Perception and connectedness with marine and coastal environments: the perspective of basic education and undergraduate students from two Brazilian cities

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Abstract

This work investigated the perception and connectedness with marine and coastal environments of basic education and undergraduate students from coastal and non-coastal cities. Our results highlighted a utilitarian view among all student groups, since they cited food and location as main types of relation with the environments. In addition, few basic education students from the non-coastal city can establish a relation with these environments. This could happen because people in general have difficulty establishing relationships with physically distant environments from their daily lives.

Key words: Environmental perceptions, connectedness, marine and coastal environments, basic education students, undergraduate students.

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Introduction

Many of the largest cities in the world, where population growth rates are highest, are located near the coast (e.g. São Paulo, Brazil). These huge populations increase the pressures on utilization of resources in coastal areas and, in addition, lead to habitat degradation, fragmentation and destruction (Gray, 1997). Especially in these high population areas, a plan for marine and coastal conservation is needed. It should include, among other things, well-structured Environmental Educational programs (Berchez et al., 2005). Recently, a review article highlighted that there are a few number of this kind of programs in Brazil, despite the country's extensive coastline (Pedrini et al., 2014).

Marine and coastal ecosystems need a special attention on Environmental Education actions, since they are sometimes overlooked based on an apparent distance between them and people's daily lives. Therefore, stimulating people to correlate their daily life and these environments is a great challenge, because establishing this connectedness seems to be even more difficult to marine and coastal environments than to land ecosystems (Towata et al., 2013). A critical point to develop Environmental Education programs, including the ones focused on marine and coastal ecosystems, is to understand the perception and the connectedness that people establish with these environments. However, there are few studies about it when comparing with the ones focusing on land ecosystems, especially in Brazil (e.g. Ghilardi-Lopes et al., 2015; Katon et al., 2013; Savietto, 2014; Vikan et al., 2007).

Environmental Perception is a complex concept. However, we assume that it is the relation that people establish with the environment in which they are inserted, which occurs through perceptual and cognitive mechanisms (Del Rio and Oliveira, 1996; Whyte, 1977). White (1977) stresses that "one of the difficulties for the protection of natural environments is the existence of differences in perceptions of the values and importance of the same between the different cultures of individuals or socioeconomic groups that perform different social functions, in these environments." Additionally, if different people may have completely different reactions to the same environment (Bentham, 2006), it is important to know the perception of a community about an environment, in our case the marine and coastal environments, to plan better activities to increase their knowledge about the importance and the influence of those environments for the planet balance and our daily lives.

Therefore, the aim of this work was to investigate the perception and connectedness with marine and coastal environments of basic education and undergraduate students from two southwest Brazilian cities located near the coastline.

Methodology

We investigated the concepts of three different student groups from Brazil through questionnaire application. The first group (**UG-NCC**) was formed by 63 Biology undergraduate students (preservice teachers) from São Paulo, which is the biggest city in Brazil, located approximately 70 km far from the sea. They studied at São Paulo University. There were 36 girls and 27 boys, 17-36 age group. The second group (**BE-NCC**) consisted of 79 basic education students from a public school also from São Paulo city, 43 girls and 36 boys, 11-16 age group. The last group (**BE-CC**) consisted of 74 basic education students from two public schools from a coastal city Caraguatatuba, Brazil), 51 girls and 23 boys, 13-16 age group.

For this article, we present the analysis of two open questions: "When you think about the marine and coastal environments, which are the 3 words or expression that first come to your mind?" and "Is there any relation between your day by day life and the marine and coastal environments? ( ) Yes. ( ) No. Explain your answer."

For the analysis of the first question, we quantified the answers and grouped them into broader categories to compare the subject groups. For the second question, we used Bardin's Content Analysis technique (2009), which includes the following stages: (i) pre-analysis; (ii) exploration of the materials; and (iii) treatment of the results, inference, and interpretation. We also compare the categories founded to each subject groups.

Results and discussion

UG-NCC and BE-CC mostly cited living beings as one of the 3 words or expression that first came to mind when they think about marine and coastal environments, which seems to indicate a biodiversity valorization (Figure 1). We can suppose that it is a typical characteristic among students that chose Biology as their graduation courses (UG-NCC).

