

Imprint

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Summary

As part of the European project “Holistic Urban and Peri-Urban Mobility”, a survey in Turku region was realized to study urban mobility lifestyles. The online Maptionnaire survey was participated by about 800 respondents but in this report we analyzed the answers of a subsample of 474 respondents who provided answer to all questions. We identified four personas, namely four groups of people with similar neighborhood preferences and travel attitudes. These groups differed in terms of their socio-economic characteristics, their travel behavior in different seasons, their preferences for future mobility services, and their perceived health and life satisfaction.

Pro-sustainable urbanites prefer green and beautiful neighborhoods that are convenient to walk and cycle and that have good access to public transportation and city center. These residents are often females and rather young and most likely to live in intensive transit zones. **Multimodal price-conscious** residents are omnivorous but cost-sensitive in their travel mode choices. In their neighborhoods they value functionality over attractiveness. These residents are often males and highly educated but have limited budget. These first two groups walk more than the following two groups – even in winter. They also cycle more and use car less– regardless where they live.

Time-conscious suburbanites value suburban, quiet and green neighborhoods with good proximity to schools and recreational facilities. In their travel they are time-sensitive and car-oriented. These high-income residents have often children and own one or more cars and they are least likely to live in intensive transit zones. In their daily life they use car more than other groups regardless of where they live. **Auto-oriented residents** value good access to the main roads and district shopping center as well as the cleanness of the neighborhood and spacious housing. The members of this group are rather old and live alone or with a partner. Although they often live car-dependent life, they decrease their use of car if they live in intensive transit zone.

When estimating the perceived health of the four groups, it appeared that the pro-sustainable group living in intensive transit zone had the highest and the auto-oriented group living in basic transit or car zone had the lowest perceived physical health among the groups. Findings regarding perceived life satisfaction were different: the time-conscious suburbanites living in basic transit or car zone had the highest perceived life satisfaction while the pro-sustainable urbanites living in intensive transit zones had the lowest perceived life satisfaction.

The likelihood for using walking and cycling infrastructure, bike sharing, scooter sharing, electric bike services or improved transit services to travel to Turku harbor in the future is highest among the pro-sustainable urbanites followed by the multimodal price-conscious residents. The latter group is most likely to use ride sharing, car sharing and car rental services for their harbor related trips in the future.

The results of this study can be used both in transportation and land use planning. The identified personas can be targeted as different market segments for different mobility management strategies or policies aiming at increasing sustainable and active travel behavior. The results can be considered when investing to the improvements of certain travel modes or when deciding about the maintenance levels of routes during various seasons. The findings can also inform land use policy when estimating the best balance between supply and demand of various types of urban neighbourhoods.

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Introduction

This report presents the results of a mobility survey in Turku region which was conducted using a digital participatory planning survey tool (Maptionnaire). The survey entitled **“Mobility in Turku region and future of the harbor area”** was part of the research project “Holistic Urban and Peri-Urban Mobility”, co-funded by the EU in Interreg Baltic Sea Region programme.

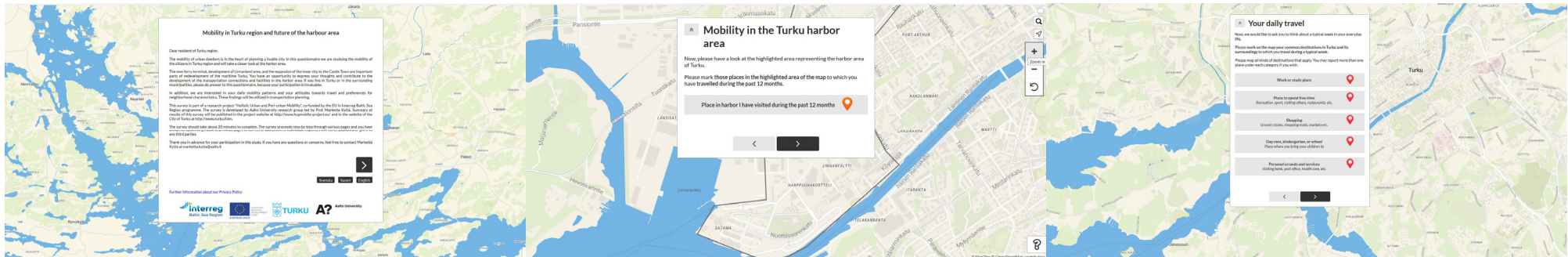
The summary of results and descriptive statistics of all the respondents (806 in total) are presented in a separate report. The current report presents the results of statistical analysis of the data collected through the survey. Different statistical analysis methods were used to identify different personas in the Turku region based on respondents’ attitudes towards travel and their preferences for neighborhood characteristics. For the purpose of such analyses only the respondents that had provided answer to all the attitudinal questions have been included (474 in total).

After identifying four different personas, further analysis was conducted to explore the sociodemographic characteristics of these personas, where they are more likely to live, how their travel behavior differs in different seasons and what future mobility services would they prefer and use to travel to harbor area if service improvements are made. Moreover, perceived health and life satisfaction of these different groups have been explored as well.

The results of this study can be used both in transportation and land use planning. The identified personas can be targeted as different market segments for different mobility management strategies or policies aiming at increasing sustainable and active travel behavior. The results can be considered when investing to the improvements of certain travel modes or when deciding about the maintenance levels of routes during various seasons. The findings can also inform land use policy when estimating the best balance between supply and demand of various types of urban neighbourhoods.

Method: Online Maptionnaire survey

Since 2005, Aalto University has developed online mapping surveys in close co-operation with planners. These so-called softGIS surveys, as they were originally called, were later (in 2014) developed as an online, 'do it yourself', service of Maptionnaire (<https://maptionnaire.com/>). Maptionnaire is an advanced example of PPGIS (Public participation GIS) methodology enabling the mapping of environmental experiences, daily behaviour practices and localised knowledge and ideas for spatial development. Direct planner involvement in its setup has ensured the relevance of the produced, 'soft' geocoded information. Maptionnaire allows anyone to create, publish and analyse map-based questionnaires with an editor tool. Allowing planners to design their own PPGIS tools independently is an essential step in building a bridge between PPGIS methodology and planning support systems (PSS). The methodology is used both in research projects and in participatory planning practice-oriented projects, where various planning phases, various scales and various planning approaches have been involved.



As part of HUPMOBILE-project a Maptionnaire survey called "Mobility in Turku region and future of the harbour area" was arranged in the Turku region. The data collection took place during January-February 2020. The survey was participated by 806 respondents but in this report we analyzed the answers of a subsample (n=474). The respondents of the survey were recruited partly by sending an invitation letter to a sample of randomly selected dwellers. 704 respondents participated this random sample survey. The survey was also marketed openly by the city of Turku and 102 respondents answered the survey this way.

1. Identifying the neighborhood preference and travel attitude factors

In the online map-based questionnaire, the respondents were asked to rate, how important they considered different neighborhood attributes to be, when choosing their current place of residence. The first set of questions included 29 statements regarding neighborhood characteristics. In addition, the respondents were asked to provide their opinion about 15 travel related attitude statements.

Separate statistical factor analyses for both sets of statements were conducted in order to identify highly correlated variables which constituted latent attitudinal factors.

The 29 statements regarding neighborhood characteristics resulted as 7 factors of which 4 were found to have sufficient internal reliability and were kept for further analysis. The 15 statements regarding travel attitudes formed 3 factors. The tables on the next pages illustrate the statements that were used to measure each of these factors.

Statements about important neighborhood characteristics

Factors

- Safe and convenient to walk and bike for errands
- Easy access to a good public transport service
- Easy to walk and/or cycle in the neighborhood
- Easy access to city center
- Local shops within walking distance (e.g. grocery store)

Neighborhood walkability, access to transit and city center

- Easy access to school or university
- Neighborhood school quality (for my children)
- Proximity to work location
- Other facilities such as a community center or places to spend free time available nearby

Access to school, work and free-time facilities

- Easy access to highway network or main road
- Easy access to a district shopping center
- Good street lighting
- Clean neighborhood
- Spacious housing available

Spacious housing, access to main roads and shopping center

- Low level of car traffic on neighborhood streets
- Quiet neighborhood
- Tree lined street
- Attractive appearance of neighborhood
- Parks and green spaces nearby

Quiet, attractive and green neighborhood

Statements about travel attitudes

- Changing how people travel is a great way to improve the environment
- I prefer to take public transport than drive whenever possible
- I prefer driving to other modes of transportation
- I prefer to walk rather than drive whenever possible
- I try to limit my driving to help improve air quality
- I prefer to cycle rather than drive whenever possible
- Vehicles should be taxed on the basis of the amount of pollution they produce
- I like to be able to rest or read while travelling
- We could manage pretty well with one fewer car than we have (or with no car)

- I do not like to have variation in my daily travel time
- I like to avoid queues and congestion while travelling
- I do not like to wait for another travel mode while travelling

- Transit fare affects my choice of daily travel by public transport
- Fuel price and/or price of parking affects my choice of daily travel by car

Factors

Pro-sustainable travel

Time-sensitive

Cost-sensitive

2. Cluster analysis

Identifying personas

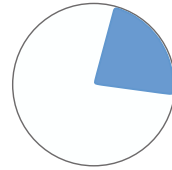
The aim of the cluster analysis was to identify groups of people with similar neighborhood preferences and travel attitudes. The cluster analysis was conducted based on the neighborhood preference and travel attitude factors gained from factor analyses. First, a hierarchical clustering was conducted in order to define the suitable number of clusters and after that, a non-hierarchical clustering defined a cluster membership for each respondent.

The cluster analysis resulted in four resident clusters with distinctive preferences and attitudes, which are referred to in this report as personas: *Pro-sustainable urbanites*, *Multimodal price-conscious residents*, *Time-conscious suburbanites* and *Auto-oriented residents*.

In order to identify the socio-economic characteristics of these different personas, their travel behavior in different seasons, their preferences for future mobility services, and their perceived health and life satisfaction regression analysis and structural equation modelling (SEM) were used. The results of such analysis are presented in this report.

2.1 Pro-sustainable urbanites

23 % of the respondents

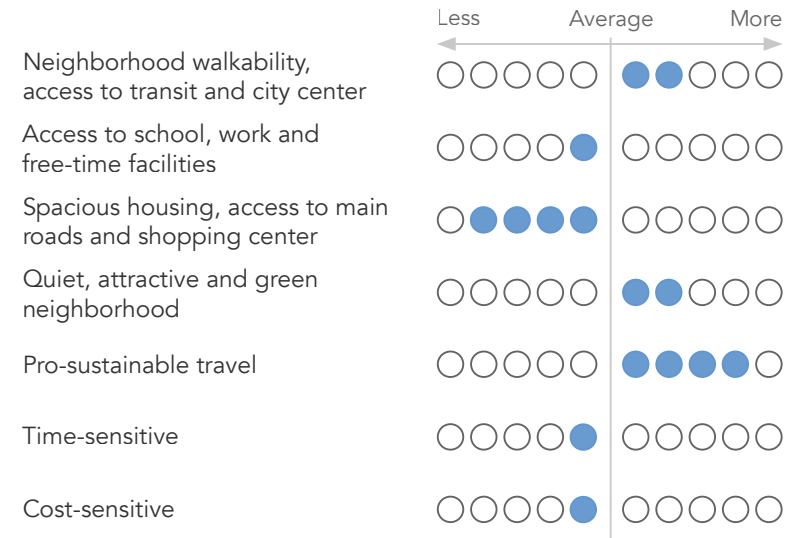


Pro-sustainable urbanites care for living environments that are convenient to walk and cycle and that have good access to public transportation and city center. In addition, they appreciate the nice appearance and greenness of the neighborhood. In their everyday journeys, these residents prefer to use sustainable transport modes rather than drive and the travel choices of pro-sustainable residents are not either very time- or cost-sensitive.

