

June 22 2020

“GEOCACHING IS ABOUT PLACES WHERE YOU WOULD NOT HAVE BEEN OTHERWISE”

A research about geocachers in and geocaching in the
rural area of Anderen, Drenthe

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Master Thesis Cultural Geography – Track Tourism and Planning

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ABSTRACT

Geocaching is an outdoor hobby in which people can locate and find certain treasures called geocaches with their GPS system. Geocaching has been around for two decades, and is becoming more popular each year: Geocaching.com, one of the online geocaching communities has over three million members. With this popularity, the ecosystem service could suffer consequences, as this form of tourism or recreation can be affecting nature. Anderen, located in the province of Drenthe is a rural area where many geocachers go geocaching. This rural area is frequently visited by geocachers, and this research aims to find out who the geocachers are that are geocaching in and near Anderen. Furthermore, motivations for geocaching are questioned, as this is important in connection with the cultural ecosystem service that geocaching is. A questionnaire has been spread among geocachers who collected geocaches in the area of Anderen, which led to 140 respondents. Results show that geocachers in this area are higher educated and older than the average of the Dutch population. Furthermore, the most important reason to geocache in general and in Drenthe is to have fun finding and solving geocaches. There is however more to this than just this only motivation, a geocachers find multiple reasons important, concluding that there is not one true motivation to go geocaching.

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1. INTRODUCTION

Geocaching is an outdoor hobby, which has been in its current form for almost 20 years. It came into existence in 2000, when the first geocache was hidden shortly after increasing the precision of GPS systems globally (Frame, Leane and Lindeman, 2018; Huddart and Stott, 2019). A geocache is a treasure which people can find, most of the times in a waterproof container containing a logbook. The geocachers (people who are geocaching) use a GPS system so they can fill in the coordinates they have found beforehand. According to Geocaching.com (2019), there are more than three million geocaches active at this moment and are available at all seven continents in 191 different countries. Furthermore, there are over seven million active geocachers who are a member of geocaching.com, with a free or a paid membership (2017). There are however also other websites and communities that provide information and tool to go geocaching, such as OpenCaching. Geocaching is seen as a recreational outdoor activity, which people do to have fun. Next to having fun, people are doing a physical exercise, they have the possibility to experience nature and it gives them the opportunity to bond, as well as strengthen relationships (Agate, Zabriskie, Agate and Roff, 2009; Balzan and Debono, 2018). There has been done research about geocaching, for example in urban areas. Golbeck and Neustaedter (2016), Cord, Roeßiger and Schwarz (2015) and Telaar, Krüger and Schöning (2014) all found that geocachers in urban areas are mainly young people with a high education level. Furthermore, geocaching in urban areas is mostly practiced at a location where people are wealthier and have a higher education (Cord et al., 2015). Europe has a rich history of the rural landscape, which has been built over the last thousands of years (Agnoletti, 2014). Landscapes that classify as rural comprise 95% of the territory of the European Union and 66% of the inhabitants of the European Union live in rural areas (Agnoletti, 2014). The question rises what the characteristics would be of geocachers who search for geocaches in rural areas.

Geocaching is in many researches seen as a form of tourism or recreation, as well as a cultural eco system service (Cord et al. 2015). Ecosystem services arise when an ecological structure or function directly contributes towards a human need or want (Daniel et al. 2012). These services provide benefits, which contribute to general well-being. As many people enjoy a form of tourism or recreation, this can be seen as an opportunity to manage the interaction between ecosystems and people (Daniel et al. 2012). As tourism and recreation are mainly seen as a way in which the ecosystem is being threatened, it would make sense to know what the motivations of geocachers are when geocaching in an area (Cord et al. 2015; Daniel et al. 2012). The need to make sure that motivations of geocachers are clear is even more necessary, as geocaching as a hobby is becoming more popular. The last years several websites have promoted geocaching as a hobby (NU.nl, 2019; Telegraaf, 2020). This subsequently means that there is more pressure on certain nature areas, which makes knowing what motivations are for geocaching even more relevant.

The aim of this research is to get more clarity about geocachers in rural areas and what their motives are for geocaching in this area. As geocachers can be seen as tourists or recreationists, theory about ecosystem services will provide additional information about how geocaching is seen.

The research question is: Why do certain geocachers go to a specific location and what are their reasons for geocaching? Three sub questions have been created to try and answer this question:

- Who are the geocachers that are geocaching in this area?

This first sub question is to create a profile of geocachers. Questions about their age, education, marital status, etc. will be asked to create a general profile about the geocacher. Furthermore, three different profiles will be created on the basis of the total number of found geocaches.

- Why are these geocachers geocaching?

The second sub question will give insight into why these geocachers are geocaching. Reasons that have been given in the research of Cord et al. (2015) will be used to see if there are similarities between geocachers in urban areas and geocachers in natural areas. This question furthermore provides the possibility to elaborate on that particular question.

- Why are these geocachers geocaching in this specific location?

Finally, the last sub question will look specifically into an area and the reasons why geocachers are geocaching there. It can be the case that these reasons differ from the answers that were given at the previous sub question.

After the introduction, the theoretical framework will follow. Important concepts and theories will be explained as well as the term geocaching in itself. Second, the methodology of this research and the choices that have been made, will be explained. Thirdly, the results will be presented, which will be done by the means of several figures and a qualitative analysis. The discussion focuses mostly on the results found by the quantitative tests that have been run. Furthermore, limitations within this research and recommendations for future research will be given. The last part will consist of a conclusion of this research, followed by the literature and the appendix.

2. THEORETICAL FRAMEWORK

2.1 Geocaching

Geocaching has been in its current form for 20 years, but the idea for Geocaching derives from Letterboxing, which is a much older outdoor hobby. Letterboxing is an outdoor hobby which originates from Dartmoor, the United Kingdom, and started around the 1850s (Huddart and Stott, 2019; Letterboxing, n.d.). It originated when James Perrott of Chagfort set up a glass jar where visitors in Dartmoor could leave their visiting cards, and the next person who would find them, would post them. In the following decades, it slowly developed further (Dartmoor National Park Authority, n.d.). In 1998 Letterboxing was featured in the Smithsonian Magazine, and three years later, in every American state there were over 1000 letterboxes (Huddart and Stott, 2019). Letterboxing is a hobby that “combines the elements of hiking, treasure hunting and creative expression” (Letterboxing, n.d.; Huddart and Stott, 2019). A traditional letterbox consists of a stamp and a logbook, and can be found by following clues, which can be found online, on lists, but also by word of mouth. A letterbox is most of the times placed in a waterproof container to protect it against the elements (Huddart and Stott, 2019; Letterboxing, n.d.).

While Letterboxing does not use Global Positioning Systems (GPS), geocaching does. Geocaching is described as a worldwide outdoor game of hiding and seeking treasures, a high-technology treasure hunt, in which participants use a GPS receiver or mobile device to locate these geocaches (Cord, Roeßiger and Schwarz, 2014; Huddart and Stott, 2019). Geocaching emerged in 2000, shortly after the improvement of accuracy in GPS systems. In that year, President Bill Clinton announced that this practice would stop, and civilian demand for GPS skyrocketed (Huddart and Stott, 2019). This meant that the error in the GPS system went from approximately 100 meters to 10-15 meter (GPS.gov: Selective Ability, 2018). After this decision, GPS systems could be used for civil and commercial use worldwide. This also meant that it became easier to use mobile devices for geocaching purposes, as this updated system provided much more detailed information for people on their way to a certain location (Ihamäki, 2012).

The website geocaching.com became available in 2000. This is currently the largest website available for geocachers, with the most geocaches published. A membership can be free, or paid, and geocaching.com has more than three million active geocaches online (Geocaching, 2018). Furthermore, geocaching.com also has more than seven million active geocachers in 2017, with almost one million in the United States (Geocaching, 2017; Huddart and Stott, 2019). There are also other platforms who offer people information about geocaching, both internationally and nationally oriented. The OpenCaching Network offers a free online portal, accessible for everyone, free of charge and created by global positioning system company Garmin (Opencaching, n.d.). Other goals of the OpenCaching network are protecting nature, encouraging responsibility of the owner of a geocache and making sure that geocaching is not a competitive sport (Opencaching, 2016). Opencaching is furthermore available in several European countries and the United States. Another form of geocaching is found in the mobile app Munzee. With this app you can locate QR codes, which are hidden in the real world – and score points with every code found. There are over 8 million codes hidden over the world

(Munzee, n.d.). Players are even encouraged to connect with geocachers during Munzee or geocaching events, which will provide them with a special badge (Munzee, 2019). What also can be used in the same way as geocaching is story seeking, which combines reading with geocaching, SCVNGR, which makes one do challenges at certain locations, and confluence, which is a project that encourages people to visit each of the longitudinal and latitudinal intersections (Confluence Project, n.d.)

The organization of Geocaching (2018) uses the following description of geocaching:

“Geocaching is a real-world, outdoor adventure that is happening all the time, all around the world. To play, participants use the Geocaching app and/or a GPS device to navigate to cleverly hidden containers called geocaches. There are millions of geocaches in 190 countries waiting to be discovered—there are probably even some near you right now.”

The website of geocaching presents several types of geocaches which can be found or hidden, and some of the different geocaches can be found in table 1 (Geocaching, n.d. d). The different geocaches all have another goal or aim. Some have the aim to learn something to the geocacher, while others have the purpose to clean a certain area. Via geocaching.com, not all geocaches are available for everyone. Some are only accessible with a premium account.

Type of geocache	Description
Traditional	The original, most straightforward type of cache. Most of the times a container at a specific location. Consists at the minimum of a logbook.
Mystery/Puzzle	A puzzle that needs to be solved, which gives access to the right coordinates.
Multi	Caches which involve two or more locations. A logbook can be found at the final cache.
Earth	A special geological location where people can learn something special about that specific place of the earth. To learn about processes shaping the earth.
Letterbox Hybrid	Letterboxing is another form of treasure hunting, which uses clues and not coordinates. There will be a stamp in this cache which is used by letterboxers to record their visit.
Event	A gathering of local geocachers or geocaching organizations, for which a certain amount of time has been set. There are also mega and giga events, which consists of activities and sometimes multiple days.
Cache In Trash Out (CITO)	An environmental initiative by the geocaching community, to clean and preserve the natural areas in which they are geocaching.

Table 1: Different types of geocaches of geocaching.com

The different platforms for geocaching have several types of geocaches, and the one mentioned above are specifically presented by Geocaching (n.d.). OpenCaching has other, specific geocaches for geocachers who use OpenCaching. For example, an OwnCache travels with the owner of the geocache, which means that when someone wants to find this geocache, the geocachers needs to be found (OpenCaching, 2019). Another example is a BitCache, which is a small tag that can be found – inside or outside a container. A password is placed on this tag, and with this password you can log your found (OpenCaching, 2013). Story seeking is also something that can be seen as a form of geocaching. Story seeking provides

someone with a story, and at the end of every chapter one can get clues about the location of a hidden geocache.

Geocaching can be experienced by everyone and free of charge. It is an all-year hobby, which can be done on various different locations. Next to urban or rural regions, it can also be in the water, for which someone need to buy equipment. Geocachers have the possibility to decide for themselves what they would like to spend on this hobby, which makes it a hobby that is easily accessible for everyone.

While it is easily accessible for everyone, it seems that this hobby is still mainly performed by men and less by women (Cord et al., 2015, O'Hara, 2008; Falcao, Damásio & Melo, 2016).

2.2 Ecosystem services

An ecosystem service arises when an ecological structure (e.g. wood fiber) or function (e.g. the filtering function of soils) directly or indirectly contributes towards meeting a human need or want (Daniel et al. 2012). These services can generate benefits for people, such as improved human health, which can contribute to overall well-being of people. Furthermore, they also have value for people: ecosystem services are deemed important (Chan et al. 2012). Geocaching is a form of (natural) tourism and recreation that can be seen as a cultural ecosystem service. Cultural ecosystem services are in that sense about nonmaterial benefits that people obtain from ecosystems (Millennium Ecosystem Assessment, 2003). Examples of cultural ecosystem services are about cultural diversity, sense of place, cultural heritage values and recreation and tourism. Geocachers are in that sense engaging in a form of tourism or recreation, which presents a major opportunity to manage the interaction between nature and people (Cord et al. 2015). This field has been mainly seen as a threat for nature, as infrastructure has to be put in place to make sure that tourists and recreationists can reach their destination, as well as natural wildlife can feel threatened (Daniel et al. 2012; Taff, Benfield, Miller, D'Antonio & Schwarz, 2019). However, recreation and tourism also have their benefits, which are physical exercise, aesthetic experiences, intellectual stimulation, inspiration, and psychological well-being (Chan et al. 2011). These are also aspects that draw tourists and recreationists. Furthermore, even short exposure to green spaces can have a positive influence on people, which contributes to the economic productivity of society (Daniel et al. 2012).

Geocaching is not only about finding geocaches, but also about creating geocaches and finding places which have a certain cultural or natural value and showing this to other geocachers. It is a particular way of using public space (Cord et al. 2015).

2.3 Recreation and tourism

In the last 40 years, the number of outdoor recreationists has grown substantially (Attarian, 2001; Schild, 2019). Furthermore, 99 percent of Dutch inhabitants recreated in 2015 (NRIT Media, Centraal Bureau voor de Statistiek (CBS), NBTC Holland Marketing & Centre of Expertise Leisure, Tourism and Hospitality (CELTH), 2015). When looking at outdoor recreation more specifically, it would seem that outdoor recreation is the most common form of recreation with the highest number of activities (NRIT Media et al. 2015). Geocaching can also

be seen as a form of outdoor recreation, in which people leave their homes to go to another location to geocache.

Next to a form of outdoor recreation, geocaching can also be seen as a location-based creative tourism experience (Ihamäki, 2012). As geocaching is location-based (as well as online), geocachers have to go to a certain location to collect a geocache. To collect this geocache, geocachers have the opportunity to walk through nature, and for example, solve puzzles which are focused on the specific location of the geocache. This can be an opportunity for the geocacher to learn something about the nature in which he or she is walking, or to learn something about the language or dialect that is spoken in that particular area (Richards & Raymond, 2000). It gives adults and children alike also the possibility to learn something about nature, with technology as a connection bridge (Huddart & Stott, 2019). Next to this, one of the earlier aims of geocaching is that geocaches should be placed in places where you can learn something. It could be about a particular spot or a location that one has to make some effort to visit the place (Geocaching, 2018). The website of Geocaching (2018) mentions the following:

“Geocaching is a great way to find remarkable destination that you would not have otherwise discovered. It is also an excellent education tool and an excuse to get off the couch”

The quote above is also what O’Hara (2008) found: geocaches can be found in place that have a significance or a natural beauty. Furthermore, geocaching can also increase knowledge during recreation or tourism. It gives geocachers the opportunity to learn more about the area in which they are residing, or even about the area in which they live in. This can be about nature itself, or even about the local culture (O’Hara, 2008; Geocaching, 2018). Technology is used as a bridge between location-based elements and outdoor recreation, as mentioned before by Huddart & Stott (2019).

Building further on ecosystem services mentioned in the last subchapter, geocaching could also be seen as nature (and eco) tourism. Nature tourism (or nature-based tourism) is based on the natural attractions of an area (CBI, 2020). Responsibility of the tourists is in this case important, as fauna and flora needs to be preserved and the quality of live of the locals needs to be protected. Ecotourism is in that case a specialism within nature tourism, in which people can learn about the environment, minimize negative impacts and contribute to environmental protection (CBI, 2020). Tourism New South Wales (n.d.) places adventure tourism also within the umbrella term ‘nature tourism’. Adventure tourism is hard to define, as adventure for one person could be not an adventure for the other, so the word “adventure” is quite subjective. Tourism New South Wales (n.d.) chose to define two types of adventure tourism: soft adventure and hard adventure. Soft adventure tourism requires a moderate level of physical involvement by participants, whereas hard adventure tourism requires a high level of physical involvement, with a higher risk factor (New South Wales, n.d.). Geocaching has a place (for most geocaches) in soft adventure tourism, together with hiking, mountain biking and orienteering (Huddart and Stott, 2019). However, visiting a place for the first time could also be considered as an adventure (Weber, 2001). The diversity in the term adventure also means that adventure tourism is broad - you are not required to have certain skills or be an expert in

something (Rantala, Hallikainen, Ilola & Tuulentie, 2018; Pomfret, 2019). Adventure tourism furthermore suggests that you have to do something more active: it is furthermore seen as quite absorbing and engaging. Unraveling mysteries, deciphering clues and tracking down the hidden treasures during geocaching add an adventurous element to geocaching, and even more so when you are a tourist in a place you do not know (Ihamäki, 2012).

2.4 Motivations for geocaching

Motivation is an important framework to understand tourism participation. Motivation is about cultural and biological forces, which give value and direction to travel choices, behaviors and experiences, integrated by both push and pull factors (Pearce, Morrison and Rutledge, 1998; Crompton, 1979). Motivations are thus seen as an important concept within tourism and recreation, as it majorly influences destination choice (Falcao et al. 2016).

Previous research has pointed out that geocachers have several reasons for geocaching in general. One of the reasons is that geocaching is a sport related, outdoor activity (Ihamäki, 2012; Balzan and Debono, 2018). It gives people reasons to go outside, enjoy the fresh air and to walk or collect geocaches. It is important to see geocaching not just as a way to reach a destination, or see geocaching as a way of “just” walking. Geocaching gives a walk a sense of purpose. This sense of purpose helps motivating participants to walk and engage in a physical activity and without they would be less inclined to go (O’Hara, 2008). This sense of purpose also helped parents to bring their children outside, as it motivates children to spend more time outdoors than in front of the TV (Garney, Young, McLeroy, Wendel and Schudiske, 2016).

Another reason found is about discovering and experiencing places. It is sometimes not that much about geocaching in itself, but where the geocaching route leads someone, as a consequence of doing this treasure hunt (O’Hara, 2008). Enjoying nature can be a vital part of this geocaching experience for many geocachers (Telaar, Krüger and Schöning, 2014; Balzan and Debono, 2018; Cord et al., 2015). With the help of a GPS system or tracking app for a mobile device, a geocacher can find geocaches, but the focus is not on those systems or apps at all. Nature can be enjoyed, rather than focusing completely on the GPS systems (O’Hara, 2008). Geocachers can focus on their surroundings, enjoy nature, and experience places far away or close to home, as geocaching makes sure that geocachers can learn new things about locations close to home (Cord et al., 2015). Geocaches are not placed randomly but are placed in locations that consist of natural beauty or significance. If geocachers seek geocaches, they discover places which they would have not found otherwise – it is thus a way to explore and discover (O’Hara, 2008).

Geocaching is about physical exercise as well as tactical thinking, as multi caches or mystery caches need to be solved on location. It provides a certain challenge, in which people have the possibility to develop their statistic further (Garney et al., 2016). Among many geocachers there is a friendly competition, which is to make sure that a geocacher is the first, second or third geocacher to find a geocache. There is an urgency amongst certain geocachers to make sure that statistics show that they have been the first to find this (O’Hara, 2008). It can also be seen as a mental challenge, as people can feel satisfaction when finding a difficult geocache. With puzzle geocaches, geocachers also spend time beforehand to solve this and receive the coordinates. This is most of the times done at home, where people can socialize and solve

puzzles together (O’Hara, 2008). Geocaches that are furthermore harder to find, also create more satisfactory feeling with the geocachers. Reporting that someone “did-not-find” a geocache can be seen as a public admission of defeat (O’Hara, 2008).