About basic education studies, the category living beings was almost 20% lower for BE-NCC when compared to BE-CC (Figure 1), which might have indicated that to these students, the physical proximity to marine and coastal ecosystems make some difference on their connectedness with these environments, since the students from coastal city chose living beings on their answers much more than BE-NCC. "Sea", "beach", "water" and "sand" were also cited for the three student groups, but only UG-CC remembered "shore".
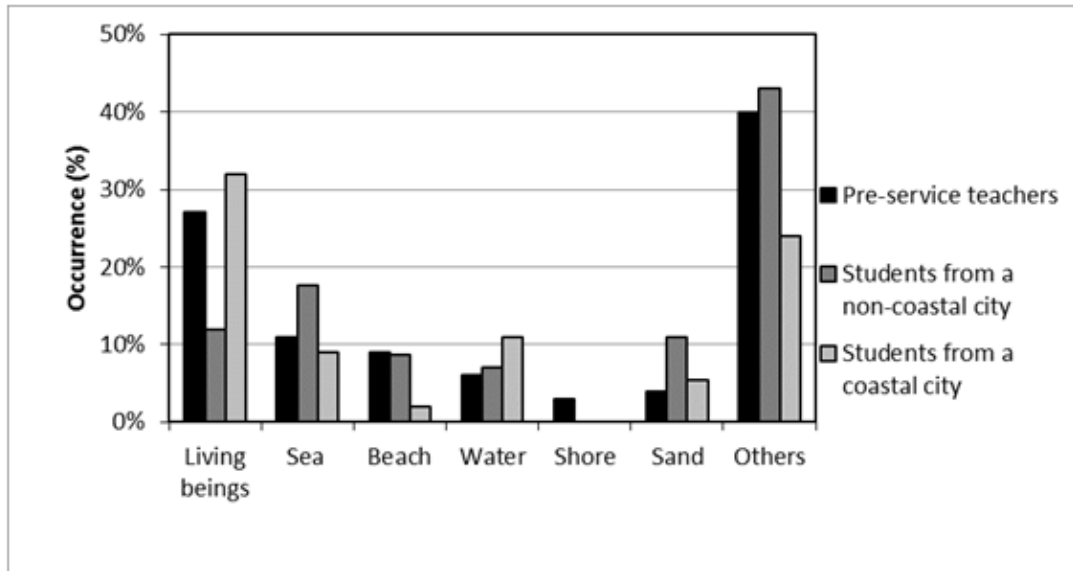
Figure 1. Occurrence of categories on the answers of UG-NCC, BE-NCC and BE-CC for the question "When you think about the marine and coastal environments, which are the 3 words or expression that first come to your mind?"

About the second question, the three student groups showed different results among them. For UG-NCC, 11 (17%) participants answered "no" and most wrote that those environments are distant and/or have an indirect relationship with these environments. The most cited categories for who marked "Yes" were "food", "derivate" and "pollution" (Figure 2). This group showed a bigger variation of categories on answers when compared with the basic education students (Figures 2-4).
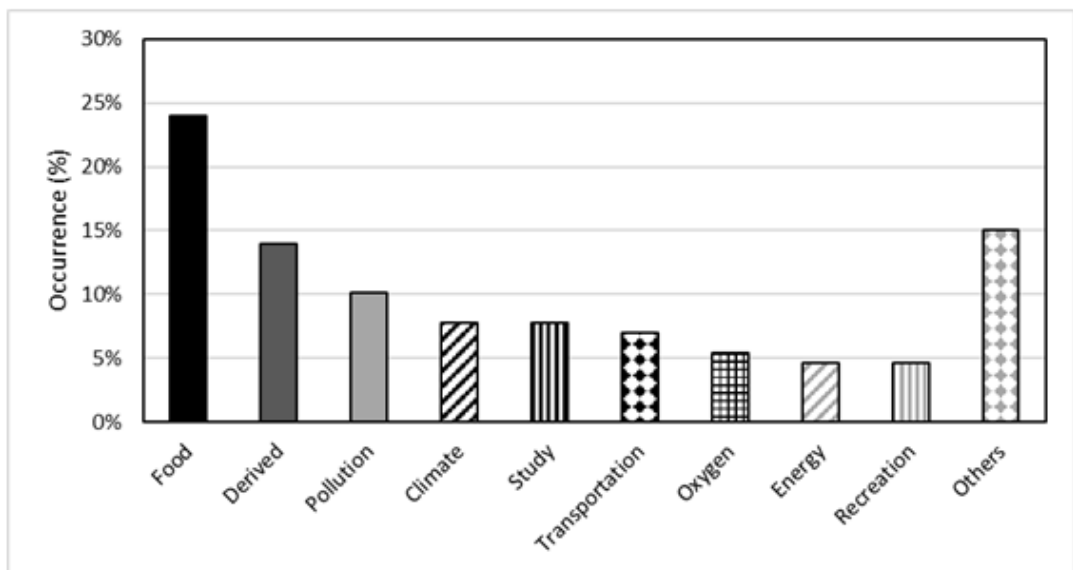