Who are they?

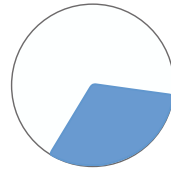
Females, young adults (25-34-year-olds), those having monthly income less than 4500 euro, those with no car, and those owning a cheap transit pass are more likely to belong to this cluster of residents.

Pro-sustainable urbanites' preferences:



2.2 Multimodal price-conscious

31,5 % of the respondents



Multimodal residents do not have a strong preference towards any particular travel mode, but they are cost-sensitive in their travel mode choices. They value proximity to their everyday locations and city center by sustainable travel modes but also place importance on easy access to main roads. The quietness and attractiveness of the neighborhood is not an important criteria when multimodal residents are choosing their residential area to live in.

Who are they?

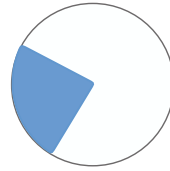
Males, highly educated residents, bike owners, those living with a partner, and those having an income less than 3000 euros are more likely to belong to multimodal price-conscious resident group. Those aged above 64 and those having more than one car are less likely to belong to this cluster.

Multimodal, price-conscious residents' preferences:



2.3 Time-conscious suburbanites

24 % of the respondents

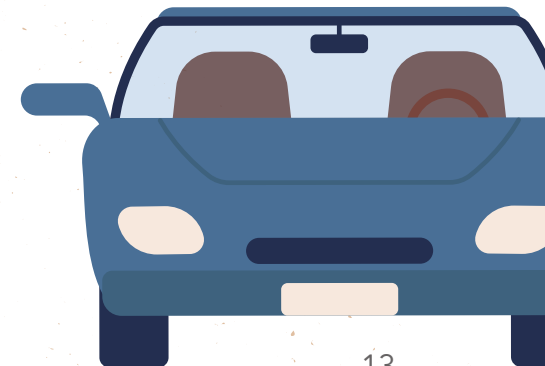
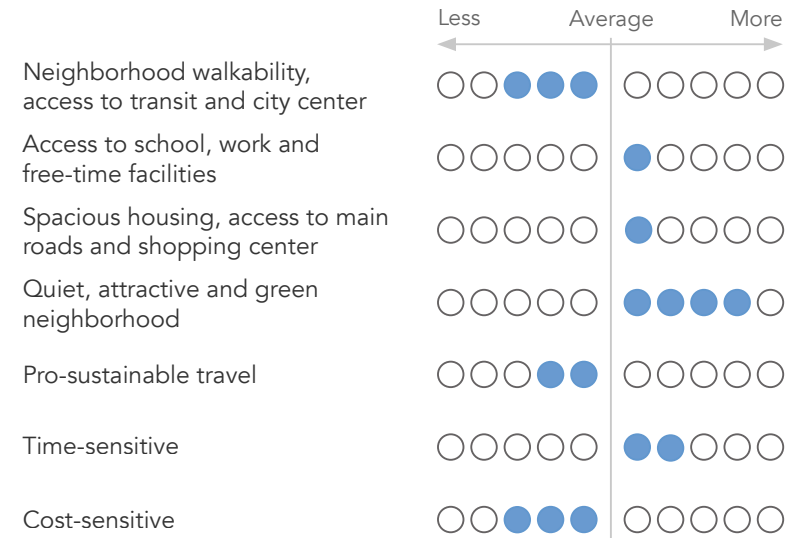


The residents in this cluster value the traditional suburban qualities, such as the quietness and greenness of the neighborhood. In addition, proximity to good quality school and recreational facilities is considered important. In their travel choices, the residents in this cluster are time-sensitive and do not want to have time variation or waiting during their travel. Thus, the suburbanites are car-oriented, rather than advocates of sustainable travel.

Who are they?

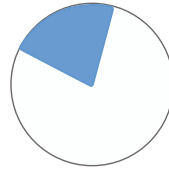
High-income residents (over 4500 euros/month), those having children and those owning one or more cars in the household are more likely to be in this cluster.

High-income, time-conscious suburbanites' preferences:



2.4 Auto-oriented

21,5 % of the respondents

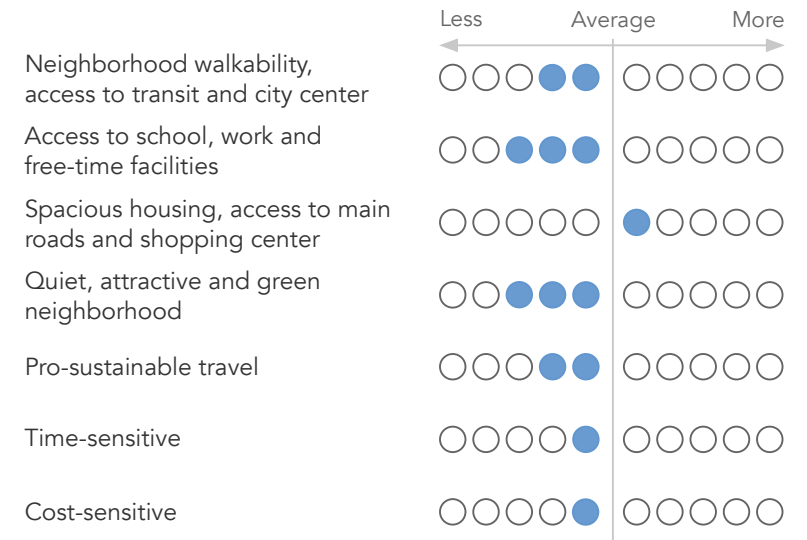


The auto-oriented residents value living environments that enable convenient travel by car. These neighborhood qualities include good access to the main roads and district shopping center. In addition, they value the cleanness of the neighborhood and spacious housing. These residents' attitudes towards travel are in accordance with the car-oriented neighborhood preferences, showing no support for walking, cycling or public transport.

Who are they?

Those owning one or more cars, those living alone or with a partner without children, those above 45 years old are more likely to belong to this cluster.

Auto-oriented residents' preferences:



2.5 Socio-economic characteristics of the personas

Pro-sustainable urbanites



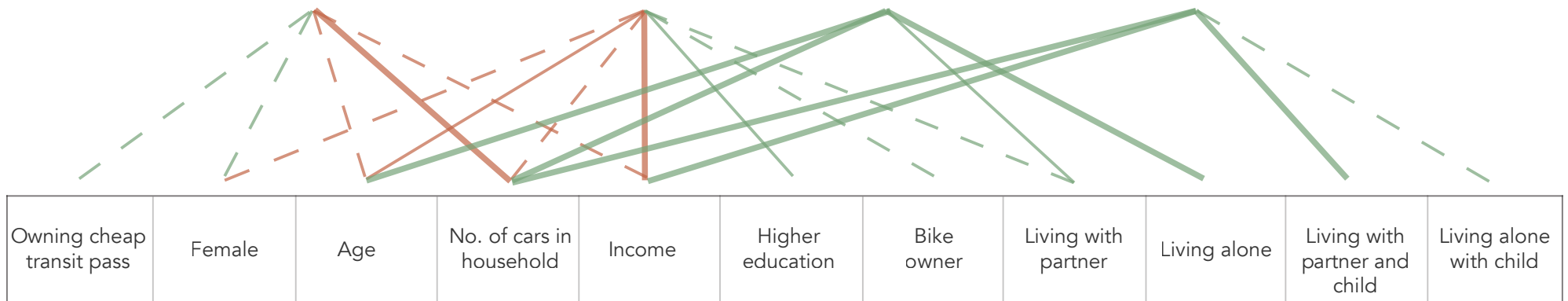
Multimodal price-conscious



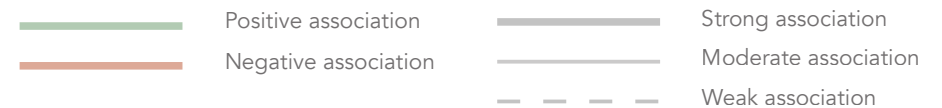
Auto-oriented



Time-conscious suburbanites





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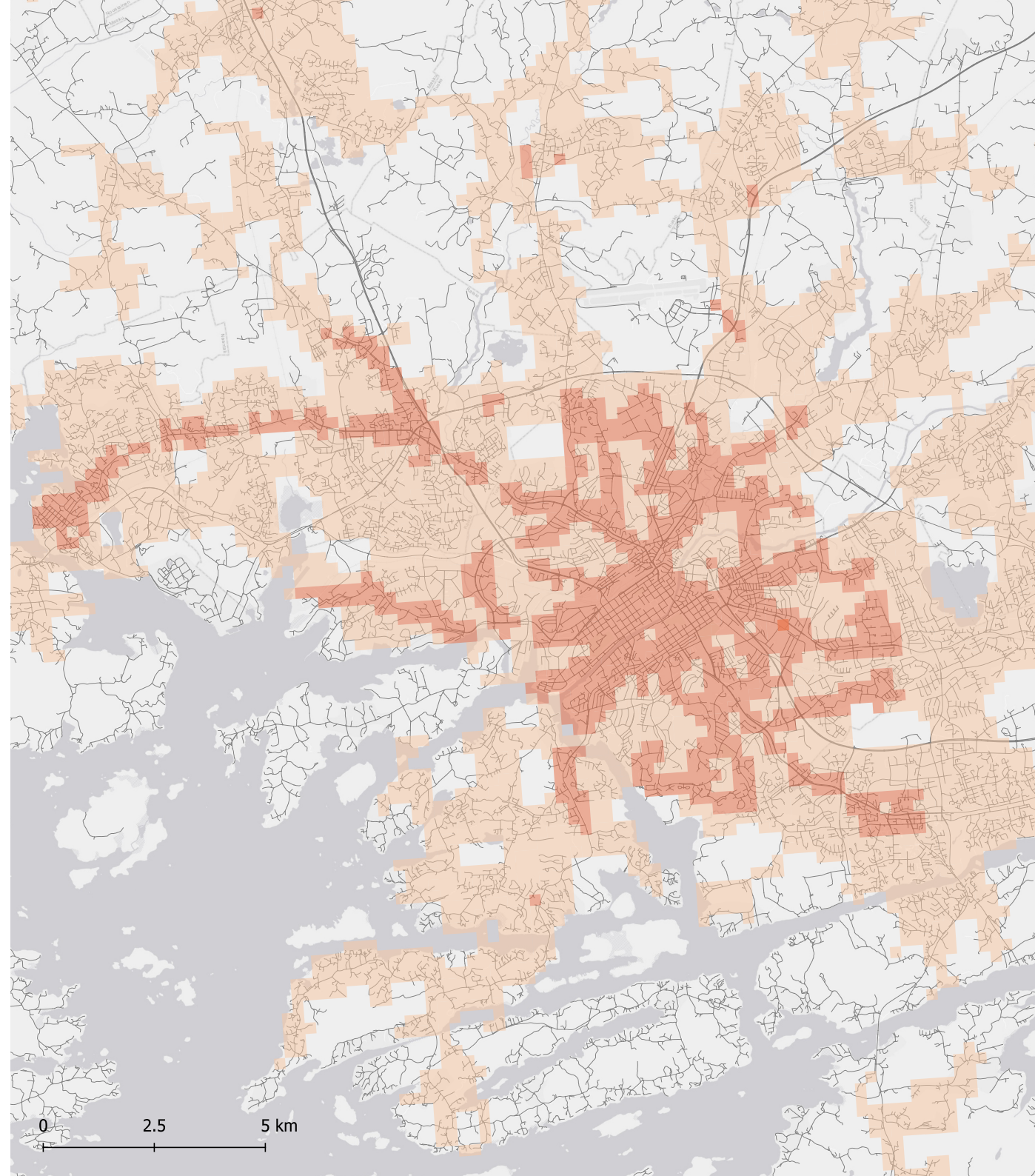
3. The Urban Zone classification in Turku region