Furthermore, the social aspects are also considered important during geocaching. Geocaching also gives people opportunities to bond with other geocachers and strengthen relationships (Ihamäki, 2012; Agate, Zabriskie, Agate & Roff, 2009). During geocaching, the total attention of the geocachers does not have to lie on geocaching alone. This means that social interaction is easily possible and makes it even an important part of the geocaching experience (O’Hara, 2008). This also counts for walking as a family – it might be the case that not everyone enjoys geocaching as a hobby. But geocaching as a social activity in which the whole family goes together, can be enjoyable for those people (O’Hara, 2008). Geocaching is also an activity in which many people can easily join. Previous research points out that friends and family often join during geocaching, but that geocachers also meet new friends during geocaching, geocaching events or via online communities (Cord et al. 2015; Garney et al., 2016).

Next to all these reasons, for many people geocaching is mostly a fun recreational activity to do when people have spare time. People enjoy the hunt of trying to find geocaches, or it can complement other hobbies such as hiking (Garney et al., 2016).

2.5 Online communities and online features

Geocaching consists of two different elements, which are the location-based elements and the online elements. The location-based elements consist of the geocaches that can be found anywhere, plus the events that are organized by other geocachers. The online elements consist of several geocaching websites and social media websites, such as Facebook. The geocachers have the possibility to share their experiences online with other geocachers and have the opportunity to connect with other geocachers (Ihamäki, 2012). This can be done online, as well as in real life. The different online communities consist of people who interact digitally about a specific theme, which is in this case geocaching, or discuss about a common purpose (Dover and Kelman, 2018). People have the feeling that they can interact freely, and discuss things with people who share the same hobby - which is most of the time also a requirement for joining an online community (Arfini, Bertolotti & Magnani, 2017). Geocaching.com, one of the online communities, was created with the goal to improve the geocache-hunting experience (Geocaching, n.d.). This also gave geocachers the opportunity to connect with other geocachers, especially when social media was not as big as it is now. On opencaching.eu members give other members information about their placed geocaches, and information where to find them. Such websites make it easier for geocachers to ask questions about geocaches, as well as get to know other geocachers who prefer the same geocache style. Furthermore, there are several Facebook groups available for geocachers. In these Facebook groups geocachers can ask each other questions as well as discuss about all things related to geocaching. Thus, with geocaching, it is not just about participating and moving towards a specific location, it is also the (online) community that plays a big role.

What could be seen as an important concept related to geocaching, is Augmented Reality (AR). Geocaching can be seen as an AR game, as geocachers use a GPS location service to find the hidden objects in the game that they are playing outside. The geocachers are moving in real

time and can come close to the object which they are looking for. This therefore means that there are two different groups: people who can see the hidden objects and people who cannot see the hidden objects. This could be perceived as a digital or mental layer which geocachers can see, but non-geocachers cannot see (Liberati, 2017). As there is a layer which certain people cannot see, there might be some confusion about why geocachers are looking for caches at certain places, for example in the middle of a city. Geocaching involves individuals mediating between two different worlds: the internet and the outside world. (Ihamäki, 2012). This connects the online elements with the location-based elements - and the other way around. The perception of the surroundings of the geocachers might differ from those who are not geocaching. This can also be connected to the concept of sense of place.

2.6 Rural areas

The CBS (Centraal Bureau van de Statistiek) used a criterium in which a maximum of thousand addresses per km² are seen as rural. In 2004 that meant that 70% of the Dutch surface would be perceived as rural (Steenbekker, Simon, Vermij & Spreeuwens, 2008). Furthermore, in 2009 the CBS mentioned that half of the neighborhoods in the Netherlands can be classified as rural if there is being talked on a neighborhood level or with zip codes. According to Haartsen (2002), the word 'rural' is in the ideas of rural geographers more a social construction. In that case, the definition of the word rural also changes over time. It seems clear that there are multiple definitions of what 'rural' is. In this research, the 'G4' and 'G40' cities in the Netherlands have been used. The G4 are the four biggest cities in the Netherlands, and these cities cooperate together on many different occasions (CBS, n.d.) The G40 are the bigger cities in the Netherlands. These cities also cooperate together and the main aim of the G40 is to look after interests of all involved stakeholders. Furthermore, sharing knowledge is seen as an important value. Knowledge can be easily shared between the different cities and room is given to stakeholders, to make sure that everyone can benefit (G40 Stedennetwerk, n.d.). Cities or villages that are also part of the municipality of a G4 or G40 city are also classified as urban in this research.

2.7 Sense of place: place attachment

Another focus of this research is the concept of place attachment, which connects to sense of place (SOP). SOP is the sum of three features, which together create a dynamic process (Jorgensen & Stedman, 2001). The first feature is place attachment, which focuses on the emotional bond with a place. The attachment to a place is determined by the feelings that someone attaches to that place. The second feature is place identity, which is about the individual's personal identity in relation to the physical environment. This is created by the means of conscious as well as unconscious ideas, beliefs and feelings which are relevant to this place. It is a more cognitive structure, which can be a part of self-identification. The last feature is place dependence, which is about what the individuals perceived strength of association is between them and the specific place (Jorgensen & Stedman, 2001). While these three components are connected, they are not interchangeable. It is possible that someone with a low place identity has a high place attachment. Furthermore, important to note is that SOP is about the relations that one can have with a place, and not just about a place in general (Paasi, 2016). People can assign their own emotions to a place, which makes that there is no

true essence of place (or no genius loci). No place is neutral, and without meaning, a place would “just” be a space (Tuan, 1975).

In this research, the focus will be on place attachment in relation to the place that people are geocaching. With the questions that Jorgensen & Stedman (2001) asked in their research on lake shore owners’ attitude toward their properties, the place attachment of these geocachers will be questioned. Differences might arise, as some geocachers might live near the location of research and other visited the site once, only for geocaching purposes. Ryan (2002) found that length of residence positively influences appreciation of place, which indicates that if one lives close by, chances are that their attachment to place is stronger.

2.8 Conceptual model and hypotheses

On the basis of the literature, a conceptual model has been created (figure 1). Geocachers have different motivations as well as different profiles and could be part of different (online) communities. These are connected with each other and influence each other as well. Geocachers who are higher educated might be more aware of the damage that they can bring to an ecosystem, as well as that geocachers that geocache with their children might have problems with making sure that they do not damage nature.

Visible in this model is that ecosystem services have an important role when it comes to motivations of geocachers to go geocaching. Furthermore, the popularity of geocaching in the media has as a result that more people discover geocaching, which leads to more recreation and tourism. More tourism and recreation automatically ensure that there is more pressure on the ecosystem service, which is why they are connected to each other.

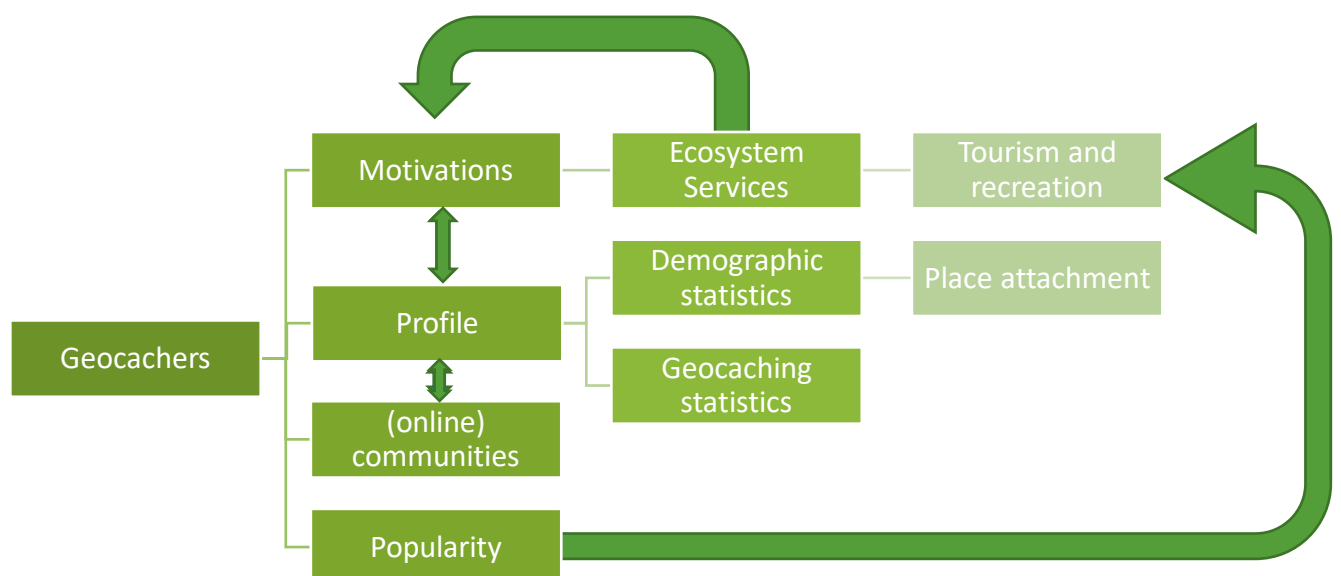


Figure 1: Conceptual model

Several hypotheses can be created on the basis of the literature found. The following hypotheses will be answered during this research:

Profile of geocachers

1. Geocachers have the same age as the population
2. There no differences between the geocaching groups when it comes to age at which a person started with geocaching
3. There are no differences between the groups of geocachers when it comes to educational levels
4. There are no differences between gender and total amount of found geocaches

Motivations of geocachers to go geocaching

5. Enjoying and experiencing nature is the most important motivation for geocachers
6. Different groups of geocachers have different motivations for geocaching

Motivations of geocachers on location and place attachment

7. Geocachers who live closer to the area have a higher place attachment than geocachers who live further away
8. There are no differences between men and women when it comes to most important reason to go geocaching
9. There are no differences between the created groups when it comes to most important reason to go geocaching

3. METHODOLOGY

The area selected for this research is Anderen, which is located in Drenthe (figure 2). Drenthe is a province in the north of the Netherlands. Anderen is located on the Hondsrug and near National Park de Drentse Aa, a place where much outdoor recreation takes place. In the province of Drenthe are two urban areas (based on the G4 and G40), which are the municipalities of Assen and Emmen. Further information about the study area is visible later in this chapter.

Research Area: Drenthe

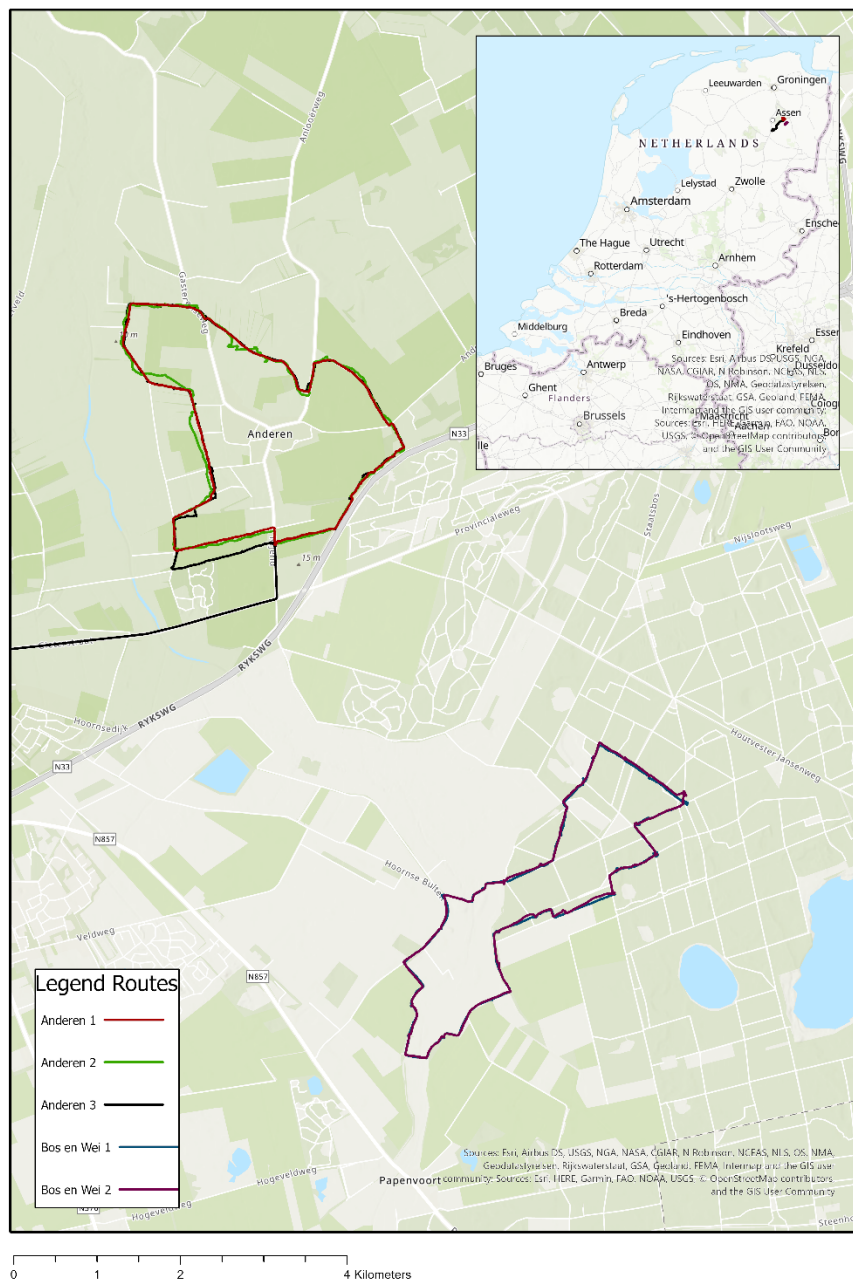


Figure 2: Research area

First, to gather general information about geocaching within academic literature, literature research has been done. Several (academic) articles were found about geocaching, which has become a more popular pastime in the last 10 years. Several articles looked at the motivations of geocachers when geocaching, which were of great value to this research. There were also many non-academic articles found about geocaching, of which some were from online communities about geocaching and others from news sites. This provided a lot of extra information. Not only research about geocaching was found, also research about (outdoor) recreation and tourism is an important aspect of this research. As geocaching can also be used as a way to discover an area during a vacation abroad, tourism can be seen as an important part of geocaching and geocaching an important part for tourism. This counts especially for geocachers, who can use geocaching and geocaches as an unofficial tour guide. Another important topic for this research is sense of place. For this research, an article about sense of place of Jorgensen and Stedman (2001) was used, to look at place attachment amongst people who geocache in Drenthe. The same questions about place attachment in that research were used in this research.

The focus of this research lies on quantitative methods, but with more qualitative elements. A questionnaire has been created to create a profile of geocachers who are geocaching near Anderen. In this questionnaire, two follow-up questions made sure that geocachers could elaborate on their previous answer. These questions were both related to the question “What would be the main reason for you to geocache (here in Anderen)?”. People could then describe what are also reasons for them, for example when they found that one answer would not be sufficient. Furthermore, this also gave geocachers the possibility to tell a story about how they started geocaching and how they use geocaching. This provided this research with valuable information.

In the questionnaire three different sections were presented. The first section consisted of questions about demographic characteristics, which could assist in creating a profile about geocachers. Questions about gender, age, marital status, education and current location of residence were asked. Furthermore, questions about geocaching in general were asked. When did they start geocaching, how many geocaches did they found, how many times they are geocaching, where they geocache mainly (in rural or urban areas) and if they geocache mainly alone or with other teams. In this way, geocaching characteristics could also be used to create a profile and see if there would be any differences in geocaching behavior. The second section of questions were more about geocaching motivations. What is an important reason for geocachers to go geocaching? To go deeper into this, a follow-up question gave the possibility to go in depth in the many different reasons that motivate people to go geocaching. The last section of questions were specifically focused on geocaching in Drenthe. Why did they choose to geocache in Drenthe, did they go geocaching alone or with other teams, what is their place attachment to the location in which they went geocaching and if they wanted to learn more about the surroundings of the walked geocaching route.

3.1 Data collection

The questionnaire has several different aspects, which flow from the theoretical framework.

The first section of question refers to the first sub question, about who geocachers are. Questions about demographic characteristics were asked, followed by statistics about geocaching. These questions could aid in creating a profile of geocachers in this region. Questions about motivations for geocaching were based on previous research. It is interesting to see how different people in different locations can have different motivations for geocaching. The questions in this research were mainly based on the article of Cord et al. (2015), who asked the same question about motivations for geocaching in relation to ecosystem services. The question about motivations has been used two times in the questionnaire: one for geocaching in general and one for geocaching near Anderen. For place attachment in Anderen an article of Jorgensen and Stedman (2001) was used, to see how attached geocachers are from the surroundings as well as from far away feel about Anderen.

3.2 Analyzing data

The results of the questionnaire were processed in SPSS and different statistical tests have been executed. At the beginning, a one sample t-test has been run to look at the age difference between geocachers and the Dutch population. Cord et al. (2015) found that the average geocachers is younger than the population of Leipzig. To see if this also connects with geocachers in Anderen, this test has been executed. To create three separate profiles of geocachers, three different groups have been created on the basis of the total number of found geocaches at that moment. This also provides demographic characteristics per group by the means of geocaching activity. Geocaching activity could show clear differences per group, which could be characteristics that purely connect to that group of geocachers. An ANOVA test has been run to look at differences between groups, specifically about at what age geocachers have found their first geocache.

When looking at motivations for geocaching in general, connecting to the second sub question, a more qualitative approach has been taken. People could fill in a follow-up question, in which they could elaborate on their most important reason to go geocaching. The answers that the geocachers gave were placed into different categories, such as nature, discovering new places and social contacts. People could have multiple motivations for geocaching, so it could be the case that people gave multiple answers and were also placed in multiple categories. The quotes that connected to a category, were presented and connected to earlier found literature.

The last part of the questionnaire has again a more quantitative approach. This section of the questionnaire consisted of a five-point Likert-scale, in which questions about place attachment were asked. The questions were based on research of Jorgensen and Stedman (2001). There was, again a question about the motivation of geocachers to go geocaching, but in this case specifically for Anderen. This was also followed by a follow-up question, which provided the opportunity to elaborate on the previous made choice. Several quotes have also been used from this question and connected to the literature. There were several geocachers who decided to send their spatial data, as in the questionnaire was still stated that if someone

has a GPX file, they could send it. The routes are incorporated in a map, and some additional information which was in the GPX files will be mentioned.

The questionnaire has been tested beforehand by different people, who gave feedback to make sure that the questions were clear to respondents. The researcher has reached out for respondents via Facebook as well as the website of geocaching.com. The group at the former platform consisted of more than 10000 members, but that proved not to be the most efficient way to collect data. After posting the questionnaire in the Facebook group, only 10 respondents filled in the questionnaire. At the latter platform, over 200 people were contacted who have walked in the vicinity of Anderen in 2020. This approach seemed to be more successful, as many people also replied that they filled in the questionnaire.

Furthermore, in later chapters the differences between people who live near Anderen and those who do not live near Anderen will be presented.

3.3 Ethics

Next to the influence of the COVID-19 pandemic, there were several other ethical considerations that needed to be considered.

