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Cross linguistic comparison of Wilderness Perception in Switzerland - Perceptions of French-speaking and German-speaking Switzerland in two Regional Nature Parks

ESS 511 Master's Thesis

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Cross linguistic comparison of Wilderness

Perception in Switzerland

Perceptions of French-speaking and German-speaking
Switzerland in two Regional Nature Parks

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Abstract

This thesis investigates wilderness perception differences between German-speaking and French-speaking Switzerland by means of a cross-linguistic survey. Wilderness areas being increasingly endangered by growing population, increasing energy needs and anthropogenic climate change, its important role needs more attention. Especially in Switzerland where different languages cohabit and cooperate closely, public opinion is required in order to better address potential issues in this concern. Surveying is an indispensable tool for bottom up policy implementation in order to achieve high sensitization and acceptance within communities of different languages. These procedures are crucial for the establishment and the maintenance of protected areas such as regional nature parks. Such parks, other than national parks are widely spread in Switzerland and are subject of concern to more citizen. This thesis aims to investigate if cross-linguistic wilderness are present within such parks by analyzing answers from image description tasks, as well as with opinion to selected terms and additionally combining the findings with a PPGIS task. Consistent differences are identified, reasoned and related to similar studies. On the other hand, concordances between the languages in some collected data indicate that other parameters, such as the shown images, might influence perception differences more seriously than the linguistic parameter.

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Nomenclature

Acronyms and Abbreviations

FOEN	Federal Office for the Environment
FoLAP	Forum Landscape, Alps, Parks
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature and Natural Resources
LABES	Swiss Landscape Monitoring framework
NCHA	Federal Act on the Protection of Nature and Cultural Heritage
ParkO	Parks Ordinance
PPGIS	Public Participation Geographic Information System
SNP	Swiss National Park
SPN	Swiss Parks Network
WSL	Swiss Federal Institute for Forest, Snow and Landscape Research

Chapter 1

Introduction

1.1 Context and Motivation

Wilderness is a term of many facets. Many definitions and descriptions exist and so does its perceptions differ. The fact that it does not translate to French is reason enough to investigate its perception more thoroughly. Particularly in Switzerland, where linguistic and culture diversity exist in all parts of the country within close space. With the ongoing climate crisis, fauna and flora are facing dramatic biodiversity losses (IPCC, 2013). Growing population and increasing energy needs also endanger wilderness areas that act as pristine habitats of high biodiversity. With anthropogenic climate change and increasing land use demands, as well as landscape changes, it becomes increasingly important to study physical and ecosystem values of landscapes as well as societal perceptions of nature (Wartmann et al., 2019).

According to the study of Moos et al. (2019), experts agree that more wilderness areas are mandatory and should be extended. In a densely populated country such as Switzerland, the protection of wilderness is indisputably bound to the establishment of protected areas. A part of that process consists of studying the perception of wilderness and understanding different interests as well as cultural discrepancy. Therefore, it is important to have a detailed opinion from the population. It would further encourage increasing awareness and acceptance of wilderness as a part of our lifeline, as described by Watson et al. (2016), and therefore help to achieve better park management and define goals for protected areas more clearly. This is also approved by Jalignot et al. (2019), who state that participatory methods are important to support planning policies. A comparison of the different perceptions would point

out areas and subjects, where there are potential conflicts or misunderstandings. Regional nature parks represent important intersection areas between wilderness and humans. Particularly in Switzerland with different linguistic regions within a small area, it is of great value to have good communication between citizen and decision makers. Moreover, the methods used in the survey of this study can be analyzed comparable to free-listing tasks. Findings of the latter method have proven to be a useful tool that contribute in the development of educational materials or help determine priorities for policy or practice (Keddem et al., 2021).

1.2 Research Questions

This is the hypothesis, followed by the research questions that will guide the study:

Hypothesis:

French-speaking and German-speaking Switzerland have distinguished perceptions of wilderness.

Based on subjective opinion from the media and from people at the language border, there are differences in cultural and political perceptions. Therefore, presuming that there is a different perception of wilderness and landscape is possible.

How different is wilderness perceived in the French-speaking part compared to the German-speaking part of Switzerland?

If there is in fact a difference in perception, how far away are the perceptions of both Swiss regions?

How do citizen sensible to nature from both regions, perceive wilderness in two selected Swiss regional nature parks?

This questions helps to narrow down the research question in a particular case.

Is there a wilderness gradient pattern recognizable from the perception of the two groups of interest?

Are there specific parameters that influence or guide any group towards similar perceptions?

Not included in this study are feasibility studies, whether regional nature parks could actually sustain an extension by means of a new or larger core zone or even a category upgrade. It should be noted here that the parks will not be evaluated

by their qualities. For this study the parks are simply convenient areas of research, since nature is preserved, biodiversity is supported and since they represent popular destinations for people sensitive to nature.

Inspired by the study of Moos et al. (2019) about wilderness potential in Switzerland, this thesis aims to study the intersection of human and wilderness in Switzerland. More particularly the perception of French-speaking and German-speaking people. For this purpose, two regional nature parks along the linguistic border were selected. Regional nature parks are expected to have lower quality of wilderness areas compared to a national park. However, following the results of the above mentioned study, there is medium to high potential to find wilderness within the two selected regional nature parks. For these contrasts it is compelling to study these parks in particular along with the fact that regional nature parks are the most frequented parks because of the combination of their large numbers and distribution across the country.

1.3 Thesis Structure

Content of the thesis:

- Chapter 2 describes wilderness and its linked terms and concepts in order to understand the importance of its perception by humans of different languages. Focusing on the situation in Switzerland, an overview of protected areas is given. The literature review shows the progress in wilderness perception studies and finally research gaps are identified.
- Chapter 3 presents the methods used to gain information about wilderness perception in Switzerland by the means of an online survey. The design of the survey is presented as well as the reasons for these choices.
- Chapter 4 illustrates and analyses some selected results from all three tasks of the survey and relates the different findings, focusing on comparing French-speaking and German-speaking data.
- Chapter 5 discusses the implications of the survey results and evaluates their limitations before attempting to answer the research questions.
- Chapter 6 concludes the thesis and gives an outlook for further improvement in the field.

Chapter 2

Background

This chapter introduces the terms linked to wilderness and offers a brief historical context. It then narrows down towards the situation in Switzerland and the topic of wilderness and nature perception. Based on literature review, it also shows different points to be considered when looking at wilderness perception and the multiple aspects and points of view that play into account. At the end, the state of the art and the relevance of this study should be clear. Finally, research gaps are identified.

2.1 What is Wilderness?

What is wilderness? The answer to this question seems to be harder to find than expected and is even harder to define in Switzerland due to the multitudes of languages. Translating wilderness into German results most likely in "Wildnis". German and English are both Germanic languages and are therefore similar. In the Latin languages spoken in Switzerland however, no translation fits the term of wilderness properly. At least not in only one word. In French for instance, "espace sauvage" or "nature sauvage" are often used to describe what can be considered wilderness in our understanding. But, wilderness is not defined the same everywhere. To understand the definition differences, the origins of wilderness as a concept has to be discussed.

The wilderness idea is still imprinted by the romantic descriptions of the 19th century that emerged in America (Ward, 2019). In the United States the philosophers and naturalists Henri David Thoreau and later John Muir coined the concept in literature (Thoreau, 2006; Muir, 1912). From dangerous places of evil to be feared, to areas

of rich resources to be exploited and finally as idyllic environments worthy to be protected, through history, wilderness has been described by many authors and institutions completely differently. So different feelings have always been involved in the perception of wilderness. These perceptions are, to some extent, responsible for the development of the wilderness concept.

A first legislative embedding was fixed by the U.S. Congress with the Wilderness Act in 1964. Therein, wilderness was defined as "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain" (Wilderness Act, 1964). This definition refers to untouched areas with the absence of humans.

For the densely populated region of Central-Europe, for instance Switzerland, no wilderness area is comparable to the wilderness standards that can be found in the immense National Parks of North America. However efforts are ongoing in Europe, in order to achieve predefined goals to protect areas of high naturalness comprising endangered, rare habitats (Brackhane et al., 2019).

2.1.1 Wilderness and linked Terms and Concepts

Nowadays, as stated by different authors such as Callicott (2008) or Hall (2014), the word wilderness is still controversial and difficult to translate. It is even unclear if the use of wilderness is the correct one for some purposes. When referring to the American experience of the wilderness definition and protection, another term, "wildness" is often mentioned. In Europe this term is newer and the differentiation can be misinterpreted. At first glance, it is unclear which word to use, because "wildness", not as an opposition, but as a different word than "wilderness" with similarities, are not the same (Chapman, 2006). "Wildness" is defined by Van Horn and Hausdoerffer (2017), to describe an ability of anything to renew itself, whereas, "wilderness" stands for a place where nature can be wild. The difference between wilderness and wildness appears to be unclear or missing in many studies. In his book, "Earth Repair", he describes the two terms as follows: "Wilderness was the place and restoring wildness was the process. Both movements were outgrowths of the same admiration for an idealized nature that was untouched and pristine [...]" (Hall, 2005, p. 150). Seeing wilderness in terms of time instead of space leads to wildness, which stands for change, becoming, learning and evolution. Wilderness is the holding place for these processes (Tallmadge, 2017, p. 179).

Understanding this, the wilderness that could not be recreated per definition and that was gone once destroyed, as described by Thoreau (2006) and Muir (1912), could in fact regrow. It would probably be slightly changed, but it could come back with time. And following Thoreau (2006), "In Wilderness is the preservation of the world".

Here, firstly it becomes clear that wilderness critically includes nature preservation concepts, and secondly that it can get mixed up with wildness, particularly in Europe where the native language differ from English and the differentiation of both terms is unknown. For such reasons, some prefer to stick to the English term.

Rewilding is another related term that can not be omitted from wildness and wilderness, particularly as global human population increases and anthropogenic impact has become more and more important (Carver, 2013). Rewilding has become a subject in many institutions. Most importantly, rewilding is a human induced idea and action. It incorporates our own ideas of how wilderness should look and interventions upon nature. Carver (2019) talks about different rewilding methods and namely rewilding through land abandonment, where the principle is to let nature develop freely after previous usage by humans. He points out that researchers mostly agree that land abandonment enhances biodiversity where native vegetation can recover from past cultivation or human activity.

Similarly (Watt, 2017, p. 110) agrees on the preference of abandonment where traces of the past are gradually left to fade rather than see them preserved and restored. Removing past, harmful traces of human impacts artificially from the landscape would create a false impression of wilderness, where the landscape is artificially sought. Forcing out is crucially different from disappearing in its meaning. Disappearing however suits better to the idea of wildness.

Rewilding is based on two processes, enlarging nature reserve areas and restoring vegetation, and connecting the wilderness areas (Noss and Cooperrider, 1994). Therefore, rewilding is directly related to ecocentricity, as state Kopnina et al. (2019).

To sum up, a singular definition of wilderness does not exist, neither for Europe nor globally, as the attempts represent different approaches (Schumacher et al., 2018). This shows the variety of interpretations that the term wilderness can bring about, depending on the point of view (Voigt, 2010). Macnaghten and Urry (1998) describe how heavily contested the concepts of wilderness and wild nature are and how there has been several historical shifts in public perception in history. Alone the fact that

eight frames of wilderness can be described emphasizes the ambiguity of the term.

2.2 Wilderness Perception

As can be deduced from the imprecise definition of wilderness, shown in the last section, the way people perceive wilderness is similarly various and it is also influenced by history, as will be explained further below. This results in multiple facets of wilderness that are perceived differently, thus have different priority and importance for different persons. The numerous different points of view towards wilderness and landscape show this.

Wilderness definitions are strongly bound to its very own perceptions and various points of view that can be identified towards wilderness. For some wilderness has a significance as a recreational space, for others as an economic space. Some deal with the landscape as planners, scientists or politician. Accordingly, we all have different experiences, demands, needs, interests on which we base our perception of a landscape. People's perception of landscape relies on our experiences, demands, needs and interests (Hunziker, 2012). People with similar degree of training, for instance geographers, may achieve high level of consensus due to similar analysis approaches when evaluating landscapes and theoretical background (Dearden, 1987).

Further findings related to experiences show that the most remembered moments of a visit in the Swiss National Park (SNP) are bound to emotions such as observing animals or admiring impressive and scenic views. Further, when questioning children, they believe that if other people would see these landscape, they would behave more sustainably. Wilderness within the SNP is not only regarded as beautiful, but also has the ability to change the behaviour (Jakob, 2018).

There has been researches about the perception of nature, where, for instance Buijs et al. (2009) and Mark et al. (2011) find out varying perceptions between different cultures. Whereas Wartmann and Purves (2018) finds restricted differences in the language, describing features of the sense of place. Perception of nature has also been analysed by Bauer and von Atzigen (2019) where five different types of nature perceptions could be identified. Studies in similar fields of research like Buijs et al. (2009), concludes that questioned people with integrative or functional image of nature are less likely to prefer natural landscapes compared to people with wilderness image. Landscape perception has also been subject of research where

Soliva and Hunziker (2009) find out that ecocentrism corresponds to the preference of cultural landscapes, while anthropocentrism was congruent with a preference for agricultural environments. Another attempt was to define eight frames representing wilderness. Namely, fragile ecosystem, national symbol, adventure playground, last frontier, sublime space, self-renewal ground, enchantment, and lost civilization (Vannini and Vannini, 2016).

In another study, seven argumentation patterns are identified to describe free nature development: cultivating, managing, balancing, conserving, using, respecting and participating (Moos et al., 2019, p. 98).

These different points of view can be related to the concept of sense of place as Agnew (2014) define it. Sense of place is used to describe a large spectrum of relations between people and places. It changes according to the meaning and attachment of a person for a particular situation Lewicka (2011).

In general, Watson (2013) observes a transition of perception towards protected areas, in other words, from an utilitarian view to environmental well-being.

Some studies observe gradients concerning people and their perception tendencies. Watson et al. (2016) analyses wilderness as recreational area and discusses the negative relationship between the perceived quality of wilderness and the number of groups encountered in it. Else, (Kienast et al., 2015) observe a gradient concerning relation of the living place of participants and their perception. Namely, people living in more rural regions, seem to perceive their living place as more beautiful compared to inhabitants of urban areas.

Dependant on the methodology, perceptions could vary when surveying people. Showing images is more likely to lead to consensus among participants compared to evaluations undertaken outside in the field, within a park for instance. (Dearden, 1987)

Different studies using similar approaches for addressing wilderness perception and how it is described, exist. A similar approach as used in this thesis but based on free-listing task was also applied by Williams et al. (2012) and Wartmann et al. (2019). Kuhn (2001) also differentiates grammatically the terms used to describe landscape. And further Wartmann et al. (2018) identify seven features (toponym, biophysical, cultural, perceptual, sense of place, activity, people) and used cosine

similarity comparisons to analyse the data.

Further, in the context of nature conservation and wilderness some perception lead to negative aspects. For instance growing tourism activities and energy production endanger the remaining potential wilderness areas (Moos et al., 2019), (Borges et al., 2011).

2.3 Wilderness in Switzerland

Here a brief history of nature conservation in Switzerland is given:

The Swiss National Park is the oldest and most protected area in Switzerland in terms of nature conservation. It was established in 1914 for protection and conservation purposes. But it was not until almost one hundred years later that nature preservation in Switzerland made a large step forward with the revision of the "Federal Act on the Protection of Nature and Cultural Heritage" in 2007, followed by the establishment of the Biosphere Entlebuch in 2008 as the second protected area in the country. It is today part of the UNESCO heritage and also a regional nature park. Since, many parks were created and today these are differentiated into three main park categories. There is the Swiss National Park, 17 regional nature parks, and two nature discovery parks. To this day the Swiss National Park remains the only national park in the country and it is the only area of category Ia "Strict nature reserve", whereas nature discovery parks are labeled as category II and regional nature parks are category V and VI (Schweizer Pärke, 2019a). These categories are referencing to the International Union for Conservation of Nature (IUCN) categorization, where Ia represents the highest protection of nature with the most restrictions. Categories with higher numbers have less strict restrictions (Dudley, 2008). Following Art. 23f Abs. 3a NCHA of the Federal Act on the Protection of Nature and Cultural Heritage (NCHA) about national parks and Art. 23h Abs. 3a NCHA about nature discovery parks, "a core zone where nature is allowed to develop freely and to which the general public has only limited access", are part of both categories. Such core zones could be considered to be the closest equivalent of wilderness zones in Switzerland, considering the officially defined areas.

Looking for wilderness in the country, this place in the canton Graubünden comes the closest to it in many aspects. It's large area, protection policy, monitoring and core zone are some of the main features that give the Swiss National Park it's

reputation (Kupper, 2014).

For this study however, it is of interest to look at natural places which are more easily accessible. This means places, where visitors have facilitated access. For the study site of interest, this includes areas closer to the midland basin, where most of Swiss's population is located and also closer to western Switzerland, where the French-speaking Swiss region is involved. It makes it easier to find common places to be judged at the language frontier between French and German along the so called Röstigraben. In Switzerland this term stands for the non-physical frontier between French- and German-speaking parts of the country and stretches from the South in the canton of Valais to the Northwest across the cantons of Fribourg and Bern. This means, the alps and the Jura mountains are linguistically speaking divided. For these reasons, regional nature parks are suitable areas for studies of wilderness perception. Image 2.1 shows the 20 current parks of Switzerland.