The classification of residential neighborhoods into intensive transit zones or basic transit zones/car zones is based on the Urban Zone classification data produced by the Finnish Environmental Institute. The original classification includes pedestrian zone, fringe zone of the city center or secondary center, public transport zone, car zone, or a combination of these. This categorization is based on distance from the city center or secondary center, population density, and the service level of the public transportation.

In this study, intensive transit zones include pedestrian zones in the city and secondary centers, which often also have a high public transportation service level, and areas, where public transportation service interval is maximum 10 minutes. In general, these areas provide good possibilities for walking, cycling and the use of public transportation in everyday journeys.

-  Intensive transit zones
-  Basic transit or car zones

Urban Zone Classification 2017 (modified by the authors) / © Finnish Environmental Institute. The data has been downloaded from SYKE's download service 17.02.2020 with license CC 4.0 BY.
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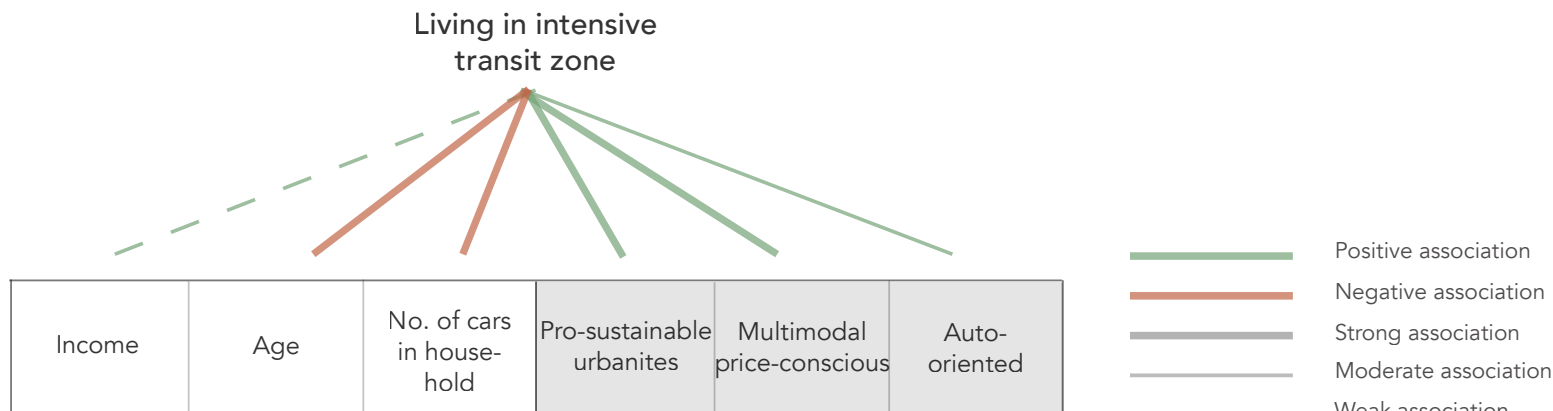
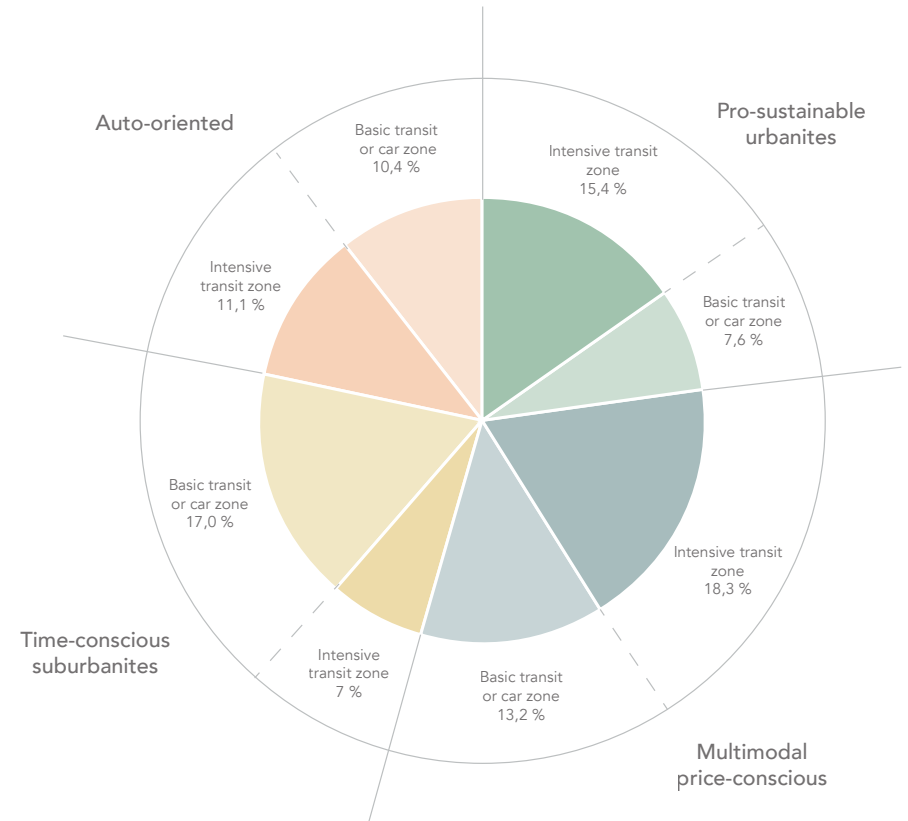


3.1 Where do these different persona reside?

Among different clusters the pro-sustainable urbanites are more likely to live in intensive transit zones, followed by the multimodal price-conscious and the auto-oriented residents. The time-conscious suburbanites are the least likely group to live in intensive transit zones.

The residents belonging to the auto-oriented group are more equally distributed between intensive transit zone and basic transit/car zone compared to the other groups.

Besides the indirect influence of some socio-economic factors on the possibility to live in intensive transit zones through their association with the different inhabitant groups (i.e. persona), some of the socio-economic factors showed a direct influence on the possibility of living in an intensive transit zone regardless of to what cluster they belong. Those having a monthly income between 3000-4500 euros are more likely to live in an intensive transit zone, whereas those aged above 45 years are least likely to live in intensive transit zones compared to other age groups. Moreover, those owning two or more cars are least likely to live in intensive transit zones.



4. The use of different travel modes in different seasons



Walking

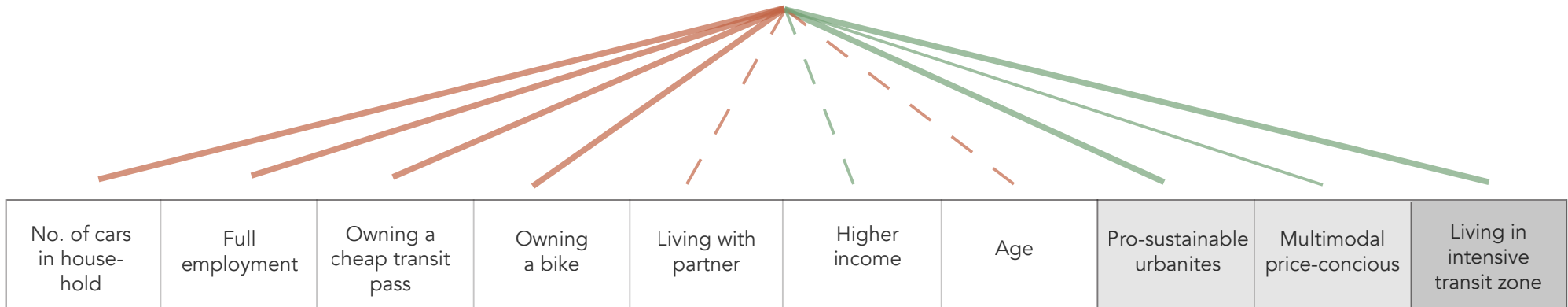


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The degree of association of different factors with monthly distance walked in Turku region during spring, summer, and autumn: In spring, summer, and autumn the pro-sustainable urbanites walk significantly more than other groups followed by the multimodal price-conscious residents who walk less than the pro-sustainable group. Those living in intensive transit zone walk more than those living in the basic transit/car zones.

- Positive association
- Negative association
- Strong association
- Moderate association
- - - - Weak association

In addition, more cars in household, being fully employed, owning a cheap transit pass, owning a bike, living with partner and older age decreases walking. Interestingly, the higher income residents walk slightly more than other residents in this season.

Differences of walked distance between different persona when living in intensive transit zone versus when living in basic transit/car zone: In order to find out whether the different personas would show different travel behavior if living in an intensive transit zone versus when living in basic transit/car zone, further analysis was conducted. The results indicate that the pro-sustainable urbanites and the multimodal price-conscious residents walk significantly more than the other two personas (i.e. the time-conscious suburbanites and the auto-oriented) only if they are living in an intensive transit zone. Moreover, the pro-sustainable urbanites living in intensive PT zone are still walking more than the multimodal price conscious residents living in the same zone type.



