

URBAN MOBILITY AND CYCLIST'S ENVIRONMENTAL COGNITION¹

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ABSTRACT. This is a qualitative research that aimed to analyze environmental cognitions among bicycle commuters in the city of Florianópolis, State of Santa Catarina, Brazil. Under perspectives of environmental psychology and people-environment studies, environmental cognitions refer to the human capacity to know, extract, and store information on the environment, producing knowledge that helps people solve daily problems. This study was conducted in two steps, one of them exploratory and centered on the environment, and the other descriptive and centered on the person. In the last one, 18 commuters answered a semi-structured interview and a questionnaire, both oriented to identify the barriers and facilitators to bicycle commuting, their motivations and difficulties to ride their bicycles, as well as other aspects that draw attention in traffic. The results suggest that commuting by bicycle is a way to know the city and can mediate the construction of an image of the city by its experimentation.

Keywords: Environmental psychology; urban environments; cognitive processes.

MOBILIDADE URBANA E COGNIÇÃO AMBIENTAL DE CICLISTAS

RESUMO. Trata-se de um estudo de natureza qualitativa que teve por objetivo analisar as cognições ambientais de ciclistas na cidade de Florianópolis (SC). Na perspectiva da psicologia ambiental e dos estudos pessoa-ambiente, entende-se por cognição ambiental a capacidade humana de conhecer, extrair e armazenar informações a respeito do ambiente, produzindo conhecimentos que auxiliam na resolução de problemas cotidianos. O estudo foi conduzido em duas etapas, sendo uma exploratória e centrada no ambiente e outra descritiva e centrada na pessoa. Nesta, 18 pessoas que utilizavam a bicicleta como meio de transporte responderam uma entrevista semiestruturada e um questionário orientados por questões a respeito das barreiras e facilitadores para o uso da bicicleta, as motivações e dificuldades para tal, bem como os aspectos que chamavam a atenção no trânsito. Os resultados indicaram que pedalar

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Palavras-chave: Psicologia ambiental; ambientes urbanos; processos cognitivos.

MOVILIDAD URBANA Y COGNICIÓN AMBIENTAL DE CICLISTAS

RESUMEN. Se trata de un estudio de naturaleza cualitativa que tuvo por objetivo analizar las cogniciones ambientales de ciclistas en la ciudad de Florianópolis, Santa Catarina, Brasil. En la perspectiva de la psicología ambiental y de los estudios persona-ambiente, se entiende por cognición ambiental la capacidad humana de conocer, extraer y almacenar informaciones sobre el ambiente, produciendo conocimientos que ayudan en la resolución de problemas cotidianos. El estudio fue conducido en dos etapas, una exploratoria y centrada en el ambiente y otra centrada en la persona. 18 ciclistas respondieron una entrevista semiestructurada y un cuestionario acerca de las barreras y facilitadores para el uso de la bicicleta, las motivaciones y dificultades para ello y los aspectos que llamaban la atención en el tránsito. Los resultados indicaron que pedalear en la ciudad es un modo de conocer su terreno y puede mediar la construcción de una imagen de ella a partir de su experimentación.

Palabras clave: Psicología ambiental; ambientes urbanos; procesos cognitivos.

Introduction

In an increasingly urbanized world, mobility is one of the challenges imposed on contemporary cities. In the face of a global ethical and political panorama that requires mobility, the modulations of the current socio-political context reverberate in individuals through a spatiotemporal experience, since there is the possibility of transiting through a wide extension of the globe in a minimum time. An alliance between systems of objects and actions, currently the geographical space allies itself to the time dimension in the consolidation of a global order that is not reduced to clock time and space as a measure, but in 'globalization spaces' interconnected in networks (Santos, 2014).