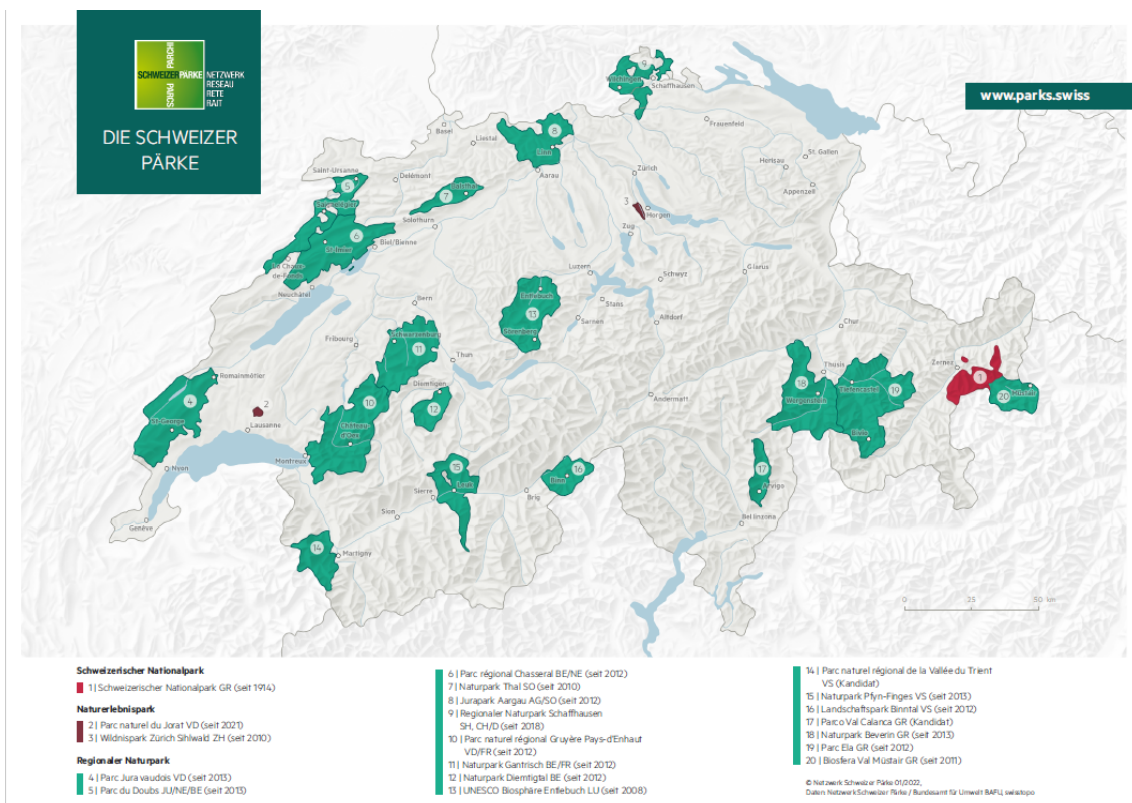


Figure 2.1: Map and location of the current Swiss Parks.

"A regional nature park, is a large, partly populated area, characterised by the richness of its natural and cultural landscape, whose buildings and installations blend harmoniously with the landscape and sites of local character.

Within a regional natural park:

- a. the quality of nature and the landscape shall be maintained and enhanced;*
- b. sustainable business activities shall be encouraged and the marketing of the resultant goods and services promoted."*(Art. 23h Abs. 3a NCHA)

This definition creates room for interpretation concerning whether or not any human made construction or land use is in harmony with the surrounding landscape. And similarly does the official definition of a park, as described by the Federal Office for the Environment (FOEN) in the Parks Ordinance (ParkO).

Further, the parks claim to promote sustainable development in their region and to stand for ecological, social and economic interests. In particular the protection of diverse flora and fauna in convenience with the regional identity of the parks region is important. To a major part, inhabitants of the parks regions have to show their willingness and engagement in order to make the establishment of a new park possible. Only after a positive vote in favor of the park the establishment can begin. Once a park has been established, every ten years their inhabitants vote again. This means, the creation and maintenance of a park is strongly bound to the acceptance of their inhabitants. Their perception of the environment and the nature is therefore crucial for the future of every park.

In the process of the establishment of a regional natural park, two main criteria are regarded as the most important along the feasibility study. Namely, a high natural and scenic value as well as the full commitment of the inhabitants and local authorities' to the project. (Netzwerk Schweizer Pärke, 2022)

Swiss parks vary in their conservation management, biodiversity as well as in their wilderness qualities. They are dispersed over all regions of the four native languages of Switzerland. Since humans can be considered part of wilderness to a certain extent, as Moos et al. (2019) and Vannini and Vannini (2016) describe it, perception of wilderness can also be diverse, especially in Switzerland with its multilingual tradition.

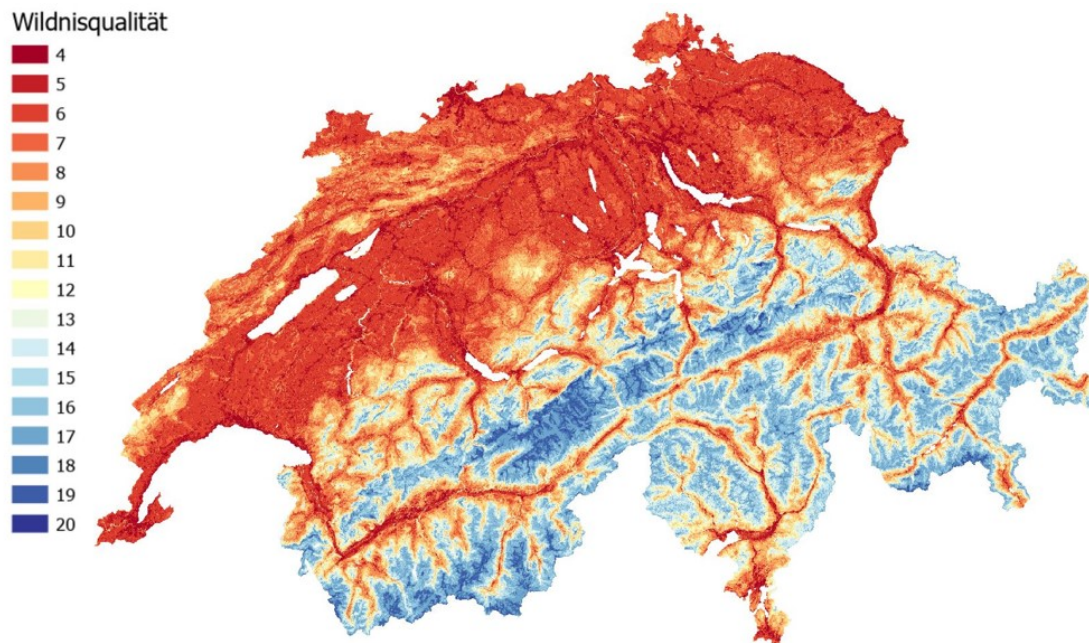


Figure 2.2: Wilderness quality in Switzerland based on the four criteria "naturalness", "human impact", "remoteness" and "roughness of topography", resulting from the study of Moos et al. (2019).

In figure 2.2 the expected wilderness potential in Switzerland was estimated based on the four criteria "naturalness", "human impact", "remoteness" and "roughness of topography". Blue color show where highest wilderness potential is expected. Those are mostly situated in the alps at high altitude with rough terrain and far from humans, mostly inhospitable and inaccessible places such as high mountain terrain.

2.3.1 Nature conservation in Switzerland

Other than parks and conservation organisations, research institutions such as the Swiss Landscape Monitoring framework (LABES), the Forum Landscape, Alps, Parks (FoLAP) or the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL) are specialized in monitoring scientific research of nature in Switzerland. Further, organisations, foundations or associations such as "pronatura", "naturschutz.ch", "mountainwilderness", "Network Swiss Parks", "Stiftung Landschaftsschutz Schweiz" and least but not last the "Swiss Alpin Club" are some of the most engaged groups among many others. Different labels, such as "Smaragd regions" are among the European protection goals. In Switzerland the "Berner Convention" describes 37

different "Smaragd" regions with their main protection goals of faunistic or floristic species. Further, "ValPar.CH" aims to contribute to the common understanding and estimation, of biodiversity losses within parks, between scientific and governance instances (Reynard et al., 2021).

Historically, the European sight on conservation developed towards gardening based on perceptions of a "beautiful" nature. These perceptions were not necessarily based on what was most natural. Still today, many recreational parks, mainly around large agglomerations of humans are far away from natural status and represent an idealized representation of nature which is often regarded as beautiful (Hall, 2005).

But, different levels of wilderness are defined and recognized by authorities around Europe. Such as secondary wilderness areas, which rely on the restoration idea of rewilding. Although compromises are inevitable concerning fragmentation and quality of secondary wilderness areas, an advantage on the long term is still most certain for maintaining endangered species (Brackhane et al., 2021). In Germany for instance Brackhane et al. (2021) and Kun et al. (2015) talk about the implementation of the 2% goal for secondary wilderness, where the aim is to establish protected secondary wilderness on at least 2% of Germany's surface.

2.3.2 Röstigraben and Nature Conservation

There are mostly prejudices about the differences between German-speaking and French-speaking Switzerland, as the term "Röstigraben" indicates. The term Röstigraben is specifically used to describe this trench in language and ideology that lies in-between them.

However, in general there are multiple examples where French-speaking and German-speaking Switzerland differ from each other. Lang (2011) and Bühlmann et al. (2013) for instance analyse these cultural differences concerning political values where the French-speaking part is considered more liberal and German-speaking Switzerland is considered rather radical.

Political tendencies are also integral parts of the wilderness debate. Whereas 20% to 30% of French-speaking population express availability to engage in environment protection activities, the percentage was found to be slightly higher among the German-speaking population (Knoepfel et al., 2010, p. 47).

As far as concerning wilderness around the Röstigraben, not many studies have been

analyzing differentiated perceptions.

2.4 Importance of Wilderness

Wilderness, undisturbed by humans is able to fulfill important ecosystem services, such as maintaining endangered species, thus in turn restoring productivity of the land (Jordan, 2022, p. 332). Study Ecosystem Engineers (UniL) justifies the importance of key species of the fauna and flora that can be reintroduces in our ecosystems, to enhance biodiversity of ecosystems (Losapio et al., 2022). Liqueste et al. (2015) and European Wilderness Society (2021) investigates ecosystem services and identifies core habitats and corridors that connect them. Further, Oteros-Rozas et al. (2018), analyses the relation between cultural ecosystem services and landscape features.

Rewilding, comprising reforestation and restoring habitats are useful strategies applied to reduce biodiversity loss (Prober et al., 2019) (Di Marco et al., 2019).

Wilderness is important in Switzerland also for its vanguard role towards other countries (Moos et al., 2019). Switzerland has an increasing number of parks, therefore conservation agencies will need an increasing acceptance of local communities towards wilderness and reforested areas (Soliva and Hunziker, 2009). Without the support of the community members, there would be no park (Schweizer Pärke, 2019b). A study including perception towards rewilding in the Biosphere Entlebuch, one of Switzerland's oldest and largest regional nature park, concludes that shifting decision making from the cantons to smaller regions would allow the involved communities to have a larger impact towards more wilderness areas (Bauer et al., 2009).

2.5 Relevance of Wilderness Perception

Perception of wilderness by the population of the different regions and cultures is important for the parks for different reasons, as has been exposed by different researches for landscape perceptions. Facilitating collaboration between local communities and governance is fundamental in order to achieve biodiversity and climate goals (Fernández-Llamazares et al., 2020). With a bottom-up approach to describe landscapes, the way landscapes are described does better fit local needs (Derungs and Purves, 2016). Similarly, citizen involvement and future land-use policies are important approaches that challenge policy makers and planners, but participative

strategies for landscape protection is crucial (Scott, 2003), (Müller, 2001). Further, analysis of social media data (tags, location and image content), as well as citizen science approaches are also investigated (Wartmann et al., 2019).

To add into context the importance of rewilding, Perino et al. (2019) proposes that rewilding projects should consider needs and expectations of stakeholders. Thus, a structured approach would include estimates of the contributions of nature to people. Further, rewilding is often also a topic strongly involving the development of wilderness within parks. Questions about rewilding development and to which grade rewilding takes place, could also benefit from public opinion (Marris, 2013).

Perception and acceptance of new regional nature park projects among local population is shaped by numerous factors. It is therefore not directly possible to assume that the acceptance of a project could increase if a particular factor is changed (Toscan, 2007).

Raising awareness of the importance of wilderness in Switzerland among population is the most important requirement for its protection (Moos et al., 2019). Populations of potential national park regions are more sensitive to subjects linked to wilderness when they are exposed to it, not only because they live near or even within a regional park, but also because they fear to face some restrictions, for the sake of protected areas, for instance wilderness. Thus, regional nature parks with less restrictions are expected to get higher acceptance among locals. However, there are still active opponents (Wallner et al., 2007).

Finally, conducting surveys is a useful instrument for participatory planning. The smaller the scale and more concrete a landscape project, the more divergent are the judgements towards landscape issues and thus, the larger the need to perform population surveys and establish participative planning (Hunziker, 2012).

2.6 Research Gaps

To this date, there seem to be no study that compares the wilderness perception between the French and German-speaking part of Switzerland.

Nature, landscape nor wilderness perception between French- and German-speaking Switzerland has been particular matter of any study so far, despite evidence of differentiated nature perception between different cultures. Possibly, this could be

due to the geographical proximity of both regions. There are studies comparing different languages between countries, but in Switzerland, regions with different languages are small.

Most studies observing attitudes towards wilderness originate in North-America where wilderness has a longer tradition (Bauer and von Atzigen, 2019, p. 151).

Public opinion towards ecological restoration is among the top needed information, as Ghimire et al. (2015) observed in a survey of wilderness experts.

Additionally, in Switzerland the regional nature parks are relatively new political objects, therefore not many studies were made so far.

Chapter 3

Methods

This study is based on a quantitative approach based on an online survey, where participants (1) describe eight landscape photographs from two regional nature parks, (2) decide whether selected terms correspond to an image and (3) mark an area, where they expect particular wilderness. Focus group for the survey were people with potential affinity for the subject, such as environmentalist, geoscientists but persons with other background were also welcome. They should have at least French or German as mother language. The questioning of these people should give information about the perception of German and French speaking persons towards nature and wilderness, focusing on two selected regional nature parks. The survey was performed separately in German as well as in French. This allows to differentiate these two linguistic groups of Switzerland by their perception of nature and wilderness, and facilitates more precise descriptions in the native language of the participants.

3.1 Study Sites

For this study, two regional nature parks from different regions and different geological history have been selected. One is Chasseral Nature Park ("Parc régional Chasseral"), which is situated in the Jura mountains in the canton of Bern and Neuchâtel, and which is part of the "Swiss Parks Network" since 2012. The other park is Pfyn-Finges Nature Park ("Naturpark Pfyn-Finges"), located in the canton of Valais in the Alps, and is crossed by the Rhone river. Figure 3.1 shows the location of the two parks on a topographic map section of Switzerland.

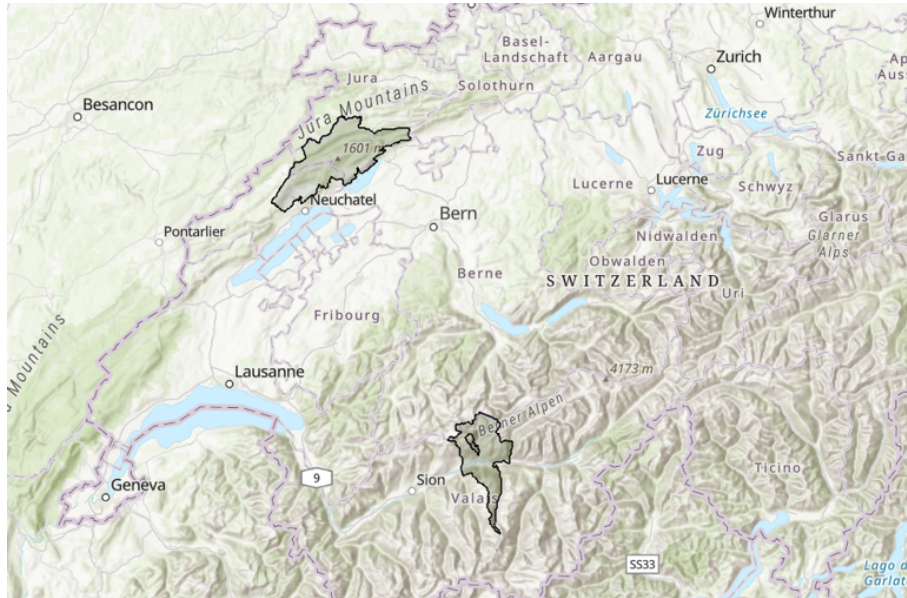


Figure 3.1: Swiss Topographic map with both selected natural regional parks of the area of research highlighted. Chasseral Nature Park is situated in the north-west of Switzerland and the Pfyng-Finges Nature Park in the south.

These two parks are different from each other not only in terms of geology but also represent the two main mountain chains of Switzerland with characteristic flora, fauna and landscapes. This makes it interesting to have perception feedback from both environments. Further, both parks are located at the French-German linguistic frontier. This should facilitate the recruitment of participants from both language regions with possible knowledge of at least one of these parks. In addition, Chasseral Nature Park is one of the largest park of Switzerland and Pfyng-Finges Nature Park has particular alpine landscapes of very high wilderness potential, such as high, steep mountains and glaciers, as visible in figure 2.2 from the study of Moos et al. (2019).