First, when opening the questionnaire, geocachers were informed that the data that was being collected will only be used for this research. By starting the questionnaire, people agreed to the informed consent (Dowling, 2016; Hay, 2016). Anonymity can be guaranteed, as the identity of a geocacher is not relevant for this research.

Second, the researcher was not a part of the researched group. On the one hand, this made it easier while on the other hand, it made it more difficult. Because I was (are) an outsider, it was interesting to learn more about geocaching in general. I was already familiar with geocaching, as my boyfriend has been an active geocacher for several years. He gave additional information about geocaching as well as information about how to find things on and navigate through the website geocaching.com. Becoming a member of geocaching.com was the easy part. This website gave access to the different routes that were chosen beforehand, and which geocachers have found the geocaches on those specific routes. More difficult was the access to Facebook and making sure that the questionnaire was promoted via social media. In (private) Facebook groups, I needed to ask permission to join the group and to post the questionnaire in the group. After a week I had only five filled in questionnaires and one geocacher who wanted to collect spatial data for this research.

Third, as the questionnaire was online, people also needed to be approached online. Because approaching via Facebook did not work as planned, a different approach was needed. The idea was to send a message to every geocacher who have walked one of the three selected routes near Anderen (the routes are called Bos & Wei, Anderen and Rondje Hondsrug). This message would be sent via geocaching.com, in which is visible when a geocacher has collected a certain geocache. A short introductory message with some basic information, a link to the questionnaire and the question if they would like to fill in the questionnaire was written and send to over 230 geocaching teams. Not everyone wanted to fill in this questionnaire, as the message via geocaching are mainly used for asking question about a certain geocache or route

that the geocacher owns. This gave people the opportunity to fill in the questionnaire if they wanted, or not to if they did not want to participate in this research.

Lastly, There are several geocachers that stand out in this research, and mainly because the number of geocaches that they have found is low or high. The person with the least amount of geocaches found, has six found geocaches. The person with the highest amount of geocaches found however, has more than 50000 geocaches found. The decision has been made to keep them both in the data set, as these outliers influence both sides of the number.

3.4 Study area

The location where this research is conducted is near Anderen, which is located in the province of Drenthe (figure 2). This location is near National Park Drentse Aa, a place where much outdoor recreation takes place. National Park Drentse Aa is furthermore located on the Hondsrug, which is a geopark appointed by UNESCO. This location is an important cultural as well as natural area, which has been formed by the last ice age in the Netherlands (De Hondsrug, n.d.).

Geocaches in this area are frequently found by geocachers, which is visible on the website geocaching.com. “Anderen” has been found over 2400 times, “Wei en Bos” has been found over 2200 times and “Rondje Hondsrug” has been found 500 times. The latter geocache route has been online for almost a year, whereas the former two have been online for more than three years.

Choosing for Anderen as a location for research has several reasons. First, in the region of Anderen are three geocaching routes, which are walked quite frequently. These are “Rondje Hondsrug”, “Bos en Wei” and “Anderen”. Beforehand, this information was visible on the website geocaching.com, on which statistics can be found on all placed routes. As these geocaching routes are walked often, it is easier to find participants who would like to walk and geocache there. This also means that there are many geocaching teams that have already walked this route and might be willing to fill in the questionnaire. Second, there are many rural areas in Drenthe. As this research focuses on rural areas specific, Drenthe is ideal – with only the two bigger cities of Assen and Emmen. Third, Anderen is easily accessible for the researcher. Before starting with the data collection phase, the three routes located near Anderen had been visited and walked. All three routes were observed and walked in two weeks, to see what geocachers could encounter during their walk. Furthermore, tracking app Strava has been tested, to see how it works, as well as making it easier to explain to geocachers who had never used Strava before. The initial idea was to let geocachers walk one of these three routes and collect spatial data. This could have been done with a tracking app such as Strava, a GPS tracker or with their own GPS system. With the questionnaire, a profile could be created of the different geocachers and how these geocachers differ in their spatial behavior when they are geocaching. It could be the case that people who walk mostly alone are much faster than people who walk with children or a bigger group. It could also be the case that people who are retired take more time to geocache and take several breaks during geocaching. This would have been visible when people track their routes.

4. RESULTS & ANALYSIS

In this part, the results of the questionnaire will be presented. By means of the sub questions, the results will be presented. In the 'discussion' section, the results will be discussed in comparison with other theories that have been found, except for the second sub question. Other results and descriptive statistics can be found in the appendix of this thesis.

The questionnaire was filled in by 140 geocachers, and this group consists of 78 men and 62 women. The year of birth ranges from 1943 until 2003, which makes it a quite diverse group of respondents (figure 3). The average age at which people started geocaching is 42 years, of which the youngest started at the age of 10 and the oldest started at the age of 67.

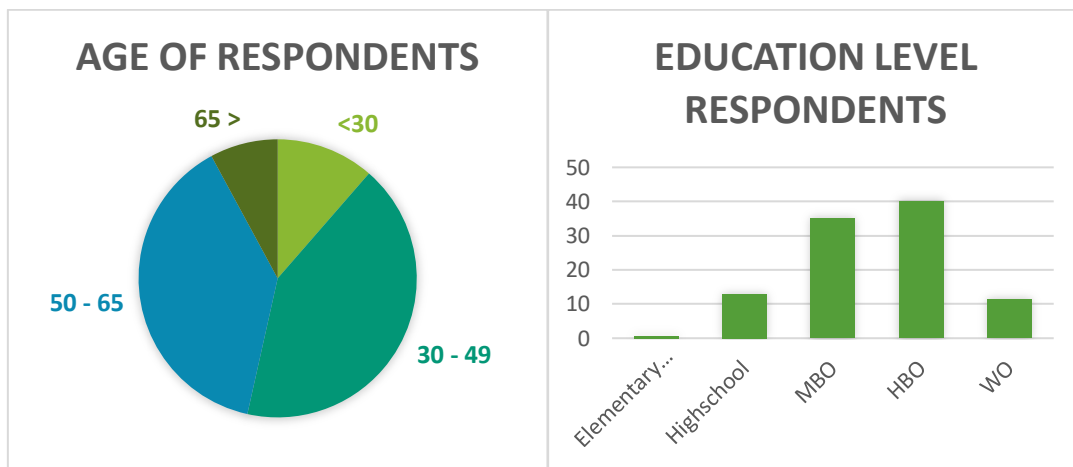


Figure 3: Age and education level of respondents

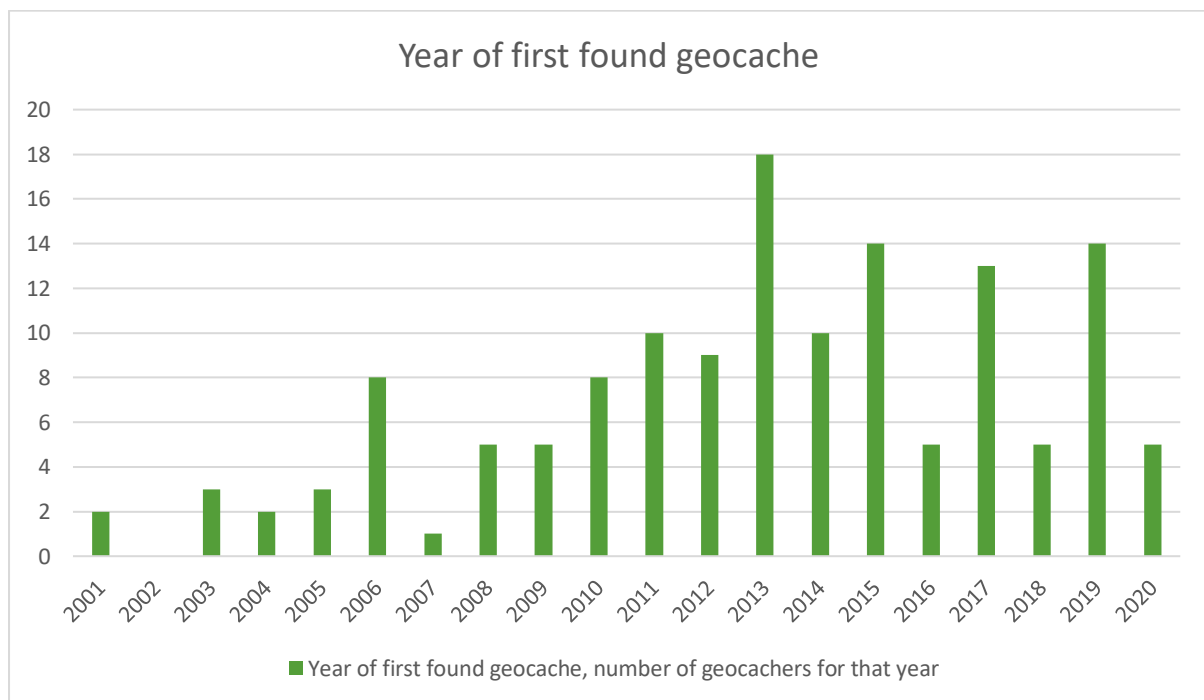


Figure 4: Year of first found geocache

Most of the respondents (70%) come from one of the three northern provinces (Groningen, Friesland, or Drenthe, visible in figure 5). 61% of the respondents live in a rural area and 39% lives in an urban area (based on the G4 and G40). In figure 5, a map where the respondents come from is presented. 63% of the respondents is married, 26% is not married and 11% is divorced or has a registered partnership. Education levels are quite diverse, as 40% of the respondent passed their (Dutch) applied university education, 35% passed their MBO education, 11% has a degree from university and 13% finished high school (figure 3). There is one person who (at this moment) only finished elementary school - but this respondent is also the youngest one.

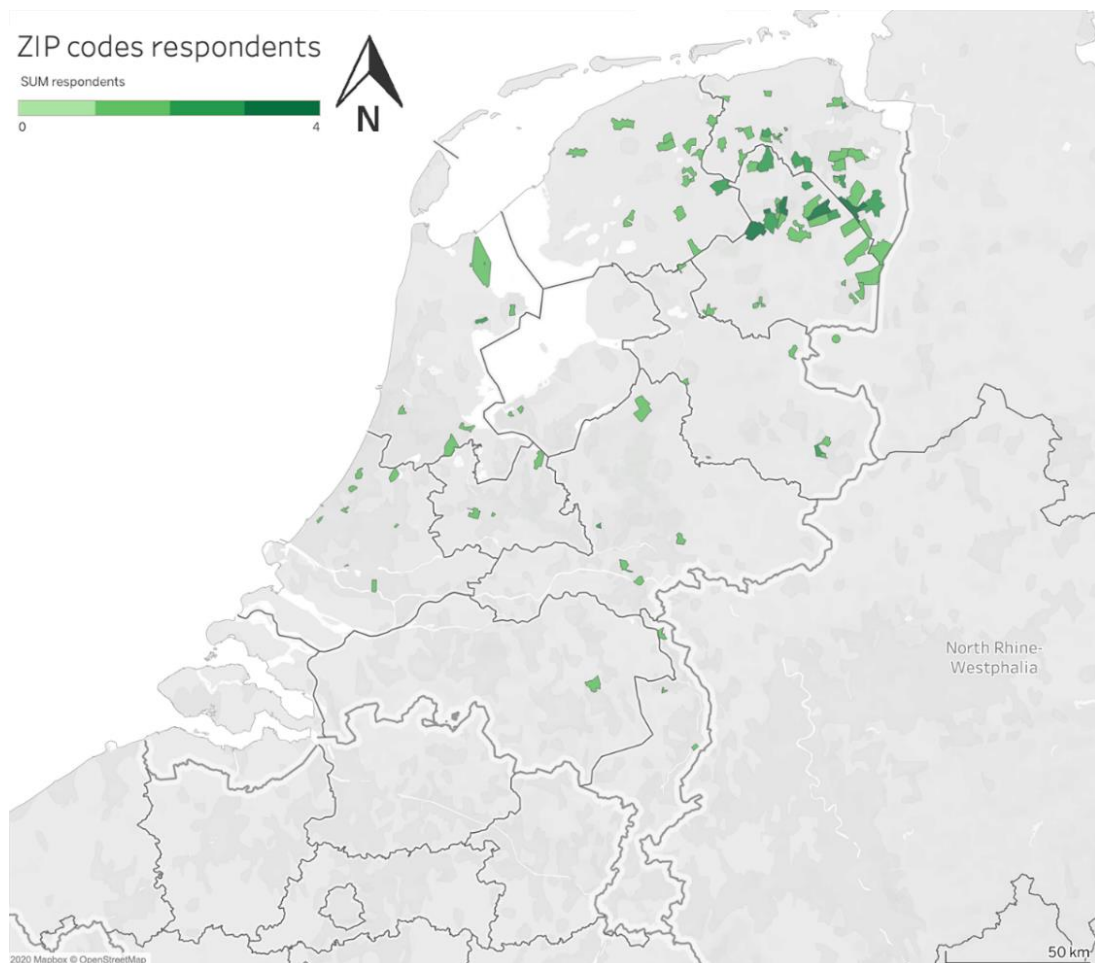


Figure 5: Where do respondents live?

Most geocachers in this research have found their first geocache between 2011 and 2015 (44%), but there are also some geocachers who started between 2001 and 2005 (7%), just shortly after geocaching emerged. Almost 70% of the respondents mentions that they are geocaching at least once a week (figure 6). And while most geocachers like to go geocaching with others (46%), there are also many geocachers who like to go geocaching on their own (30%) (figure 6). Geocachers are mainly inclined to go geocaching in rural areas (76%), while only 2% is mainly geocaching in urban areas – the others are geocaching in both places equally. Furthermore, the geocachers in this research have found on average 3648 geocaches. The

person with the lowest number of found geocaches has found 6, while the person with the highest number of found geocaches has found over 53,330 geocaches. Both these persons identify as a female, while the research population consists of more men than women.

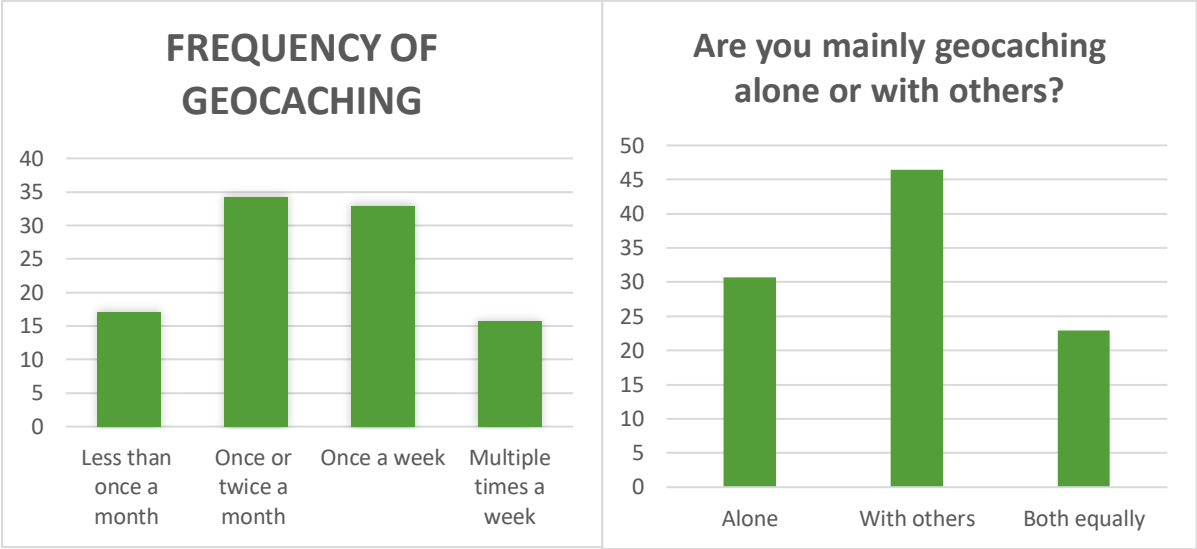


Figure 6: Frequency and social contact

To see if there are any differences between the year of birth of the respondents and the year of birth of the population, a one sample t-test has been run. The SPSS outcomes are visible in table 2:

One-Sample Statistics						
	N	Mean	Std. Deviation	Std. Error Mean		
Year of birth	140	1971,26	13,183	1,114		
One-Sample Test						
Test Value = 1978						
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Year of birth	-6,045	139	,000	-6,736	-8,94	-4,53

Table 2: One Sample T-Test year of birth

The average year of birth in the group of geocachers is 1971,26, which translates to 1971 and 3 months, or 49 years. There is a difference of -6,736 birth years (almost 7 years) between the respondents and the given test value, which is the average year of birth in the Netherlands (CBS, 2019). This is also what the significance level 0,000 confirms.

For this thesis, several sub questions have been created. The next four sub chapters will discuss them separately and with their own different hypotheses.

4.1 Who are these geocachers?

To create a profile on who these geocachers are, the geocachers are split into different groups, which are based on their total finds at the moment of questioning. These different groups are created to look at differences between people who are more (or less) active in geocaching than others. In this way, the distinction between people who are geocaching often and people who are geocaching less can be easily made.

The first group consists of geocachers who have found less than 600 geocaches in total, the second group has found between 600 and 2500 geocaches and the final group has found more than 2500 geocaches. The reason to choose for this distinction, is to have three equal groups on basis of the number of geocachers. This means that every group consists of about 45 geocachers. With separating geocachers in separate groups, it becomes clear which type of characteristics belong to these groups.

The reasons to choose for demographic characteristics is to look at differences between three groups, which also has been done in research of Cord et al. (2015) and Falcao et al. (2016). The five demographic characteristics make it easy to see if certain characteristics are more common in a group of geocachers who have found more geocaches than others.

Furthermore, also geocaching information is displayed in the several tables. This to see how long geocachers have been geocaching, how often they are geocaching, where they are geocaching and when they have found their first geocache. In this way, clear distinguishable features per group can be seen, also with the geocaching characteristics between the different groups.

Lastly, each group has been given a name to make it more distinguishable.

4.1.1 Less than 600 found geocaches

The first group consists of geocachers that have less than 600 found geocaches. This group is called 'intermediate'. These are mainly geocachers who are geocaching at a certain moment in time, and some of these geocachers have not been geocaching for a long time.

This group consists of 43 different geocachers, of which 20 are men and 23 are women. Statistics of this group can be found in the following table (3).

Less than 600 found geocaches: Intermediate				
Gender	Male (46,5%)		Female (53,5%)	
Current residence	Rural (60,5%)		Urban (39,5%)	
Current residential province	Groningen (30,2%)	Drenthe (44,2%)	Friesland (4,7%)	Other (20,9%)
Age	<30 (27,9%)	30-49 (51,2%)	50-64 (18,6%)	65> (2,3%)
Marital status	Married (41,9%)	Not married (46,5%)	Registered partnership (7,0%)	Divorced (4,7%)
Highest education	Highschool and elementary school (11,6%)	MBO (32,6%)	HBO (41,9%)	WO (14,0%)
How many times do you geocache?	Multiple times a week (2,3%)	One time a week (18,6%)	One or two times a month (39,5%)	Less than once a month (39,5%)
Where do you geocache mainly?	Outside the city (74,4%)	In the city (7%)	Both equally (18,6%)	
Do you mainly geocache alone or with other teams?	Alone (18,6%)	With others (58,1%)	Both equally (23,3%)	
First geocache found in:	2001-2005 (0,0%)	2006-2010 (7,0%)	2011-2015 (30,2%)	2016-2020 (62,8%)

Table 3: Less than 600 found geocaches

28% of these geocachers is younger than 30 years, and 51% is between 30 and 49. The average age of this group is 41 years. The youngest person in this group is 17 years and the oldest 67 years old. Noticeable in this table is that the education level of this group is high, as more than 50% completed a applied university (HBO) or university education. The biggest part of this group is not married (47%), followed closely by those who are married (42%). 60% of these geocachers live in rural areas, and almost 80% of these geocachers are from one of the three northern provinces in the Netherlands.