Scenario of contradictions of contemporary ways of life, city spaces are where the movement of people, meetings, and social relations take place, making them privileged vectors of the production of subjectivity and symbolic life support of its inhabitants. In the cities, mobility is designed paradoxically. It is possible, at the same time, to move rapidly through streets, shorten distances, and have freedom to define your own itinerary (Sennet, 2003). The negative side of this situation creates a shadow in the shape of 'immobility' (Rolnik & Klintowitz, 2011).

Traffic congestions, poor condition of traffic infrastructure and inefficiency in public transportation not only hamper the movement of people but place a large part of society apart from access to the cities and social facilities available and consequently apart from access to public policies. Thus, either by environmental damage caused by pollution, or immobility, this issue is a concern that permeates the fields of public policy and academic research, setting up urban mobility as an area of interdisciplinary knowledge.

In the field of public policies in Brazil, Law 12.587 (2012) establishes the guidelines of the National Policy on Urban Mobility, a legal milestone that defines mobility as the condition in which people or cargo are moved in urban spaces. From this document, it can be understood that the conditions of access to cities must be universal, promoting the sustainable development of these spaces and prioritizing non-motorized transportation modes instead of motorized options.

In this sense, the use of bicycles as means of transportation has been indicated as a viable alternative for individual locomotion. Benefits are low environmental impact, when compared with other transportation modes, for being a non-polluting and sustainable mode of transportation, and being a way to practice physical exercises daily (Gatersleben & Haddad, 2010; Passafaro et al., 2014).

Urban mobility by bicycle also signals to other possibilities of experiencing the city and otherness, from the perspective of the person who experiences the urban fabric by coming and going, along with its concreteness. In addition, cycling is a way of feeling, knowing, and behaving in the cities, pointing to the affective, cognitive, and behavioral components of this activity (Olekszechen, Battiston, & Kuhnen, 2016).

In the field of psychology, few studies addressed urban mobility by bicycle, to assist in the understanding of the psychological aspects related to urban mobility, especially in Brazil (Olekszechen, 2016). This study, therefore, aimed to analyze the environmental cognition of college students who use bicycles as means of transportation.

Theoretical guiding

The goal of the present study is based on the theories of environmental psychology, a psychology specialty within people-environment studies. This discipline has been urged to answer questions of practicality, arising mainly from the environmental imbalance caused by human action. The investigation of the mutual relationship between the environment and the people is the hallmark of environmental psychology (Günther, 2003), based on the transactional perspective. In this sense, we understand that the person-environment relationships are defined in a mutual and dynamic way, considering that stability and transformation coexist and that human-environment transactions are two-way.

The concept of environmental cognition, understood as the human capacity to know, extract, and store information on the environment, producing knowledge that assist in solving everyday problems, can be profitably used by environmental psychology. We understand that any space, natural or built, can be accessed physically and subsequently represented, developed, and manipulated from the meanings attributed to it (Higuchi, Kuhnen, & Bomfim, 2011).

Environmental cognition is not limited to a mental attitude to the environment, but a physical positioning, a way of acting that assumes the experimentation of the surroundings. In a transactional perspective of environmental psychology, it is necessary to understand environmental cognition as a dynamic process that involves the person situated in a determined cultural and environmental context, going beyond the innate or biological dimension of the operation modes in the environment (Heft, 2013).

Result of the direct experience of the environment and process that generates primary representations (Pinheiro, 2013), it is not a uniquely rational mode of producing knowledge, since it is crossed by the ethical-affective rationality (Sawaia, 1995; Bomfim, 2010), understood as the power of creating spaces crossed by collective interests and needs, requiring the invention of motion areas and collective existence in the cities. In those terms,

the concept of affectivity in the city can be combined to environmental cognitions to emphasize the multifaceted character of human-environmental phenomena.