3.2 Data collection

During two field trips across Chasseral Nature Park and Pfyng-Finges Nature Park, equipped with a "Canon EOS 750D" camera, photographs with different features, showing diverse landscapes were taken. Eight photographs were then selected for the survey. The expeditions took place by bike on 6 June 2023 and 16 June 2022, two lightly cloudy days but overall mostly sunny. The goal was not only to take photos for the survey, but also to discover and sense the nature and the atmosphere

of the parks.

Recruiting participants was possible by spreading a link and a QR-code of the survey among geography and environmental Institutes within Universities of Switzerland, within personal networks, as well as through nature protection organisations such as "natureschutz.ch" through their social media accounts and their weekly newsletter.

The first four pictures shown in the survey are photographs from the Pfyn-Finges Nature Park, the pictures five to eight are from the Chasseral Nature Park.

Image number one, figure 3.2, shows the Illhorn and the Pfyn forest, which mostly consists of pines as well as oak trees and covers the western part of the Illgraben fan. The photograph was taken from Leuk Brentjong on the other side of the Rhone valley, with view to the southwest. This perspective gives an overview of the Pfyn forest, which also gives the name to the park. On the left of the forest the Illgraben is recognizable.

The second image, figure 3.3, shows the Illgraben one of the most active debris flow channel in the Alps. It is actively monitored and an alarm system is in place in order to alert the local residents in case of a dangerous event (Hürlimann et al., 2003).

The third image, figure 3.4, is taken close from the Gemmipass at the end of the Lämmeren alluvial plain with view at the Wildstrubel glacier in the background.

Image four, figure 3.5, displays a close view of the Rhone river with coarse gravel debris islands and the water meandering.

The next four pictures are photographs from Chasseral nature park.

Image five, figure 3.6, represents a pasture with a wooden stable and horses at Mont Soleil north of the Chasseral mountain on the second Jura ridge. In the background, next to some conifer and broadleaf trees there are four large wind turbines.

In the sixth image, figure 3.7, a typical dry stone wall is shown in front of a flourishing dry grassland and conifer trees in the background.

Image seven, figure 3.8, pictures high grass with white flowers (cottongrass), typical in bogs. It is the raised bog (Tourbière) of La Chaux-des-Breuleux with spruce trees of different ages.

The last image, figure 3.9, presents a pond surrounded by a large variety of different conifer trees. It shows the pond of "La Marnière."



Figure 3.2: Image 1. Pfyf forest and Illhorn.



Figure 3.3: Image 2. Dry Illgraben across the Pfyn forest.



Figure 3.4: Image 3. Lämmeren alluvial plain and Wildstrubel glacier.



Figure 3.5: Image 4. Wild Rhone.



Figure 3.6: Image 5. Meadow with horses and wind turbines at Mont Soleil.



Figure 3.7: Image 6. Dry wall and flourishing meadow with conifers.



Figure 3.8: Image 7. Raised bog of La Chaux-des-Breuleux with cottongrass.



Figure 3.9: Image 8. Pond "La marnière".

The images contain different landscape features such as mountain, valley, glacier, river, meadow, moor and pond landscapes and additionally some human features as well.

Figure 3.10 and 3.11 show the locations within the parks of each photo used in the survey. The selection of the photos was not primarily based on the location, but rather on the variety of features as described above and further four were selected for each park.

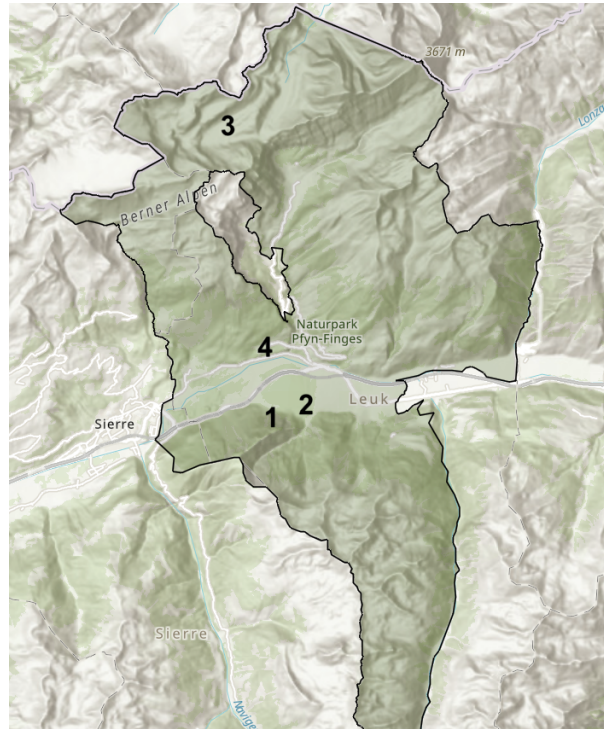


Figure 3.10: Location of Image 1 - 4 within Pfyn-Finges Nature Park.

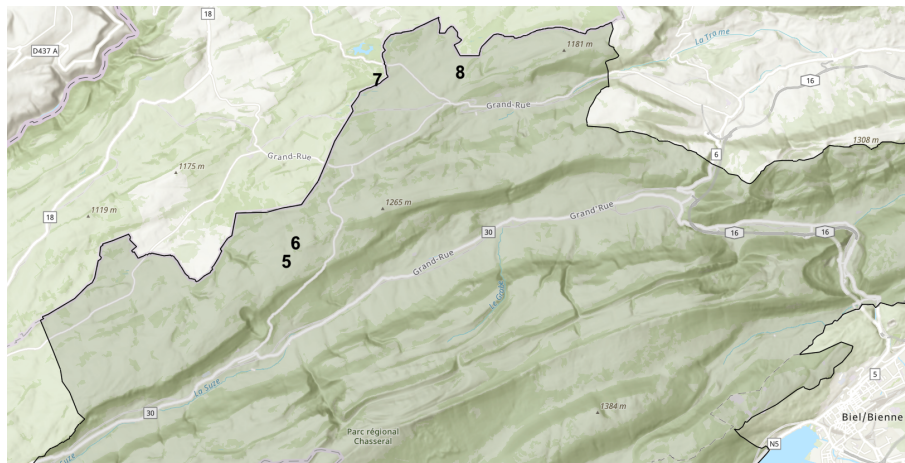


Figure 3.11: Location of Image 5 - 8 within Chasseral Nature Park.

Some reasons for these image choices are the following. They represent different typical features of each park, have various colours and brightness, different angles of

view and therefore offer a wide range of interpretation for participants to describe them. In terms of human activity or impact, the images show varying levels. From almost no impact to very obvious human constructions, such as the wind turbines. This could demonstrate whether perception of wilderness changes despite different pronounced anthropogenic impacts.

3.3 Survey Design

The online survey was created with survey123. Thereby the survey123 connect app based on excel proved to facilitate a more personalized setup.

The opening page of the survey introduces participants to the tasks and informs about the duration as well as how confidential personal data will be treated. The survey should take between five to ten minutes to complete. After reading the information and accepting the terms of use, on the second page participants answer basic personal questions, such as gender, date of birth, postal code, native languages, accomplished educations and knowledge of the two parks.

The first task of the survey then requires participants to describe the eight selected images with only one-word first and then in the next step with two more words. This is similar to a free-listing task in written form and it is comparable to the interviews performed in Wartmann et al. (2018), where hikers were interviewed in parks and were asked to describe photographs of landscapes.

The second task of the survey, requires the participants to evaluate if selected terms are more or less appropriate to a corresponding image. The terms should be scored along a range from one to ten, for less appropriate to more appropriate respectively. This is done for three randomly selected images out of the eight accordingly. Table 3.1 displays the selected terms, their translations and a study that inspired the choice of each term. There are more terms, that could be interesting to be asked to public opinion, but it was important to keep the survey short.

After the first task, where participants were free to list in total three terms that they would choose without further influence or information, the participants receive some inputs in the like of selected terms related to wilderness. They might understand that they are guided towards a more specific topic than before, as it gives them a closer view on the topic of wilderness without calling it by the name for now. By using a Likert scale with an even amount of selection possibilities, for instance

10 grading levels, it does not allow a neutral response. This forces participants to choose a preferred side.

German Term	French Term	English Term	Source
abgeschieden	éloigné	remote	(Moos et al., 2019)
friedlich	paisible	peaceful	(Wartmann et al., 2021)
Gefahr	danger	danger	(Höchtel et al., 2005)
unberührt	vierge	untouched/pristine	—
gepflegt	soigné	neat	(Hall, 2005)
Naturerbe	patrimoine naturel	patrimony	Borges et al. (2011)
Naturschutz	protection de la nature	nature conservation	(Netzwerk Schweizer Pärke, 2022)
Renaturierung	renaturalisation	restauration	(Marris, 2013)
Wildnis	nature sauvage	wilderness	—
ruhig	calme	tranquil	(Wartmann et al., 2019)

Table 3.1: 10 Selected terms to be evaluated by participants in German, French and English.

Finally, the last task of the survey uses a Public Participation Geographic Information System (PPGIS). Here, participants can draw a surface where they perceive, or where they expect areas of particular wilderness within one of these parks by drawing a polygon on a topographic map showing the two parks. Even if a participant does not know a park, a drawing is welcome, because knowledge of a park is expected to alter the perception of wilderness.

3.4 Data Processing

The answers from the first task of the survey were used to establish four lists of words. These represent the first answers with one-word only and the answers from the two-words responses, each list for German and French. Every word was classified after

described feature themes, inspired by the classification of Wartmann and Purves (2018). The feature classes used, are describing the following aspects: biophysical, cultural, perceptual, sense of place, ecological processes, toponyms, other, and not applicable (NA).

Table 3.2 shows the selected features and the coding scheme used, with some examples for each category.

Feature	Abbreviation	Examples
Biophysical	bp	mountain, riverbed, meadow, valley
Process	pro	erosion, biodiversity, snow-melt, cloudy
Cultural	cul	hiking, farmland, wind turbine, restoration
Sense of place	pl	beautiful, calming, peaceful, wild
Perceptual	per	green, dirty, wet, sparse
Toponymes	topo	jura, illgraben, alps, mont-soleil
Other	o	land, landscape, nature, high

Table 3.2: Features and coding scheme for the classification of the free-listing tasks.

Words classified as biophysical features contain terms relating to geology, biology, landforms and landcover. Process features describe different natural processes that are in movement or developing through time such as geological and ecological processes or weather, but also contains terms related to concepts of conservation, restoration and nature protection actions. As cultural feature, every description corresponding to human actions, such as activities, constructions and land use, including cultivated fields and livestock were counted. Sense of place, as described in chapter 2.2, correspond to every emotional relation, such as feelings, memories to a place or landscape, while perceptual feature is used to group all answers describing colors, dimensions and other states describing the image such as neatness or simple descriptions without emotional bounding to the place itself. Toponymes describe names of places and finally, every word placed in the "other" category, are mostly terms too broad to fit in only one of the above features, or they are very particular and would request their own feature.

Here, some different classifications are combined. For instance Olafsson et al. (2022) has more differentiated classifications with a distinguished feature for ecological processes, including weather. Here, it was included to the process feature. Further, cultural feature, considered anthropological themes similar to Stephenson (2008)

was adopted. But here, due to low numbers of responses in this category, human impact and human activities were grouped. Overall also inspired by Wartmann et al. (2018), the features chosen for the coding scheme should reflect various perception categories of the evaluated landscapes, that are contained in the data.

Next, the words were classified grammatically by nouns, proper nouns, toponyms, adjectives, verbs, pronouns, adverbs and not applicable (NA), as shown in figure 3.3. This is similar to the study of Purves et al. (2011).

Part of speech	Abbreviation	Examples
Nouns	n	mountain, river
Proper nouns	pn	alp-valley, jura-grassland
Toponyms	topo	illgraben, alps
Adjectives	a	green, calm
Verbs	v	hiking, swimming
Pronouns	pron	no, many
Adverbs	adv	very, like
NA	NA	wow

Table 3.3: Part of speech categories and coding scheme for the classification of the free-listing tasks.

Further, the lists for the two-words answers were also labelled by dependence of the two words to each other. This helps to show whether the both words are related to each other or complementing, or if they are two different descriptions with no relation.

There is also an additional classification to show if any word is composed. This is mainly important for the differentiation of French and German words, as the German language allows more word compositions, whereas French often needs several words to describe the same thing.

Data processing comprised mainly harmonization of the created word lists. The lists were filtered in order to eliminate or correct stop words, adjust word spacing, punctuation and spelling mistakes as well as transforming all upper case words into lower case. The stop list contained articles, prepositions and conjunctions. These were eliminated as well as extra spacing, points and exclamation points. Hyphens were only kept for proper nouns, where they are part of the correct spelling, such

as "Mont-Soleil" or "V-Tal". Note, singular and plural words were not harmonized and thus left as different words.

To analyze the data, different procedures were performed for each language separately. First, for each French and German, then for each image one list with one-word only answers and one list with two-words answers were compared. Thus, linguistic differences are shown visually with word clouds and by the feature and part of speech classes for each image. Note, word clouds were generated for each image by "survey123" based on raw data. For instance, this means that those include stop words and do not differentiate between upper and lower case. They were included in the study as an additional visual tool to differentiate the two languages.

Later, one-word and two-words lists were combined for each language to sum all answers of each language together and to use all three words per participant in one pot.

To display the variance, Chi²-test was applied to the statistics of the features for each image separately. Statistical analysis and data processing, as well as plotting was performed in R Team et al. (2013) and Microsoft Excel Microsoft Corporation (2018).

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Chapter 4

Results

Data and Results from the online survey are presented in the same order as the structure of the survey. For a first overview of the participants, statistics from the introductory personal answers are shown. Then, results from the image description task are displayed, with graphics helping to get an overview of the differentiated data and comparing both language groups for each image, as well as frequencies of top words. The first task has turned out to give the largest output of data with multiple possibilities to analyze cross linguistic differences. Therefore the focus here is based on the large words data bank obtained from the first task. For the second task, for each language the average scores for each term is compared. Finally, the results from the PPGIS task is presented briefly.

4.1 Demographic Information

In total 146 person participated in the online survey. 117 (80%) with native language German and 29 (20%) with native language French, as can be seen in table 4.1. Only two participants specified to have both German and French as mother language. More participants of the French-speaking group were older than 40 years, one third, versus one fifth of German participants. This explains, why the mean age is closer to the median age within the German participants. Another notable difference is the gender distribution, as within the French group female and male are almost equal, the German group consists of more female. Park knowledge is unevenly distributed among both groups. A larger part of French-speaking participants, almost half of them, have been to at least one of the parks, whereas the majority of German

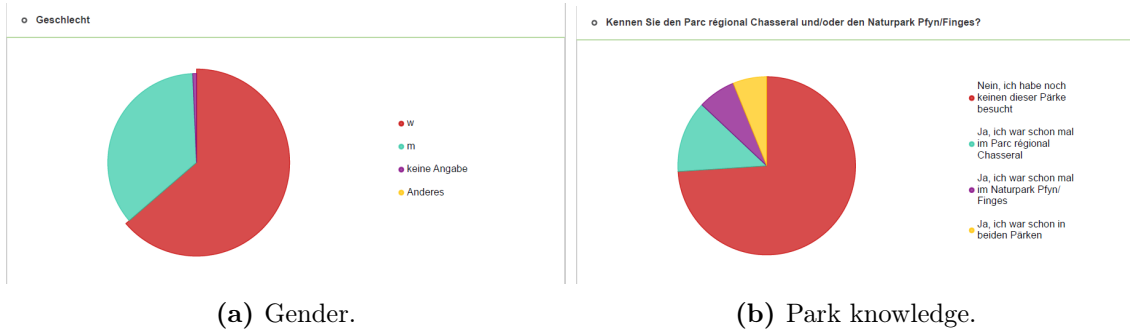


Figure 4.1: Overall participants statistics for (a) gender distribution, with red for feminine and green for masculine participants and purple for no precision, and (b) knowledge of the park, where red represent the portion of participants that do not know any of the two parks, green the knowledge of Chasseral Nature Park, purple the knowledge of Pfyn-Finges Nature Park and yellow the knowledge of both parks.

participants do not know the parks. The total distribution of gender and park knowledge is shown in figure 4.1.

	German-speaking	French-speaking
Total: 146	117	29
Gender (f/m)	79/37 (+1)	15/14
Age (mean/median) [y]	30/27	37/31
Park knowledge (both/Pf/Ch/none)	6/4/15/92	3/6/4/16
Education (Uni/other)	74/43	15/14

Table 4.1: Personal information of the participants. First row: Total amount of participants for each native language. Second row: Gender information (male: m, female: f, plus one without indication). Third row: mean age and median age in years (y). Fourth row: Knowledge of both parks, only Pfyn-Finges Nature Park, only Chasseral Nature Park and none of these two parks known. Fifth row: Education at university level or other education.

4.2 Image Description

As a first output, a visual impression with word clouds displays an overview of the word frequencies. The larger a word, the higher its occurrence in the answers. By distinguishing each language and looking separately at the first words in mind versus two other more words, see chapter 3.3. Figure 4.2 to 4.9 present all eight images from the survey and the four corresponding word clouds. On top, word clouds filtered for the German answers, beneath for French. On the left, answers based

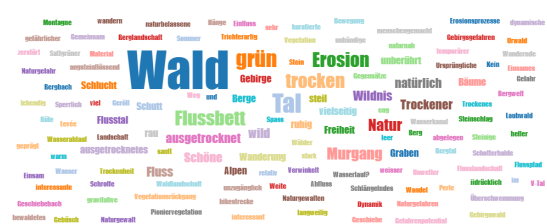
on one-word answers contain notably more spaces. Evidently, these word clouds are based on half the words than the two-words answers, but here, there are also more co-occurrences. This minimizes the amount of different words represented, as participants have higher concordance when describing the same images with only one word. Based on the visual impression, this is true for both languages. Two-words answers show smaller size differences of words especially for German with much more participants, where most word clouds are saturated due to the large amount of different answers. The majority of the according word clouds are similar for both language. However, there are some differences for some images. If focusing on the most frequent words, we get some first indices of linguistic differences. For some images the most frequent words are different for both languages. It is even clearer when comparing the languages for one-word and two-words answers per image. For example figure 4.7 has four different top words. In figure 4.8 the term "Teich" ("pond") occur much less than the corresponding word "étang" in French. It appears that in German "See" ("lake") is used more often than "pond". These word clouds also allow to notice the longer words that are used in German answers, such as "Waldsee", "Waldrand", "Blumenwiese", "Steinmauer" or "Schmelzwasser". Those are examples of composed words, which are often found in German, whereas in French it is very rare.