Furthermore, geocaching is not done actively, as 79% says that they go geocaching one or two times a month or less. These geocachers are mainly geocaching with others (58%) and are mostly geocaching in areas outside the city (74%). Most of these geocachers have found their first geocache between 2011 and 2020 (93%).

4.1.2 Between 600 and 2500 found geocaches

The second group is called “advanced”, and this group has individually collected between 600 and 2500 geocachers. These are geocachers who have already been geocaching for quite a while.

This second group consists of 46 geocachers in total, of which 25 are male and 21 are female. The statistics of this group can be found in the following table (4):

Between 600 and 2500 found geocaches: Advanced				
Gender	Male (54,3%)		Female (45,7%)	
Current residence	Rural (58,7%)		Urban (41,3%)	
Current residential province	Groningen (37%)	Drenthe (26,1%)	Friesland (10,9%)	Other (26,1%)
Age	<30 (2,2%)	30-49 (47,8%)	50-64 (41,3%)	65> (8,7%)
Marital status	Married (76,1%)	Not married (19,6%)	Registered partnership (2,2%)	Divorced (2,2%)
Highest education	Highschool and elementary school (8,7%)	MBO (37,0%)	HBO (39,1%)	WO (15,2%)
How many times do you geocache?	Multiple times a week (10,9%)	One time a week (34,8%)	One or two times a month (41,3%)	Less than once a month (13,0%)
Where do you geocache mainly?	Outside the city (73,9%)	In the city (0%)	Both equally (26,1%)	
Do you mainly geocache alone or with other teams?	Alone (34,8%)	With others (50,0%)	Both equally (15,2%)	
First geocache found in:	2001-2005 (10,9%)	2006-2010 (19,6%)	2011-2015 (50,0%)	2016-2020 (19,6%)

Table 4: Between 600 and 2500 found geocaches

There is a difference between the age from the beginner group, and the age in the experienced group. 48% is between the age of 30 and 49 and 41% is between the age of 50 and 65. The average age in this group is 52 years, where the youngest is 30 years and the oldest is 75 years old. These geocachers mainly live in rural areas (59%) and are also mainly from the three northern provinces of the Netherlands (74%). More than 75% of this group is married and education levels MBO and applied university degrees are finished with respectively 37% and 39%.

Most geocachers are geocaching once or two times a month (41%), closely followed by geocaching one time a week (35%). These geocachers geocache mostly with other geocachers (50%), but do not mind geocaching alone (35%). Finally, most people started geocaching between 2011 and 2015 (50%).

4.1.3 More than 2500 found geocaches

The final created group consists of geocachers who have found more than 2500 geocaches. Therefore, this group is considered as “expert”, as they could be considered as the ‘experts’ of geocaching.

This group consists of 51 geocachers in total, with 33 males and 18 females. The statistics of this last group can be found in the following table (5):

More than 2500 found geocaches: Expert				
Gender	Male (64,7%)		Female (35,3%)	
Residence	Rural (64,7%)		Urban (35,3%)	
Province	Groningen (19,6%)	Drenthe (27,5%)	Friesland (13,7%)	Other (39,2%)
Age	<30 (5,9%)	30-49 (29,4%)	50-64 (52,9%)	65> (11,8%)
Marital status	Married (70,6%)	Not married (13,7%)	Registered partnership (9,8%)	Divorced (5,9%)
Highest education	Highschool and elementary school (19,6%)	MBO (35,3%)	HBO (39,2%)	WO (5,9%)
How many times do you geocache?	Multiple times a week (31,4%)	One time a week (43,1%)	One or two times a month (23,5%)	Less than once a month (2,0%)
Where do you geocache mainly?	Outside the city (80,4%)	In the city (0%)	Both equally (19,6%)	
Do you mainly geocache alone or with other teams?	Alone (37,3%)	With others (33,3%)	Both equally (29,4%)	
First geocache found in:	2001-2005 (9,8%)	2006-2010 (29,4%)	2011-2015 (49,0%)	2016-2020 (11,8%)

Table 5: More than 2500 found geocaches

53% of these geocachers are between 50 and 64 years, which means that this group is also the oldest one of the three, the average age in this group is 54 years. The youngest person in this group is 21 years old and the oldest 77 years old. 71% of these geocachers are married and most of these geocachers finished a Dutch applied university education (39%), and 65% lives in a rural area. In this group, the percentage of geocachers that do not live in one of the northern provinces is the highest (39%). 71% of these geocachers are married.

These geocachers are mostly geocaching multiple times a week (31%) or once a week (43%). Just like the second group, around the 10% started geocaching between 2001 and 2005. Finally, these geocachers are mainly prefer geocaching alone (37%) and outside of the city (80%).

4.1.4 Differences between groups

An ANOVA test has been run to see if there are any differences in the age of geocachers when they start geocaching between the three groups. There is a significance level of 0,04, which indicates that there is a difference between the age of geocachers when they start geocaching between groups. A post hoc test elaborates on this result further (table 6). Differences can be seen between the intermediate group with the advanced and the expert group. The advanced and expert group have differences with the first group, but not with each other.

ANOVA						
Age Start						
	Sum of Squares	df	Mean Square	F	Sig.	
Between Groups	1522,794	2	761,397	5,698	,004	
Within Groups	18305,244	137	133,616			
Total	19828,171	139				
Multiple Comparisons						
Dependent Variable: Age Start						
Bonferroni					95% Confidence Interval	
(I) Total found geocaches	(J) Total found geocaches	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
<600	600-2500	-6,843	2,452	,018	-12,79	-,90
	2500>	-7,939	2,393	,007	-13,19	-1,59
600-2500	<600	6,843	2,452	,018	,90	12,79
	2500>	-,550	2,350	1,000	-6,25	5,15
2500>	<600	7,393	2,393	,007	1,59	13,19
	600-2500	,550	2,350	1,000	-5,15	6,25
*The mean difference is significant at the 0.05 level						

Table 6: ANOVA Starting age

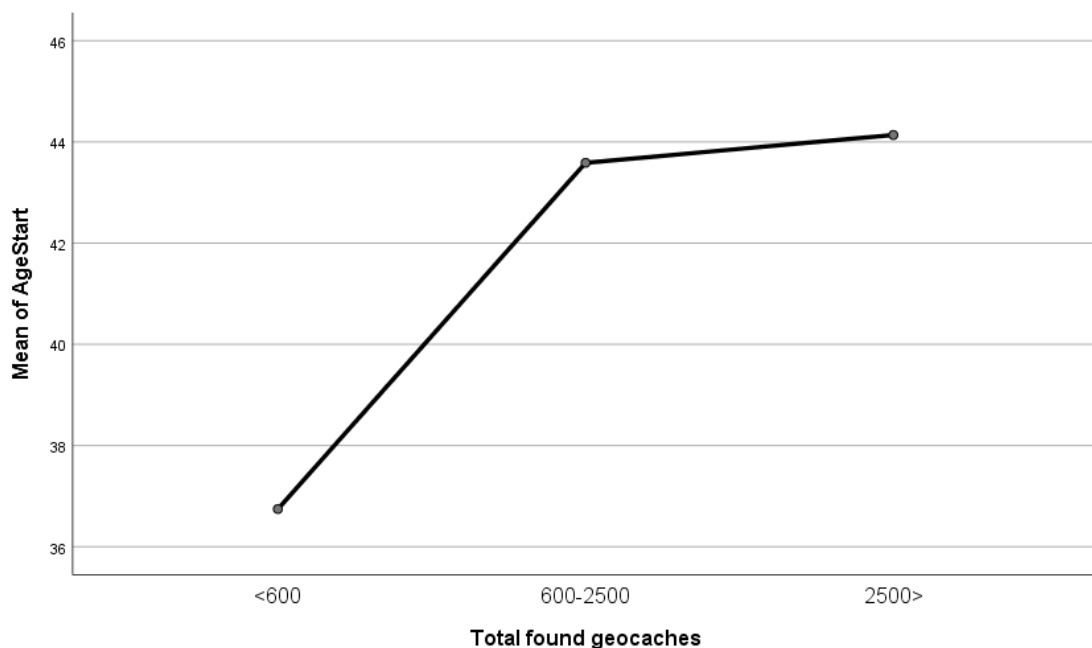


Figure 7: Mean plot of ANOVA starting age of geocachers

From the tests follow that people who are in the intermediate group started geocaching when they were around 37 years. People who are in the advanced group have started geocaching on average just before 44 years, whereas people in the expert group started geocaching when they were 44 years old. This is visible in figure 7, which portrays a mean plot of this ANOVA. So, geocachers who have found more geocaches started on a later age with geocaching than geocachers who have found less geocaches. There is a seven-year differences between the group with the least and the group with the most found geocaches. This indicates that many people find this hobby when they are already at a working age.

A chi-square test has been executed look if there are any differences between the groups when it comes to educational levels. The results of this test are visible in table 7.

Education Level * Total found geocaches Crosstabulation					
		Total found geocaches			
		<600	600-2500	2500>	Total
Education level (finished)	Elementary school and High school	5	4	10	19
	MBO	14	17	18	49
	HBO	18	18	20	56
	University	6	7	3	16
Total		43	46	51	140
Chi-Square Tests					
		Value	df	Asymptotic Significance (2-sided)	
Pearson Chi-Square		4,664a	6	,588	
Likelihood Ratio		4,850	6	,563	
N of Valid Cases		140			
a. 1 cells (8,3%) have expected count less than 5. The minimum expected count is 4,91.					

Table 7: Chi square education level and total found geocaches

The chi-square presents, with a significance of 0,588, that there is a significant difference between the three created groups and their educational level. This means that educational levels differ between the created groups. This is also visible in table 5, where geocachers who have found the most geocaches have the lowest percentage of people who graduated from applied university or university.

A last chi-square test was executed to look at differences between the three groups and two genders, men and women, as previous research has pointed out that mainly men are geocaching. The results are presented in table 8. These last results present a significance level of 0,204. This indicates that there is a difference between gender and the total amount of found geocaches. This means that gender differs between the three presented groups.

Total found geocaches * Gender Crosstabulation				
		Gender		Total
		Male	Female	
Total found geocaches	<600	20	23	43
	600-2500	25	21	46
	2500>	33	18	51
Total		78	62	140
Chi-Square Tests				
		Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square		3,182a	2	,204
Likelihood Ratio		3,203	2	,202
N of Valid Cases		140		
a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 19,04				

Table 8: chi square total found geocaches and gender

4.2 Why are geocachers geocaching?

To answer the question about why people are geocaching, another question was asked in the questionnaire: “What is an important reason for you to go geocaching?”. This question was a multiple-choice question, based on the research of Cord et al. (2015). People could elaborate further on this question afterwards. The results of this question were quite diverse, as can be seen in the following figure (8).

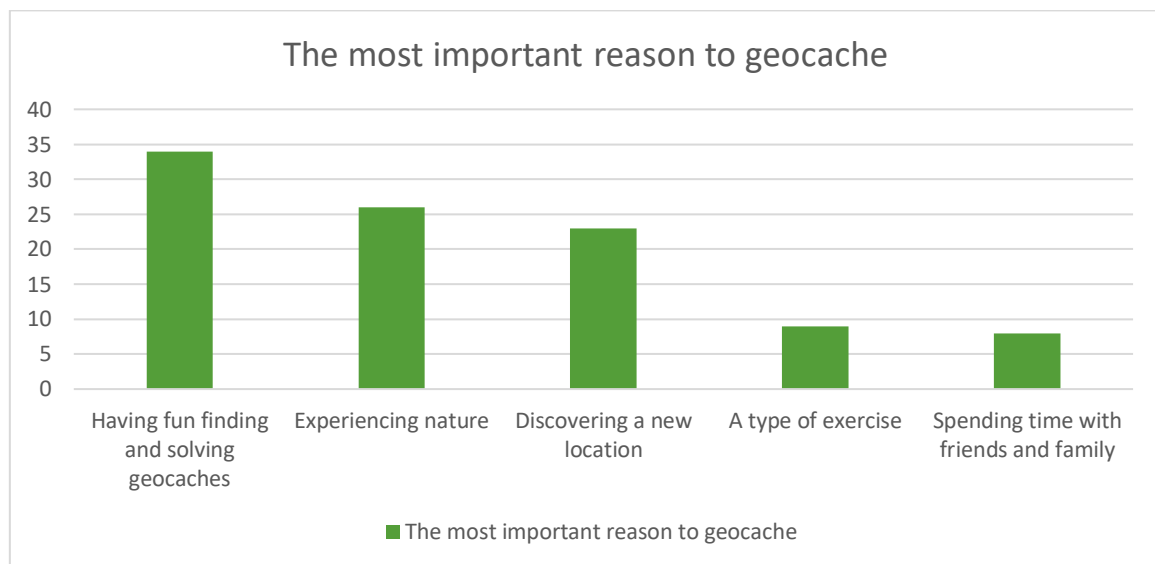


Figure 8: the most important reason to geocache

Most people answered that having fun in solving and searching for caches was their most important reason (34%). There was a follow-up question to make sure the geocachers could further elaborate on this, but this question could also be used to reflect on other reasons that might be of importance to them. What should be noted is that the researcher decided that everyone had an unlimited amount of answers. Some people gave three answers, others gave two. For analysis purposes, the researcher sorted the answers (the follow-up question was filled in by 90 of the 140 respondents) into different themes. The different themes are discovering new places, nature, exercise, education, social contacts, purpose, and relaxation.

31 geocachers mentioned in this follow-up question that discovering places they have never been to is quite important to them, which is exemplified in the following quotes:

“(…)and you visit so many beautiful places of which you didn’t even know they existed; it is quite an addictive hobby”

“What is better than walking through nature and discovering this place with the help of non-existing posts, which we would have never found otherwise?”

“when I am on a holiday, I use geocaching to guide me to special locations”

“we are geocaching a lot during holidays; you see the most beautiful places (...) and you visit places where a tourist office would not lead you. You meet geocachers all over the world, and they can tell you a lot about all those beautiful places”

Geocaching is also used by many when going on a holiday, as it provides them to visit other areas than the more regular touristic places. The first quote exemplifies that you have the possibility to discover many new places, which can be addictive to many geocachers. Furthermore, the second quote illustrates that there is nothing better than walking through nature and discovering this place with the help of non-existing posts. So, geocaching helps people discover places which they would otherwise not have found. Next to that, geocaching is also used as a guide during vacations, which is visible in the third and fourth quote. Geocaching can give people another kind of tour than ‘regular’ city tours, plus it also gives the opportunity to learn about that specific location. Cities that have not been explored by geocachers are mentioned as well, as it gives them the opportunity to learn more about a certain city, which can change their view of a place. This result is also found by Garney et al., (2016), Balzan and Debono (2018) and Telaar et al., (2014).

Exploring a region with the help of geocaching was the second found reason in the research of Cord et al. (2014). Another point they mention is that discovering and learning more about one's own region is also considered as important, which is also visible in the quotes above. This connects also to (cultural) ecosystem services, described by Daniel et al. (2012) and Cord et al. (2015). Tourism and recreation is seen as an important part of geocaching, as geocaching can be a guide for people. It gives people the possibility to enjoy nature, learn things about their surroundings and discover new places.

Another important aspect is nature, which is mentioned by 25 geocachers. Nature was also mentioned in the first question, and 25,71% of geocachers found that the most important reason for geocaching in general. Several answers are giving to why nature is important:

“I really like to walk in nature, and I especially like to be in the more quiet areas (...)”

“Being outside and looking for beautifully created caches, which connect to nature is very important to me (...)”

“You discover how beautiful Dutch nature is..near your home, as well as in your own province and throughout the Netherlands”

The quotes above show that nature plays an important part for people who are geocaching. People like to walk in the quieter areas as it gives them an opportunity to relax and unwind a bit from their day-to-day lives. There are also quite creative geocache makers, who also place them and connect their geocache to the nature it has been placed in, which the second quote exemplifies. People can really enjoy the creativity that comes with geocaches and the effort that other geocachers can put into geocaches. The last quotes also connects to the former point about discovering new places - you can also discover nature near you own house or village, which is an important factor. Cord et al. (2015) and Telaar et al., (2014) found in their researches that being in nature is the most mentioned reason for geocaching in general.

What connects to nature is that many people enjoy walking in nature, but with geocaching walking gets an extra purpose. There is a goal connected to 'just walking', which 17 geocachers mentioned as important to them. Geocachers have the possibility to learn something from the area, for example from the culture or nature itself. This gives many geocachers a (sometimes needed) extra dimension to walking in nature.

Geocaching as a form of exercising, such as a daily walk, is also mentioned frequently, by at least 22 geocachers, while 9% mentioned that in the earlier question. This could mean that seeing geocaching as an exercise might not be the top priority of geocachers, but they do see it as important enough for them to mention. This result was also found by Balzan and Debono (2014), who note that geocaching as an exercise can be quite important for people. In that way, geocaching make sure that people go out of their homes and go for a walk of several kilometers.

Regarding social contacts, in the question about selecting the main reason, spending time with friends or family was selected by 8% of the respondents. This did not include gaining social contacts during geocaching itself, which is surely included in the following quotes. Geocaching as a way of connecting with others (other geocachers or friends) are also mentioned in 19 responses, which the following quotes illustrate:

"We started to motivate our children to come with us to, for example, a forest. By adding a search- and game element to the walking, our children also liked going to the forest with us."

"Geocaching is a sort of outing for my family. Just a little bit of time for each other and our hobby"

"Geocaching makes sure that you connect more easily with other groups, because everyone has the same goal. Because of that, groups of geocachers connect spontaneously, who then hang out together. It is a social thing."

"It is also important to me to do this together with my wife. Participating in this hobby together also brings us closer together"

Geocaching seems to give people another opportunity to connect with other, while they know them or not. The first and second quotes illustrate that children can also play a role when it comes to selecting a location to geocache. With the search- and game element that is incorporated in geocaching in general, the children seem to be more enthusiastic about joining their parents. Geocaching in that sense also seem to be a hobby for families, to spend time together at certain locations and practicing the same hobby. The third quote illustrates the latter point: because you practice the same hobby (or have the same goal), you might be more inclined to contact other geocachers. It might be the case that, on a sunny day, you encounter other geocachers and connect with each other. Some geocaches (for example some during the night) are more safe or fun to do with others, which adds to the social component of geocaching. The last quote exemplifies that geocaching is also important for couples who have been together for a longer time. It can make couples happy as well as bring them closer together. The social aspect is also what Cord et al. (2015 and Telaar et al. (2014) found in their

research, but just like in this research, it was deemed less important than enjoying nature. It seems that social contacts are somewhat less important for geocachers.