Regarding research on the use of bicycles as means of transportation in people-environment studies, the literature indicates an organization possibility in three thematic axes (Olekszechen et al., 2016). Firstly, there are studies dealing with the habits and attitudes of cyclists, referring to individual aspects, such as habits, attitudes, and emotions, and the social and cultural aspects involved in the choice of using bicycles. In this sense, the studies address the analysis of the relationship between the social image of the bicycle and the intention of cycling (Gatersleben & Haddad, 2010), affective and cognitive aspects (Passafaro et al., 2014), as well as individual, environmental, and political factors (Nkurunziza, Zuidgeest, Brussel, & Van Maarseveen, 2012) involved in cycling.

Secondly, there are the studies that link the behavior of cyclists and environmental variables, such as relief, climate, paths infrastructure, and other characteristics of the built and natural environment. In general, they reinforce the importance of good quality cycling infrastructure as essential factors for adhering to the use of bicycles as means of transportation (Basu & Vasudevam, 2013; Buehler, 2012; Nkurunziza et al., 2012), and climatic conditions, such as cold, heat, rain, and wind, as important barriers to cycling (Flynn, Dana, Sears, & Aultman-Hall, 2012; Erigyt & Ter, 2014).

Finally, it is related to the studies on the perception of cyclists when cycling, focusing on the senses such as hearing and vision (Waard, Lewis-Evans, Jelijs, Tucha, & Brookhuis, 2014), as well as the perception of barriers to cycling among adults (Kienteka, Rech, Fermino, & Reis, 2012). These data reinforce that perception, behavior, and cognition are interrelated and should be analyzed in conjunction with the environment, which makes urban mobility through bicycles a multi-determined phenomenon and an interdisciplinary field in knowledge production (Olekszechen et al., 2016).

Method

This is a qualitative, descriptive and exploratory study, aiming to analyze the cognitive aspects of bicycle transportation among college students in the city of Florianópolis, state of Santa Catarina, Brazil. It refers to a larger study that aimed to characterize the relationship established between people using bicycles as means of transportation in the urban environment, with emphasis on the affective, cognitive, and behavioral aspects of this relationship. We understand that cycling as everyday transportation involves ways of knowing, feeling and behaving in the city, subsidizing the construction of a way of being and enjoying that environment.

The study was conducted in two stages: the first exploratory focused on the environmental aspects of a college campus, and the other, person-centered, allowing the approach with the participants' experience in the city. In the first stage, we produced photographic records aimed at the identification of the cycling structures available on the campus and its surroundings (bicycle paths, lanes, bicycle racks) to be later analyzed along with the data reported by the participants.

In the second stage, we conducted semi-structured interviews followed by a self-filled questionnaire with 18 participants (six women and 12 men), who were selected according to the 'snowball' technique, in which a participant, at the end of the interview, suggests the name of another possible participant. The number of participants corresponded to the saturation threshold of responses in the light of the study's objectives, i.e., when the

information obtained showed little variation or could not be organized in a new category (Francis et al., 2010).

The individuals selected to participate in this study made use of bicycles as means of transportation, as long as the following inclusion criteria were met: be linked to the university where the study was conducted; be aged over 18 years; live in Florianópolis when the interview was conducted; have used the bicycle to go to the university at least four times in the semester when the data was collected; and use it routinely in other routes.

In the interviews, which were recorded and transcribed in full, a semi-structured script was used, based on the affective maps generator tool (Bomfim, 2010) that guided the investigation about the barriers and facilitators to cycling, motivations and difficulties, how they felt during the daily commutes, what drew their attention, and how they acted in traffic, involving the affective, cognitive, and behavioral aspects described in the literature. As this is a descriptive, exploratory study aimed to understand the relationship between cyclists and the city, we understand that the interview enabled the approximation to these people's experience, which guided the choice of this technique instead of structured instruments found in the literature (Passafaro et al., 2014). In the questionnaires, sociodemographic and commutes made by bike information were organized, and, finally, a written description of two routes that the person traveled through more frequently was requested.

Data were subjected to content analysis (Bardin, 1977) and organized into category, subcategories, and analysis elements, oriented by the saturation of the participants' answers. Table 1 lists the subdivision made from content analysis.