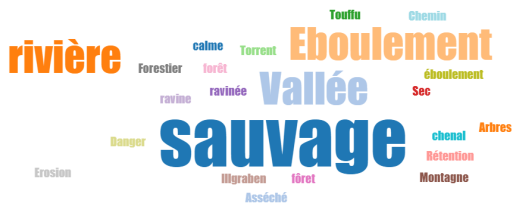
Figure 4.2: Wordclouds for image 1 with (a) one-word German, (b) two-words German, (c) one-word French and (d) two-words French.



(a) One-word German.



(b) Two-words German.



(c) One-word French.



(d) two-words French.

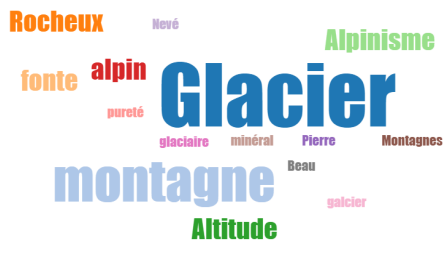
Figure 4.3: Wordclouds for image 2 with (a) one-word German, (b) two-words German, (c) one-word French and (d) two-words French.



(a) One-word German.



(b) Two-words German.



(c) One-word French.



(d) two-words French.

Figure 4.4: Wordclouds for image 3 with (a) one-word German, (b) two-words German, (c) one-word French and (d) two-words French.



(a) One-word German.

(b) Two-words German.



(c) One-word French.



(d) two-words French.

Figure 4.7: Wordclouds for image 6 with (a) one-word German, (b) two-words German, (c) one-word French and (d) two-words French.



(a) One-word German.



(b) Two-words German.



(c) One-word French.



(d) two-words French.

Figure 4.8: Wordclouds for image 7 with (a) one-word German, (b) two-words German, (c) one-word French and (d) two-words French.

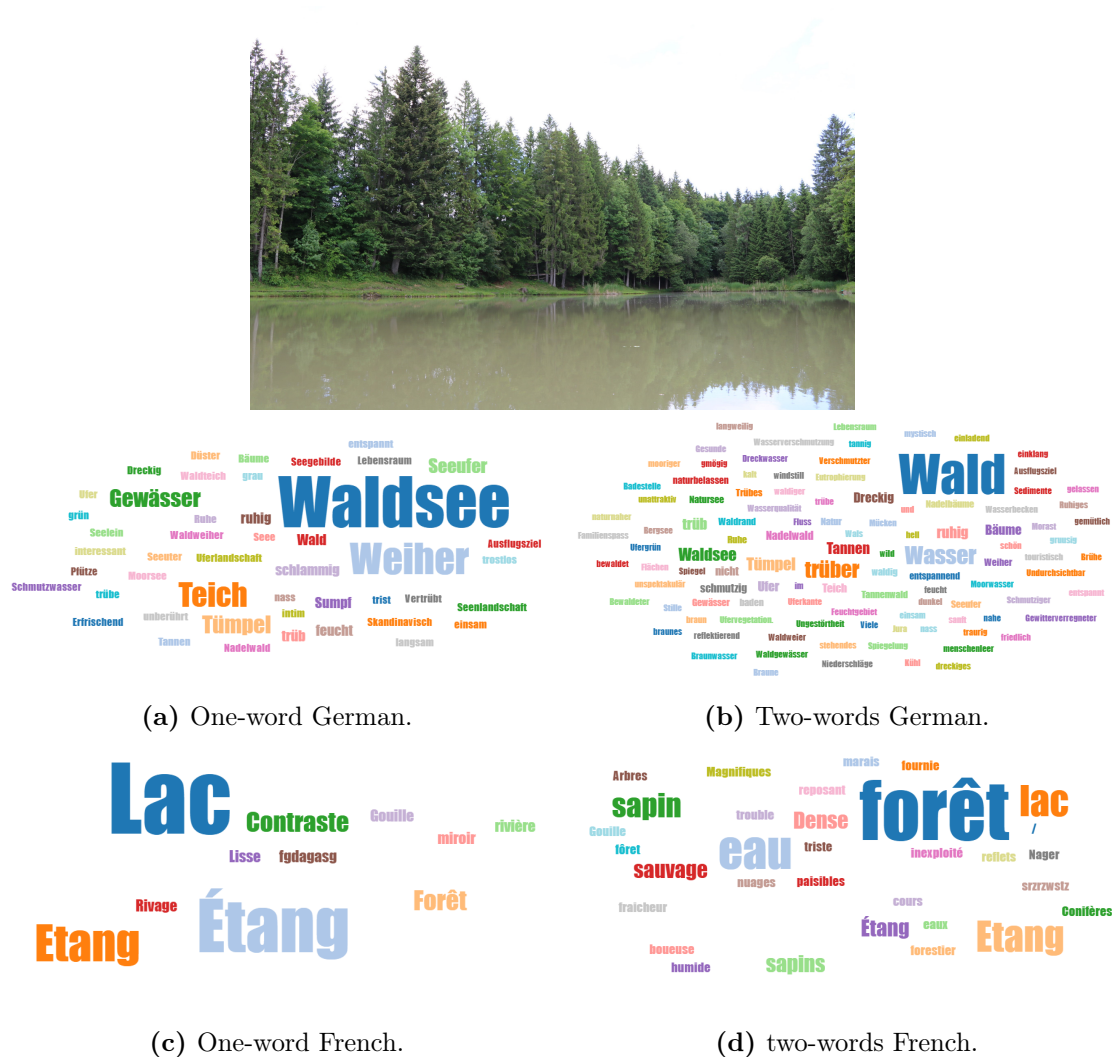


Figure 4.9: Wordclouds for image 8 with (a) one-word German, (b) two-words German, (c) one-word French and (d) two-words French.

4.2.1 Word Frequencies

Yet alone with a look at the word clouds, interesting data is visible. So, analyzing the word frequencies more precisely provides more in-depths comprehension of the data. Data mentioned from here on was analyzed after data harmonization. It provides a condensation of the words, as it brings together words that would otherwise be considered as different words. Looking at all answers together for each language separately and ranking the words after their frequencies, helps analysing the results. For instance, 20.6% of German answers against 24.1% of French answers were unique terms. This result was not expected. As more words can be created in German with many word composition possibilities, a higher rate of single words in German

was expected. Figure 4.10 compares the distribution of word frequencies for each language. Note how much higher the frequency of the first most frequent word is. Though, mind the logarithmic x-axis that allows a better visualization. Keep in mind that the smaller amount of words in French means that words occurring only once, make a larger part of the French answers than the part of singular words of German words for German. This explains why the French curve ends on higher percentage values than the German curve although the minimal amount of words recorded is "one" for both languages. However, this effect can be neglected for more frequent words on the left side of the curve, precisely where the difference is largest between both languages.

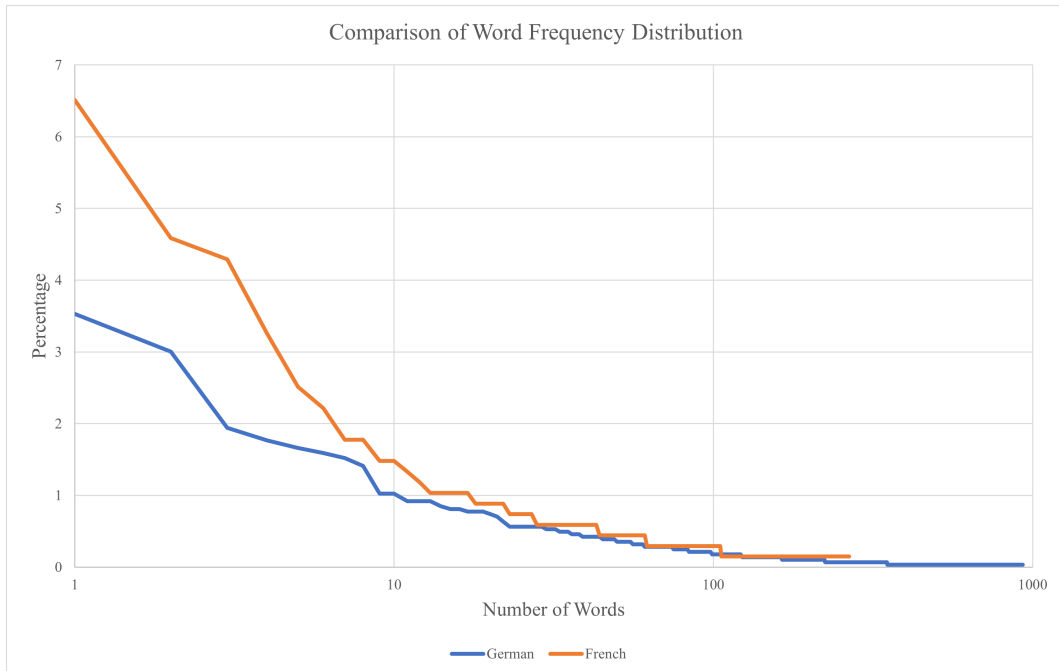


Figure 4.10: Comparison of word frequency distribution for both languages.

4.2.2 Analyzing Perception Features

Next, for each image the occurrence of different perception features are illustrated in the following plots, figure 4.11 to 4.18. The graphs show the proportion for each language and feature in percentage in order to compare them related to the number of answers per language. Clearly, words corresponding to the biophysical feature were mentioned the most over the hole task one, making up to half or even two third of the answers for some images. Overall French and German answers mostly have very strong correlation, over 0.88 for all images, see table 4.2. There

are some differences between the images though. For instance, images five and six show significant higher values for cultural features, which makes sense considering the obvious human constructions contained in them, wind turbines and dry stone wall respectively. A notable difference throughout most images is the fact that words belonging to the feature of perception and sense of place are mentioned more often in German. Thereby, image two and six have values around three times higher for the sense of place feature in German compared to French. On the contrary, except for image seven, biophysical feature is higher for the French group.

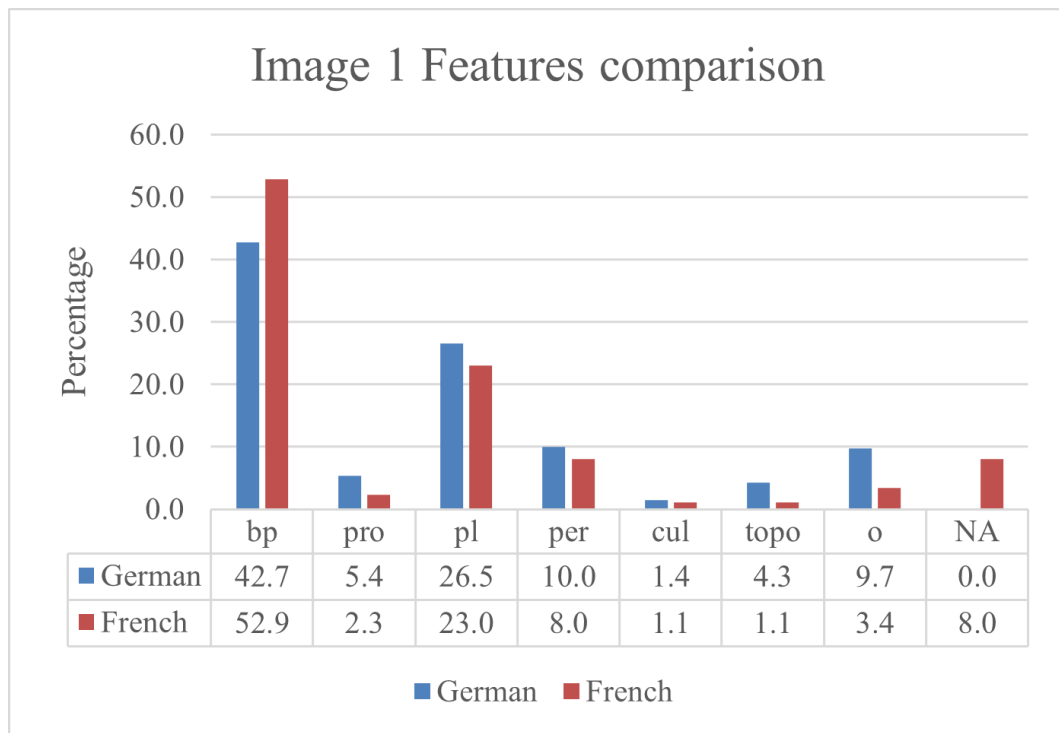


Figure 4.11: Features comparison for both languages for image one (Pfyn forest and Illhorn).

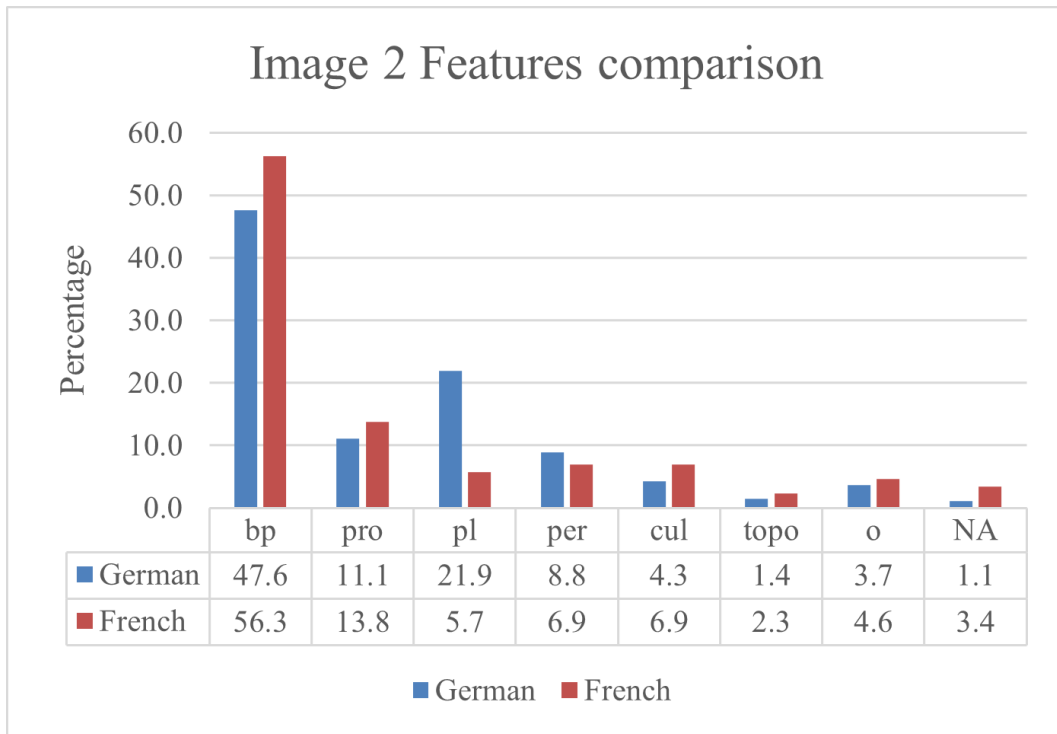


Figure 4.12: Features comparison for both languages for image two (Illgraben).

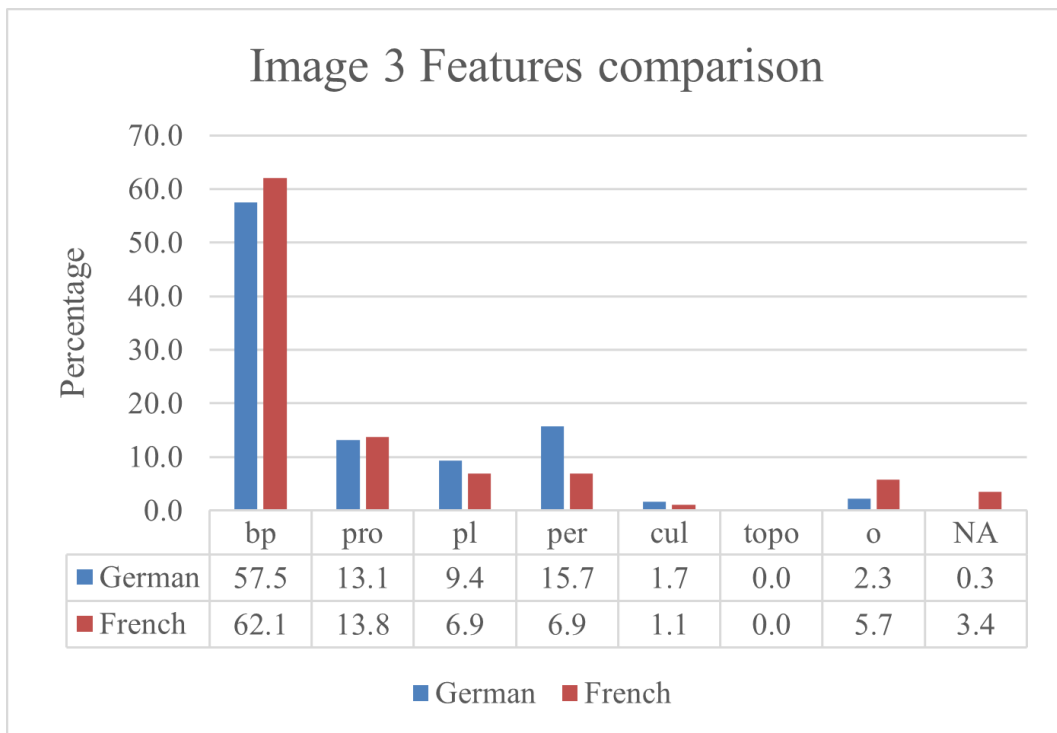


Figure 4.13: Features comparison for both languages for image three (Wildstrubel glacier).