Strong positive association to walking

Pro-sustainable urbanites and multimodal price-conscious **living in intensive transit zones** show a strong association to walking

Walking in winter

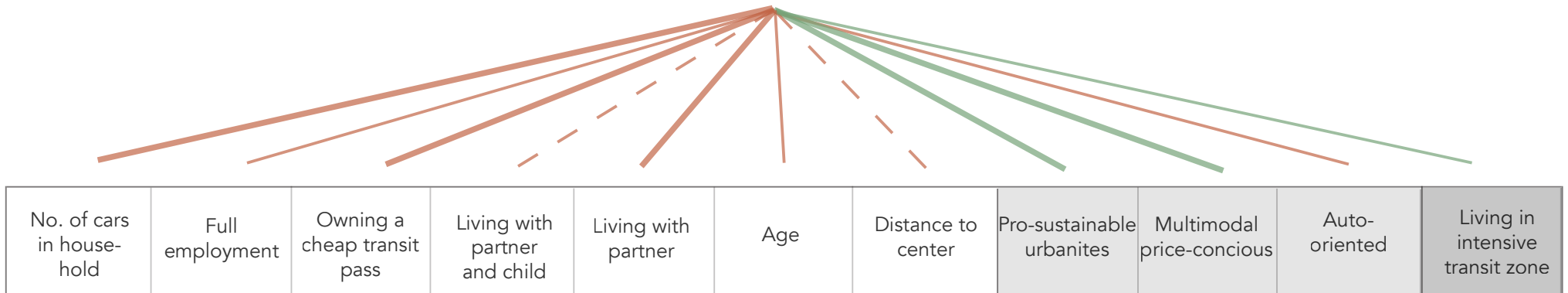


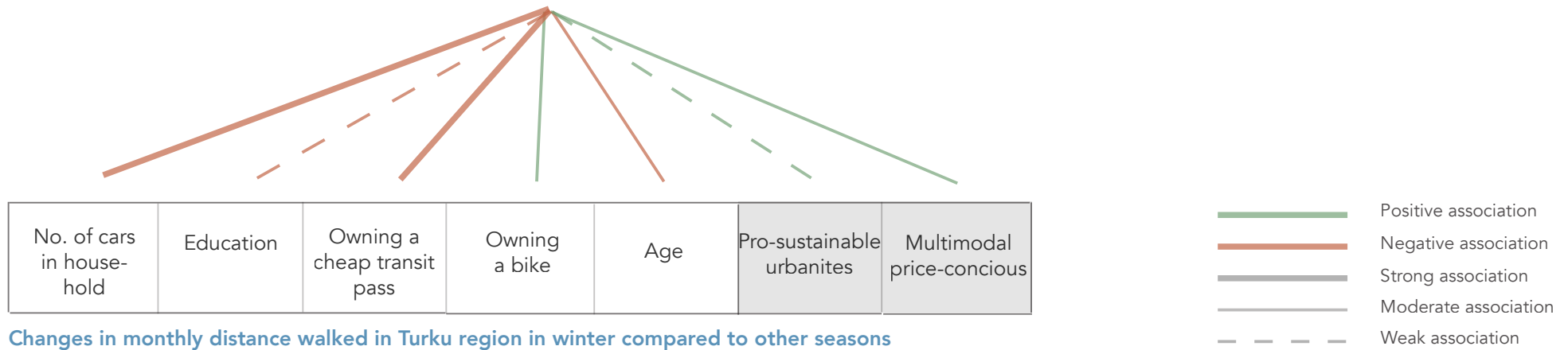
Image: © Good studio / stock.adobe.com

The degree of association of different factors with monthly distance walked in Turku region during winter:

During winter the pro-sustainable urbanites and the multimodal price-conscious residents are still walking more than all the other groups. Comparing their walking in different seasons, however, shows that the multimodal group are walking more in winter than in summer. The pro-sustainable group are also walking very slightly more in winter. The auto-oriented group who did not show any difference in their walking behavior compared with the time-conscious suburbanites in other seasons, walk less than this group in winter. Living in an intensive transit zone is still showing associations with more walking also in winter, although the degree of association is moderate in winter compared to other seasons when the degree of association was strong.

- Positive association
- Negative association
- Strong association
- Moderate association
- - - - Weak association

Changes in walking in winter



Changes in monthly distance walked in Turku region in winter compared to other seasons

Distance to the Turku city center also showed to reduce walking in winter. The influence of socio-demographic factors on distance walked in winter is almost the same as what was discussed for other seasons. However, owning a bike which showed to have a negative association with walking in other seasons does not have such an influence on walking in winter. This can indicate that the bike owners who used to bike more in other seasons may have shifted travel mode to walking in winter. This can also explain the result regarding more walking for the pro-sustainable and multimodal group in winter compared to other seasons. In addition, the higher income group who showed to walk more than other groups in other seasons, do not show such a behavior in winter.

Cycling

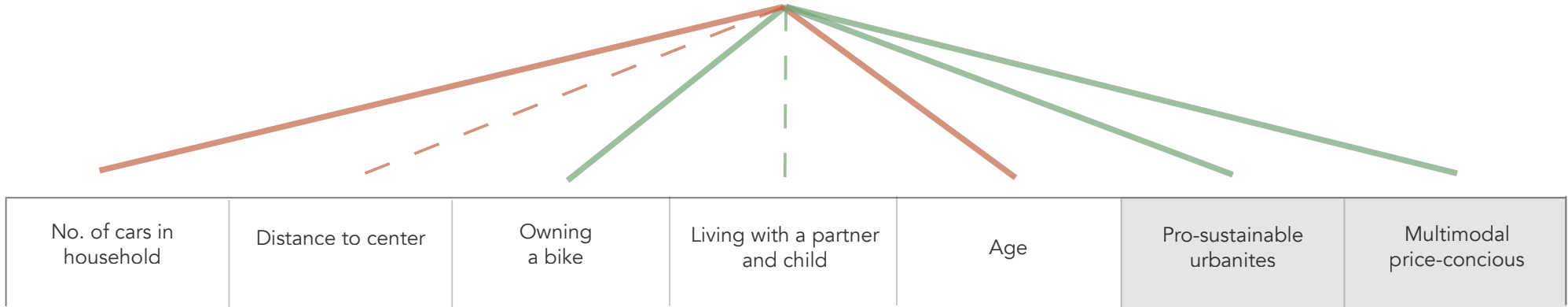
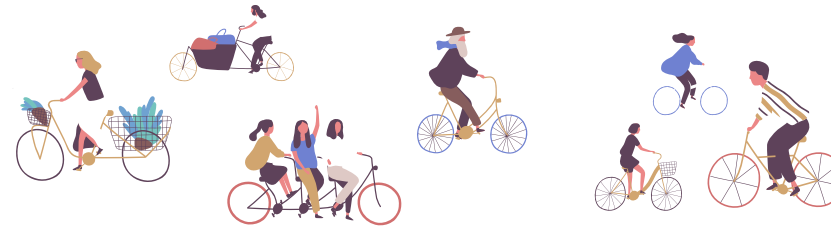


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The degree of association of different factors with monthly distance cycled in Turku region during spring, summer, and autumn: Same as what was seen for walking, the pro-sustainable urbanites and the multimodal price-conscious groups cycle more than other personas in these seasons. The pro-sustainable urbanites cycle more than the multimodal price-conscious group. Moreover, both of these groups are cycling more than walking in these seasons and this difference between cycling and walking is more significant for the multimodal price-conscious group. Living in an intensive transit zone does not have an association with cycling.

- Positive association
- Negative association
- Strong association
- Moderate association
- - - - Weak association

However, as distance from home to Turku city center increases, cycling decreases slightly. Among the socio-demographic factors, owning a bike and living with partner and child increase cycling. Conversely, an increase in number of cars in household and age decreases cycling.



Basic transit or car zones

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Differences of cycled distance between different persona when living in intensive transit zone versus when living in basic transit/car zone: Contrary to the results found for walking behavior, the pro-sustainable and the multimodal persona cycle more than the other groups regardless of where they live (i.e. in intensive transit zone versus basic transit/car zone). However, the pro-sustainable and multimodal group living in intensive transit zones cycle slightly more than their counterparts in basic transit/car zones.

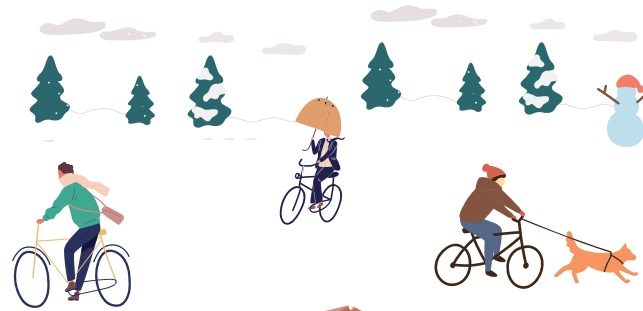


Intensive transit zones

Strong positive association to cycling

Pro-sustainable urbanites and multimodal price-conscious **living in intensive transit zones or basic transit or car zones** show a strong positive association to cycling

Cycling in winter

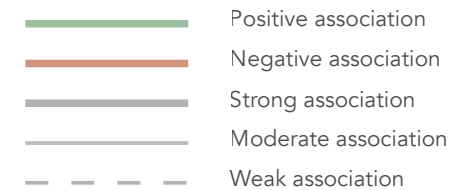


No. of cars in household	Distance to center	Owning a bike	Owning a cheap transit pass	Age	Female	Pro-sustainable urbanites	Living in intensive transit zone
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Image: © Good studio / stock.adobe.com

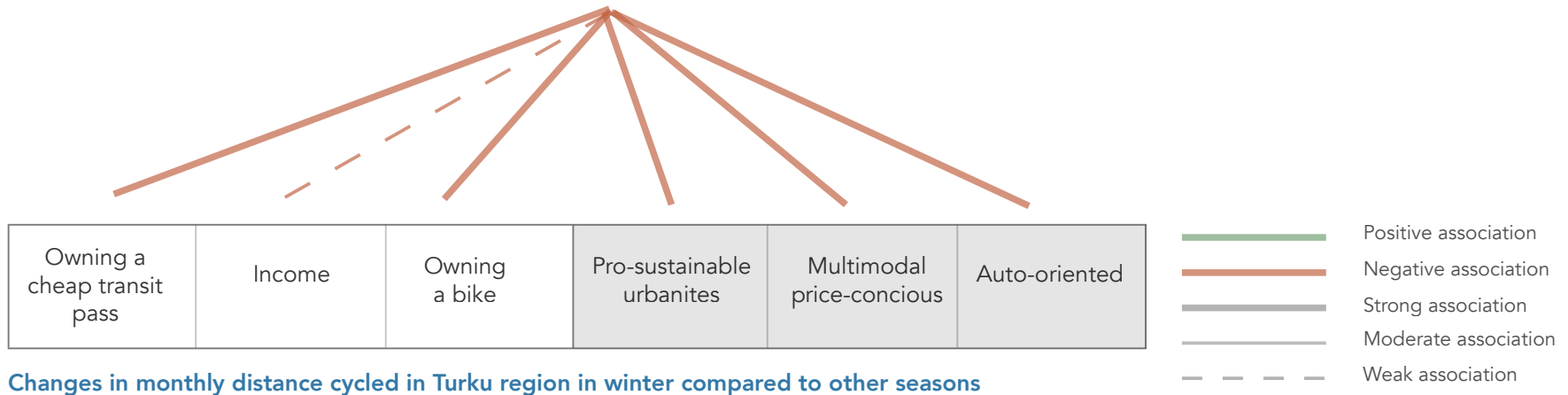
The degree of association of different factors with monthly distance cycled in Turku region during winter:

The pro-sustainable urbanites are still cycling more than other persons in winter. However, their cycling is less than their walking in winter. Moreover, there is a significant reduction in cycling of this group as well as the multimodal price-conscious group in winter. Moreover, although the auto-oriented group did not show significant difference in their cycling from the time-conscious suburbanites in other seasons, they show to cycle less compared to this group in winter. Contrary to what was found for walking behavior, those living in intensive transit zones show to cycle less than those living in basic transit or car zone in winter.