Table 1. Presentation of the analysis category, sub-categories, and elements.

Cognitive aspects of the cyclist-city relationship	Reasons/benefits of using bicycles	Autonomy; Well-being; Contact with the place; Enjoy cycling; Cost; Practicality; Time; Traffic and transports; Convictions and choices;
	Factors that hinder using bicycles	Environmental factors; Conditions of the paths; Personal reasons; Cultural aspects; Political factors; Expenses and costs;
	Evaluations of cycling structures	Lack of space; Sufficiency/Insufficiency; Lack of political incentive;
	Environmental cognitions	Route markers; What draws attention; Choice of path; Spatial orientation; Sensations;

Fonte: The author's.

Results and discussion⁴

The cognitive dimension of the cyclist-city relationship was composed of reviews, choices, and ways of knowing the city that relate to present or future time. In addition to expressing the reasons for using bicycles, its purpose and benefits involved in this activity, it explains the ways in which the cyclist moves and is located in the space during daily commutes. It is about notions that surround the ways of knowing the city, since they mediate and reinforce its knowledge, understood here as environmental cognition. From the elements identified in the theoretical guiding, the reasons for choosing the bicycle, evaluations and opinions regarding cycling structures, and ways of knowing the city can be considered as indicators of environmental cognition among cyclists.

As for the reasons for using bicycles and its benefits, we decided to gather them in one group and discuss them together, as we understand that the two factors are interconnected and explain each other. Firstly, autonomy is one of the benefits/reasons related to the use of bicycles. Participants reported that the fact that they 'depend only on themselves' to move around, being 'free to go and come back' anytime without depending on the timetables of buses and carpools ensures, besides autonomy concerning urban mobility, a certain independence of factors such as costs, people, and other transportation modes.

Another aspect pointed out as a benefit/reason is the well-being generated by its use. We understand as well-being the factors related to physical exercise, health gains, and moments of relaxation propitiated by cycling. Make the 'body work', do a 'physical activity', and 'release substances' in the body and at the same time relax, produce what participants called a 'good feeling'. Passafaro et al. (2014) indicate that these good sensations, which can include relaxation, satisfaction, and happiness, predict the desire to use bicycles. Coupled with the past behavior of cycling, this desire can indicate the future use of bicycles and the consolidation of a habit.

In addition, well-being is related to contact with the place and with the fact of '*liking to cycle*'. The participants cited as a significant consequence of cycling daily 'getting to know new places, experience the way through which they pass', and 'enjoy it fully'. In some cases, the route to be followed is chosen due to being the most beautiful landscape or the challenge imposed by the relief to reach the destination. In this way, the feeling of unity with the environment and well-being can be related with the psychological benefits of cycling, i.e., perception of positive experiences, decreased stress, and mood improvement.

Practicality showed itself as a facilitator for cycling, as it is considered a transportation mode that streamlines the day-to-day, allowing the cyclist to continuously be in motion in most part of the route, even when traffic is heavy. 'Always being in motion', even if in a slower speed is a way to optimize the use of the day, as it implies time savings and quickness to complete a route. Participants reported that they gain in time and speed when opting for the bicycle, as it allows them to travel on short distances, either to leave the house and go to the university, or to move around the campus. It is a *practical* and versatile vehicle, which ensures a 'fluid movement in the city'.

⁴ Sections in quotes refer to literal passages from participants' speeches.

In this sense, the time factor is significant, because when comparing the use of bicycles with other transportation modes (such as public transportation, for example), the participants reported that the time spent waiting for a bus in addition to the length of the route is often higher than the time spent going by bicycle. Therefore, choosing the bicycle for its convenience interferes with evaluation of other transportation, since going by bicycle 'ends up being faster than by car, by bus or on going on foot', either due to travel time or waiting time.

Regarding convictions and choices, participants reported that the option for using the bicycle goes through deliberate option for this transportation. Face the everyday hardships, 'fight against sedentarism', and against the 'logic of cars' indicate a political stance on the situation of mobility in the city and a way to contribute to overcome an 'obsolete' traffic system.