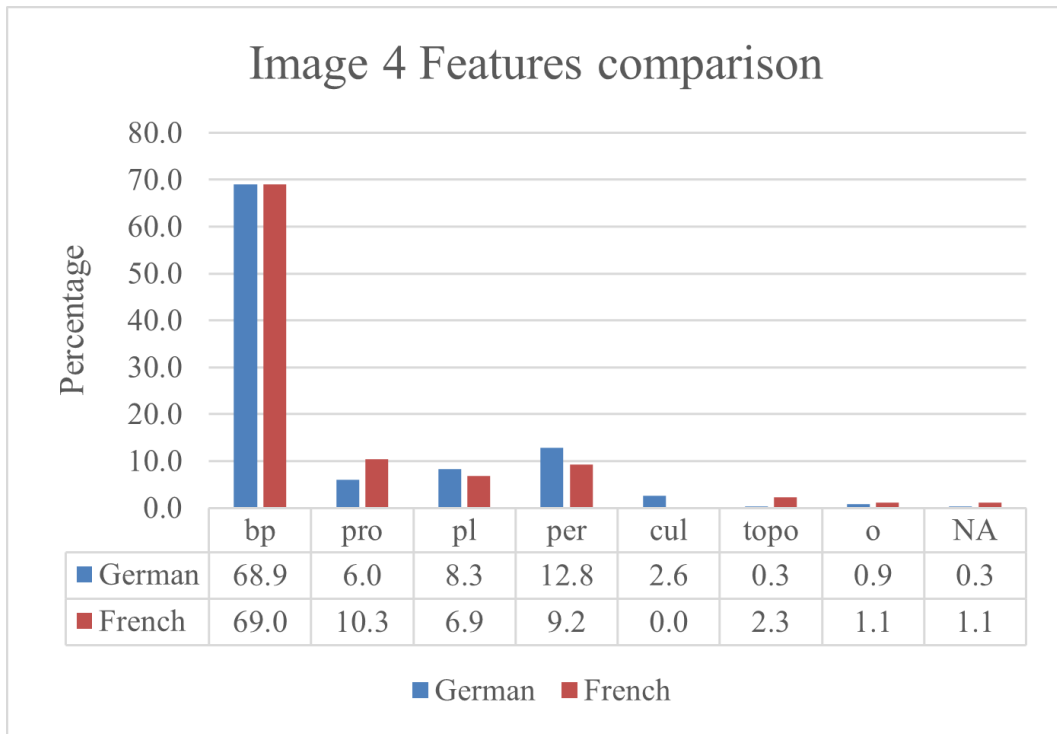


Figure 4.14: Features comparison for both languages for image four (Rhine).

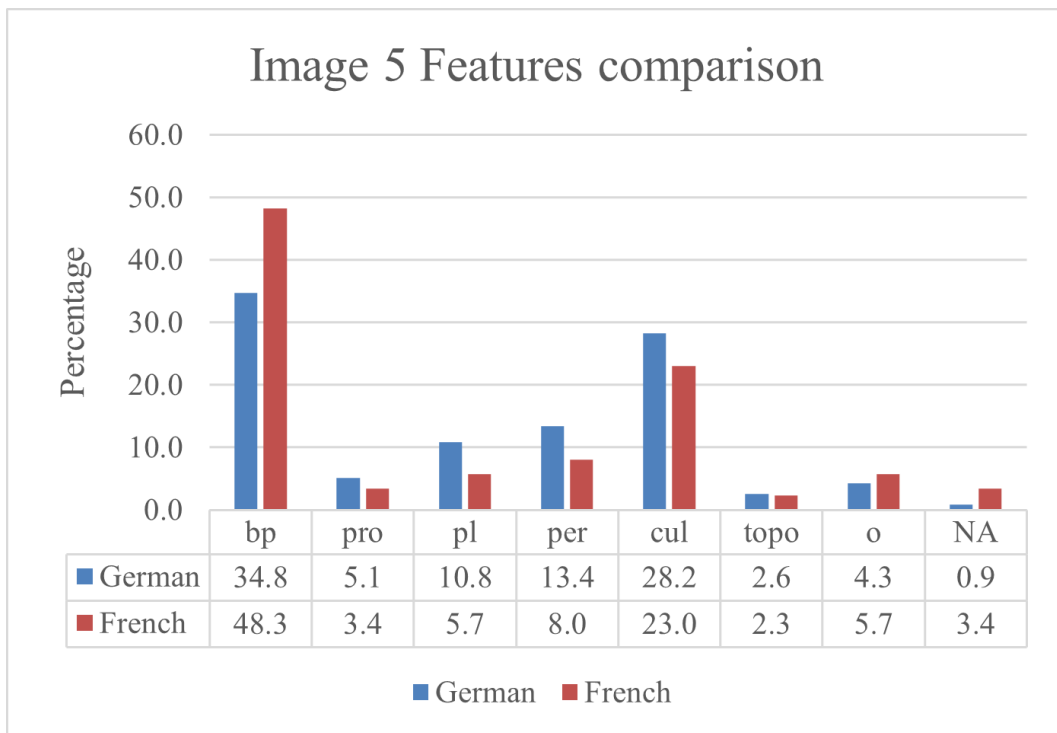


Figure 4.15: Features comparison for both languages for image five (pasture with horses and wind turbines in the background).

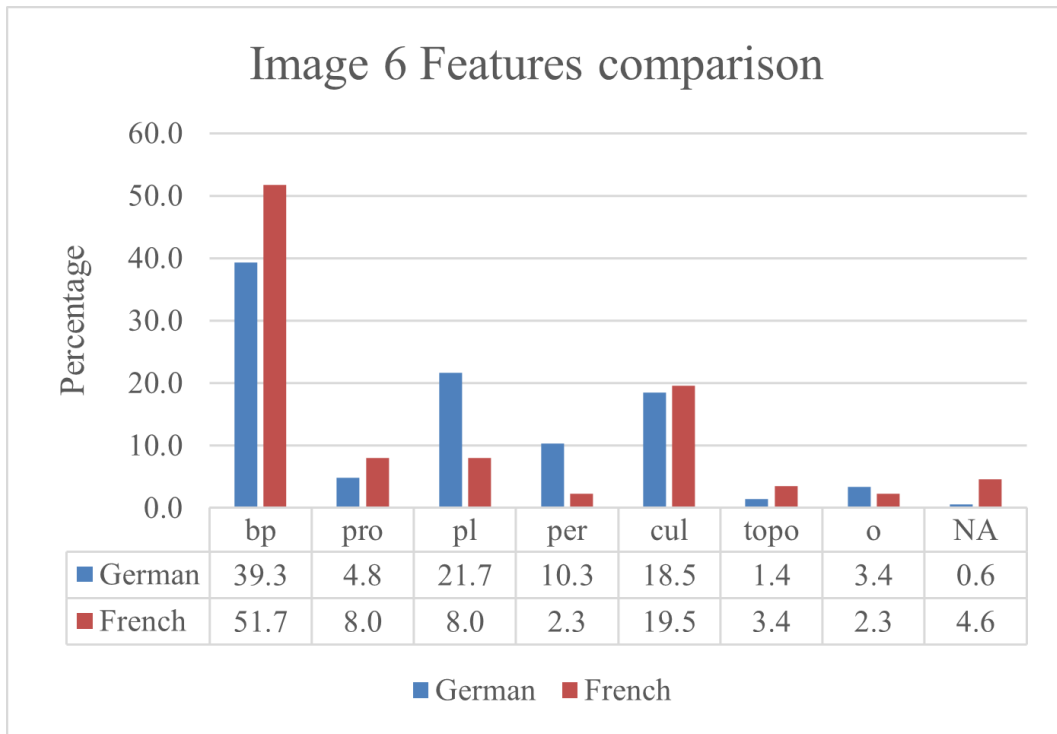


Figure 4.16: Features comparison for both languages for image six (flowery meadow with a dry stone).

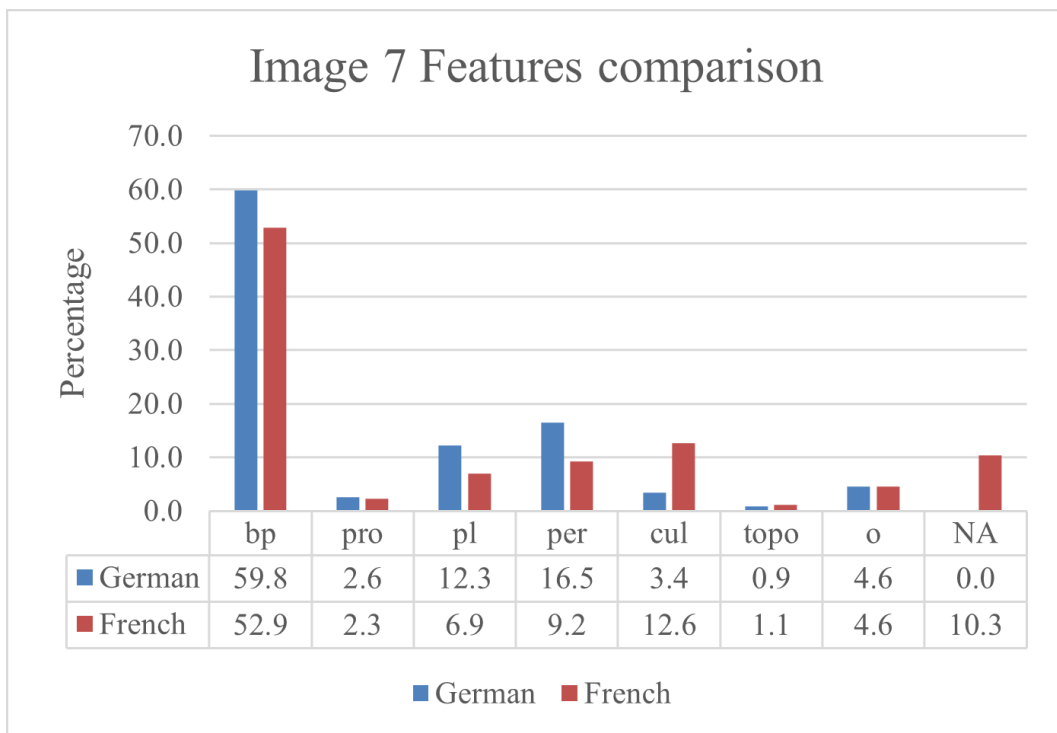


Figure 4.17: Features comparison for both languages for image seven (raised bog).

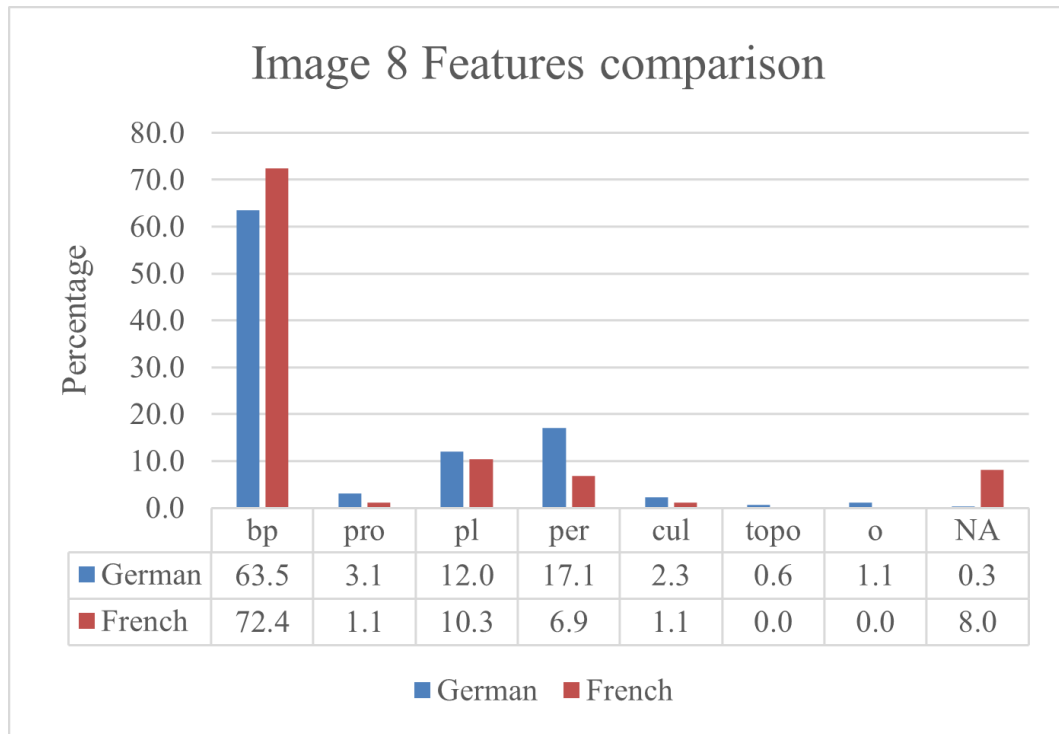


Figure 4.18: Features comparison for both languages for image eight (pond).

In order to test German and French for statistical significance, the absolute values of the tables from the features occurrences at the bottom of each feature plots are used as contingency tables and the expected frequencies are derived from them. As visible there, some samples are very small and in fact every table of the expected frequencies contain values below five, so chi-square test can not be used. So, Fisher's exact test is preferred to analyze the dependency of small samples McCrum-Gardner (2008). That way, German and French can be tested upon independence, as shown in table 4.2.

Image Number	p-value
1	7.396e-05
2	0.0077
3	0.0248
4	0.1347
5	0.1118
6	0.0003
7	2.116e-07
8	0.0004

Table 4.2: Fisher’s exact test for each image to test German and French for independence rounded to two decimals.

With the output of Fisher’s exact test we see that most p-values are smaller than the significance level at $\alpha=0.05$, therefore the null-hypothesis can be rejected. However image four and five have p-values higher than the significance level, thus the null hypothesis can not be rejected and it can not be affirmed that there is no relation between French and German. If looking at the features occurrences of image 4 in figure 4.14, it is obvious that the results for both languages are very similar for each feature. On the other hand for image 5 in figure 4.15, there are notable differences in the languages between the features. The test outputs are probably unstable due to low data and therefore have to be taken cautiously.

In addition, similar to the plots of the landscape features for the part of speech, the languages are compared for each image. As all plot are very similar, with almost entirely nouns and adjectives and with similar distributions among the images. For every image the pattern is similar with slightly more nouns in French and the opposite for adjectives. Thereby, for every image, nouns dominated with proportions around 60 and 80 %. For these reasons the plots of these images are not included here, but can be found in the appendix.

4.2.3 Analyzing Most fequent Words

As observed in figure 4.10, large differences are observed among the top frequent words of each language. In order to compare the different answers, the top 20 of all words generated from the free-listing task is shown in table 4.3. Here, not only both one-word and two-words lists were considered together, but also all words from all

images. In other words, all top French and all top German words are compared.

All words G	f	All words F	f	Translation G	Translation F	Rank
wald	100	prairie	44	forest	meadow	1
wiese	85	montagne	31	meadow	mountain	2
fluss	55	forêt	26	river	forest	3
wasser	50	rivière	22	water	river	4
see	47	étang	17	lake	pond	5
berge	45	eau	14	mountains	water	6
grün	43	glacier	12	green	glacier	7
bäume	40	lac	12	trees	lake	8
gletscher	29	montagnes	10	glacier	mountains	9
natur	29	nature	8	nature	nature	10
kalt	26	fonte	7	cold	melt	11
schön	26	mur	7	beautiful	wall	12
wild	26	paysage	7	wild	landscape	13
blumenwiese	24	torrent	7	flower meadow	torrent	14
tal	23	arbres	6	valley	trees	15
waldrand	23	champ	6	forest edge	field	16
landschaft	22	éolienne	6	landscape	windmill	17
ruhig	22	fleurs	6	tranquil/quiet	flowers	18
schmelzwasser	22	sapin	6	meltwater	fir	19
tannen	21	sapins	6	firs	firs	20

Table 4.3: Top 20 words over all for (one-word and two-words answers together) for German (G) on the left and French (F) in the middle with the according frequencies (f). The English translation with the rank is on the right side.