46% of the respondents said that they are mostly geocaching with other teams. This illustrates that social contact can be of importance for many geocachers. On the other hand, there are also teams that consist from multiple people, which could be the case with families or couples. 30,7% mostly geocaches alone - which is also what some of the people in the follow-up question mentioned. They like the peace and quiet while geocaching, and it gives them a chance to rewind:

“relaxing, clearing your head and putting everything from work aside for a moment”

“it is my way to disconnect from the daily structure, and the peace that geocaching brings clears my head”

“This hobby gives me peace and quietness. You focus on something else. You can see the change in your geocaching statistics, and the “addicting” part is that you want to score better in all of the categories.”

In the first quote, the respondent mentions that with geocaching, you have the possibility to clear your head for a while. It might be the case that this person had a rough workday, and he or she can relax when geocaching. The latter quote illustrates something different, that it can also be a more addictive hobby. He mentions that he sees geocaching as a way of focusing on something else. He adds to that, that he really likes seeing the statistic change over time and see how many geocaches he has collected. He wants to be better in the different categories and thus he wants to find more geocaches. This more competitive view is also found in researches by O’Hara (2008) and Garney et al. (2016).

4.3 Why are geocachers geocaching in Drenthe?

Lastly, geocachers were asked to elaborate on why they are geocaching in Drenthe and how they feel about that specific place.

First, four questions about their place attachment to Drenthe were asked, by the means of a Likert-scale. Place attachment is about the emotional bond that people have with a place. This has been measured based on the research of Jorgensen and Stedman (2001), who asked the same questions regarding sense of place. The results from all the questions are visible in the following table (9). Noticeable is that with each question, the standard deviation grows and the mean gets lower, suggesting that the respondents had more diverse answers near the latter questions. The place attachment of geocachers in Drenthe is furthermore visible in figure 9, which create an image about how the answers shifted.

Descriptive Statistics						
	N	Minimum	Maximum	Median	Mean	Std. Deviation
I feel comfortable when I am geocaching here	140	2	5	4,00	4,43	,636
I feel happy when I am geocaching here	140	2	5	4,00	4,21	,662
Drenthe is my favorite place for geocaching	140	2	5	3,00	3,29	,773
I miss geocaching in Drenthe when I haven't done that in a long time	140	1	5	3,00	2,74	1,050
Valid N (listwise)	140					

Table 9: Descriptive statistics place attachment

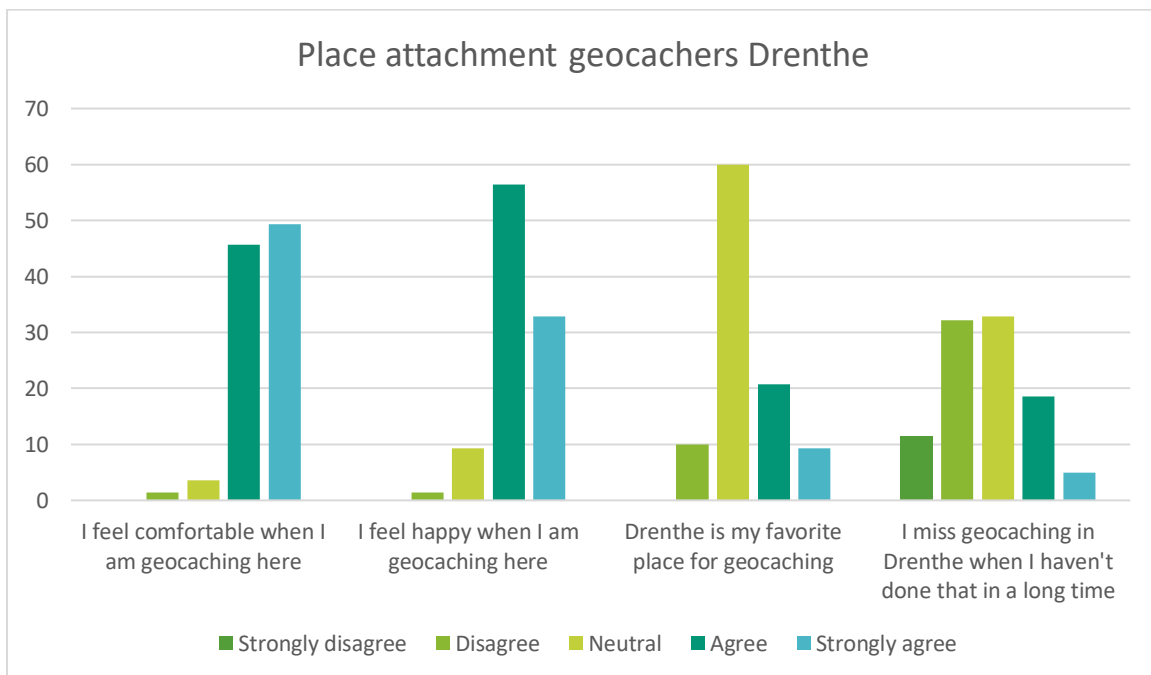


Figure 9: Place attachment geocachers Drenthe

While we cannot calculate what the mean is, since it is an ordinal variable, the median displays that geocachers feel both comfortable and happy while geocaching in Drenthe (table 9). Furthermore, geocachers became more neutral when seeing Drenthe as their favorite place for geocaching. This also counts for missing Drenthe when geocachers have not been there for a long time. We can see from the standard deviation that the answers became more diverse, which indicates that geocachers became more neutral in the latter questions (table 9).

70% of the respondents come from the three northern provinces in the Netherlands, which are Groningen, Drenthe and Friesland. Building forth on this, it could be the case that place attachment differs between geocachers who live in the north of the Netherlands and geocachers who live outside these three provinces. This information will be displayed in figures 10 and 11.

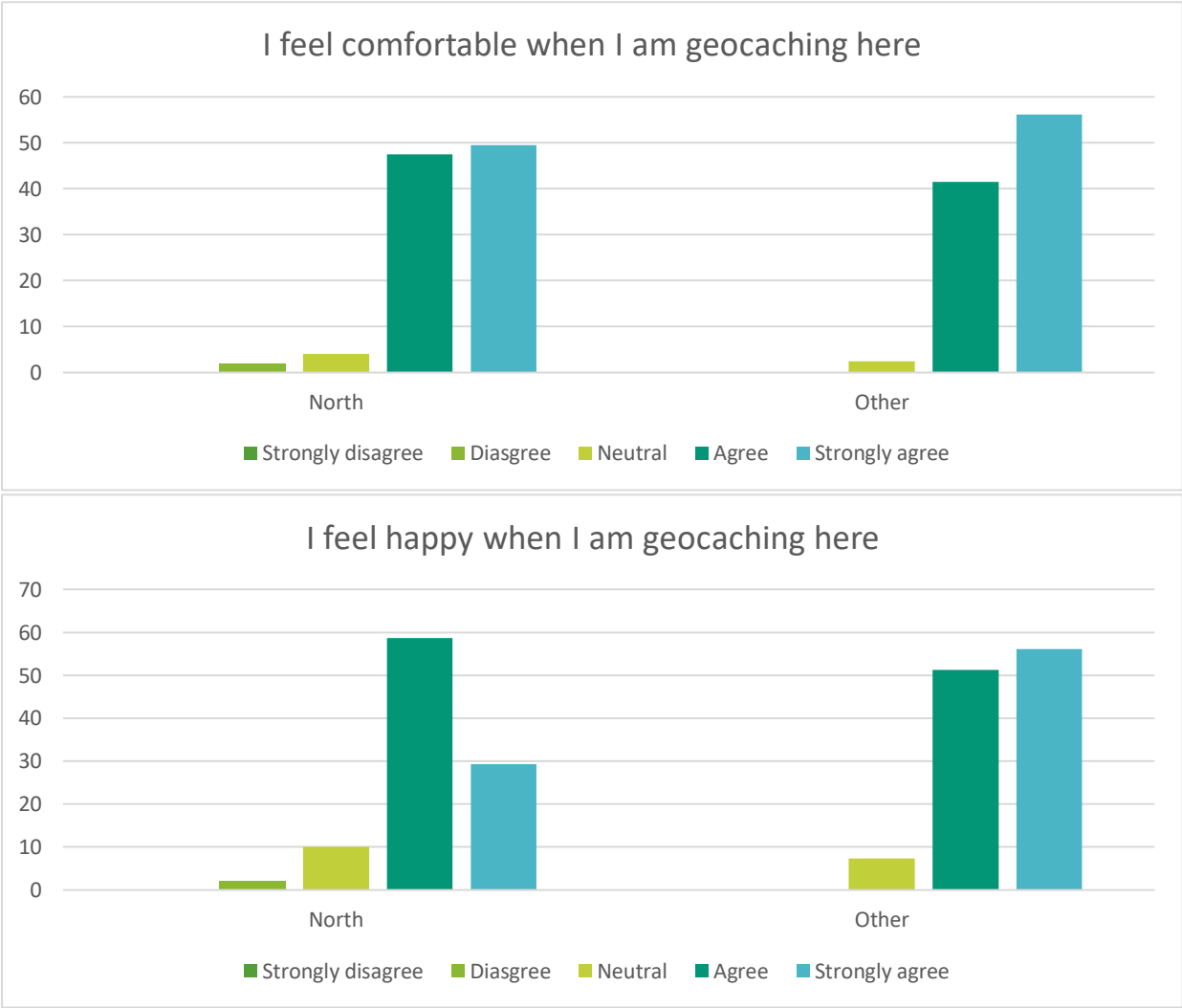


Figure 10: I feel comfortable and I feel happy when I am geocaching here

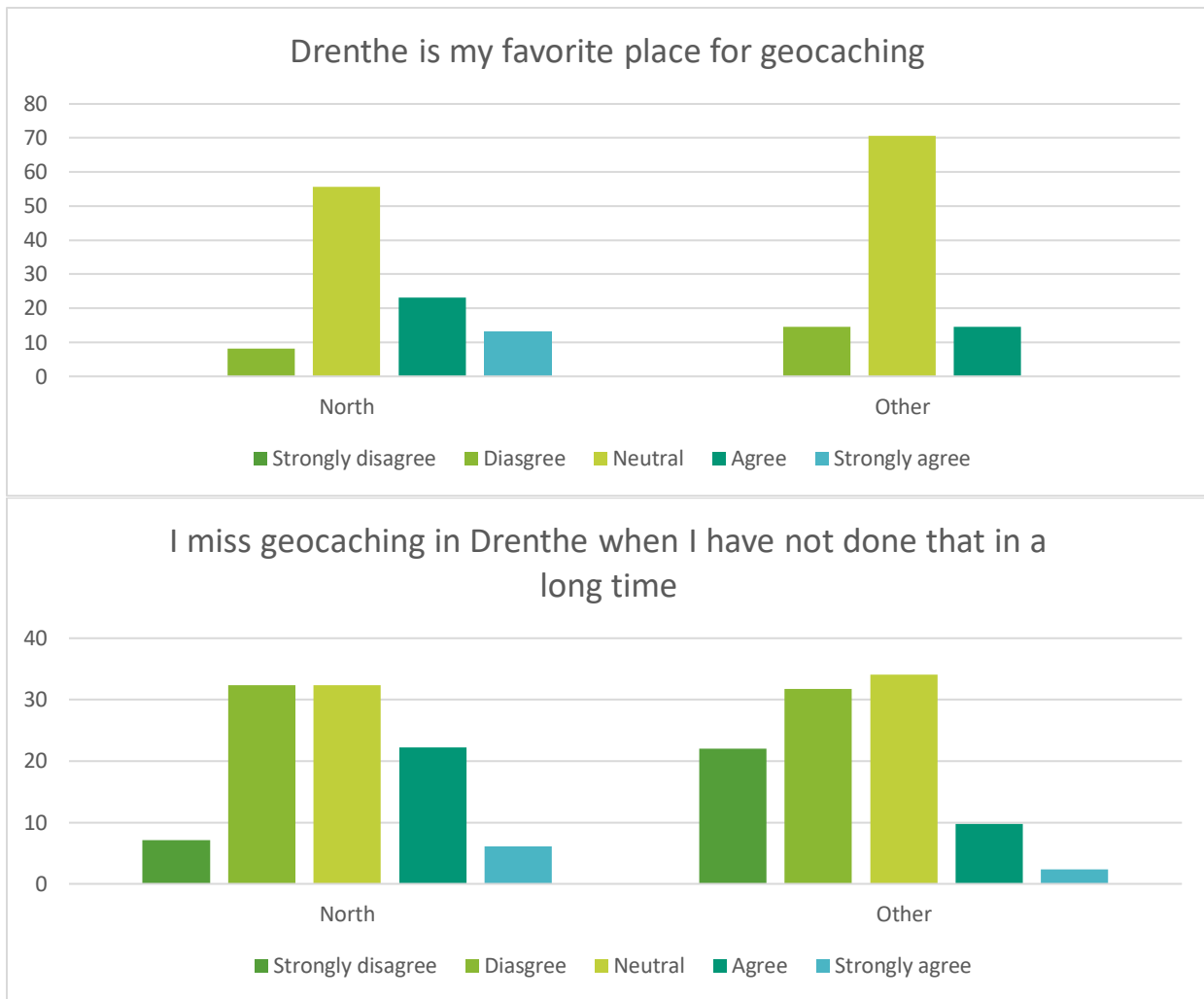


Figure 11: Drenthe is my favorite place for geocaching and I miss geocaching in Drenthe when I have not done that in a long time

Visible in these figures is that when it comes to the latter questions, people who do not live in one of the three northern provinces tend to disagree more to the statements. What is also visible is that they are just as inclined to say that they are comfortable or happy as geocachers who live in one of the three northern provinces.

Furthermore, respondents were asked with a multiple-choice question if they wanted to learn more about this specific area in Drenthe. This can be about the nature in this area, the culture in this area, both factors in this area or neither of these factors in this area. 42% mentioned that they would not want to learn something about this area, whereas the other 58% would want to learn something about Drenthe. Social contacts are, again, important when geocaching. 62% of the geocachers went geocaching with other teams in Drenthe, whereas the other 38% was geocaching on their own.

Geocachers could also choose between different motivations why they were geocaching near Anderen. These were the same options that were given at the question about geocaching in general. The results of this question are visible in figure 12.

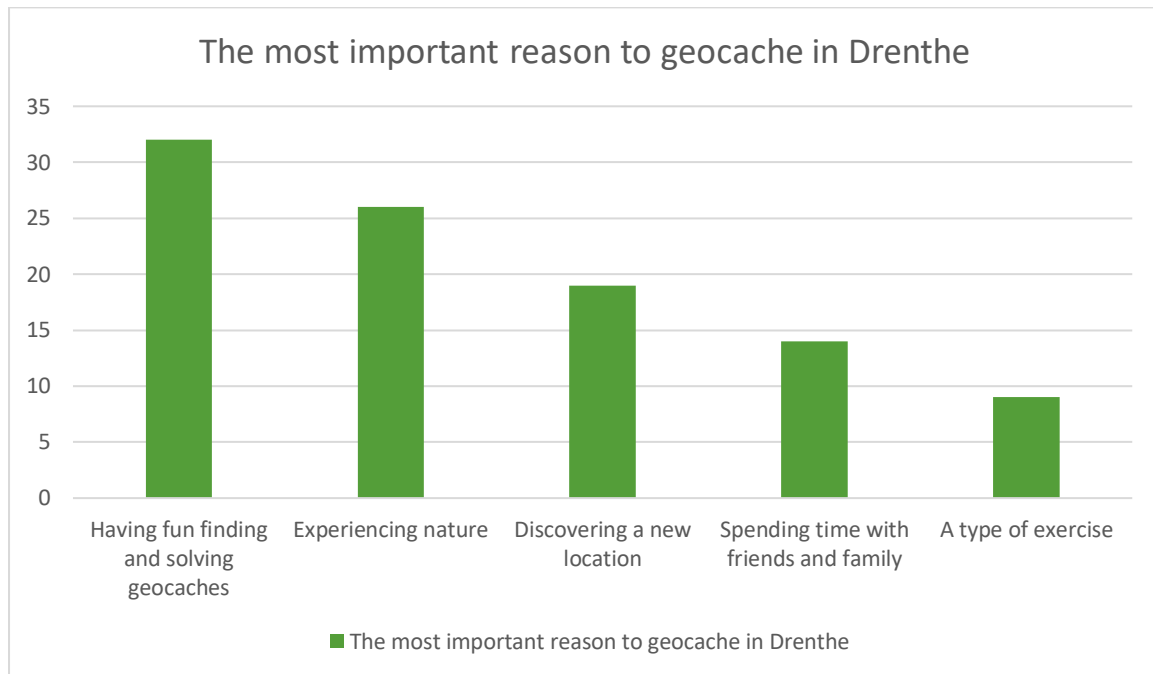


Figure 12: Most important reason to go geocaching in Drenthe

After this question, several people elaborated why they went to Anderen for geocaching:

“We have a family member in Stadskanaal, so we go to the north of the Netherlands regularly and search for geocaches as well”

“I visited Drenthe for the first time, because this area was “corona-free” and the nature camping was open! I would like to visit this area more often with my camper!”

“It is really nice to visit a location with a team member, to visit their “birth ground”, to feel it and to experience it”

The choice for location can differ per team or even within team and per person. Having a family member nearby, such as in the first quote, could be a reason to visit a location. This might also count for living nearby - which was also mentioned by a respondent. If you live nearby certain geocaching routes, it might be the case that you visit them faster than those routes far away. This makes a relative that lives in another part a good reason to visit them and enjoy geocaching on the way there.

Also, during the corona pandemic, people went geocaching and the second quote mentioned that that was a reason to visit Drenthe. Because there were not many cases of COVID-19 in Drenthe at that moment, he decided to go to Drenthe. Despite COVID-19 he enjoyed his stay in Drenthe and is looking forward to visiting Drenthe again. Several geocachers also

mentioned that they use geocaching more actively during the COVID-19 pandemic because they have little to do.

The last quote exemplifies that geocaching can also be used as a more embodied experience, in which you can learn something about a person and its connection to a region.

To see if there were any differences about the motivations for geocaching and gender, a chi-square test was executed. In table 10, the results of this chi-square are visible.

Gender * What is the most important reason for you to geocache here in Drenthe?							
Crosstabulation							
		What is the most important reason for you to geocache here in Drenthe?					Total
		Experiencing nature	Discovering a new location	As a physical exercise	Having fun in solving and searching for geocaches	To spend time with friends or family	
Gender	Male	20	13	6	27	12	78
	Female	16	14	7	18	7	62
Total		36	27	13	45	19	140
Chi-Square Tests							
		Value	df	Asymptotic Significance (2-sided)			
Pearson Chi-Square		1,870a	4	,760			
Likelihood Ratio		1,870	4	,760			
N of Valid Cases		140					
a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 5,76.							

Table 10: Chi-square gender and the most important reason to geocache in Drenthe

All of the different reasons for geocaching in Drenthe have been mentioned by the respondents. There is a significance level of 0,760, which means that there is a connection between gender and a reason to geocache in Drenthe in this sample.

Another chi-square test has been run to see if there are differences in reasons to go to Drenthe between the groups created on the basis of number of found geocaches. The groups that have been created in the first sub question are being used for this test. The result will show if there are any differences between the created groups in the first sub question. This is relevant, as the different groups can have different reasons to choose for Drenthe as a location for geocaching. The results of the test are visible in table 11.