Figure 2. Occurrence of categories for UG-NCC that answer "Yes" for the question "Is there any relation between your day by day life and the marine and coastal environments? Explain your answer."

We present below the definition and some examples of the 8 categories found for UG-NCC when answered "Yes" in question 2 (Figure 2).

1. Food - It is related with student diet.

"At the moment, I can only think on food, fish and seafood."

"I eat fish at least once a week and these fishes come from the sea. (…)."

2. **Derivate - When student consume products derived from marine organisms.**

"Many products that I use daily (toothpaste, for example) come from marine organisms. I wish this relationship could be less utilitarian but I cannot see the marine and coastal environments otherwise in my daily life."

"(...) Many products are made with algae (toothpaste, food products) for example, and they are part of my daily life."

3. **Pollution - When pollution affects those environments.**

"Our sewage goes to the sea, affecting it directly. (...)."

"(...) In addition, much of the garbage I produce was carried through the sea."

4. **Climate - It is related with climate changes.**

"Besides the fact that I grew up on the coast. I believe that the coastal environment exerts great influence on the capital's climate. (...)"

"(...) Furthermore, the currents are essential in defining important factors in our day-to-day, as the wind and rain."

5. **Study - It is related to the study of those environments.**

"I have a long preference for zoology, for ichthyology, and I am getting used to reading articles about marine ecology."

"In my day-to-day I study interactions that occur in these environments. (...)."

6. **Transportation - It is related with navigation and transport of products through the sea.**

"Products that arrive by ships in ports. (...)"

"(...) These environments serve as a means of transportation, extraction of resources (food, fuel, etc.), and deposition of waste, for example."

7. **Oxygen - It is related with oxygen production.**

"(...) It is in the production of O2, foods containing algae, etc."

"The oxygen produced in marine environments (...)."

8. **Recreation - It is related with go to the beach.**

"(...) Also, whenever possible I travel to the beach with my family."

"(...) Furthermore, the marine and coastal environment is a place of leisure, especially during the vacations."

Others - Other categories that was cited less than 5%.

"In general, much of my day-to-day is related to coastal environments. A great example is that almost all my home decoration: are handcrafted products, made by people who make them with local material."

"(...) Besides being important in the water processes/cycles."

Most of the students from a non-coastal city (BE-NCC) did not find any relation between their daily lives and the marine environment. Only 20% marked "Yes" and the most cited category is "everyday" (Figure 3). The percentage of "Yes" was higher to BE-CC (57%) and the most cited categories are "lives", "food" and "frequency" (Figure 4). For the students who answered "No", we found similar categories: 77% of BE-NCC marked "No" and the most cited categories are "distant" and "different" (Figure 3); and in BE-CC 43% and the most cited categories are "do not go" and "different" (Figure 4).

We present below the definition and some examples of the 3 categories found for BE-NCC when answered "No" in question 2 (Figure 3).

1. **Distant - It is related with the geographic distance between the city and the coast.**

"Because I only go to the beach once a year and so I think that it is not part of my daily life."

2. **Different - When it is related to the difference between what student do in the city** and in marine and costal environments.

"Because when we are on the coast we just go to spend the holidays and in our day-to-day we have things to do and cannot be resting."

3. **Never Been - When student wrote they never went to the beach.**

"Because I never went to the beach to have fun."