When looking at the top three words, there are large differences in occurrence frequencies. "Forest" ranked first in German, is almost twice as frequent than the third word "river". In French, the difference in occurrence between the first and third word is also true but for other words. Here, "forest" is only third and the top word is "meadow". From the top tens, only two words are not present in the top twenty of the other language, namely "green" in German and "pond" in French, found further down in the list of the other Language. All other top ten words occur at least in both top twenties. This gives a first impression of a solid concordance in the most frequent word chosen in both languages. As mentioned before, singular and plural were not consolidated on purpose when harmonizing the data. The

idea is to have the least intrusive data manipulation, therefore changing for example "mountains" to "mountain" and considering them as the same would not suit a conservative use of data harmonization. When looking at the top three words, there are large differences in occurrence frequencies. "Forest" ranked first in German is almost twice as frequent than the third word "river". In French, the difference in occurrence between the first and third word is also true but for other words. Here, "forest" is only third and the top word is "meadow". Maybe "meadow" is less frequent in German because "wiese", "meadow", is probably also often described as "weide", "pasture" and therefore this description is split into these two terms. Another explanation might be the rather high frequencies of related words in German, such as "blumenwiese", "wiesenlandschaft" and "naturwiese", in English "flower meadow", "meadow lanscape" and "natural meadow" occurred 24, eight and five times respectively. As mentioned before, these are typical composed words that are found in German that allow more precise descriptions with only one word. Further, the plural form of "meadow" was mentioned eight times. In French however, no other related term was used than "meadow", except the plural "pasture". The differentiation of the last might happen more distinctly in French. These reasons explain why "meadow" occurs more frequently in French and shows how German description uses composed words.

4.2.4 Cross-Linguistic Co-Occurrence Comparison

A final cross-linguistic comparison was performed with data from the first task, here also based on all words for each language separately. Figure 4.19 displays this visual comparison. The dots indicate the frequency of a given word for each language according to its coordinates. Additionally, some of them are written down to visualize the results. Note that not all words are noted for readability reasons on the plot and also, it only contains data for the co-occurrences. Which means, words occurring only in one language, that would lay on the x or y axis are not included.

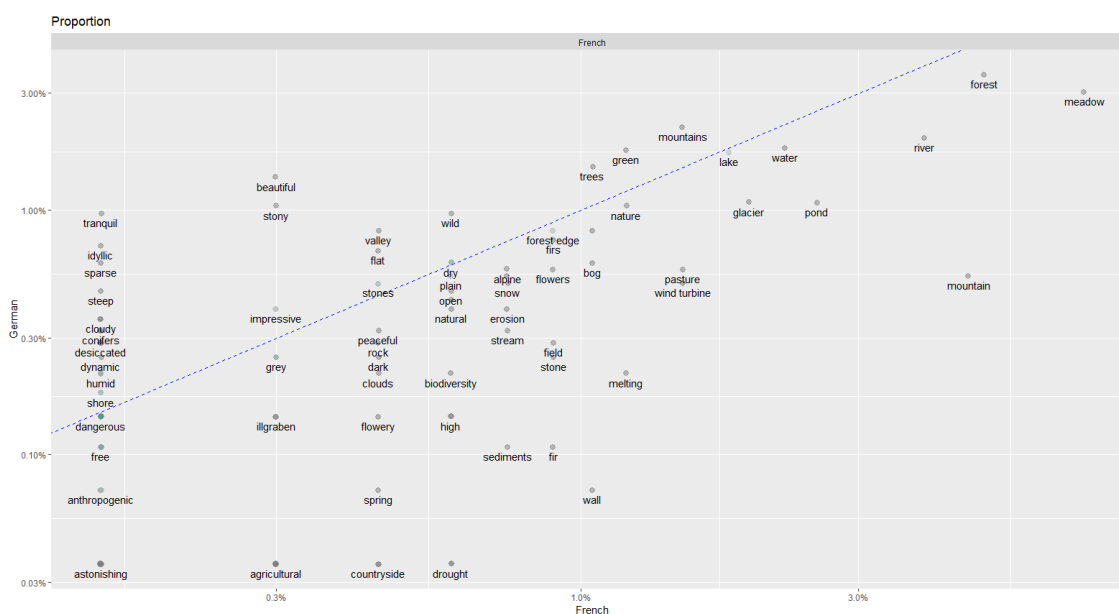


Figure 4.19: Cross-linguistic comparison of word proportion using German as a reference in the y-axis and French in the x-axis. Note the logarithmic scale.

Prior to this cross-linguistic comparison all words were translated in English. Along the y-axis the proportion of German words are opposed to the French words along the x-axis. The blue dotted line shows the $x=y$ line, which means, words on that line are equally frequent in both languages. Such examples are "lake", "forest edge" or "dry". The most frequent words, familiar from table 4.3, can be found on the top right of the plot, which means they are very frequent in both languages. This matches the prior findings of co-occurrences within the most frequent words. Indeed, as stated before, almost all words from each top ten can be found within the top 20 words of the other language. Interestingly, here we can also have a good look at words that are used differently between both languages. This means, the farther away from the dotted line a word, the more distinct it is used between French and German. Hereby, words over the $x=y$ line are more frequent in German, whereas words under it are more frequent in French. "Mountains" and "wall" for instance are used much more in French, in contrast "beautiful", "stony" and many other on the far left hand of the graph are most frequent in German. The later are words occurring only once in French that are frequently used from the German-speaking participants such as, "tranquil" or "idyllic" to name the most distinct of them. Both, as well as "beautiful", are words categorised as features of the sense of place and there are more in this region, confirming the findings from the features plot, where sense of place was observed more often among German speakers.

On the other hand, some results are intriguing, such as the differentiated use of "mountain" in the singular and "mountains" in the plural form. French speakers apparently used the singular form much more frequently. The plural on the other hand occurring more often among German answers, but only by a small margin.

Overall, one can observe a higher density of points beneath the blue line, indicating the tendency of french words to be dominant among more frequent answers when looking at words that occurred at least once in each language.

When searching for some specific words related to wilderness in the data, a slightly different observation can be made. As can be seen in table 4.4, terms considered as linked closely to wilderness or the wildness concept are similarly sparse in both languages, when describing landscape of varying wilderness potential and with no indication of wilderness terms.

English Term	Occurrence (G)	[%]	Occurrence (F)	[%]
wild	27	0.96	4	0.60
wilderness	6	0.21	0	0
untouched/pristine	7	0.25	0	0
peaceful	12	0.43	4	0.6
danger	7	0.25	2	0.3
unviolable	0	0	1	0.15

Table 4.4: Some interesting regrouped terms found in the data that are related to wilderness and their frequencies by means of occurrence and percentage by language.

This short list regroupes some related words. Some terms such as "danger", include for example, "danger", "dangerous", "nature danger". Else, "peaceful" and "peace" are combined. It gives an indication of potential missed observation when separating each of these words by its exact spelling. It also gives indication of the poor mention of such terms. Further, comparing the occurrence difference here would require higher occurrence numbers.

4.3 Scores for Suitable Terms

As mentioned at the beginning of this chapter, as the data from the first task revealed itself to be rich, most analyses concentrate on it. Still, for the second task the mean values of the given scores are extracted in each language for each proposed term.

Whereas higher scores mean that the participants perceived the term to correspond better to an image. Further here, the parks can be looked at separately.

	éloigné	paisible	danger	vierge	soignée	patrimoine naturelle	protection de la nature	renaturation	nature sauvage	calme
French Term:										
German Term:	Abgeschiedenheit	friedlich	Gefahr	unberührt	gepflegt	Naturerbe	Naturschutz	Renaturierung	Wildnis	ruhig
English Term:	remote	peaceful	danger	untouched / pristine	neatly	natural patrimony	nature conservation	restoration / renaturing	wilderness	tranquil
Overall F:	6.34	6.77	5.49	4.82	5.10	6.82	6.69	5.55	6.313	6.77
Overall D:	6.75	6.97	4.09	5.84	4.61	6.30	6.17	4.53	6.10	6.98
French Pfyn:	7.53	4.64	7.49	6.59	3.62	8.35	6.95	5.31	8.39	5.23
German Pfyn:	7.81	6.03	5.87	7.49	3.02	7.29	6.15	4.14	7.98	6.01
French Chasseral:	5.15	8.90	3.50	3.06	6.58	5.66	6.43	5.80	4.24	8.31
German Chasseral:	5.70	7.90	2.30	4.19	6.20	5.31	6.19	4.91	4.21	7.95

Figure 4.20: Mean scores and scores per park of selected terms for each language accentuated with a color gradient for a better visibility, whereas dark green stand for higher, dark red for lower and white for neutral scores.

Table 4.20 shows the mean values for the scores of each language for each proposed term. All mean scores lay between four and seven, which is not surprising when taking the mean values and added to that, it regroups scores to different images. There might be some indication by the most distinct scores with over one score in between, such as "untouched/pristine", over one score higher in German. On the other hand, "nature conservation" is higher in French. So, when looking at the overall statistics, the mean scores appear to have rather similar tendency for each image.

When distinguishing the results for each park, a much clearer pattern is recognizable. The data shows higher concordance within a park for both languages. More precisely, both parks show similar differences for both languages. For instance, they generally score higher for the images from Pfyn/Finges Nature Park concerning the following terms: "remote", "danger", "pristine", "natural patrimony", "nature conservation" and "wilderness". They also agree on Chasseral Nature Park to score higher for: "peaceful", "neatly" and "tranquil". Only "nature conservation" and "restoration" had less distinct scores.

4.4 Cartography from PPGIS

Finally, the last task for the first time shows the term "wilderness" to the participants. But without in-depth information nor short introduction about it. 38 participants have already been to at least one of these two parks before. When looking at the the different combinations (German-speaking with knowledge of Chasseral Nature Park, French-speaking with no park knowledge, etc.), there is possible indications, such as the following for participants who know at least one of these two parks. Firstly, they prefer to draw an area of particular wilderness within the known park. Secondly, more wilderness areas were drawn within the park perimeters instead of outside when the park was known. Further, smaller, thus more precise areas are indicated, compared to participants who guessed an area based on their expectations and experiences without knowing the park. Approximately only one quarter of participants know at least one park and their drawing are distributed over both parks so that not sufficient data is collected to create a significant heatmap only for them. Therefore, the following figures 4.21 and 4.22 contain data from French-speaking and German-speaking participants together.

When we look at the amount of results handed in for both parks, 75 for the Pfyn Nature Park, 43 for the Chasseral Nature Park, it gives a first indication of which region is considered to have higher wilderness values. There is also an indication of correlation between the hotspot for wilderness and the distance from cities and traffic axis, as well as with the roughness of the terrain.

Considering the wilderness potential of both areas from figure 2.2, where we can see higher values of wilderness in the alps, notably also in the Pfyn-Finges Nature Park region compared to the Chasseral Nature Park in the Jura mountains. This could lead to the assumption that people tend to relate wilderness areas more easily or more often in the alps. But, when we compare the choices of both regions, it gives another impression. 60 German-speaking participants picked the Pfyn-Finges Nature Park versus 28 for the Chasseral Nature Park. Conversely, only 6 French-speaking participants chose Pfyn-Finges Nature Park versus 12 for Chasseral Nature Park.

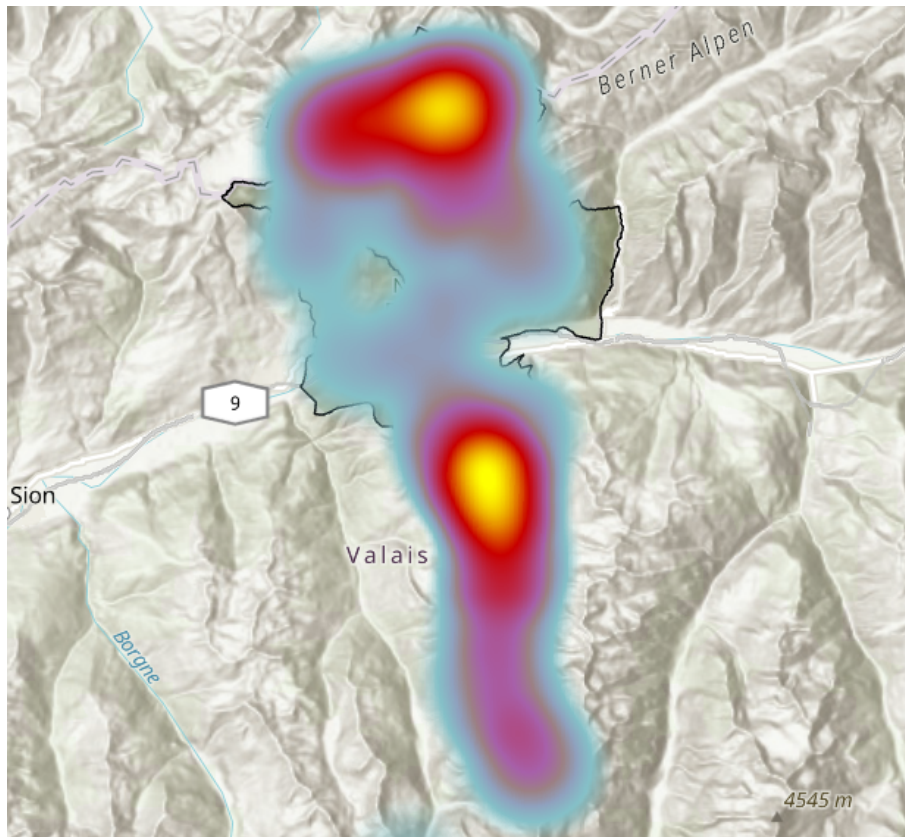


Figure 4.21: Heatmap of the areas of particular wilderness, as drawn by participants for the Pfyng-Finges Nature Park.

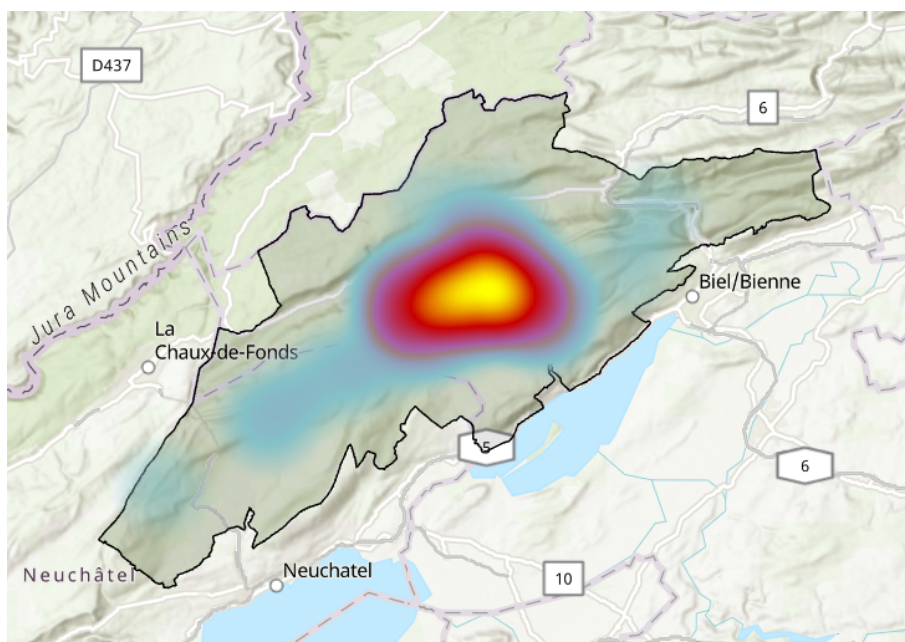


Figure 4.22: Heatmap of the areas of particular wilderness, as drawn by participants for the Chasseral Nature Park.

Chapter 5

Discussion

In this section, first some notes on the survey design, issues concerning the survey and limiting parameters are discussed. Further, more in-depth thoughts on the results are presented to each task of the survey. Then, some results are referred to linked studies. The last part of this chapter attempts to answer the research questions.

5.1 Discussing Task 1

When translating each list to English, bias can emerge, but this is the compromise it gets to be able to better compare languages. Even before translating the words, errors may occur due to semantic ambiguities, when classifying them. Words with the same spelling, but with different meaning might be categorised wrongly to the same feature classes. To reduce bias due to this concern, different researchers could create the feature lists independently and then check for any discrepancy, comparable to Dress et al. (2018) and Karlawish et al. (2011) for the translation of lists from different languages to English.

An additional observation is the indication for patterns within answers of individual participants, as for example some prefer to use adjectives to describe all the images. Or others tend to use sense of place or cultural features more frequently. Thus, some participants might have more influence on the results, particularly within French-speaking participants with far less participants.

Originally four lists were created based on the data of the first task. Whilst analyzing

them, it turned out that combining one-word and two-word lists might be beneficial to obtain a larger word pot for further analyzes.

These four lists include data from all images together. In behalf of the diversity of words used to describe the different images, the images were additionally analysed separately with the feature plots (figure 4.11 - figure 4.18). This should avoid smoothing of the data, as different images would balance each other depending on their observed features.

The first task of the online survey, where participants have to describe images, is up to a certain extent comparable to a free-listing task. The difference is that they are limited to three words here. This makes it harder to compare the salience between the two groups with indexes such as Sutrop or Smith. This was chosen so, in order to avoid the survey to become too time consuming for participants. By keeping it shorter more participants could probably afford to complete the study.

Putting all words in one pot for the last data analyzes, carries the disadvantage to separate two-words answers that form a pair. Looking more closely at the two-words answers, it shows very similar proportions of correlation within one answer for both languages. More precisely, one quarter of the two-words answers were made up of two words that belong together, such as "fonte neige", in English "melt snow". Recognizing this answers as a pair was mostly possible due to stop words, for instance "fonte de neige" originally. The stop words were cut out for the "most frequent words" and every analysis after this. Further indications for pairs of two-words answers are obvious relations such as "climate change". At a certain point one could argue for some examples that this separated pairs and addition of words originally not belonging together transform the meaning of some answers, as some words are conglomerated from the fragments of composed ones. Such an example provides the word "dry", which is present alone, as well as in combination with "meadow" and also "wall". But overall, a subjective categorization can not be omitted from this research.