Considering factors that hinder the use of bicycles, some barriers were reported concerning environmental, cultural, political, and personal aspects that interfere with daily cycling. Environmental factors cited involve climate and topography, which at times deal with peculiar characteristics of the city of Florianópolis.

In this sense, rain was cited as the main difficulty to travel by bicycle. Thus, if the rain starts before departure, participants reported that they prefer other ways to get around. On the other hand, if there is rain forecast for the day, they use bicycles, the participants usually prepare and carry specific equipment to protect themselves against the weather. In addition, the winds were also cited as a difficulty: 'when the South wind hits, it takes a little longer'.

It is worth mentioning that the environmental factors interfere in different ways according to the purpose of cycling. People who use bicycles primarily as transportation referred to environmental factors as difficulties to be overcome. Those who use bicycles as a means of recreation or sport seek precisely these obstacles (especially hills), since overcoming them is one of the purposes of cycling. These data partially meet those identified by Flynn et al. (2012), when they stress that, for many cyclists, factors such as temperature, rainfall, and wind are significant barriers for choosing bicycles.

In addition, the condition of paths and transit infrastructures of Florianópolis consisted not only in a factor that hinders the use of bicycles, but also the main target of complaints from the interviewed cyclists. Regarding exclusive paths for bicycle traffic (cycle paths and lanes), they are few and unconnected. As for the city's streets and highways, holes, lack of maintenance, and narrow streets, they hinder cycling in some places, for not offering enough security for neither cyclists or pedestrians. With this, we do not mean that every street should have bicycle paths, since shared traffic is something desirable. However, conditions for the safe and efficient movement for all modes of transportation, motorized or not, are necessary.

Personal reasons also include barriers to using bicycles. In this sense, 'laziness' before leaving home, 'fatigue' caused by cycling and the distance traveled on a longer route hinder the performance of the activity. In addition, being 'afraid' in some stretches of the daily commute route was also listed as a personal reason that hinders the use of bicycles. Thus, we agree with Daley, Rissel and Lloyd (2007), when saying that motivation is an important factor for the decision of cycling. However, even if the individual sphere has relevance when it comes to choosing or not the bicycle, it is necessary to consider that they are situated on the environment and culture, which, in turn, can also influence or discourage cycling.

Regarding cultural aspects related to the use of the bicycle, the traffic and the lack of respect for the cyclist hinder circulation by bicycle. It is understood that traffic is a cultural

factor mainly due to the importance the automobile has in the urban context, leading people to experience traffic congestion as something commonplace.

Another factor that limits the use of bicycles is the lack of respect cyclists undergo daily, either for not having any space in the path, or for not having the preference in traffic. In this regard, the legal aspect reinforces the 'lack of respect', which is the requirement for drivers to keep the distance of one meter and 50 centimeters when passing cyclists. According to the reports, the lack of respect for cyclists unfolds in cascade, for 'car drivers do not respect the cyclist, pedestrians do not respect the bicycle path, and motorcyclists form corridors', which forces the cyclist to go on the wrong side of the street, on sidewalks, and ignore the traffic lights.

Political factors concern failures in public safety and lack of planning of traffic aimed at bicycles. The lack of safety both on campus and its surroundings was cited as an obstacle to use bicycles. For those cyclists who spend the day at the university, leaving the bicycle in the same place too long can be a cause for concern and requires attention to the parking spot. In the same way, cycling at night can be a 'tension' generator, and the fear of being accosted by robbers can define the use (or not) of the bicycle for a few days. Thus, it is understood that the lack of security is a matter of public policy, to which cyclists are exposed. Sometimes, cyclists avoid passing through some places or even cease to use bicycles for fear of robbery.