Others - Other categories that was cited less than 5%.

"Because I do not like to go to the beach."

We present below the definition and some examples of the 4 categories found for BE-NCC when answer "Yes" on question 2 (Figure 3).

1. **Every day - When it is related with something they do every day in the city.**

"(...), I go every day."

2. **Distant - It is related with the geographic distance between the city and the coast.**

"Because the coast (beach) is a little far from home, my family does not have the habit of going there daily."

3. **Recreation - It is related with go to the beach.**

   "Because half of my family lives there, e we visit them there."

4. **Pollution - It is related with the pollution that exist anywhere.**

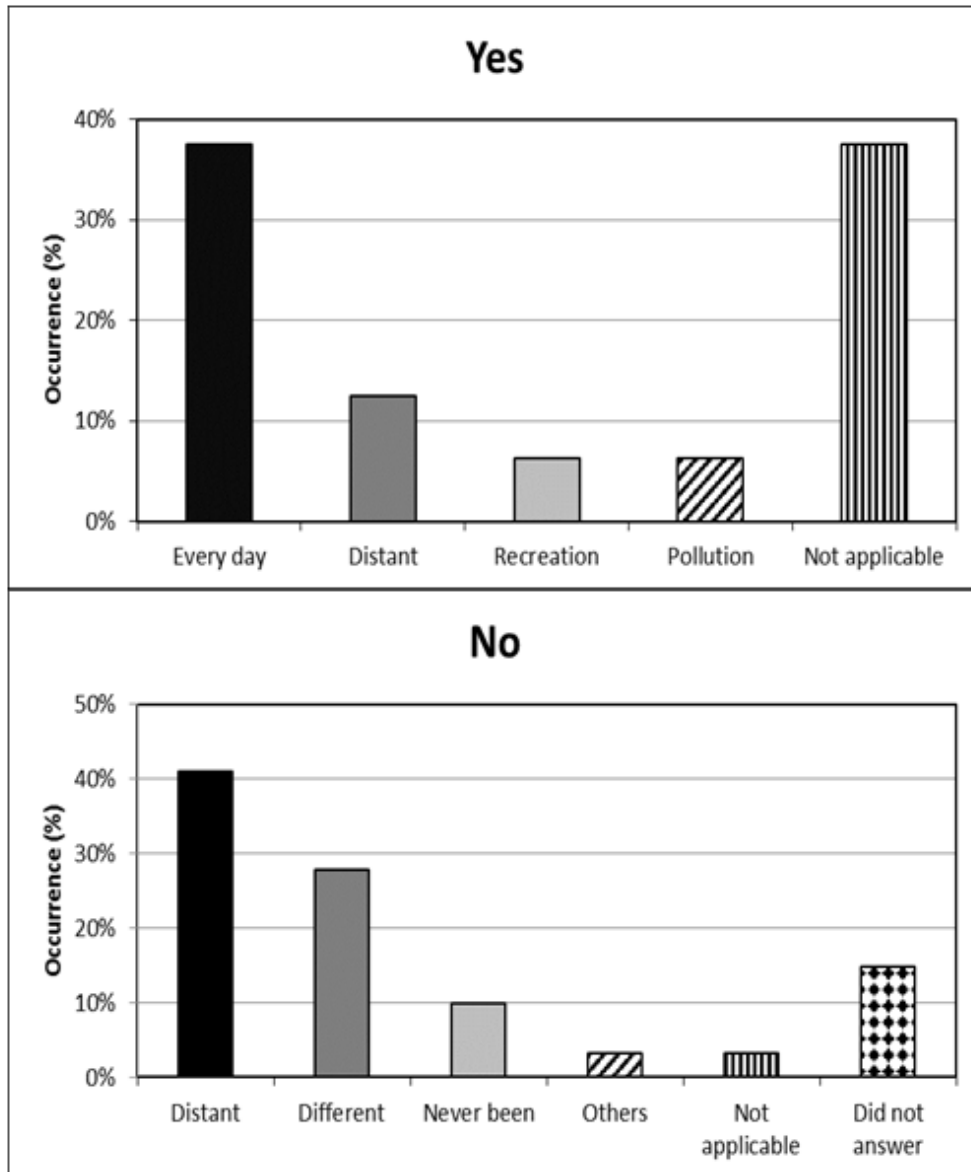*"Because the world is full of bacteria and pollution"*