As mentioned before, the word clouds as a first output of the data were only used as a visual tool to give a first impression of the data. Investing more time to eliminate word clouds from them and harmonizing them for upper and lower case would provide clearer word clouds with more co-occurrences.

When comparing the features distribution, some differences can be identified. For instance, the higher percentage of biophysical answers in French for all images,

except for image 7, as seen in figure 4.17. Potentially, a reason for that exception could be explained by the higher occurrence of cultural features in French when describing the image featuring the raised bog. When looking up particular answers for this image, there are some mentions of "pastures", which is categorized as a cultural feature, considered as land used for breeding animals. This is visible with the word clouds of figure 4.8. At the same time, there are less mention of terms linked to bog in French. This probably indicates that the raised bog was less recognized among French participants. It must be noted here that the bog with its typical appearance might have been rather poorly recognized among all participants unless they described the image with other word. But considering that most images were described mostly with biophysical features.

A closer look at the feature frequencies of cultural and sense of place features of some given images might indicate a dependency between the two features. For instance image one, three, four, five, eight and partly image two for German, indicate a negative correlation, where one class is lower, whereas the other is higher. When scanning through the sense of place data in more detail, positive feelings seem to occur more often than negative impression collectively. Words such as "beautiful" and "idyllic" are among the top 25 words where no negative words can be found. The combination of these two facts could indicate that landscapes with less anthropogenic impact are estimated as more pleasant. Most importantly when comparing French and German, apparently, French speakers tend to use less emotions to describe landscapes, if emotions are directly bound to the feature of sense of place.

Looking further for specific items displayed on the images such as "dry wall", or "trockenmauer" in German, "mur de pierres sèches" in French, we notice that there are simplified versions used in French. This is due to the inability to describe exactly this particular type of wall, namely "drywall", in only one word in French. In fact there is no mention of "drywall" in French. There is only one similar description in combination of two words, that is "mur pierres", which translated means "wall stone", but no such description as "mur sec", in English "wall dry".

Validation of the results from the first task could be achieved by comparing the words to other studies, such as Smith and Mark (2001), which also used survey based data to analyze landscape perceptions, hence with similar words as answers, particularly concerning biophysical descriptions.

5.2 Discussing the Task 2

The choice of a Likert scale with ten grading levels as used here for the second task might give participants too much liberty and make it harder for them to give their feedback. Usually, seven grading level could be more effective to avoid random answers. Furthermore, the advantage of an even number of level that forces participants to choose preferred side can on the other hand destabilise them, as they can not choose a neutral answer, as the mean number can not be picked.

However, despite design issues, the second task gets credit for pointing out the concordances of both languages to differentiate both parks. As stated in the results for most terms, French-speaking and German-speaking participants agree that they better suit to one park. In addition, the findings of the features differences from the previous task are not confirmed in this task. Some proposed words, such as "peaceful", "pristine" or "tranquil" are words that classified as sense of place. Here, however the scores for these words do not show a linguistic pattern. The decisive parameter in here apparently is the park. Seemingly one could presume, that when specific terms are proposed to the participants, the differences are not present anymore.

5.3 Discussing Task 3

Here, results from the different tasks are compared to the wilderness drawings of the third task.

The PPGIS part in the last task contained several difficulties. In the first place, the *survey123* app appeared to malfunction on some mobile devices. Some participants could not enter any drawing, others could not see the correct predefined map with the park perimeter included for better comprehension of the task and better visualization. Multiple participants commented on this. Added to that, some had difficulties in drawing a nice shape. These issues may have led to some areas being partly or completely outside of the park perimeters. Nevertheless, over 100 drawings were mostly within the park perimeters.

The heatmap generated for the centroids of the drawn surfaces, contain some areas outside of the parks perimeters. In addition, information of the irregular geometries of the entered wilderness surfaces are lost when applying the centroid points for each

surfaces and only considering these for the heatmap. So, the heatmaps deliver a fine visualization but have to be taken with caution.

Considering the wilderness potential of both areas from figure 2.2, where we can see higher values of wilderness in the alps, notably also in the Pfyn-Finges Nature Park region compared to the Chasseral Nature Park in the Jura mountains. This could lead to the assumption that people tend to relate wilderness areas more easily or more often in the alps, more precisely, in rough terrain with high topological gradient and far from civilization infrastructures. But, when we compare the choices of both regions, it gives another impression. 60 German-speaking participants picked the Pfyn-Finges Nature Park versus 28 for the Chasseral Nature Park. Conversely, only six French-speaking participants chose Pfy-Finges Nature Park versus 12 for Chasseral Nature Park.

Here, a closer look at the personal indication of their postal code probably gives an indication to this observation. Hereby, participants preferably choose a known park if available. Or, if no park is known, there is a clear pattern showing that participants draw a surface for the one park closer to their living place. When including the regional differences, it is more likely that proximity of participants to the park has a larger influence on people's preference to accord a particular wilderness zone. This should not mean, that they perceive this region as more wild than the other, but rather that within the park they know better, they think of this place having potentially the closest character to a wilderness area.

When comparing Pfy-Finges Nature Park to the potential wilderness quality in figure 2.2, we can observe that the park has large regional variances. Very low wilderness character is expected in the valley, close to the villages, roads and railways, opposed to the high-mountain regions with some of the highest wilderness potential. The results from the last task of the survey match those expectations, as the heat map clearly show two hot-spots south and north of the Rhine valley.

Further, the results from the second task match the indications from the heatmap, such as drawing distribution among the parks and the locations on rough terrain in remote locations. Wilderness scores are twice as high for Pfy-Finges Nature Park, so are the amount of wilderness zone drawn, accordingly to the findings of Moos et al. (2019).

Another observation is the fact that the locations of the images, shown in figure 3.10 and 3.11, do not particularly correspond to areas where wilderness was drawn.

5.4 Overall Observations and further Thoughts

As stated before, any term directly associated to the English term "wilderness" appear to be less present in the vocabulary of non-English native speakers. However, it is difficult to say the same about concepts related to wildness, as the awareness for nature conservation and management or non-management might be larger than it seems, but it might be described by other words.

Even if wilderness is considered as a place where humans have the least possible impact on nature that is developing freely, the fact that humans feel responsible and take action for its conservation or restoration binds wilderness to humans. And if there is still untouched nature somewhere that can be called wilderness, humans will still be implicated by interests in its services. Whether for exploitation purposes or if it is to save its pristine status for saving ecological values, human interests are the key factor for all decisions taken (Jordan, 2022). As today, almost any place on Earth has been discovered or at least remotely observed by humans, it is difficult to imagine wilderness without us. As stated by Moos et al. (2019), wilderness has its largest chances where it matches societal and ecological potential.

Studies regarding wilderness quality include biodiversity, remoteness, roughness of terrain, tranquility, distance to human activities as well as perception of landscape and nature, but there is rarely a mention of air quality. For the moment, there are apparently no studies about it in the context of wilderness, although Liqueste et al. (2015) include the potential of an ecosystem to remove air pollutants in the lower atmosphere.

This fact might indicate that people are not sensitized to the importance of such interactions for now. Most discussion of climate and wilderness are arising when considering the construction of wind turbines or solar plants within landscapes of particular high wilderness potential. Though, the focus there, is mainly on meeting energy needs, which is in opposition to the preservation of biodiversity, which in turn provides an ecological service. Dialogues on these themes could point out that landscape and wilderness perception is bound to the level of education around these topics. Sensitization of the population is therefore crucial already in school.

So, is there a sensitization noticeable among participants? With increasing environmental awareness and climate change risks lurking we detect some words related to a sensitive view of endangered nature and maybe even wilderness with words mostly

categorized as features of processes. It would be interesting to compare different studies over time to be able to compare temporal development of perceptions, for instance by counting the mentions of such words.

It is difficult to say with certainty whether the descriptions are mainly due to the languages rather than other factors. As with the languages come cultural differences of the two regions and their recurrent varying habits upon nature, landscape and wilderness topics and ideals are influenced by their histories.

With increasing environmental awareness, participants may answer to environment related questions according to social desirability such as Dearden (1987) found out.

Concerning the research sites, alone the establishment of parks, have driven the implicated communities to think about what a regional nature park is and what it means. The processes of acceptance that had to be taken for the different regions, can be considered to be an inclusive part of the goal of these parks, namely creating a community thinking and awakening the awareness of the population for close to nature living styles and with at least some marginal protection status. Still, regional nature parks imply mainly secondary wilderness areas, where humans have impacted the landscape, and where it is questionable if wilderness can even be mentioned as such. Similar to Germany and other European countries, Switzerland is densely populated, which means that regional nature parks always include the presence of human activity within them. Buildings, pastures for livestock or even entire villages are part of regional nature parks. This is why the cultural patrimony is embedded in these regions that live close to, and depend on nature.

5.5 Survey Design Issues

Already during the conception of the survey, several issues occurred with the survey123 connect app, such as hidden content due to scroll inabilities, lack of programming performance for designing individual demands, like random selected questions and the according treatment of the data for the results analysis. Malfunctioning of the survey was also mentioned by participants who left a comment at the end. Some participants reported that the slide control bar, that should allow to define the appropriate score of each term, was not working on some devices. Others could not select the "free-hand" tool to draw a surface on the map and had to use the other option of a fixed geometry such as a circle to indicate an area. Although,

during the testing period of the survey different device systems were checked and everything seemed fine, this problem occurred. Checking all different device systems would have required an even longer test period. At least everything else, such as image quality and dimension, questions as well as the other answers were displayed and secured without any problem.

Concerning the second task, unfortunately the data of the first 95 participants was lost, due to misconception of the survey. As the three images to evaluate were programmed to be shown randomly for the participants, the information indicating which group of three images was collected is missing. Therefore, the answers of the participants can not be affiliated to their corresponding images, making it impossible to use the data to compare the images. At least, the problem was solved after notice and the answers of the final 56 participants could be extracted.

5.6 Limitations

The low amount of participants notably from French-speaking Switzerland marks a first limitation for a qualitative analysis. Therefore, more sensitive results concerning the French data is expected, as the sample is smaller with only 29 participants compared to 117 participants for the German sample. The sampling error could be diminished with more participants, as could selecting more similar groups representing each language. This could be comparing between same age groups, genders and educational level. However, with the compromise of the survey length versus the amount of participants, still, valuable responses deliver useful results to compare the languages.

As mentioned when describing the survey design, the goal in the description was not to pollute participants with the term wilderness and to keep the whole description part as neutral as possible. The same idea guided the images descriptions, to avoid giving them any inspiration and to let them think freely of a description of what they perceive. Therefore questions in the survey have a large degree of freedom and do not influence participants towards any features. This could contribute to the fact that most descriptions result in the biophysical group, as people simply describe what they see. A question such as, "How do you sense the nature in this image?", would have probably lead participants to think more about features of the sense of place for instance. It probably also contributed to low frequency of answers related to wilderness.

The first task of the online survey, where participants have to describe images, is up to a certain extent comparable to a free-listing task. The difference is that participants are limited to only three words in total here. This makes it hard to compare the salience between the two groups with indexes such as Sutrop or Smith, which analyzes the answer orders of each individual participants, as was covered in the study of Wartmann and Purves (2018). This would have require more words per participants to get significance, where the earlier a word comes in mind, the more it would be weighted. However, this was chosen so, in order to avoid a time consuming survey for participants. By keeping it shorter, probably more participants could afford to complete the study and this was a concern worthy to focus on in order to obtain data.

If the overall cross-linguistic differences of these results are not high, we can see a clearer pattern overall, as well as within the languages between the answers for the different parks. Also here, the image chosen for the survey might create some bias, as one could argue that selected images for the Chasseral Nature Park might not show an adequate equivalent of wilderness quality compared to the selected images for the Pfyn-Finges Nature Park for example.

5.7 Answering the Research Questions

Finally, in this section the research questions are addressed based on the findings of the survey.

How different is wilderness perceived in the French-speaking part compared to the German-speaking part of Switzerland?

There seem to be evidence for some minor differences concerning the feature mentions. Sense of place consistently made up a larger part of German answers compared to French, whereas inversely descriptions of biophysical features were more frequently used in French for most images. Further, visible from the proportion plot (figure 4.19) and the word frequency distribution (figure 4.10) is the observation that most top frequent words occur more often in French proportionally. This is mainly explainable due to the many composition possibilities of the German language, which leads to more different words. In other words, in German the answers are more spread among different words, as there are more possibilities to express a perception in more detail with less words.

How do citizen sensible to nature from both regions, perceive wilderness in two selected Swiss regional nature parks?

Regional nature parks being inhabited parks with economical and touristic interests, they distinguish themselves from a park with national park status, where the focus clearly lays on the protection of nature containing for instance a core zone of high wilderness value. Thus, finding wilderness within a regional nature park is expected to be lower. The results from the participants with environmental or geographical background indicate this, as without an input of the wilderness topic, mentions of wilderness related terms are rare when describing images of these parks. But, the two different parks allow to identify different findings for the different regions, where Pfyn-Finges Nature Park has seemingly more wilderness character than Chasseral Nature Park, thus matching the higher wilderness potential expected there at higher altitude including glaciers and places far from humans.

Is there a wilderness gradient pattern recognizable from the perception of the two groups of interest?

A gradient can be recognized in terms of geographic information for all participants together, as shown in the PPGIS data. The farther away from traffic axes and cities and the higher the altitude and the roughness of the terrain, the more wilderness areas are expected, thus matching findings from Moos et al. (2019) about wilderness potential. This gradient being true for German-speaking and French-speaking participants together.

Hypothesis:

French-speaking and German-speaking Switzerland have distinguished perceptions of wilderness.

By answering the previous leading questions, an attempt to validate the hypothesis can be deducted. A short answer would be yes, there are differences in the perception of images with different wilderness potential. Based on this case study with an online survey and the targeted groups, there are some particular differences by means of word preferences for the same images, as analyzed with the first task of the survey. So, yes there seem to be difference, but with the limited data available it is not confirmed whether the language is the main responsible parameter for that finding.

Chapter 6

Conclusion

Wilderness is a term with controversial descriptions. Its importance for ecosystem biodiversity, climate and research is undeniable and it is now gaining attention with the ongoing climate crisis and the growing population endangering these protected areas of untouched nature. Evidence show that bottom-up policy making is crucial for the acceptance, the establishment and the maintenance of protected areas. Thus, inhabitant's perception of nature and wilderness should be taken thoroughly into account. In Switzerland where different cultures and for instance different languages are cohabiting closely, a better differentiation between French-speaking and German-speaking opinions for instance is crucial. Assessment from both groups is required to study the differences that might occur and that could endanger efficient decision taking and add to the complexity of the legal processes in the topic of nature conservation and wilderness. For this reason this thesis aims to investigate the different perceptions of French-speaking and German-speaking Switzerland within regional nature parks that are well distributed and growing in numbers. On the basis of an online survey designed as similarly as possible for both languages, data of wilderness and landscape perception is collected. The data provided by participants of both regions show interesting perception insights enabling a direct comparison. Participants are mainly comprise environmentalists and geographers that are potentially sensitive to wilderness themes. By combining the results of the different tasks, more insights on perception subtleties are possible.

By asking participants to describe with three words images showing different landscapes within two regional nature parks at the edge of the language border between French-speaking and German-speaking Switzerland, insights of word frequencies and

feature tendency show interesting differences. Further, they were asked to score appropriateness of ten selected terms to an image, thus allowing to directly compare score differences for similar translated words in both languages. Finally, in a last task, rounding up the data with a PPGIS allows to narrow down the topic to wilderness expectations and location information.

First of all, answers from French-speaking participants show notably more identical answers compared to German-speaking participants among which, more different words are cited to describe the same landscapes of different wilderness potential. Further, the data indicates consistent negative correlation of biophysical and sense of place features between German-speaking and French-speaking Switzerland. French speakers tend to use less descriptions containing emotions or belonging to describe landscapes, for instance less sense of place than German speakers. In contrary, for all images, they use more biophysical descriptions than German speakers. Though overall, the feature proportions are similar between both languages with most images being described with words from the biophysical category. Concordance between the languages is also observed concerning the scores of selected terms corresponding to images. Thereby, for the two different regional nature parks for most terms both language show identical preferences.

Also insignificant difference is observed for the PPGIS task, where participants from both groups expect wilderness far from human activities and at high altitude in rough terrain matching the findings of the wilderness potential in Switzerland from the study of Moos et al. (2019).

In conclusion, concrete results for wilderness perception differences are difficult to find when comparing images of regional nature parks of Switzerland and when omitting to introduce survey participants to the wilderness term. However, a perception comparison of French and German-speaking Switzerland can be gained from this study.

The ambiguity of the wilderness definition leads to ambiguity of its perception. Or is the diverse perception the reason for the different definitions of wilderness? Probably, both are linked and influence each other.