We can add to the political issues the barriers to urban planning in Florianópolis, reflected in the 'lack of visibility' of cyclists on mobility policies and 'poor urban planning for' bicycles. These barriers, which are concretely experienced and perceived daily, are related to management models and action plans that often 'do not leave the drawing board'.

These data echo the results of Daley et al. (2007), when pointing out the sociocultural aspects concerning the use of bicycles, such as the automobile culture, political and economic factors, values and attitudes in the traffic, as major concerns among regular cyclists. In addition, it is understood that insecurity interferes negatively with cycling (Nkurunziza et al., 2012, Franco, Campos, & Monteiro, 2014), and reinforces the image of cycling as something dangerous (Daley & Rissel, 2011). Thus, the improvement of mobility conditions could lead not only to increased use of bicycles (Sallis et al., 2013), but also to the rethinking of the image that cycling has as a means of transportation.

The cyclists' evaluations of the cycling structure on the studied campus and paths through which they pass daily constituted another subcategory. These are opinions and views on transit structures that have as a substrate the experimentation of these elements. They were organized around the scarcity of space in the streets of Florianópolis, of what is adequate or inadequate in structural terms, of the security provided by these structures and the description of the policies panorama for the use of bicycles. The analysis of this subcategory gains depth if understood in close relationship or as a development of the subcategory that deals with the difficulties of using bicycles as means of transportation, mainly on paths conditions. Thus, if there are some factors of the built environment that hinder the use of bicycles, it is certain that cyclists have something to say about them.

The lack of space on the streets of Florianópolis was one of the main points, since the configuration of the city's streets, 'tight and narrow', often does not have room for the simultaneous circulation of people and require cyclists to 'follow the stream with the cars'. In addition, the 'disrespect' suffered by cyclists in traffic, as well as the difficulty of sharing streets (something that is not always practiced by cyclists) demarcate the domain of some transportation modes and subordination of the others. In the war of traffic, which is worsened

every day on the streets, cars, buses, motorcycles, and bicycles draw the scenario of immobility (Rolnik & Klintowitz, 2011) and take the place of that which should subsidize urban mobility: people and movement.

With respect to the number and quality of the existing cycling structures, the participants' evaluation ranged from adequate to inadequate, the latter being the dominant view. Adequate structures are related mainly to the university campus, based on the reports of some cyclists who identified the existence of bicycle racks in places people usually attend, access ramps to sidewalks, space to circulate on sidewalks and in the internal streets, as well as good quality asphalt on some roads in the vicinity of the university.

On the other hand, the inadequacy of the structures expands to the city as a whole, a situation that accompanies cyclists for most of the route to the university or other destinations. Even if political efforts to create better conditions for bicycle use are perceived (such as the construction of bicycle paths and lanes in some places of the city), the general situation is not pleasing: lack of signaling for cyclists, few paths of exclusive circulation, paths 'with no interconnection' and that lead to nowhere, streets 'that are not suitable even to go on foot' that put the cyclist in 'risk situations'.

Opinions on the adequacy and inadequacy of the structures that serve cyclists in the city and the university differ in some aspects. If on the one hand the city's efforts to create conditions for the safe movement for cyclists is perceived, the structures are few and unconnected. If a disregard of the university with cyclist is not perceived, it is necessary to provide better security condition to meet their demands. What appears to be a consensus among the plurality of points of view is that there is a flaw in the context of policies, especially those that should encourage the use of bicycles.

It is a macroscopic aspect of cycling in the city, including the lack of planning for the insertion of this transportation in the existing traffic system, lack of 'signaling', and lack of traffic 'education', which starts in the training of new drivers and spreads to daily living on the streets. They refer projects of bicycle paths that 'remain only on the drawing board', or paths that, 'in practice, do not facilitate cyclists' lives and are irregularly spread in the city.

From cyclists, there is the demand for official actions of public authorities, 'who can actually do something' to solve the problem. Whilst planning actions can be the competence of the management (of the state, the city, the university campus), interventions in the sphere of the 'culture of cycling' should also be included, in the form of promotion campaigns to spread the use of bicycles as a means of transportation and encourage the sharing of streets among the various modes.