Figure 3. Occurrence of categories for BE-NCC that answer "Yes" or "No" for the question "Is there any relation between your day-by-day life and the marine and coastal environments? Explain your answer."
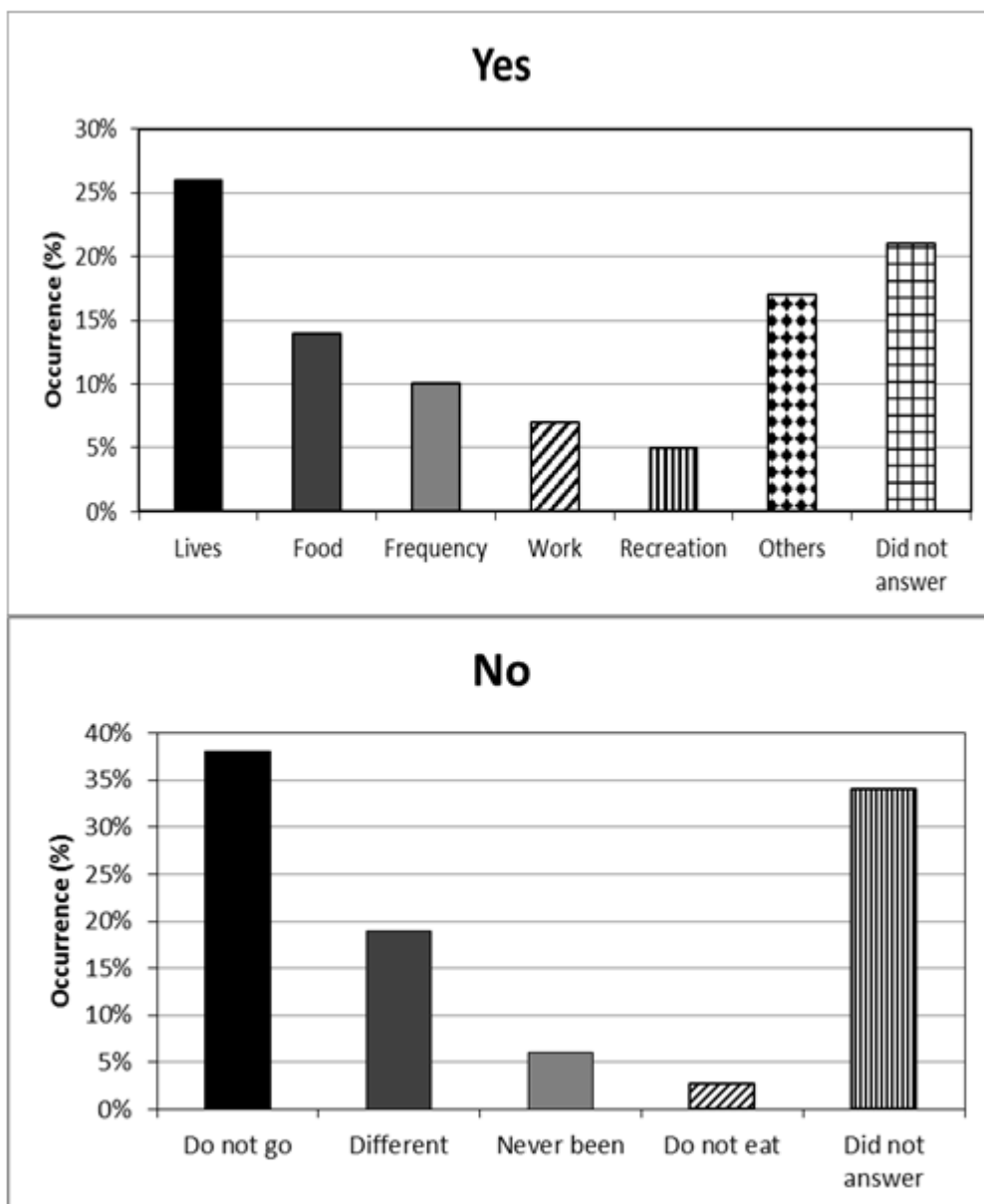
Figure 4. Occurrence of categories for BE-CC that answer "Yes" or "No" for the question "Is there any relation between your day by day life and the marine and coastal environments? Explain your answer."