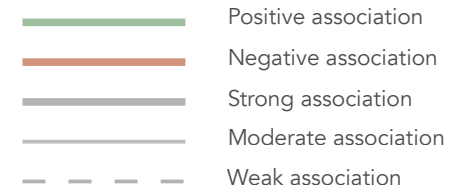
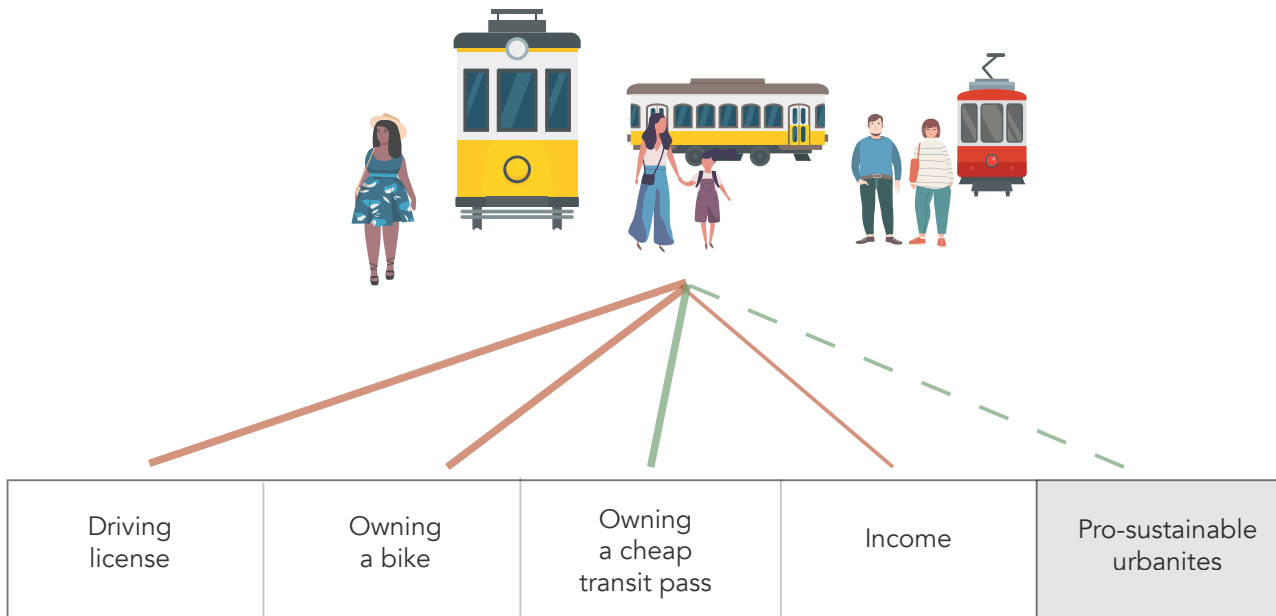


Moreover, an increase in number of cars in household, distance to the city center of Turku, age, being a female, and owning a transit pass have negative associations with cycling in winter. Owning a bike however, shows positive association meaning that those owning a bike are still cycling more than those who do not own a bike, although there is a significant drop in their cycling in winter.

Changes in cycling in winter



Transit use



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The degree of association of different factors with monthly distance travelled by transit in Turku region during spring, summer, and autumn: The pro-sustainable urbanites use transit slightly more than other persona in spring, autumn and winter. Living in intensive transit zone does not show to significantly influence transit use in these seasons. Those owning a driving license, those owning a bike, and those having a higher income use transit less and those owning a cheap transit pass use transit more.

Differences of distance travelled by transit between different persona when living in intensive transit zone versus when living in basic transit/car zone: Only the pro-sustainable urbanites living in basic transit/car zones use public transport more significantly than others in spring, summer and autumn. This can indicate that the pro-sustainable urbanites who live in intensive transit zones prefer other modes of travel such as walking and cycling to transit use in these seasons, as such zones provide the opportunity to use more active modes of travel as well.

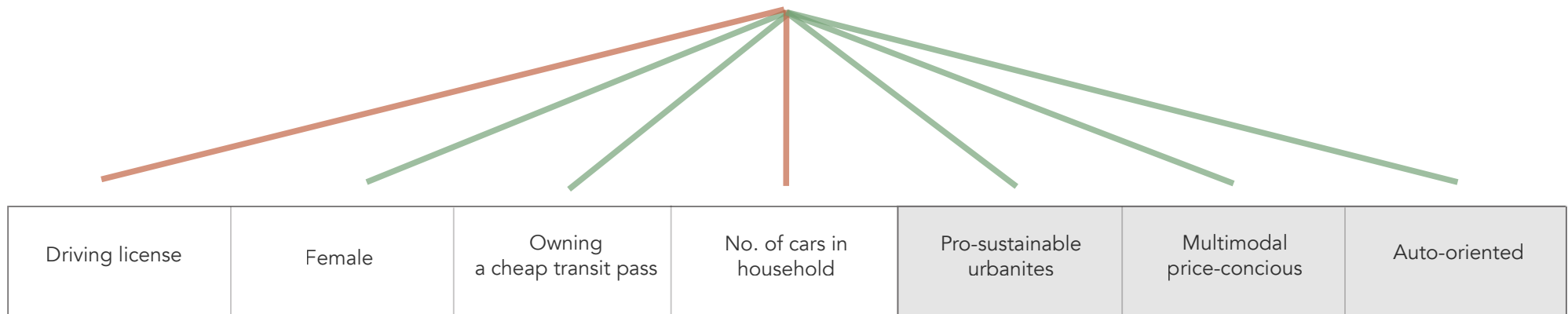
Moderate positive association to the use of transit



Pro-sustainable urbanities **living in basic transit or car zones** show a moderate positive association to the use of transit






Image: © Good studio / stock.adobe.com

Transit use in winter



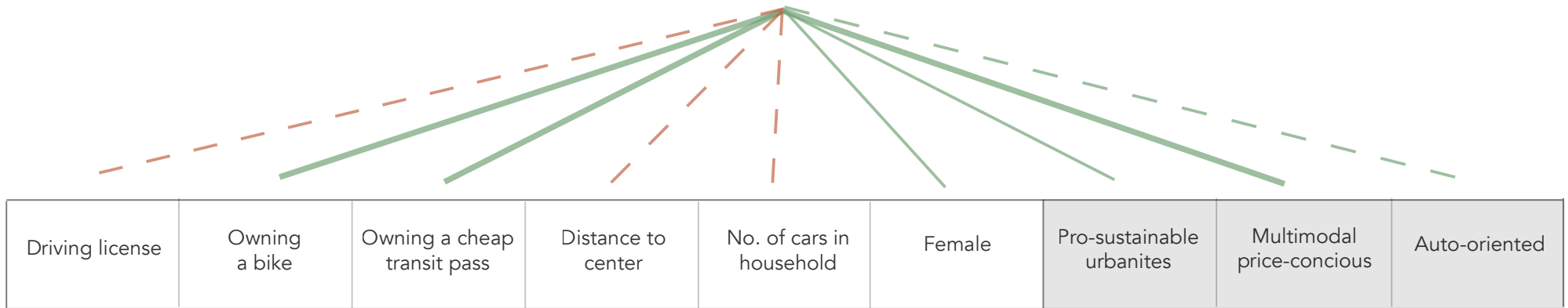
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The degree of association of different factors with monthly distance travelled by transit in Turku region during winter: Contrary to what was found regarding transit use in other seasons, in winter the pro-sustainable urbanites, the multimodal price-conscious as well as the auto-oriented use transit significantly more than the time-conscious suburbanites. The change in transit use in winter compared to other seasons is especially very significant for the multimodal price-conscious group.

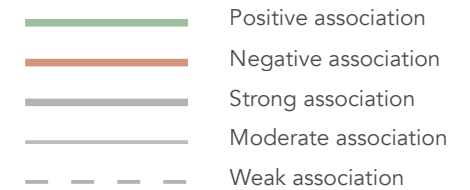
-  Positive association
-  Negative association
-  Strong association
-  Moderate association
-  Weak association

Owning a driving license is still showing negative association with transit use in this season. As the number of cars in household increases the possibility of using transit in winter decreases. In addition, female residents use transit more than males in winter. Moreover, owning a cheap transit pass increases transit use in this season as well.

Changes in transit use in winter



Changes in monthly distance travelled by public transport in Turku region in winter compared to other seasons



Car use

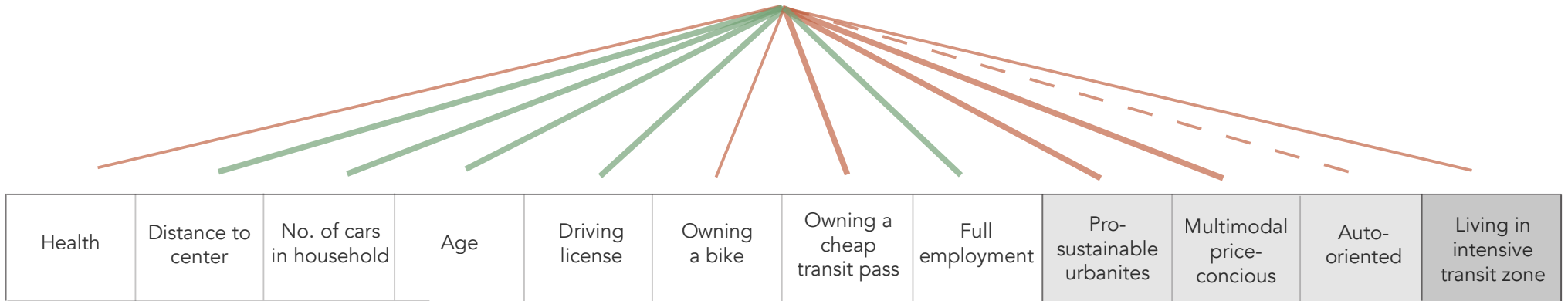
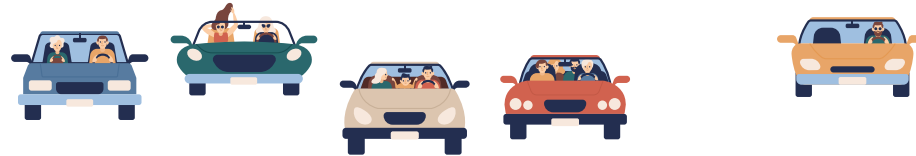


Image: © Good studio / stock.adobe.com

The degree of association of different factors with monthly distance travelled by car in Turku region during spring, summer, and autumn: The pro-sustainable urbanites use car less than all the other groups followed by the multimodal price-conscious. The auto-oriented group use car less than the time-conscious suburbanites. In addition, living in intensive transit zone decreases car use.

- Positive association
- Negative association
- Strong association
- Moderate association
- - - - Weak association

Among the socio-demographic factors, being healthy, owning a bike, and owning cheap transit pass decrease car use. Conversely, being fully employed, owning a driving license, age, more cars in household, and more distance to city center increase car use.