Participants' concerns about the barriers to the use of bicycles in the city are in line with those identified in the development of the Sustainable Urban Mobility Plan of the Metropolitan Region of Florianópolis (PLAMUS). This study identified that the lack of bicycle paths is the biggest barrier to the movement of bicycles, followed by traffic insecurity, lack of parking spaces, and robberies committed against cyclists. It is worth noting that even being a city cut by hills, the relief was not pointed out as something significant that hinders cycling, which may indicate the preponderance of other factors over this one or even an interrelationship, for example, in the case of the climbs of hills that have no sidewalk. Therefore, it is the sum of two identified barriers: one relating to the geography of the city and the other to the built environment.

The last subcategory on the cognitive dimension of the relationship between cyclists and the city concerns environmental cognition, i.e., ways to meet, apprehend, and extract knowledge of the physical and social environment. We understood that participants were

able, with greater or lesser depth, to mentally go through daily routes and elaborate them according to their organizers.

At first, we identified that the participants described their routes from markers. According to the distance traveled, the details of the path were referred to with greater or lesser frequency, so that longer routes had more markers. Three types of route markers were characterized, differing in function of scale, with coexistence between them or not. In the macro scale, names of neighborhoods and regions of the city acquired greater visibility on the route. *Trindade, Córrego Grande, Sul da Ilha, Rio Tavares* were cited as origin points and as pass through points to the final destination.

On average, the route markers were street names, either because participants traveled through them or as designation of a neighborhood. One example is the reference to street Antônio Edu Vieira referencing to the Pantanal neighborhood, since this street traverses the entire length of the neighborhood, linking the university to the Center-South accesses of the island. Similarly, the official names of streets were transformed to facilitate their characterization, often assigning to the name their physical attributes. 'The highway to three ways of river *Tavares*, the continuation of *Lauro Linhares*, the ascent of *Serrinha*, street that circles the lake', were references to peripheral aspects of streets that aid cyclists to organize the route by adding descriptive elements and details to the general landscape.

The micro-scale guiders were establishments and buildings they pass by, as well as specific elements of the streets. '*Supermarkets, gas stations, bus stops, viaducts, and university buildings*' were used as references within vision range, elements that guides the moment of following straight on the same street or doing a conversion. Often, the familiarization with the route enabled cyclists to give details of the street itself as a marker, such as those 'tricky stretches or the hole just around the corner of home'.

Sometimes, the route markers were indicated as ways to orient themselves in space. For example, to designate the place of residence, 'climbing a slope' can be an element that guides the cyclist and indicates the closeness to the final destination. Another way to orientate on the route is to use the markers (regardless of their scale) as beginning or end, such as a bicycle path that 'begins in Rendeiras and goes until the end of the Lake'.

In addition, time and distance are elements that can serve as guidance during the commutes. Reference to short paths was made according to time (five minutes to the market), and the longer paths were established by metric distance (45 km the round trip).

In line with Pinheiro (2013), it is possible to understand these modulations operated by cyclists as cognitive distortions regarding the experienced reality. However, these do not indicate an error in the reading of reality, but rather a functional reorganization of the information, which allows its representation and later mental management. Such a process, in its turn, does not happen separated from its articulations (Heft, 2013), since the city of Florianópolis (a seaside capital city in southern Brazil) has particular environmental, geographical, cultural, and political contours, producing a very specific way of being in this space.

In addition, there are some elements that draw the attention of cyclists in their daily paths. Natural elements of the environment were cited (such as the 'landscapes' and the natural beauties of the city), others relating to elements of the built environment (narrow streets, construction works, lack of infrastructure for bicycles, and holes). Lastly, social elements present in cycling were also mentioned (such as 'heavy traffic' of vehicles and its 'dangers', and the 'competition' among drivers, cyclists, and pedestrians).