Outlook:

In order to further investigate public opinion of both languages extending the range of people in the sample would be beneficial. Combining these methods additionally to user generated content based on tags or location and images from selected websites

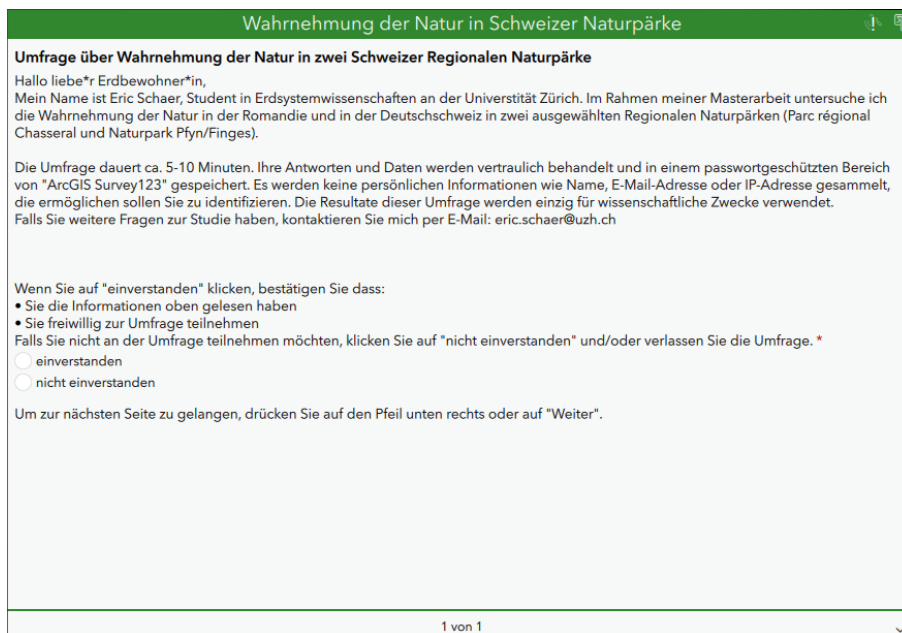
or social media could also improve validation of landscape and wilderness perception studies as suggest Wartmann et al. (2019).

For further validation of the data a mixed method approach, like described by Bran-
nen and Moss (2012), could be beneficial. It would require the combination of quan-
titative and qualitative methods in order to take the advantages of both methods.
A qualitative part could include interviews with experts and other people sensitive
to themes related to wilderness such as SAC members.

Appendix A

Appendix

Images of the survey how participants saw it.



The image shows a screenshot of a survey interface. At the top, there is a green header bar with the text "Wahrnehmung der Natur in Schweizer Naturpärke" and a small icon on the right. Below the header, the survey title "Umfrage über Wahrnehmung der Natur in zwei Schweizer Regionalen Naturpärke" is displayed. The main content area contains a greeting, an introduction of the researcher (Eric Schaer), a description of the survey's purpose and duration, and a list of terms and conditions. At the bottom of the main content area, there are two radio buttons for "einverstanden" and "nicht einverstanden". Below the radio buttons, there is a instruction to click "Weiter" to proceed to the next page. At the very bottom of the survey window, there is a footer bar with the text "1 von 1" and a checkmark icon on the right.

Wahrnehmung der Natur in Schweizer Naturpärke

Umfrage über Wahrnehmung der Natur in zwei Schweizer Regionalen Naturpärke

Hallo liebe*r Erdbewohner*in,
Mein Name ist Eric Schaer, Student in Erdsystemwissenschaften an der Universität Zürich. Im Rahmen meiner Masterarbeit untersuche ich die Wahrnehmung der Natur in der Romandie und in der Deutschschweiz in zwei ausgewählten Regionalen Naturpärken (Parc régional Chasseral und Naturpark Pfyn/Finges).

Die Umfrage dauert ca. 5-10 Minuten. Ihre Antworten und Daten werden vertraulich behandelt und in einem passwortgeschützten Bereich von "ArcGIS Survey123" gespeichert. Es werden keine persönlichen Informationen wie Name, E-Mail-Adresse oder IP-Adresse gesammelt, die ermöglichen sollen Sie zu identifizieren. Die Resultate dieser Umfrage werden einzig für wissenschaftliche Zwecke verwendet. Falls Sie weitere Fragen zur Studie haben, kontaktieren Sie mich per E-Mail: eric.schaer@uzh.ch

Wenn Sie auf "einverstanden" klicken, bestätigen Sie dass:

- Sie die Informationen oben gelesen haben
- Sie freiwillig zur Umfrage teilnehmen

Falls Sie nicht an der Umfrage teilnehmen möchten, klicken Sie auf "nicht einverstanden" und/oder verlassen Sie die Umfrage. *

einverstanden

nicht einverstanden

Um zur nächsten Seite zu gelangen, drücken Sie auf den Pfeil unten rechts oder auf "Weiter".

1 von 1

Wahrnehmung der Natur in Schweizer Naturpärke

Angaben zur Person:

Geschlecht

w

m

Anderes

keine Angabe

Geburtsjahr

Postleitzahl *

Muttersprache/n *

Deutsch

Französisch

andere

Ausbildung/en

Geben Sie alle abgeschlossenen Ausbildungen an

Obligatorische Schule

Lehre

Fachmittelschule

Gymnasiale Maturitätsschule

Höhere Fachschule HF

Fachhochschule FH

Pädagogische Hochschule PH

Universitäre Hochschule

andere

Kennen Sie den Parc régional Chasseral und/oder den Naturpark Pfyn/Finges?

Ja, ich war schon mal im Parc régional Chasseral

Ja, ich war schon mal im Naturpark Pfyn/Finges

Ja, ich war schon in beiden Pärken


Nein, ich habe noch keinen dieser Pärke besucht

< 2 von 2 ✓

Wahrnehmung der Natur in Schweizer Naturpärke

Bildbewertung Pfyn/Finges

▼ Bild1



< 3 von 7 >

Wahrnehmung der Natur in Schweizer Naturpärke



Beschreiben Sie dieses Bild mit nur einem Wort:

Beschreiben Sie jetzt das gleiche Bild mit zwei neuen Wörtern:

3 von 7

Wahrnehmung der Natur in Schweizer Naturpärke

Begriffe zur Natur im Regionalen Naturpark

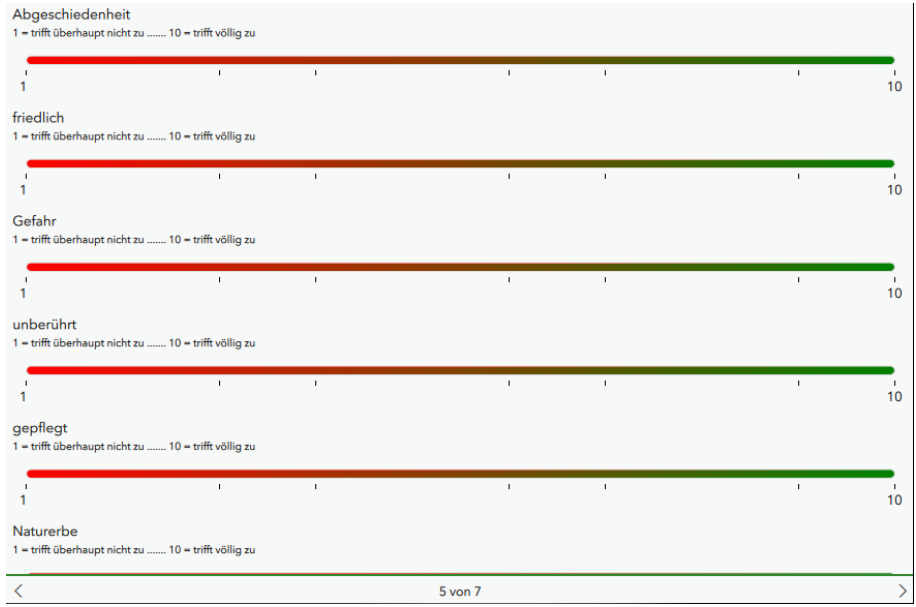
Im zweiten Teil werden zu drei der bereits beobachteten Bilder, zehn ausgewählte Wörter abefragt, welche mehr oder weniger zu diesen Bildern passen.

Ihrer Ansicht nach, wie passend empfinden Sie die folgenden Wörter zu diesem Bild?

Bild 4



5 von 7



Wahrnehmung der Natur in Schweizer Naturpärke

Kartierung


Im letzten Abschnitt geht es darum, in einem der zwei beobachteten Pärke, eine Fläche auf der Karte einzuzichnen, die Sie als besonderes Wildnisgebiet (engl.: "Wilderness") wahrnehmen. Auch wenn Sie diese Pärke nicht kennen, versuchen Sie eine Fläche einzuschätzen.

Hinweis: Haben Sie Ihren bevorzugten Ort gefunden, wählen Sie das Freihandfläche-Symbol an, um ihre Fläche einzuzichnen. Wenn Sie zufrieden sind, können Sie unten rechts auf das Häkchen drücken oder auf "Weiter". Wenn Sie die Fläche verbessern möchten, können Sie erneut auf das Symbol drücken, um Ihre Zeichnung zu ersetzen.


Das Freihandfläche-Symbol sieht so aus:



Falls Sie die Umfrage mit einem mobilen Gerät ausfüllen, sieht es so aus:



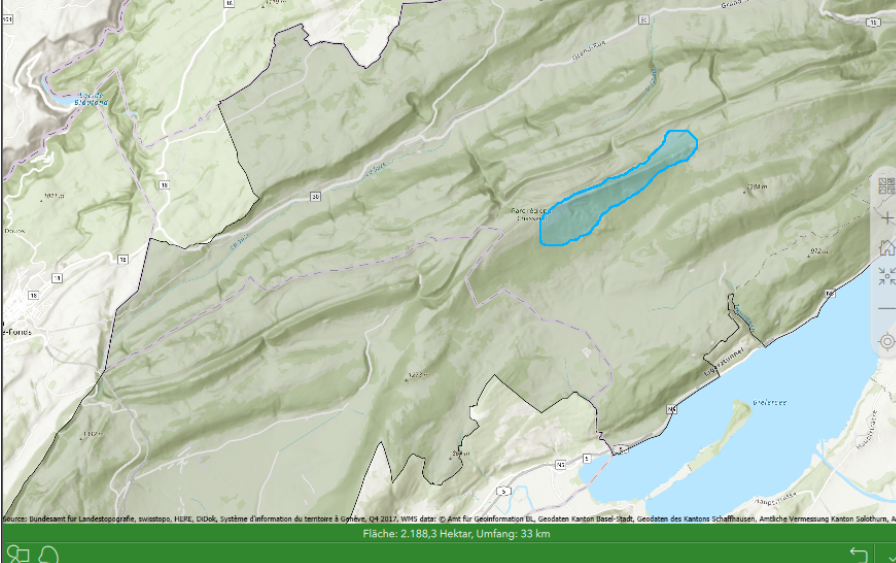
Hinweis für mobile Geräte: Drücken Sie jetzt auf das Kartensymbol, um zur Karte zu gelangen:



6 von 7

Hinweis für mobile Geräte: Drücken Sie jetzt auf das Kartensymbol, um zur Karte zu gelangen: !

Position oder Kartenkoordinate suchen



Fläche: 2.188,3 Hektar, Umfang: 33 km

Plots of the part of speech statistics based on the first task of the survey as explained in section 4.2.2:

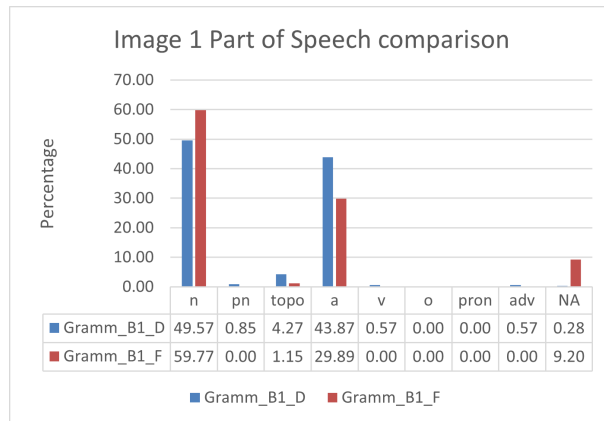


Figure A.1: Part of speech comparison for both languages for image one.

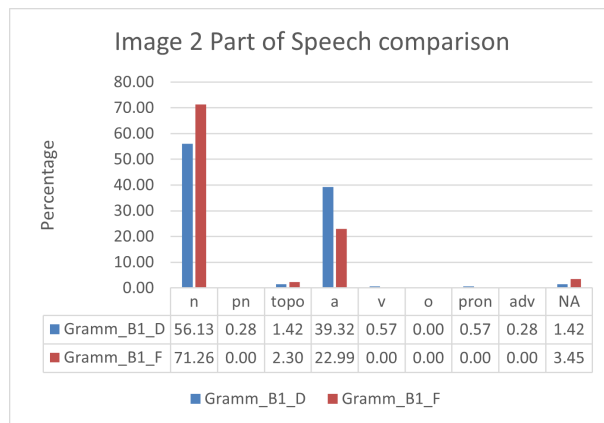


Figure A.2: Part of speech comparison for both languages for image two.

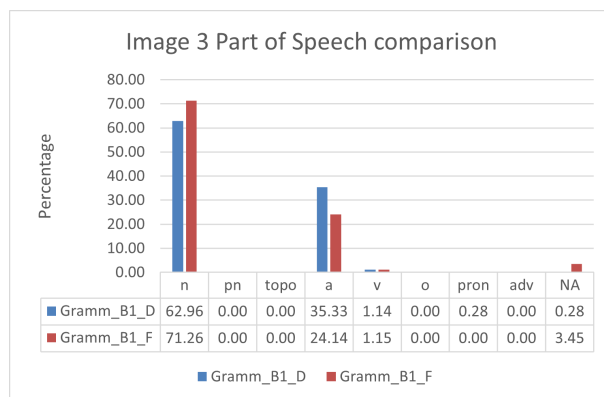


Figure A.3: Part of speech comparison for both languages for image three.

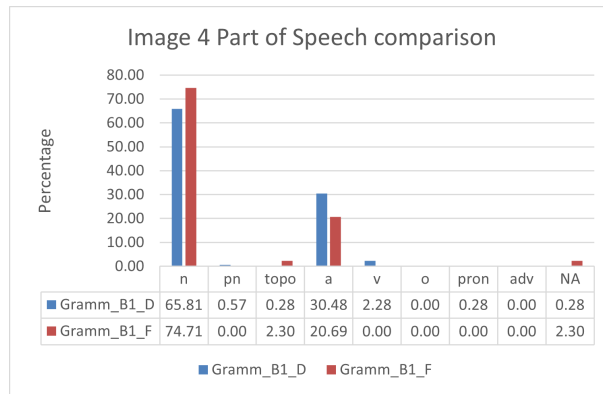


Figure A.4: Part of speech comparison for both languages for image four.

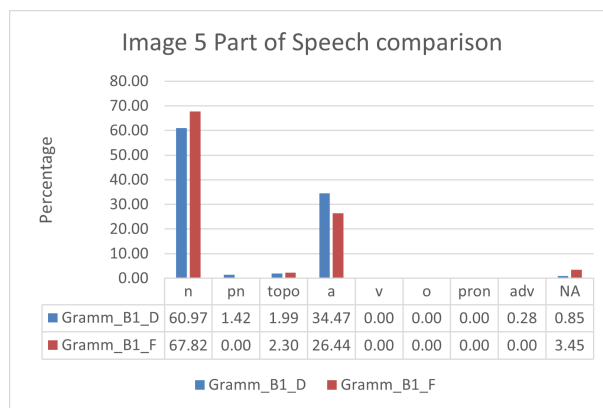


Figure A.5: Part of speech comparison for both languages for image five.

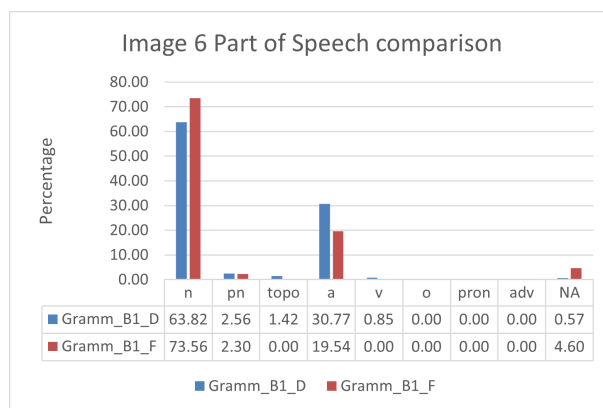


Figure A.6: Part of speech comparison for both languages for image six.

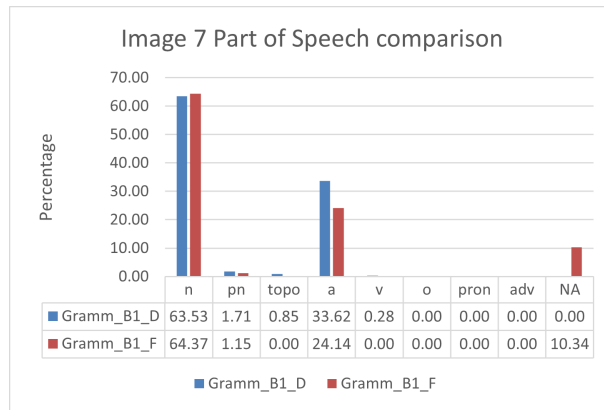


Figure A.7: Part of speech comparison for both languages for image seven.

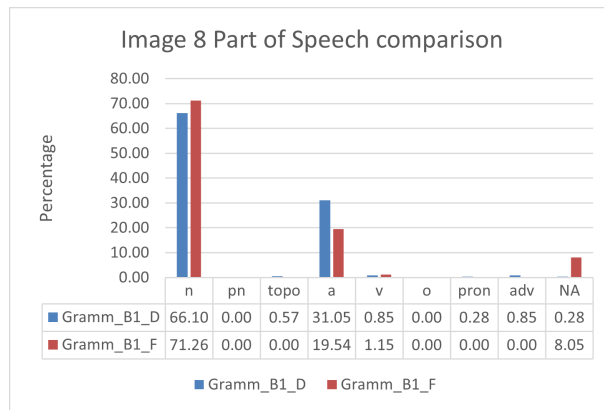


Figure A.8: Part of speech comparison for both languages for image eight.

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