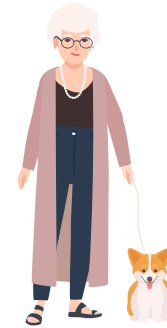
Strong negative association to cars



Images: © Good studio / stock.adobe.com

Pro-sustainable urbanites and multimodal price-conscious **living in intensive transit zones or basic transit or car zones** show a strong negative association to the use of cars.

Moderate negative association to cars



Auto-oriented **living in intensive transit zones** show a moderate negative association to the use of cars.

Differences of distance travelled by car between different persona when living in intensive transit zone versus when living in basic transit/car zone: The pro-sustainable urbanites and the multimodal price-conscious groups use car less than other groups regardless of where they live. However, both of these groups use car even less when living in intensive transit zones. The auto oriented group use car less than the time-conscious suburbanites only if they live in intensive transit zone. The time-conscious suburbanites seem to use car more than other groups regardless of where they live.

Car use in winter

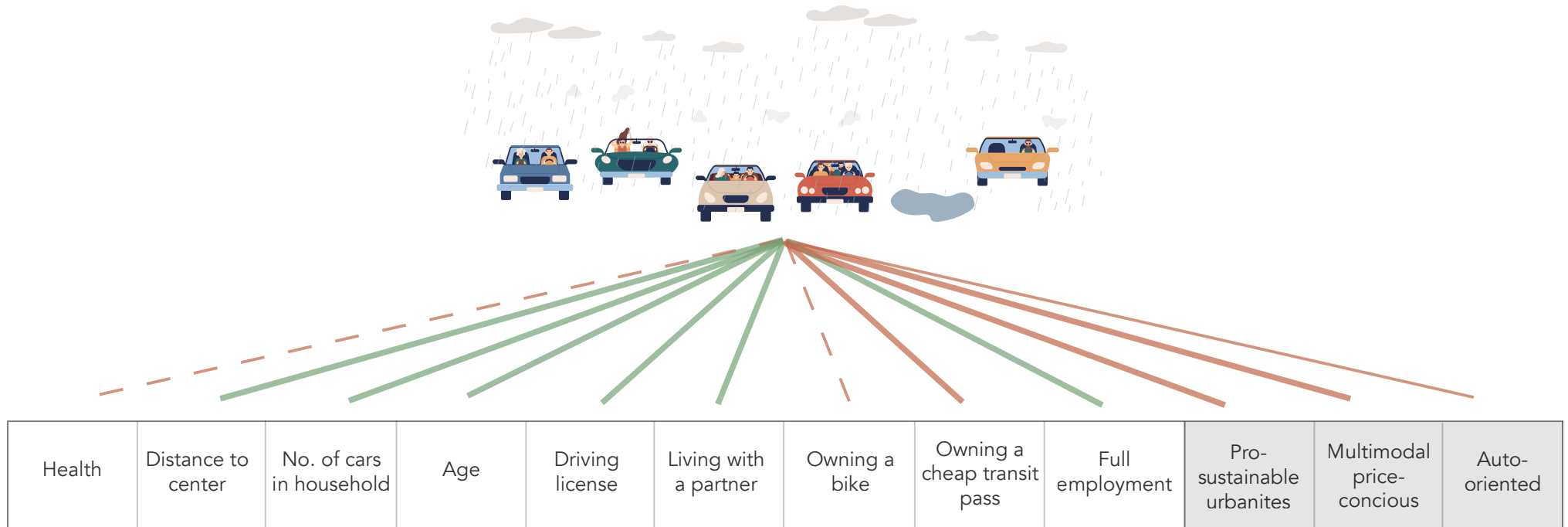
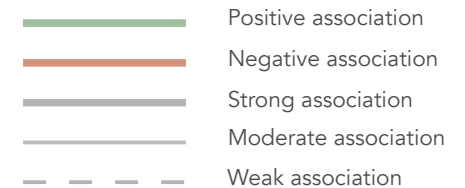


Image: © Good studio / stock.adobe.com

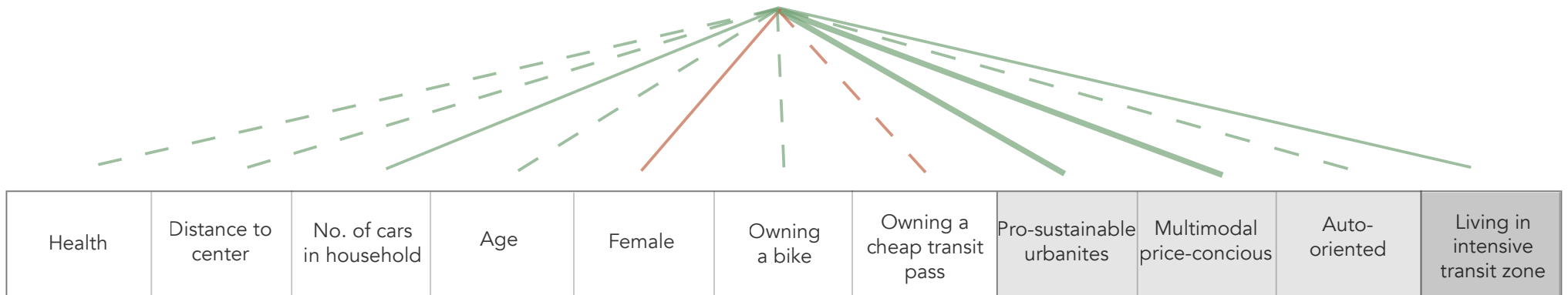
The degree of association of different factors with monthly distance travelled by car in Turku region during winter:

The pro-sustainable urbanites, the multimodal price-conscious and the auto-oriented are still using less car than the time-conscious suburbanites in winter. However, their car use in winter is more than their car use in other seasons. Living in intensive transit zone does not seem to either increase or decrease car use in winter. However, compared to other seasons, those living in intensive transit zones show more use of car in winter than those living in other zones. This indicates that those living in other zones use car in winter as much as they did in other seasons while those living in intensive transit zones use car more in winter.

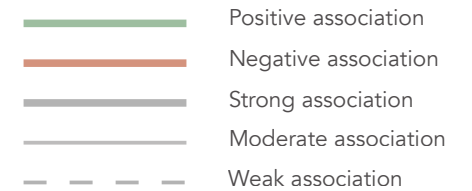


Those who have a higher perceived health, those owning a bike and those owning a cheap transit pass are still using car less than their counterparts, although their car use in winter might be more than their car use in other seasons. For example, the healthier residents show to have a slightly positive change in their car use in winter. Those living further from Turku city center, those having more cars in household, the older residents, those owning a driving license, those living with partner, and those being fully employed use car more than their counterparts.

Changes in car use in winter



Changes in monthly distance travelled by car in Turku region in winter compared to other seasons



5. Perceived physical health and life satisfaction



5.1 Which groups of people in Turku have better perceived physical health?

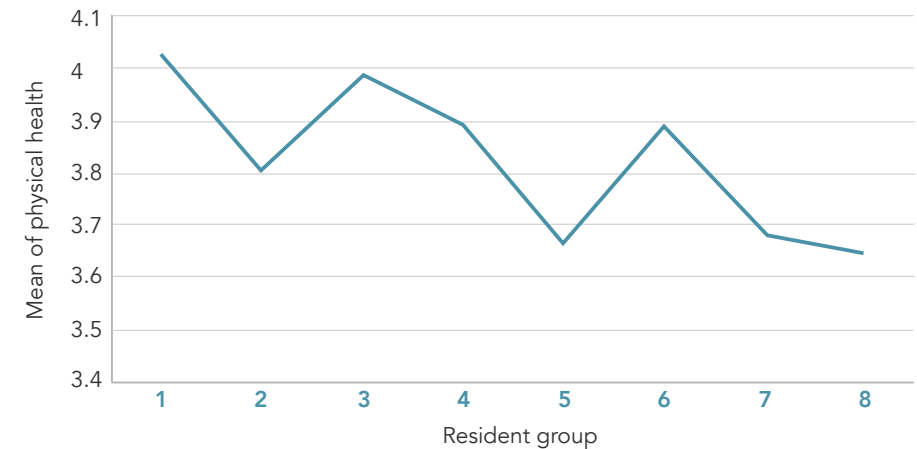
Comparing the mean of reported physical health by different groups of residents shows that the pro-sustainable group living in intensive transit zone have the highest perceived physical health and the auto-oriented group living in basic transit or car zone have the lowest perceived physical health among all the resident groups. For the three groups, pro-sustainable urbanites, the multimodal price-conscious group, and the auto-oriented group, those who live in intensive transit zone have higher perceived physical health than those living in basic transit or car zone. However, for the time-conscious suburbanites those living in basic transit or car zone have higher perceived physical health than those living in basic transit or car zone.



Image: © Good studio / stock.adobe.com

Pro-sustainable urbanities living in intensive transit zones have the **highest perceived physical health**

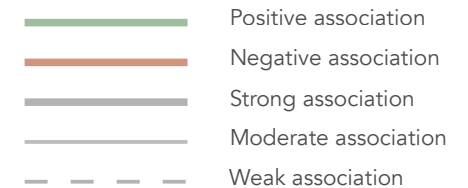
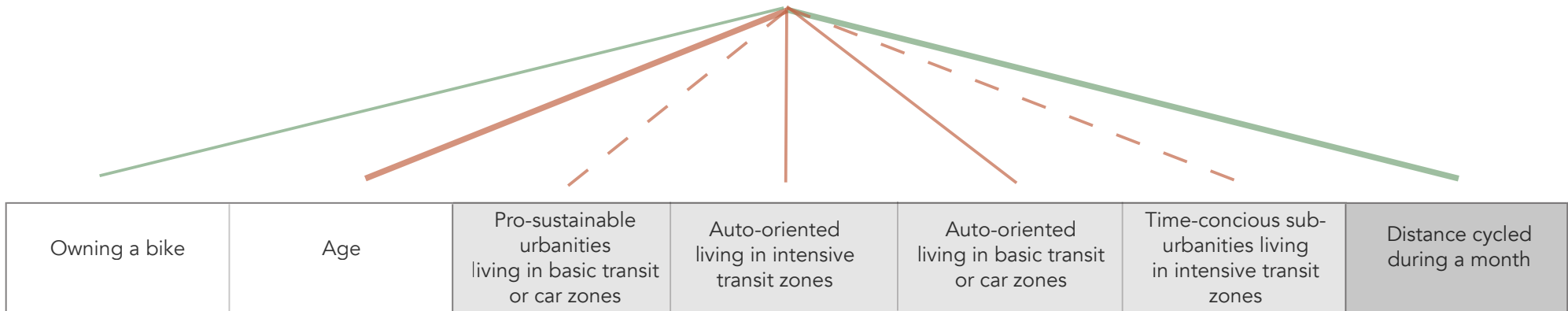
Auto-oriented living in basic transit or car zone have the **lowest perceived physical health**



Resident groups

- 1= Pro-sustainable urbanites living in intensive transit zone**
- 2= Pro-sustainable urbanites living in basic transit or car zone**
- 3= Multimodal cost-sensitive living in intensive transit zone**
- 4= Multimodal cost-sensitive living in basic transit or car zone**
- 5= Time-conscious suburbanites living in intensive transit zone**
- 6= Time-conscious suburbanites living in basic transit or car zone**
- 7= Auto-oriented living in intensive transit zone**
- 8= Auto-oriented living in basic transit or car zone**

Perceived physical health



Since the pro-sustainable urbanities living in intensive transit zone showed to have the highest mean perceived health among the 8 different groups of residents, further analysis was done to compare other resident groups with this group to see if the difference is significant. This analysis was also conducted to see what other factors influence perceived physical health.

