen et al., 2012). The move was not meant to change the mobility behaviour, but the expectation was it would. In reality, the move has not proven to be a habit-breaking intervention. We believe that extra case research to learn more about habits and spatial characteristics is useful, but some changes in the survey and other kinds of research, such as observation, panel discussions,… will be needed.

Currently, the Flemish administration is discussing a possible broader policy approach, especially in the discussion of habit change. A group a social marketeers has been appointed to bring knowledge and know-how about this topic within the Flemish administration. A popular social marketing model in Flanders is presented by Bambust (2015). And some tests in the field of nutricion are done in order to make use of habit-braking interventions or nudging.

Concerning this, one part of the story is not yet told. In the week before the move, the director of the circus school presented the data of the first survey in a newsletter. He praised the public for the high bicycle use and expressed hope and expectation the bike use would not decrease after the move. We cannot prove the effect of this call, but it may be another aspect in the explanation. Using a positive message and exemplifying one's behaviour can have a positive effect on people. This kind of

interventions is exactly what social marketing tries to achieve. It is important to do such interventions and to learn more about the effects. However, there is no need to wait to use these until they have proven to be effective: we have to use all the possible and ethical means to try to lower the car use.

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