We present below the definition and some examples of the 5 categories found for BE-CC when answer "Yes" on question 2 (Figure 4).

1. **Lives - When student related with living at a coastal city**.

"Yes, because I live in a coast region, so it has everything to do with my daily life."

2. **Food - It is related with student diet**.

"Because I eat marine animals."

3. **Frequency - It is related with go to the beach.**

"I live on the coast and go to beaches."

4. **Work - When the related with student job.**

"I work at a marina."

5. **Recreation - It is related to some activities students do at the beach.**

"Because I live on the coast and here we enjoyed the beach.

Others - Others categories that was cited less than 5%.

"Because I believe a lot of algae make part for the quality of air and water."

We present below the definition and some examples of the 4 categories found for BE-CC when answer "No" on question 2 (Figure 4).

1. **Do not go - It is related to not going to the beach.**

"Because I do not go to the beach very much."

2. **Different - When it is related to the difference between what students do in the city and in marine and costal environments.**

"Because I did not see anything similar to a marine world."

3. **Never Been – It is related to never going to the beach.**

"Because I never visit this environment."

4. **Do not eat - It is related to not eating live being from the sea.**

"Because I eat nothing marine."

Generally, we present difficulties in establishing relationships with distant environments in our everyday lives and this relationship is more present with familiar surroundings (Del Rio and Oliveira, 1996). As a consequence, it would be expected that the students from a coastal city had a natural proximity to the marine and coastal environments. Actually, BE-CC could establish more relations with marine and coastal environments than BE-NCC, but this connection is based on living near those environments. Similar results were found in other studies carried in Brazilian southwest cities (Katon et al., 2013, 2014; Savietto et al., 2014). Savietto et al. (2014), for example, investigated students from a coastal city and 52% could establish a relation with marine and costal environments. Additionally, the most cited categories reported by students were "go to the beach", "sports" and "physical proximity".

It draws attention that none BE-NCC wrote about food. Even if we do not have information about their diet, they probably consume products that are derived from marine organisms. However, the students do not recognize this as an important relation. We can postulate that these students have strong difficult to establish a relationship with marine and coastal environments even based on utilitaristic approaches.

Another interesting fact is that few students, including UG-NCC group and regardless their city location, wrote about the production of oxygen or other influences that those environments have on the planet balance. May be this occurs because it is difficult for students to understand abstract conceptions and processes (Çimer, 2012). And, if they did not understand the abstract concepts, it can be even more difficult to have an ecocentric dimension view of environment, as defined by Amérigo et al. (2007). We believe that the understanding of complex process could help people realize more clearly the connection between then and the environment, for example, the influence of marine microorganisms on oxygen production for the planet. If they do not understand the photosynthesis process and its relation to microalgae and oxygen balance on the planet, they probably could not make any relation between these processes and their daily lives.

We can conclude that the investigated students showed a predominantly utilitarian view, in which the environment is seen as the set of natural elements available to the man (Flores and González-Gaudiano, 2008). It can be noticed in categories such as "food", "recreation", "derived" and "transportation"

Conclusions

We found that basic education students from the non-coastal had strong difficulties to establish a relationship with marine and coastal environments. This could happen because of the physical and emotional distances to those environments, as postulated by some authors (e.g. Del Rio and Oliveira, 1996; Jefferson et al. 2013).

Additionally, data showed a utilitarian view of marine and coastal environment among all students' groups investigated, regardless the student level (basic education or under graduation) and city location. Most of them cited food and location (place where they live or not) as main kinds of relationship with these environments.

Our results highlighted the significant importance of Environmental Education programs related to marine and coastal environments focusing on different students' audience. We believe that the main objective of such programs should be initially help students establish relationships with such environments and subsequently overcome the idea of merely utilitarian relations.

Finally, it is important to develop further researchers to better understand the differences between the Perceptions of coastal students and non-coastal students, investigating the reasons why they occur. Other significant approach can be study the influence of other variables, as age, sex, and school characteristics.

Acknowledgements

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