It was found that the auto-oriented group living in basic transit or car zone have significantly lower perceived health than the pro-sustainable urbanities living in intensive transit zones. This is followed by the auto-oriented residents living in intensive transit zone, the time-conscious suburbanities living in intensive transit zones and the pro-sustainable urbanities living in basic transit or car zones. Regardless of where they live, the multimodal price conscious residents did not show significantly lower perceived physical health than the pro-sustainable urbanities living in intensive transit zones. Also, the time-conscious suburbanities living in basic transit or car zones did not show significantly lower perceived health than the pro-sustainable urbanities living in intensive transit zone.

Among the other factors influencing perceived health, distance cycled during a month showed to have a strong positive influence meaning that those who cycle more have higher perceived physical health. Owning a bike is also associated with better perceived health. Conversely, an increase in age decreases perceived physical health.

5.2 Which groups of people in Turku have better life satisfaction?

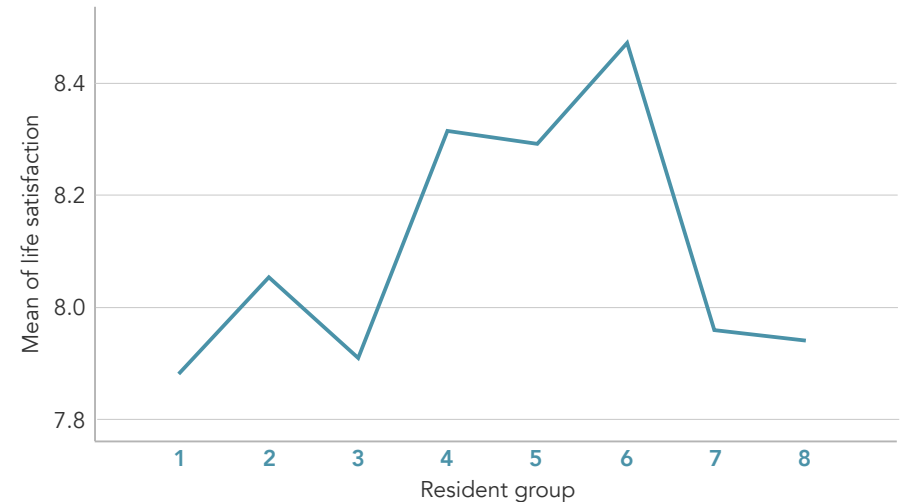
Comparing the mean of reported life satisfaction by different groups of residents shows that the time-conscious suburbanites living in basic transit or car zone have the highest perceived life satisfaction. Conversely, the pro-sustainable urbanites living in intensive transit zones have the least perceived life satisfaction among different resident groups. Contrary to what was found for perceived physical health for all personas except the auto-oriented group, life satisfaction is perceived higher if residents live in basic transit or car zones.



Time-conscious suburbanites **living in basic transit or car zone** show the **highest perceived life satisfaction**



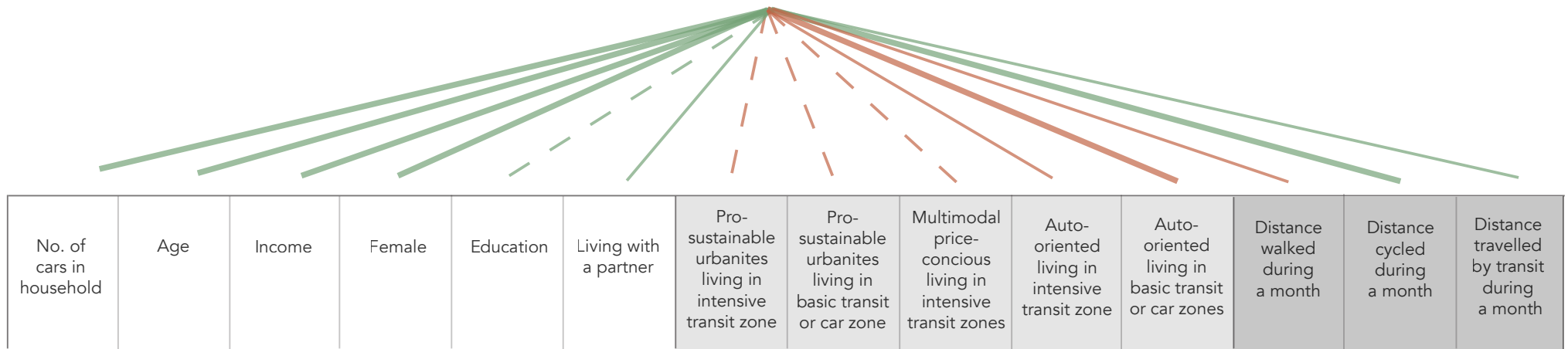
Pro-sustainable urbanites **living in intensive transit zone** have the **lowest perceived life satisfaction**



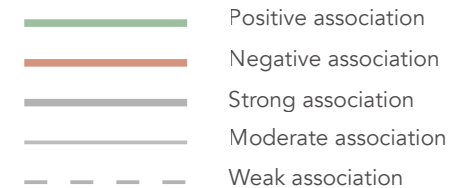
Resident groups:

- 1= Pro-sustainable urbanites living in intensive transit zone
- 2= Pro-sustainable urbanites living in basic transit or car zone
- 3= Multimodal cost-sensitive living in intensive transit zone
- 4= Multimodal cost-sensitive living in basic transit or car zone
- 5= Time-conscious suburbanites living in intensive transit zone
- 6= Time-conscious suburbanites living in basic transit or car zone
- 7= Auto-oriented living in intensive transit zone
- 8= Auto-oriented living in basic transit or car zone

Life satisfaction



Since the time-conscious suburbanites living in basic transit or car zone showed to have the highest mean perceived life satisfaction among the 8 different groups of residents, further analysis was done to compare other resident groups with this group to see if the difference is significant. This analysis was also conducted to see what other factors influence perceived life satisfaction.



It was found that the auto-oriented residents living in basic transit or car zones have significantly lower perceived life satisfaction than the time-conscious suburbanites living in similar zones. This is followed by the auto-oriented residents living in intensive transit zones, the pro-sustainable urbanites living in intensive transit zones, the pro-sustainable urbanites living in basic transit or car zones and the multimodal price-conscious residents living in intensive transit zones who have significantly less perceived life satisfaction than the time conscious suburbanites living in basic transit or car zones respectively.

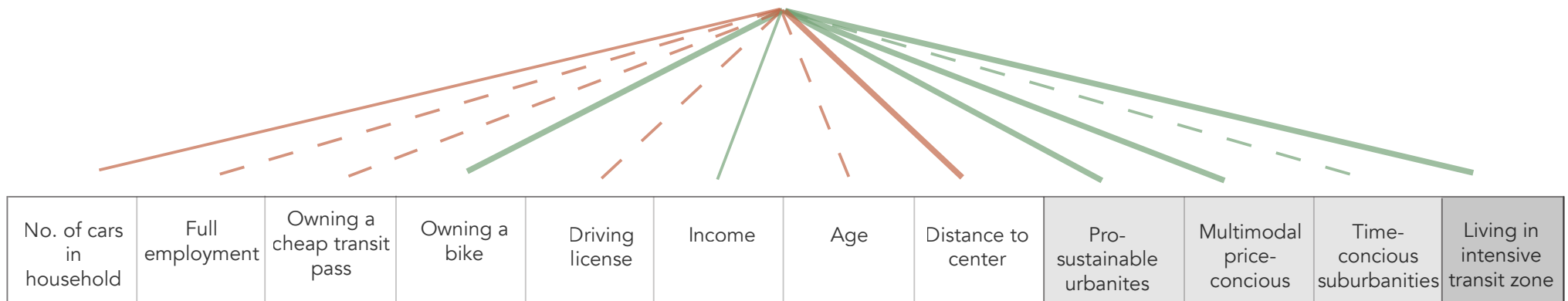
The multimodal price-conscious residents living in basic transit or car zones and the time-conscious suburbanites living in intensive transit zones did not show significantly different life satisfaction from the time conscious suburbanites living in basic transit or car zones although they are still having lower life satisfaction than this group.

Among the other factors influencing perceived life satisfaction, distance cycled during a month, distance travelled by transit during a month, income, number of cars in household, age, being a female, living with partner and education increase life satisfaction. This means that, for example, the more residents cycle during a month, the higher life satisfaction they have. Conversely, distance walked during a month seems to have negative association with life satisfaction meaning that residents who walk more have lower life satisfaction.

6. Use of future mobility services and infrastructure for travelling to harbor area



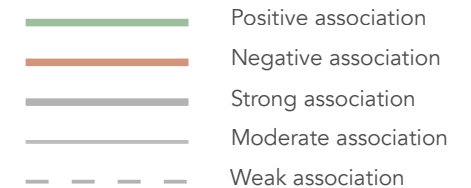
Future use of walking and cycling infrastructure



Self-reported use of future improved walking and cycling infrastructure to travel to harbor area:

The pro-sustainable urbanites are likely to use future walking and cycling infrastructure to travel to harbor area more than other persona followed by the multimodal price-conscious residents. The time-conscious suburbanites will also use future walking and cycling infrastructure more than the auto-oriented group. Those living in intensive transit zone have also declared to use future walking and cycling infrastructure to travel to harbor area more than those living in other zones.

Those owning a bike or having higher income have also higher possibility to use improved walking and cycling infrastructure to travel to harbor. Conversely, those having more cars in household, those being fully employed, those owning a cheap transit pass, or driving license, those living further from Turku city center and the older age groups have lower likelihood to use future walking and cycling infrastructure for travelling to harbor area.



Differences in self reported use of future walking and cycling infrastructure to travel to harbor area between different persona when living in intensive transit zone versus when living in basic transit/car zone: The pro-sustainable urbanites and the multimodal price-conscious residents are likely to use future improved walking and cycling infrastructure to travel to harbor area more than other groups regardless of where they live. However, those belonging to these groups who live in intensive transit zones have reported higher likelihood to use future improved walking and cycling infrastructure to travel to harbor area compared to their counterparts living in basic transit/car zones.

Only the time-conscious suburbanites who live in an intensive transit zone have reported to use future walking and cycling infrastructure significantly more than the auto-oriented group. Although the auto-oriented group did not show significant likelihood to use future walking and cycling infrastructure to travel to harbor, they are still more likely to use such infrastructure if they live in intensive transit zones and less likely to use such infrastructure if they live in basic transit/car zones compared to the time-conscious suburbanite living in basic transit/car zones.