Groups total found geocaches * What is the most important reason for you to geocache here in Drenthe? Crosstabulation							
		What is the most important reason for you to geocache here in Drenthe?					Total
		Experiencing nature	Discovering a new location	As a physical exercise	Having fun in solving and searching for geocaches	To spend time with friends or family	
Total found geocaches	<600	6	13	4	11	9	43
	600-2500	14	4	4	16	8	46
	2500>	16	10	5	18	2	51
Total		36	27	13	45	19	140
Chi-Square Tests							
		Value	df	Asymptotic Significance (2-sided)			
Pearson Chi-Square		15,271a	8	,054			
Likelihood Ratio		17,097	8	,029			
N of Valid Cases		140					
a. 3 cells (20,0%) have expected count less than 5. The minimum expected count is 3,99.							

Table 11: Chi-square total found geocaches and the most important reason to geocache in Drenthe

The test gives a significance level of ,054. In that case, there is a difference between the groups of geocachers and their most important motivation to geocache in Drenthe. The found difference is on the other hand rather small, which could indicate that the motivations for geocaching are close together.

4.4 Spatial data geocachers

Of the 140 geocachers that filled in the questionnaire connected to this research, five shared their spatial data of their walked route near Anderen. While the initial aim was to let geocachers walk to collect their spatial data, COVID-19 prevented this. In the introduction of the questionnaire was asked if geocachers wanted to share their spatial data, if they had collected this during their walk in Anderen. The reason for this is still to look for different patterns between the different geocaching groups.

Both of the routes are visible, which are Anderen (figure 13) and Bos en Wei (figure 14). Both routes are also marked as routes on the website geocaching.com, with a starting point and an end point.

Three people walked the route in Anderen, in which is visible that “Anderen 2” had probably a bigger deviation than the other two. The route is around 8,10 km and has been walked in two and a half hours. More information about this route is visible in table 12. The route Anderen is mainly walking through the forest in Anderen and several sand paths. The geocachers also needs to walk across and next to a paved road. In the middle of this route lies the village Anderen, but a geocacher does not need to walk through the village as the route goes around the village (figure 13).

Two people walked the route which is called Bos en Wei, which is to the south east of the former route. Also, in these routes it is visible that there are slight deviations, but with multiple GPX files for both of the routes, this would have been clearer. Bos en Wei follows the same sort of pattern that Anderen has as well, in which geocachers need to walk through the forest and walk across several sand paths. Furthermore, for a large part of the route the geocacher has to walk next to the Andersche Diep (figure 14).

Route walked	Distance in kilometers	Distance of route in kilometers	Time	Group
Anderen 1	7,53	7,5	2:42	Advanced
Anderen 2	8,09		2:36	Expert
Anderen 3*	28,73		5:47	Expert
Bos en Wei 1	8,61	8	3:33	Expert
Bos en Wei 2	9,12		3:13	Expert

Table 12: Spatial data five geocachers

What is furthermore visible from table 12, is that the length of the route differs. This might be because of the deviation that occur, but it could also be the case that one of the geocachers looked for a geocache in the wrong place. This is visible in the map of Bos en Wei, in which the red line presents the geocacher Bos en Wei 2. At the right side of the image of Bos en Wei (figure 14) it is visible that this geocacher was occupied with looking for a geocache. With more spatial data, there would be more possibilities to dig deeper into this subject.

Geocaching route Anderen

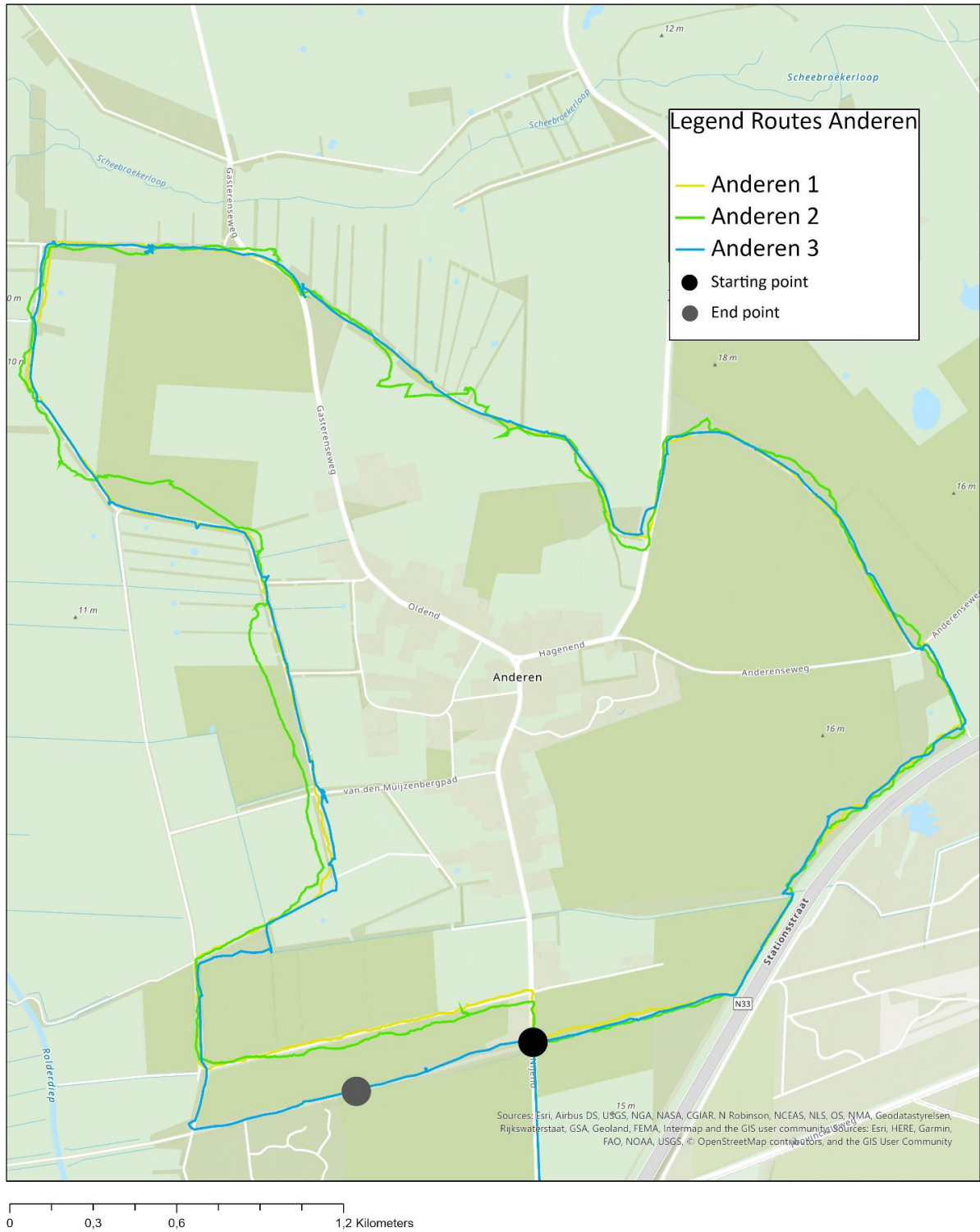
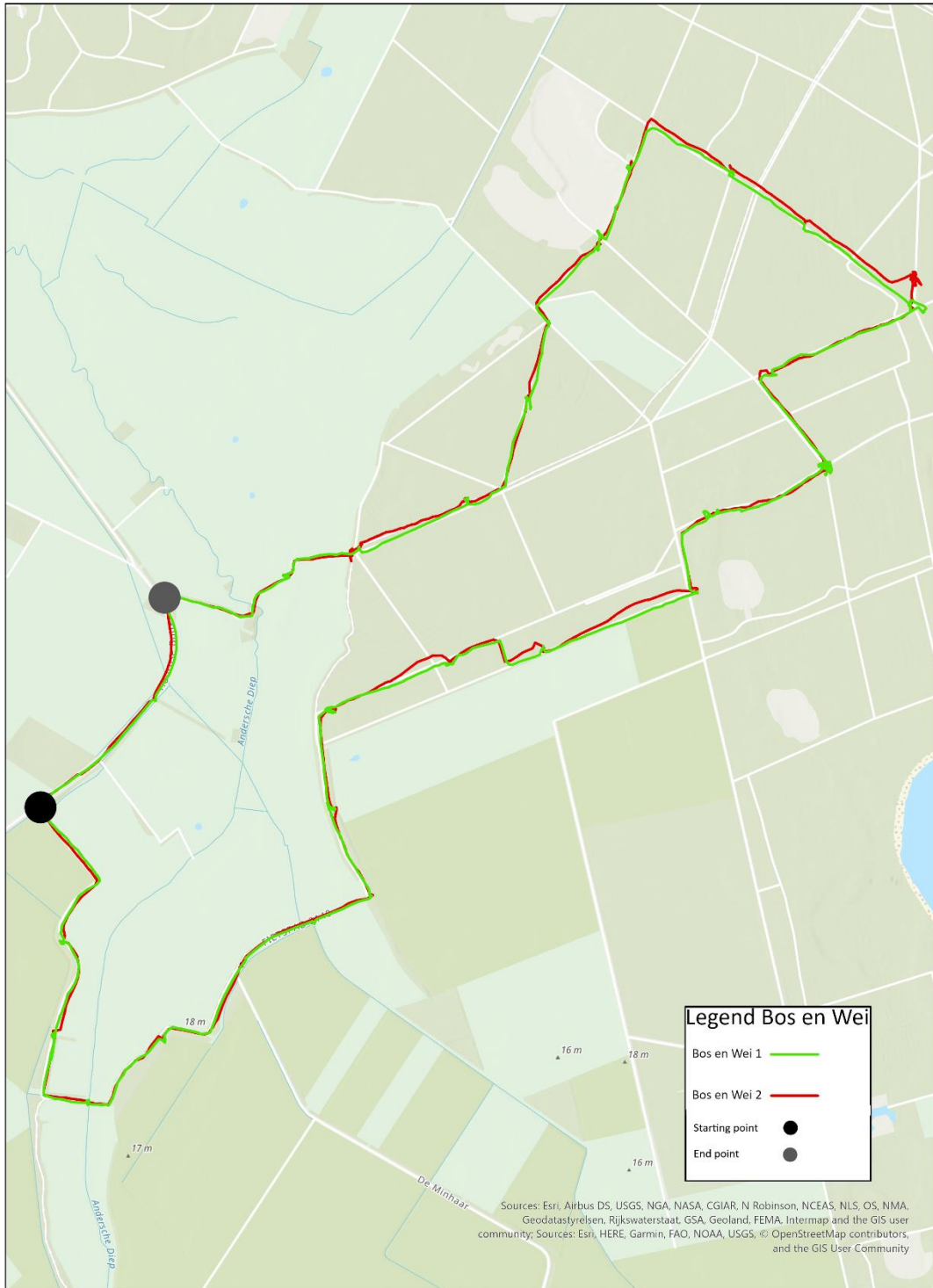


Figure 13: Geocaching route Anderen

Geocaching route Bos en Wei



0 0,33 0,65 1,3 Kilometers

Figure 14: Geocaching route Bos en Wei

5. DISCUSSION

In this part, the results from the last chapter will be discussed. The results will be connected to other theories that have been found, which are described in the theoretical framework.

5.1 Profile

The first section showed that the average age of geocachers is 49 years, whereas the average age of the Dutch is 42 years (CBS, 2019). This outcome contradicts findings done by Cord et al. (2015), who found that the average age of geocachers in the population was lower than the average age in Leipzig. This outcome also contradicts the outcome of Golbeck and Neustaedter (2016), who also found that geocachers are younger on average. A reason for these differences could be that geocachers who are geocaching in urban areas are on average younger than geocachers who are geocaching in rural areas. This result connects to the location of research. Visible from the results is that around 70% of the geocachers who are geocaching in the surroundings of Anderen are from the region. National geocachers are only geocaching here in a more limited extend. The age of people in the west of the Netherlands is lower than the age of people in the north of the Netherlands (CBS Statline, 2020; Volksgezondheidszorg n.d.). This means that looking at regional numbers could be considered more meaningful, as the regional numbers reflect the population in the provinces of Groningen, Friesland and Drenthe. The information that is provided by CBS Statline (2020) however confirms that the average age of geocachers is higher than the average age of the Dutch. The average ages for the provinces of Groningen, Friesland and Drenthe are respectively 42, 43 and 45 years (CBS Statline, 2020).

The results furthermore show that men (56%) are geocaching more than women (44%). This is in line with Cord et al. (2015), who also found that men are geocaching more than women (64% and 36% respectively). But, as geocaching teams can consist of multiple members, such as a family, it could be that the questionnaire has been filled in by one person. The results also indicate that geocachers are on average highly educated. 51,7% of the respondents in this research finished an applied university- or university education. The CBS (2018) found that 30% of the Dutch inhabitants has finished an applied university- or university education, which indicates that geocaches have a higher education level than the average of Dutch inhabitants. The findings do however connect to the research of Cord et al. (2015), who also found that geocachers are higher educated than the population of Leipzig.

5.2 Motivations

Geocachers in this research have given several different reasons for geocaching in general. The most important reason chosen in the multiple-choice question was about having fun and finding geocaches (34%). This is not in line with results from Cord et al. (2015) and Telaar et al. (2014), who found that both exploring nature and exploring locations was seen as the most important reason. Because of the nature of the multiple-choice question, the geocachers had to choose the reason that they found most important. The second and third most selected reason were experiencing nature (26%) and exploring new locations (23%), which inclines that the reasons do not differ that much from Telaar et al. (2014) and Cord et al. (2015). On the other hand, the follow-up question provided extra opportunities in which geocachers could elaborate on their most important reason. This question made clear that both experiencing

nature and discovering new places are as important as having fun and finding geocaches. This means that there would not be a difference between the different motivations at all. This links to an answer that many people gave in the follow-up question: it is all equally important. It is difficult for geocachers to just choose one reason why geocaching is so important to them. Multiple reasons can apply for different geocachers, and it is not bound to just one motivation.

Social contacts is also one of the motivations that could be chosen as important for geocaching. A reason that it is deemed as less important in this research, is because social contacts are not per say necessary for geocachers alone. Other research pointed out that social contacts during geocaching are nor a primary motive (Telaar et al. 2014). It could be the case that social contacts are more important for families (O'Hara, 2008). Geocaching is seen as a way to connect as a family, do something together. This is especially the case when everyone in a family works, goes to school and performs other hobbies. A moment of geocaching could lead to a moment in which people can connect with each other. In this research there were no questions asked about if people are walking with their family or not, which would have made sure that this could be elaborated on further.

The motivations of the geocachers could be connected to ecosystem services, where geocaching is used as a tool to discover and experience the rural landscape. With many new geocachers who started geocaching in the last five years (30% of the respondents in this research) tourism and recreation in areas is growing. Many geocachers explained that they use geocaching as a tool to guide them through the landscape. This can be either recreational and, in the area, or on a holiday as a tourist. The increase of geocachers and the increase of media coverage about geocaching subsequently mean that there is more pressure on the environment. Ecosystem services and the connection between geocaching is something that could be researched further, especially in areas where nature dominates, such as in rural areas. This could also make sure that geocachers, hikers, and other outdoor recreationists might be more aware of how their hobby influences nature.

5.3 Anderen, Drenthe

Geocachers were asked what their main motivation was to geocache, as well as what their main motivation for geocaching was near Anderen. There were small differences noticeable between the two questions, but nothing that stands out. Thus, it seems to be the case that geocachers do have the same motivations for geocaching in general as they have for geocaching in Anderen.

Four questions were asked regarding place attachment, which has been done with a Likert scale. The same set-up as Jorgensen and Stedman (2001) was used, with the exception that the questions in this research only focused on place attachment, and not on sense of place as an umbrella term. It is clearly visible in this Likert scale that the standard deviation grows from the first towards the last question. This indicates that in the latter questions the answers became more diverse. Furthermore, the mean gets lower in every question, and what flows from this is that geocachers became more neutral in the latter questions. This can be interpreted when looking at the different questions separately. People feel comfortable (Q1) and feel happy (Q2) when geocaching in Drenthe, and these two questions both have a median of 4, which stood for "agree". These questions are quite general, as well quite positive as the

words comfortable and happy are both positive words. The latter part is also what Jorgensen and Stedman (2001) noticed. People can feel comfortable and happy somewhere not only because of geocaching, as there are several other factors that can play a role in this. Weather and company during geocaching are two examples which can influence these questions. The third and fourth question (Drenthe is my favorite place and I miss geocaching in Drenthe respectively) might felt too specific for many people. Geocachers elaborated on this, saying that there are many different places that are and feel more special to them. While the biggest group of people are from Drenthe themselves (31%), there are many more different locations in Drenthe, as well as locations in the Netherlands that can have more meaning to geocachers. Other research might provide a more in depth understanding about place attachment, or even sense of place in general when it comes to geocaching in Drenthe.

5.4 Limitations

First, due to the spread of COVID-19 in the Netherlands, not every part of this thesis could be executed. The initial idea was to give geocachers a GPS tracker or let them walk with their GPS tracker to collect spatial data. In this way, the route which they had walked could be connected to their characteristics. In the beginning of March 2020, the questionnaire was posted online and received some answers, but halfway March the Dutch government decided that everyone should stay inside as much as possible. This meant that the tracking part of this research could no longer be done, as it would be irresponsible and not ethically justifiable. This was also a “hot topic” in several Facebook groups. As there was (and still is) much ambiguity about COVID-19, every geocacher had his or her own opinion about what could be done and what not. Some geocachers went geocaching because they had more time, while others put their geocaches offline (which meant that they were not visible on geocaching.com, but still could be found if you knew about the route or geocache already). Following from this situation, this meant that some people went geocaching more while other went geocaching less. Geocaching is a hobby which can be done in someone’s spare time, but COVID-19 had a rather large influence on one’s time.

Second, another limitation is that there is not many research available about geocaching in rural areas. Geocaching as a subject for research is widely used, with almost 7000 hits on Google Scholar alone. Many of these hits are about using geocaching in a classroom, as a way of teaching things to others. The articles that have been found about geocaching motivations and were accessible were also used in this research. Furthermore, there was more research available about topics connected to geocaching, such as outdoor exploration, rural landscape trends, ecosystem services and recreation.

Third, during the analysis of the results it became clear that the question “what is the most important reason for you to geocache?” could have been formulated better. Many geocachers elaborated on the question thereafter, which was also the main purpose of the question. Many geocachers mentioned that it was “difficult to choose just one”. So, this question could also have been a multiple answer question. In that case the most important reasons could be identified more easily, as well as the least important reasons. However, the elaborative question gave people the opportunity to tell more about their experiences during geocaching,

which is considered very valuable. Geocachers might not have elaborated that much on the former question if they could select multiple answers.

Lastly, there are more (online) platforms than just geocaching.com alone. The research has been done by approaching respondents via geocaching.com, which is the most popular geocaching website to date. A result from this is that there is a group of geocachers in the population who has not been found currently. It might be the case that there are different characteristics and motivations for geocaching within other (online) geocaching communities.

6. CONCLUSION

The aim of this research was to find out who geocachers are, what their motivations for geocaching are and why they choose the geocache at a certain location. First, it seems to be the case that the average geocacher in this research is older than the average Dutch inhabitant. This contradicts findings presented by Cord et al., (2015), who found that geocachers were on average younger than the population of Leipzig. There has been looked at current average ages in the provinces of Groningen, Drenthe and Friesland to see if the average age is the same in these provinces, but the population of this research still has a higher age than average.