As for the reasons that lead to the choice of route, the cyclists were able to anticipate the route to be performed, evaluate it, and make the best choice for the moment. Therefore, we understand that cyclists were able to anticipate and evaluate the route, the passageways, the best possibilities, and the risks involved.

This evaluation process occurs according to the time of day and availability of time to perform the route. Thus, when there is the option for a safer and longer route (which includes stretches in bicycle paths), this route shall be taken when there is time available. On the other hand, if they are late, the option will be for the shortest and least secure route, that is not always the best option for the cyclist, even if offering conditions for exclusive circulation and with greater security than on the streets.

The reasons for choosing were several, such as: 'speed, distance, lack of options, only option'. The reasons that stood out were those based on shorter distance and less time of commute, i.e., the transportation that will get 'faster' to the final destination. Even so, there are routes that offer other conditions of circulation, which combine the 'better conditions' of the streets, with 'longer and faster' route, and a 'better view', indicating that the aesthetic appreciation of the city is an influence on the decision of the route to be taken.

In addition, environmental cognitions can be defined by the sensations caused, i.e., by how the body is affected by elements of the route. In this way, the smell of the mangroves, fresh air, adrenaline rush triggered by the traffic on a busy street, and the intensity of the 'climbs and descents' can be other ways of organizing knowledge on the route, so that the body result of the climb and the speed of the descent indicate the end of cycling (sweaty).

It is a way to get to know the environment that is not entirely rational. In this sense, cyclists know they are passing the usual places according to the way the body reverberates with the landscape, as well as by the feelings caused, knowledge produced from the mediation of the ethical-affective rationality (Sawaia, 1995). For Lynch (1997), the organization of the environment from these assumptions can serve as a reference for individuals, a way to organize their daily activities, and, ultimately, signal the importance it has for maintaining the emotional security of the city's inhabitants, i.e., the understanding of the environment as a continuity of the self.

Environmental cognitions are, therefore, ways to extract and store knowledge from the environment that subsidizes symbolic life and trigger modes of behaving in the environment. The results suggest that the understanding of the cognitive dimension of the relationship between cyclists and the city cannot be detached from affections and behaviors. The perception of the city is partial and the composition of a mental image of it is the result of the action of all the senses (Lynch, 1997). This process is, therefore, inseparable and mutually complementary, so that if the knowledge is possible by experience, cycling is a way of conceiving the city and acting in it.

Final considerations

This study aimed to analyze the characteristics of environmental perception of cyclists in the city of Florianópolis, Brazil. Data were organized in three subcategories of analysis that indicated how people's environmental cognition are organized, as well as other aspects of the cognitive dimension of the relationship between cyclists and the city that reinforce or assist the understanding of these environmental cognitions. They can be understood as indicators of the environmental cognition from the investigated context.

The reasons for choice, the benefits and difficulties of cycling, and environmental assessments and cognitions sustain a deliberate option for bicycles and for a specific way to relate with the city. This choice, on its turn, provides a cognitive arrangement of the urban space that allows other cartographies of the city to be delineated, a way to get to know what goes beyond the urban apparatus in itself (streets, sidewalks, bicycle paths). The meaning of the streets is transfigured, formal names are redefined and become daily organizers, incorporated objects, strangely familiar. Those are decisions that cyclists make that underlie the knowledge produced on the urban environment.

In this sense, suggesting that cycling can mediate a way to build knowledge about the city, based on the idea of environmental cognitions, indicates the possibility of appropriation of space, of identification with places, and, ultimately, to trace sustainable strategies to be and exist in urban spaces. Therefore, environmental cognitions can be indicated as important steps for identification with the environment, a process that can trigger actions of care with the city and the environment.

We would like to emphasize that this study was conducted in a particular context in environmental, geographic, cultural and political terms. Other studies may be performed from an analogous methodological proposal, so that data from various contexts can be compared to better understand how people get to know their surroundings from daily practices of mobility in the city.

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