Image: © Good studio, Tartila / stock.adobe.com

Pro-sustainable urbanities
**living in intensive transit or basic
transit or car zone** show a **strong
positive association.**

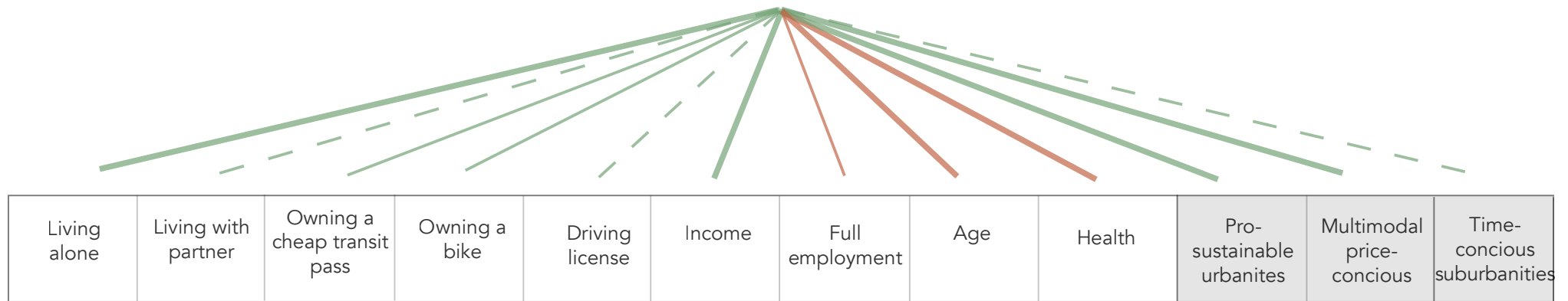


Multimodal price-conscious
**living in intensive transit or basic
transit or car zone** show a **strong
positive association.**



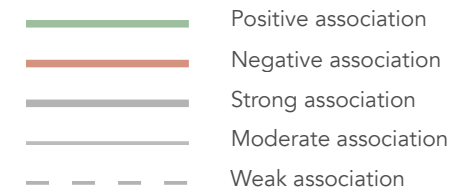
Time-conscious suburbanites
living in intensive transit zones
show a **weak positive association.**

Future use of bike sharing, scooter sharing and electric bikes



Self-reported use of future bike sharing, scooter sharing and electric bikes to travel to harbor area:

Similar to what was found for the case of walking and cycling infrastructure, the pro-sustainable urbanites and the multimodal price-conscious will be more likely to use future bike sharing, scooter sharing, and electric bike services to travel to harbor area. However, their preference for walking and cycling infrastructure is slightly higher. The time-conscious suburbanites are also more likely to use these services for traveling to harbor compared to the auto-oriented group, although their current travel behavior shows that they are using cars more than the auto oriented group.



Moreover, those living alone or with a partner (without children), those owning cheap transit pass or bike, and even those owning a driving license and having high income are more likely to use such services compared to their counterparts. Conversely, those fully employed, the healthier residents and older groups of residents are less likely to use these mobility services to travel to harbor area.

Differences in self reported use of future bike sharing, scooter sharing, and electric bikes to travel to harbor area between different persona when living in intensive transit zone versus when living in basic transit/car zone: The pro-sustainable urbanites and the multimodal price-conscious residents are more likely than other groups to use these services regardless of where they live. However, living in intensive transit zones increases their willingness to use such mobility services. This is while for the time-conscious suburbanites, those who live in intensive transit zones are less likely to use these services compared to those living in basic transit/car zones. The auto-oriented group did not show significant likelihood to use these services to travel to harbor, and their likelihood to use these services decreases more if they live in basic transit/car zones.



Images: © Good studio, Tartila / stock.adobe.com

Pro-sustainable urbanities **living in intensive transit or basic transit or car zone** show a **strong positive association**.



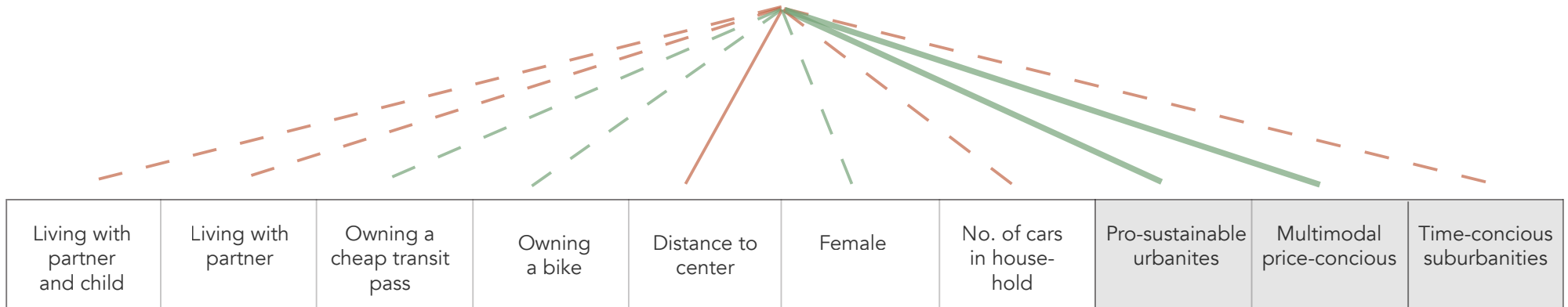
Multimodal price-conscious **living in intensive transit zones** show a **strong positive association**.

Multimodal price-conscious **living in basic transit or car zone** show a **weak positive association**.

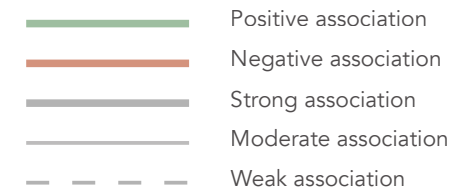


Time-conscious suburbanites **living in intensive transit zones** show a **weak negative association**.

Future use of improved transit service



Self-reported use of transit to travel to harbor area if service improvements are made: Although the current use of transit services was very low especially in spring, autumn and summer, the pro-sustainable urbanites and the multimodal price-conscious residents have both declared high likelihood of using transit if service improvements are made. The auto-oriented residents are still more likely to use transit to travel to harbor area if service improvements are made compared to the time-conscious suburbanites.



Those owning a cheap transit pass, those owning a bike and female residents are also more likely to use transit service to travel to harbor area if service improvements are made. Conversely, those living with partner or with partner and a child, those having more cars in household and those living further from Turku city center are less likely to use improved transit services to travel to harbor area in future.

Differences in self reported use of transit to travel to harbor area if service improvements are made between different persona when living in intensive transit zone versus when living in basic transit/car zone: The pro-sustainable urbanites and the multimodal price-conscious are more likely to use improved transit services to travel to harbor area compared to other persona, regardless of where they live. However, if they live in intensive transit zones, this likelihood increases slightly. On the contrary, for the auto-oriented group who are still more likely to use improved transit services compared to the time-conscious suburbanites, this is more likely if they live in basic transit or car zone. This can mean that the auto-oriented are already satisfied with existing transit services to harbor if they live in intensive transit zones and improvements would change behavior of only those auto-oriented who live in basic transit or car zones. Although the time-conscious suburbanites are less likely to use improved transit services to travel to harbor compared to the auto-oriented, those of this group who live in intensive transit zones are still more likely to use such services compared to those living in basic transit or car zones.



Images: © Good studio / stock.adobe.com

Pro-sustainable urbanities **living in intensive transit or basic transit or car zone** show a **strong positive association**.

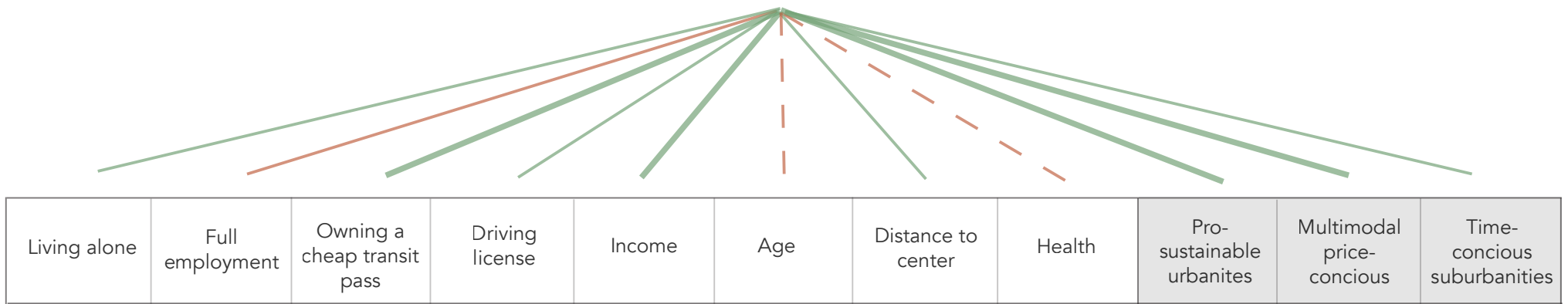


Multimodal price-conscious **living in intensive transit or basic transit or car zone** show a **strong positive association**.



Auto-oriented **living in basic transit or car zone** show a **weak positive association**.

Future use of car sharing, ride sharing and car rental services



Self-reported use of future car sharing, ride sharing, and car rental services to travel to harbor area:

The multimodal price-conscious group is more likely to use future ride sharing, car sharing and car rental services followed by the pro-sustainable urbanites and the time-conscious suburbanites.

Those living alone, those owning a cheap transit pass, those owning a driving license, the higher income residents and those living further away from the Turku city center are also more likely to use such services to travel to harbor area. Conversely, the fully employed residents and the more healthy residents are less likely to use such services.

- Positive association
- Negative association
- Strong association
- Moderate association
- Weak association

Differences in self reported use of future car sharing, ride sharing, and car rental services to travel to harbor area between different persona when living in intensive transit zone versus when living in basic transit/car zone: The pro-sustainable urbanites are more likely to use such services to travel to harbor if they live in intensive transit zones. This is the same for the multimodal price-conscious although the difference between those living in intensive transit zones and those living in basic transit or car zones is not as high. The time-conscious suburbanites are also more likely to use such services if they live in intensive transit zone although this difference is not significant. Although the auto-oriented group did not show any significant possibility to use such services compared to other groups, it seems that they are still slightly more likely to use such services compared to the time-conscious suburbanites who live in basic transit or car zones and this is especially true if the auto-oriented live in intensive transit zones.



Images: © Good studio / stock.adobe.com

Pro-sustainable urbanites
living in intensive transit zones show a
strong positive association.

Pro-sustainable urbanities
living in basic transit or car zones show a
weak positive association.



Multimodal price-conscious
living in intensive transit zones
show a **strong positive association.**

Multimodal price-conscious
living in basic transit or car zones show a
moderate positive association.

Epilogue

The results of this study can be used both in transportation and land use planning. The identified personas can be targeted as different market segments for different mobility management strategies or policies aiming at increasing sustainable and active travel behavior. The results can be considered when investing to the improvements of certain travel modes or when deciding about the maintenance levels of routes during various seasons. The findings can also inform land use policy when estimating the best balance between supply and demand of various types of urban neighbourhoods.

More outputs of this project will be published in the future.
If you are interested in this project, please contact us:

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