Second, more men seem to be geocaching than women, which is in line with the research of Cord et al., (2015). Next to that, the average education level among geocachers is higher than the average education level in the Netherlands, which is also in accordance with Cord et al., (2015). To look at differences between the geocachers, three different profiles have been created on the basis of total found geocaches. Geocachers who have found more geocaches have started on a later age with geocaching than geocachers who have found less geocaches.

Third, the most important reason to geocache is to have fun in solving and finding geocaches. This result is not in line with the findings of Cord et al. (2015) and Telaar et al. (2014), who found that geocachers find experiencing nature and exploring new places the most important reason. While this result has not been found by the quantitative question, the follow up question provided extra information. In this question, most people mentioned exploring new places and experiencing nature as the most important. In that case, it is in line with Cord et al. (2015), Telaar et al. (2014) and Balzan and Debono (2018). However, many geocachers mentioned that they have more reasons for geocaching alone. They feel that all the given motivations apply to them, or that multiple motivations apply to them. This means that there is not one clear motivation that stands out, but that multiple motivations are important.

Furthermore, social contacts during geocaching is not seen as one of the most important parts of geocaching. The hobby does however give you an easy way to contact people, before, during or after geocaching - which is also acknowledged by the geocachers. An important note is that many motivations count for geocachers, and that not just one motivation is sufficient. Geocaching can be seen as an eco system service, in which people enjoy nature and use nature to see and experience places. This connects to the tourism and recreation, as geocachers also use geocaching as a way to explore new places.

Last, the most important reasons to geocache in Anderen are almost the same as the reasons for geocaching in general. Having fun solving geocaches, experiencing nature and exploring new areas are the three most mentioned answers. Again, also in this section it seems clear that geocachers find multiple motivations important, which makes that there is not one motivation for them. To look at place attachment of respondents, questions based on the research of Jorgensen and Stedman (2001) were asked. It seems to be the case that people enjoy geocaching near Anderen, but do not miss the area near Anderen when they are not geocaching. It also seems that the geocachers were quite united about feeling happy near Anderen, but quite divided when seeing the location near Anderen as their favorite place for geocaching. There is a connection between gender and the most important reason to

geocache near Anderen, and there is a difference between the three created groups and their most important reason to geocache near Anderen.

This research has shown that the group of geocachers is quite diverse. They have a higher education level than the average Dutchman and are also older than the average Dutchman. The most important reason to geocache both in general and more specific related to Anderen is to have fun in solving and finding geocaches. This research gave a first look into geocaching and the geocachers in rural areas, and actually has several interfaces with research about geocaching in urban areas. To look deeper into this and to gain more knowledge about this interesting subject, more research is needed.

For future research, it would be interesting to look further at spatial behavior of geocachers. Is there a possibility that there is a difference in spatial behavior between the different types of geocachers? And because of what reasons could there be a difference? Could this be because of group size or are there other variables that need to be considered?

It would furthermore be interesting to go more in depth into membership of geocaching.com itself. In this research, more than 90% of the respondents is approached via the website geocaching.com, while the others were approached via Facebook. But is there a group of geocachers who is not a member of geocaching.com? And if so, how do you get in contact with those people? Next to this, is there a difference between “regular” members and paid members in number of geocaches found or any other variable? I believe that that could be very interesting to look at - and maybe compare to other hobbies in which you also have more possibilities when you are a paid member.

A final recommendation is that research about geocaching could be done more with the theories and information about ecosystem services. As geocachers and other outdoor recreationists or tourists have many benefits from this, it would be nice to see what the geocaching communities does back for the ecosystem.

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8. APPENDIX

8.1 Questionnaire

Beste Geocacher,

Mijn naam is Marlinda Gorens en ik studeer Culturele Geografie aan de Rijksuniversiteit Groningen. Voor mijn masterscriptie doe ik momenteel onderzoek naar geocachers, wie geocachers zijn en hoe zij een wandeling in Drenthe hebben ervaren.

Op dit moment ben ik op zoek naar geocachers die dit jaar of afgelopen jaar een route hebben gelopen (of gefietst), of een enkele cache hebben gevonden rondom Gieten, Anderen en Eext. Het invullen van de enquête duurt maximaal 5 minuten en ik zou het erg fijn vinden als u mij hierbij zou kunnen helpen.

Deze enquête begint eerst met wat algemene vragen over uzelf en over geocachen. Vervolgens gaat het slot van de enquête over de route in Drenthe, rondom Eext, Anderen of Gieten (bijvoorbeeld Rondje Hondsrug, Anderen of Bos & Wei) of een "losstaande" cache in hetzelfde gebied, waar u ging geocachen. Dit kan afgelopen week geweest zijn, maar ook bijvoorbeeld een jaar geleden.

Optioneel: Mocht u toevallig uw route getrackt hebben, dan zou u mij ook erg helpen door mij een GPX bestand van deze route te sturen. Met deze informatie kan ik het wandelgedrag van meerdere geocachers met elkaar vergelijken. Het versturen van dit bestand kan via Facebook (Marlinda Gorens) of via mijn mailadres.

De verkregen gegevens van dit onderzoek worden alleen gebruikt voor mijn masterscriptie en deelname aan dit onderzoek is vertrouwelijk. Als u vragen heeft kunt u mij vinden op Facebook of contact met mij opnemen via de mail (m.m.m.gorens@student.rug.nl).

Alvast bedankt voor uw medewerking!

Wat is uw geslacht?

- Man
- Vrouw
- Anders

Wat is uw geboortjaar?

Wat is uw postcode? (Cijfers zijn voldoende)

Wat is uw huidige burgerlijke staat?

- Getrouwd
- Gescheiden

- Weduwnaar/Weduwe
- Ongetrouwd
- Geregistreerd partnerschap

Wat is uw hoogst genoten opleiding? (Het gaat hierbij om een afgeronde opleiding)

- Basisschool
- Middelbare school
- MBO
- HBO
- WO
- Anders, namelijk

Hierbij krijgt u enkele vragen over geocachen in het algemeen

Wanneer heeft u uw eerste geocache gevonden?

Hoeveel geocaches heeft u (ongeveer) gevonden op dit moment?

Hoe vaak geocachet u (normaal gesproken)?

- Dagelijks
- Meerdere keren per week
- Een keer per week
- Een tot twee keer per maand
- Minder vaak

Geocachet u voornamelijk alleen of met anderen (met andere teams)?

- Alleen
- Met anderen
- Allebei evenveel

Heeft u voornamelijk geocaches gevonden in steden of meer op het platteland?

- In steden
- Op het platteland
- Allebei evenveel

Wat is voor u een belangrijke reden om te geocachen? Selecteer het antwoord dat het meest op u van toepassing is.

- Het ervaren van de natuur
- Om in beweging te blijven
- Plezier hebben in het oplossen en zoeken van geocaches
- Tijd spenderen met vrienden of familie
- Het ontdekken van een nieuwe locatie

Heeft u misschien nog een andere reden om te geocachen en wilt u die toelichten? Dat kan in het onderstaande tekstvak. – Tekstvak

In dit gedeelte krijgt u enkele vragen over de route die u heeft gelopen of de geocache die u heeft gevonden in Drenthe.

Over de plaats waar aan het geocachen geweest bent in Drenthe:

Ik voel me zeer gerust wanneer ik hier aan het geocachen ben: Zeer mee oneens – Zeer mee eens

Ik voel me gelukkig wanneer ik hier aan het geocachen ben: Zeer mee oneens – Zeer mee eens

Drenthe is mijn favoriete plek om te geocachen: Zeer mee oneens – Zeer mee eens

Ik mis geocachen in Drenthe als ik dat te lang niet heb gedaan: Zeer mee oneens – Zeer mee eens

Door het bezoeken van deze locatie:

- Zou ik graag meer willen weten over de natuur hier
- Zou ik graag meer willen weten over de cultuur hier
- Zou ik graag meer willen weten over de natuur en cultuur hier
- Zou ik niet meer willen weten over deze locatie

Was u op deze locatie alleen of met anderen (andere teams) aan het geocachen?

- Alleen
- Met anderen

Wat was of wat is voor u de belangrijkste reden om op DEZE locatie in Drenthe te geocachen?

- Het ervaren van de natuur
- Om in beweging te blijven
- Plezier hebben in het oplossen en zoeken van geocaches
- Tijd spenderen met vrienden of familie
- Het ontdekken van een nieuwe locatie

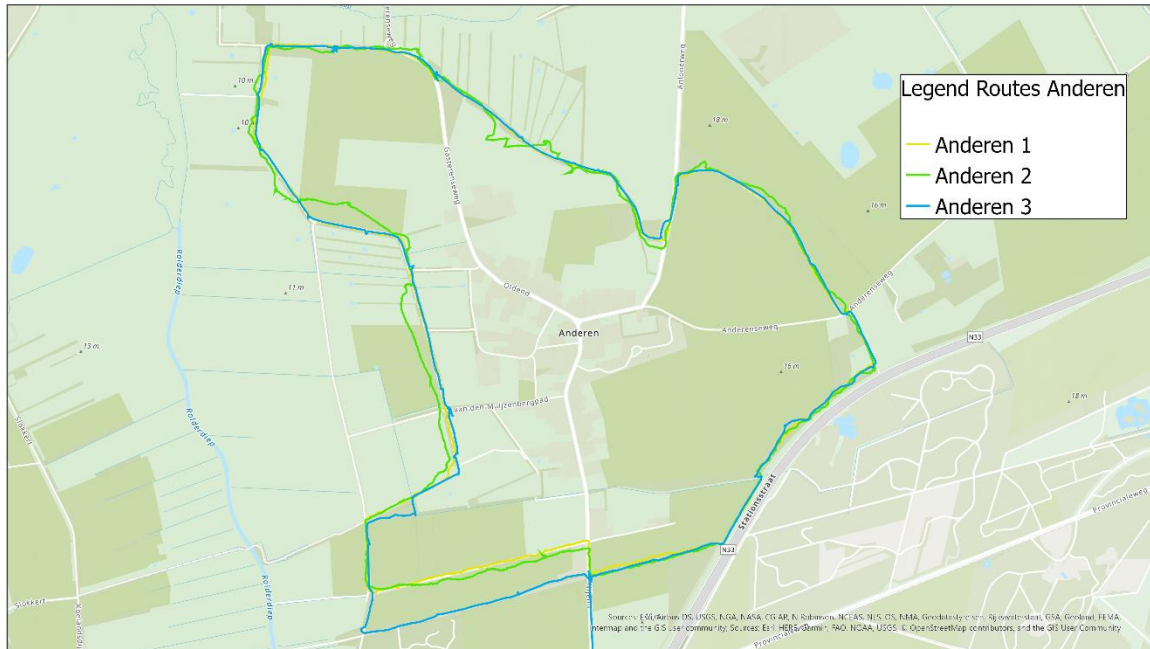
Heeft u verder nog vragen of opmerkingen? – Tekstvak

Heel erg bedankt voor het invullen van deze enquête en het geocachen voor dit onderzoek. Mocht u nog vragen hebben, kunt u een e-mail sturen naar m.m.m.gorens@student.rug.nl of contact met mij zoeken via Facebook (Marlinda Gorens).

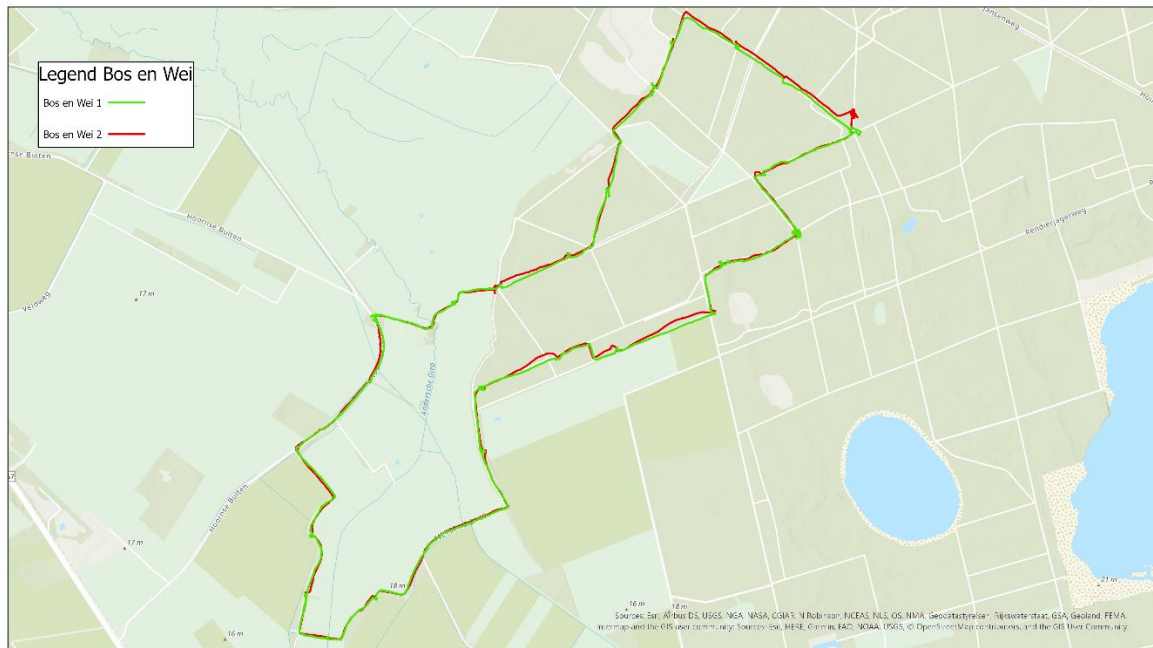
Vergeet niet op het pijltje hieronder te drukken om de enquête in te leveren!

8.2 Maps of walked routes

Geocaching route Anderen



Geocaching route Bos en Wei



8.3 Additional data

Statistics

Year of birth

N	Valid	140
	Missing	0
Mean		1971,26
Median		1971,00
Std. Deviation		13,183
Range		60
Minimum		1943
Maximum		2003

Statistics

AantalGevondenGeocaches

N	Valid	140
	Missing	0
Mean		3683,9500
Median		1303,0000
Std. Deviation		6667,44261
Range		53324,00
Minimum		6,00
Maximum		53330,00

First Geocache found

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2001	2	1,4	1,4	1,4
	2003	3	2,1	2,1	3,6
	2004	2	1,4	1,4	5,0
	2005	3	2,1	2,1	7,1
	2006	8	5,7	5,7	12,9
	2007	1	,7	,7	13,6
	2008	5	3,6	3,6	17,1
	2009	5	3,6	3,6	20,7
	2010	8	5,7	5,7	26,4
	2011	10	7,1	7,1	33,6
	2012	9	6,4	6,4	40,0
	2013	18	12,9	12,9	52,9
	2014	10	7,1	7,1	60,0
	2015	14	10,0	10,0	70,0
	2016	5	3,6	3,6	73,6
	2017	13	9,3	9,3	82,9
	2018	5	3,6	3,6	86,4
	2019	14	10,0	10,0	96,4
	2020	5	3,6	3,6	100,0
	Total		140	100,0	100,0

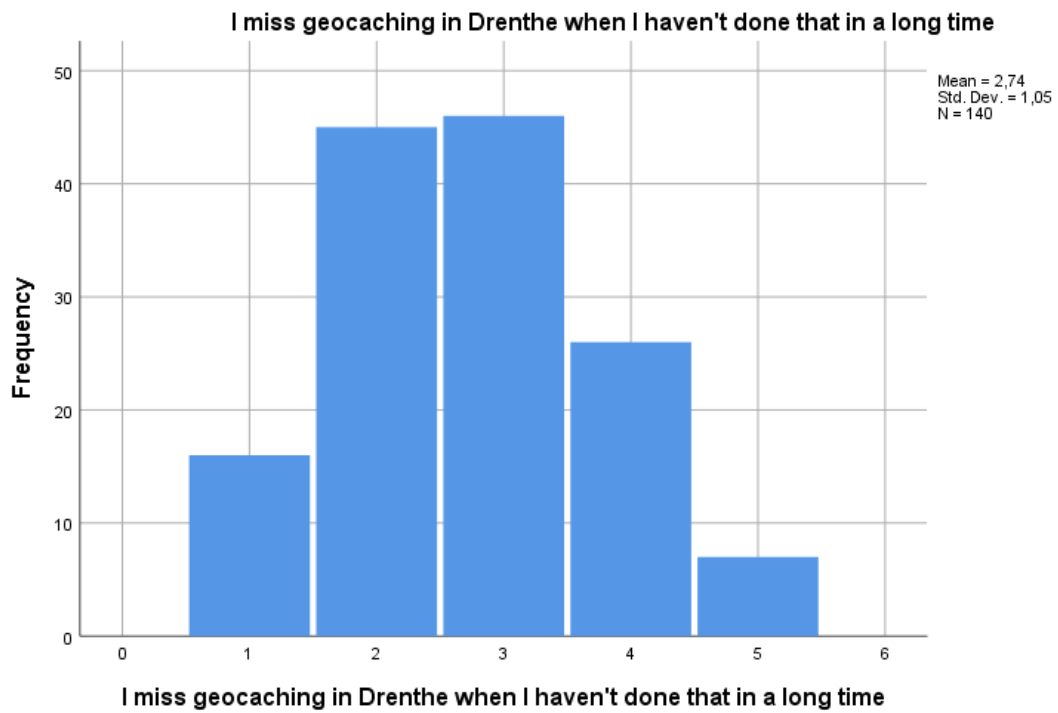
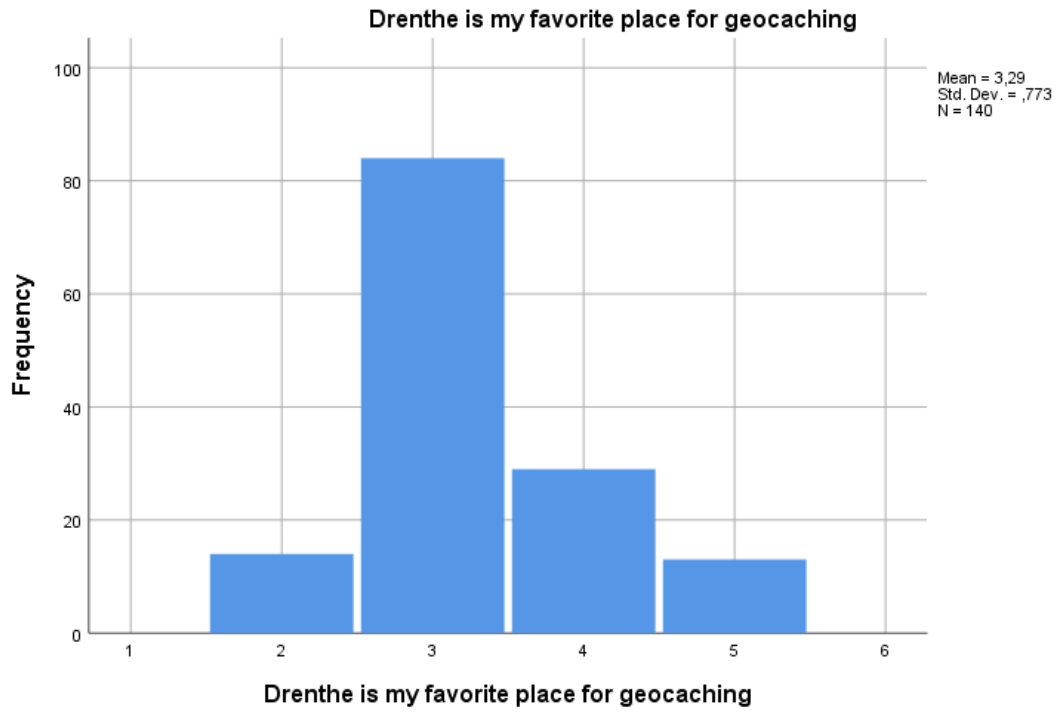
How many times do you geocache?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Een keer per week	46	32,9	32,9	32,9
Een tot twee keer per maand	48	34,3	34,3	67,1
Meerdere keren per week	22	15,7	15,7	82,9
Minder vaak	24	17,1	17,1	100,0
Total	140	100,0	100,0	

Descriptive Statistics

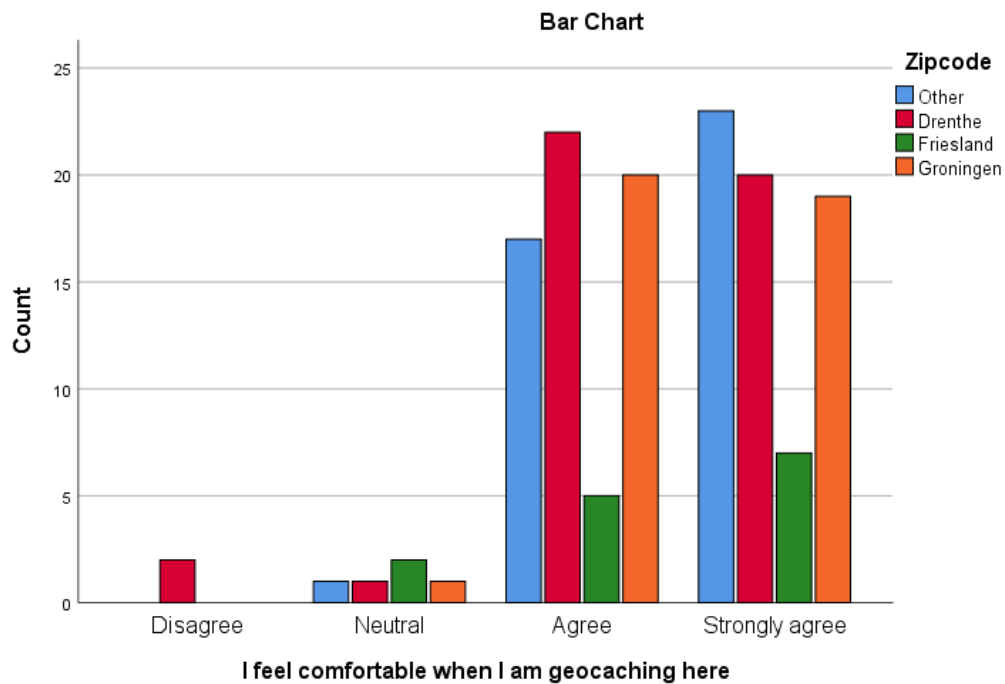
	N	Minimum	Maximum	Mean	Std. Deviation
I feel comfortable when I am geocaching here	140	2	5	4,43	,636
I feel happy when I am geocaching here	140	2	5	4,21	,662
Drenthe is my favorite place for geocaching	140	2	5	3,29	,773
I miss geocaching in Drenthe when I haven't done that in a long time	140	1	5	2,74	1,050
Valid N (listwise)	140				





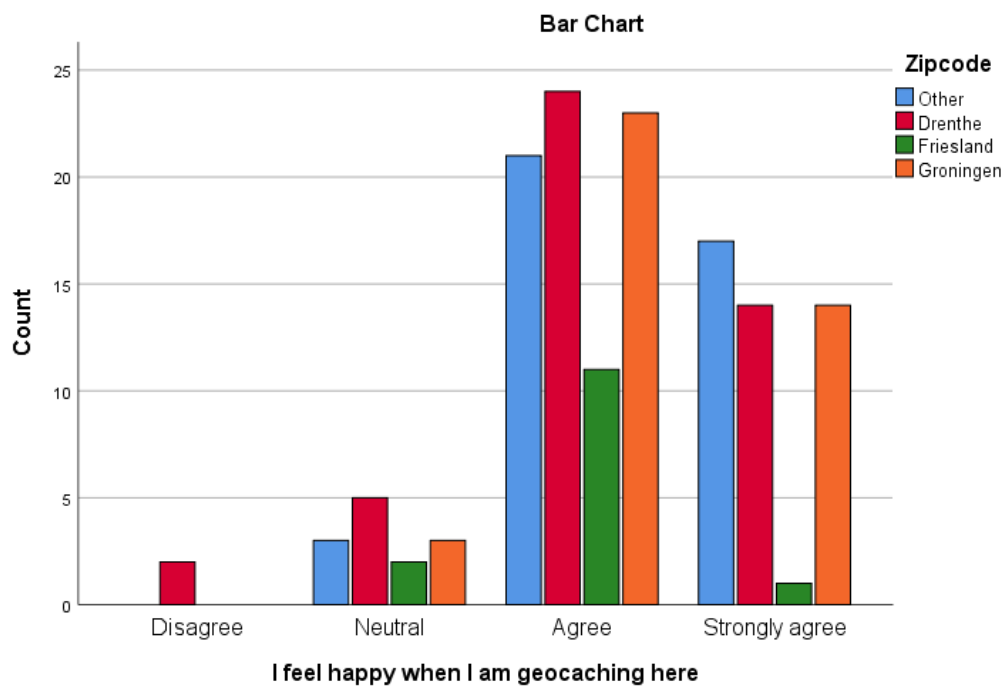
I feel comfortable when I am geocaching here * Zipcode Crosstabulation

			Zipcode				
			Other	Drenthe	Friesland	Groningen	Total
I feel comfortable when I am geocaching here	Disagree	Count	0	2	0	0	2
		% within Zipcode	0,0%	4,4%	0,0%	0,0%	1,4%
	Neutral	Count	1	1	2	1	5
		% within Zipcode	2,4%	2,2%	14,3%	2,5%	3,6%
	Agree	Count	17	22	5	20	64
		% within Zipcode	41,5%	48,9%	35,7%	50,0%	45,7%
	Strongly agree	Count	23	20	7	19	69
		% within Zipcode	56,1%	44,4%	50,0%	47,5%	49,3%
Total	Count	41	45	14	40	140	
	% within Zipcode	100,0%	100,0%	100,0%	100,0%	100,0%	



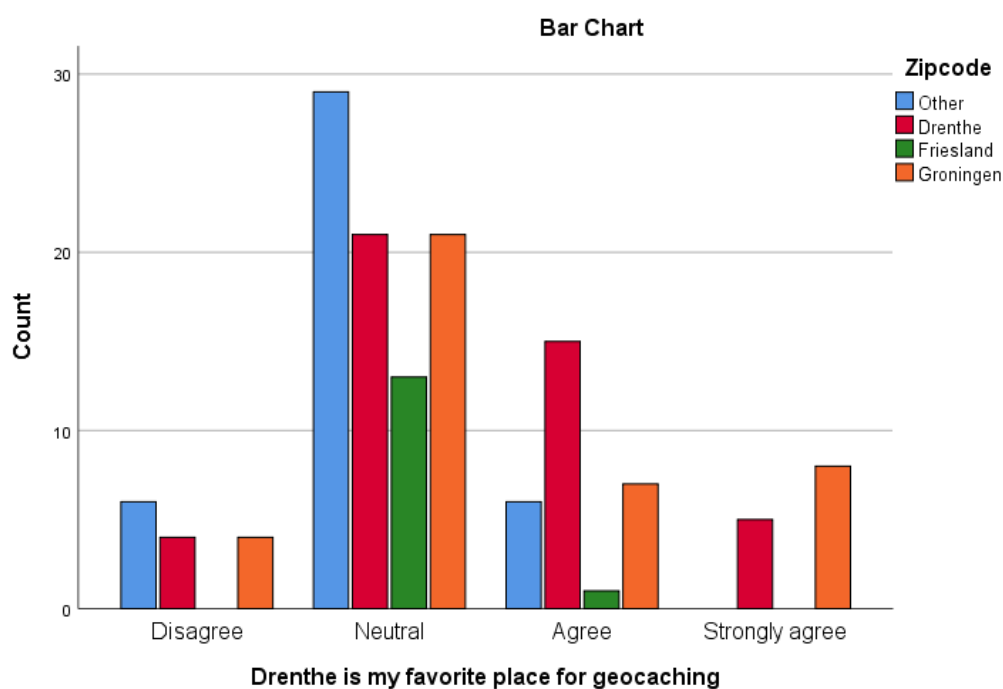
I feel happy when I am geocaching here * Zipcode Crosstabulation

			Zipcode				
			Other	Drenthe	Friesland	Groningen	Total
I feel happy when I am geocaching here	Disagree	Count	0	2	0	0	2
		% within Zipcode	0,0%	4,4%	0,0%	0,0%	1,4%
	Neutral	Count	3	5	2	3	13
		% within Zipcode	7,3%	11,1%	14,3%	7,5%	9,3%
	Agree	Count	21	24	11	23	79
		% within Zipcode	51,2%	53,3%	78,6%	57,5%	56,4%
	Strongly agree	Count	17	14	1	14	46
		% within Zipcode	41,5%	31,1%	7,1%	35,0%	32,9%
Total	Count	41	45	14	40	140	
	% within Zipcode	100,0%	100,0%	100,0%	100,0%	100,0%	



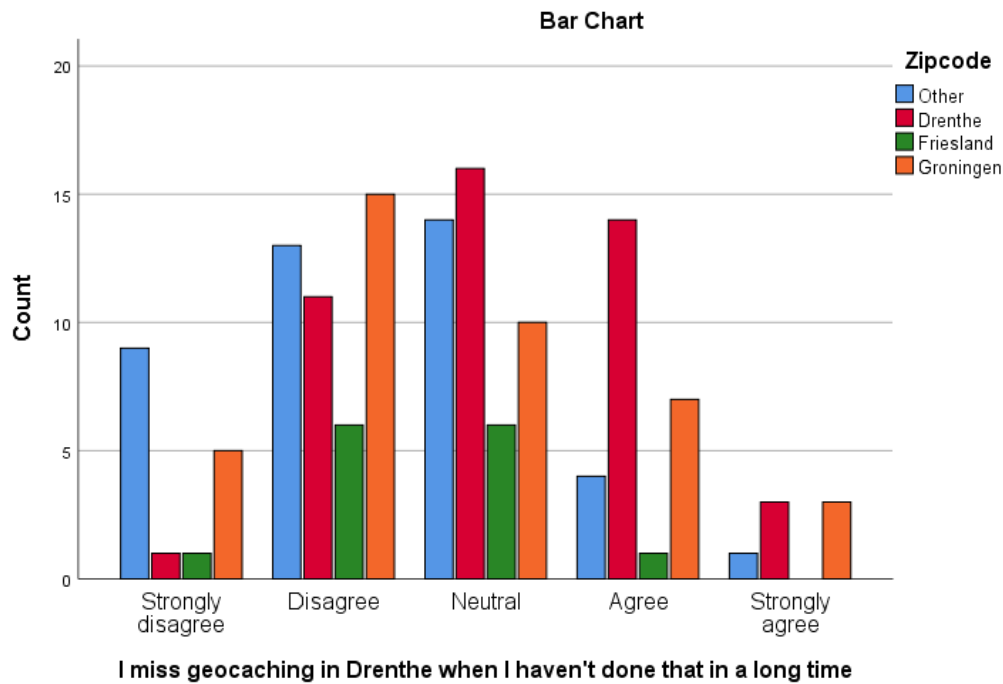
Drenthe is my favorite place for geocaching * Zipcode Crosstabulation

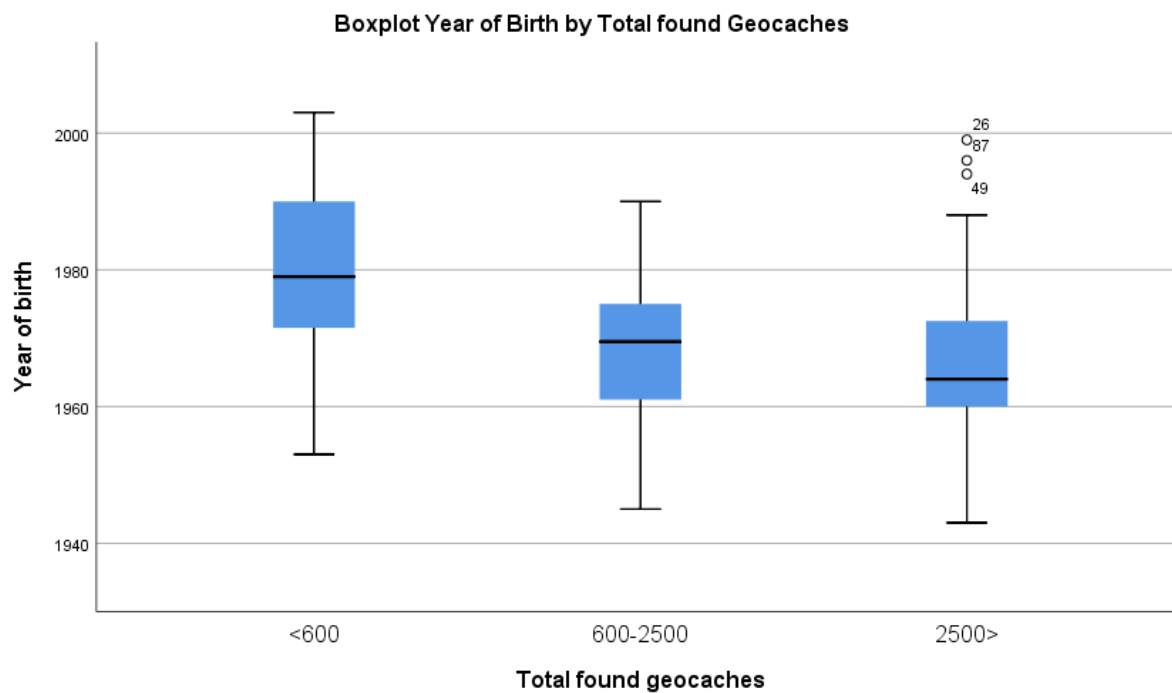
		Zipcode				Total	
		Other	Drenthe	Friesland	Groningen		
Drenthe is my favorite place for geocaching	Disagree	Count	6	4	0	4	14
		% within Zipcode	14,6%	8,9%	0,0%	10,0%	10,0%
	Neutral	Count	29	21	13	21	84
		% within Zipcode	70,7%	46,7%	92,9%	52,5%	60,0%
	Agree	Count	6	15	1	7	29
		% within Zipcode	14,6%	33,3%	7,1%	17,5%	20,7%
	Strongly agree	Count	0	5	0	8	13
		% within Zipcode	0,0%	11,1%	0,0%	20,0%	9,3%
Total	Count	41	45	14	40	140	
	% within Zipcode	100,0%	100,0%	100,0%	100,0%	100,0%	



I miss geocaching in Drenthe when I haven't done that in a long time * Zipcode Crosstabulation

		Zipcode				Total	
		Other	Drenthe	Friesland	Groningen		
I miss geocaching in Drenthe when I haven't done that in a long time	Strongly disagree	Count	9	1	1	5	16
		% within Zipcode	22,0%	2,2%	7,1%	12,5%	11,4%
	Disagree	Count	13	11	6	15	45
		% within Zipcode	31,7%	24,4%	42,9%	37,5%	32,1%
	Neutral	Count	14	16	6	10	46
		% within Zipcode	34,1%	35,6%	42,9%	25,0%	32,9%
	Agree	Count	4	14	1	7	26
		% within Zipcode	9,8%	31,1%	7,1%	17,5%	18,6%
Strongly agree	Count	1	3	0	3	7	
	% within Zipcode	2,4%	6,7%	0,0%	7,5%	5,0%	
Total	Count	41	45	14	40	140	
	% within Zipcode	100,0%	100,0%	100,0%	100,0%	100,0%	





Total found geocaches * Province Crosstabulation

Count

		Province				Total
		Other	Drenthe	Friesland	Groningen	
Total found geocaches	<600	9	19	2	13	43
	600-2500	12	12	5	17	46
	2500>	20	14	7	10	51
Total		41	45	14	40	140

Chi-Square Tests

	Value	df	Asymptotic Significance (2- sided)
Pearson Chi-Square	10,298 ^a	6	,113
Likelihood Ratio	10,415	6	,108
N of Valid Cases	140		

a. 2 cells (16,7%) have expected count less than 5. The minimum expected count is 4,30.

Total found geocaches * AlleenOfMetAnderen Crosstabulation

Count

		AlleenOfMetAnderen			Total
		Allebei evenveel	Alleen	Met anderen	
Total found geocaches	<600	10	8	25	43
	600-2500	7	16	23	46
	2500>	15	19	17	51
Total		32	43	65	140

Chi-Square Tests

	Value	df	Asymptotic Significance (2- sided)
Pearson Chi-Square	8,428 ^a	4	,077
Likelihood Ratio	8,899	4	,064
N of Valid Cases	140		

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 9,83.

Geslacht

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Man	78	55,7	55,7	55,7
	Vrouw	62	44,3	44,3	100,0
	Total	140	100,0	100,0	

BurgerlijkeStaat

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Geregistreerd partnerschap	9	6,4	6,4	6,4
	Gescheiden	6	4,3	4,3	10,7
	Getrouwd	89	63,6	63,6	74,3
	Ongetrouwd	36	25,7	25,7	100,0
	Total	140	100,0	100,0	

GeocachesInStedenOfPlatteland

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Allebei evenveel	30	21,4	21,4	21,4
	In steden	3	2,1	2,1	23,6
	Op het platteland	107	76,4	76,4	100,0
	Total	140	100,0	100,0	

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Average geocaches found per year	140	4842	6	4848	454,39	624,340
Valid N (listwise)	140					

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Year of birth * Total found geocaches	140	100,0%	0	0,0%	140	100,0%

Report

Year of birth

Total found geocaches	Mean	N	Std. Deviation
<600	1979,58	43	13,294
600-2500	1968,46	46	10,601
2500>	1966,78	51	12,097
Total	1971,26	140	13,183

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Year of birth * Total found geocaches	140	100,0%	0	0,0%	140	100,0%

Report

Year of birth

Total found geocaches	Mean	N	Std. Deviation	Minimum	Maximum	Grouped Median	Median
<600	1979,58	43	13,294	1953	2003	1978,80	1979,00
600-2500	1968,46	46	10,601	1945	1990	1969,25	1969,50
2500>	1966,78	51	12,097	1943	1999	1964,00	1964,00
Total	1971,26	140	13,183	1943	2003	1970,67	1971,00

Report

AgeStart

Total found geocaches	Mean	N	Std. Deviation	Minimum	Maximum	Grouped Median	Median
<600	36,74	43	12,672	12	64	38,00	38,00
600-2500	43,59	46	10,697	23	67	43,60	43,50
2500>	44,14	51	11,324	10	65	47,14	47,00
Total	41,69	140	11,944	10	67	42,25	42,00