

# The Experience of Emotion in Natural Environments

An explorative study using semi-structured interviews



## MSc thesis

2009

Student: Stephan Moed (830713-574-080)

Supervisor: Dr. Maarten Jacobs

Examiner: Dr. Agnes van den Berg

Wageningen University

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Socio-Spatial Analysis

Thesis code: SAL-80436



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## Abstract

Emotions seem to play a big role in nature experience literature. From stress recovery to nature preference theories, the experience of emotion is often implied. There is however not much information on the specific topic. In this explorative research, semi-structured interviews with seventeen respondents were used. This resulted in the recollections of 38 specific experiences in nature. Respondents consisted of males and females, ranging from 18 to 82 years old. They were all born in the Netherlands. They were asked what they had felt, what had caused their emotion and what effect the experience had on them. They also indicated the core affect and arousal levels of their emotions on Likert-type scales.

The interview transcripts were analyzed for patterns and interesting details. Respondents reported many different emotions. The experiences of peace, fear and annoyance were very distinctive. These experiences and their consistent factors are described in detail.

There were many aspects that caused or influenced the experiences. Four aspects are analyzed in detail, namely animals, weather conditions, people and association. All the aspects had multiple ways of influencing the experience of emotion.

Four different effects of the experiences are distinguished and analyzed. Respondents indicated a change in mood, a change in nature visiting behavior, a change in opinion on nature and they spoke about the positive effect of remembering past experiences.

The discussion compares the results of the current research with that of Berg & Heijne (2005), Barret *et al.*, (2007) and Watson & Clark (1988). Suggestions for further research are given in the concluding chapter.

The results suggest that research and policy involving nature experiences can greatly profit from a better understanding of the experience of emotion in nature.

## Table of content

1. Introduction.....	7
1.1 Background.....	7
1.2 Problem statement.....	8
1.3 Research objectives and questions .....	8
2. Literature review .....	10
2.1 Nature experience .....	10
2.1.1 Fear of nature .....	10
2.1.2 Emotions caused by animals.....	11
2.1.3 Calm and positive emotions in nature.....	11
2.1.4 Nature preference .....	11
2.1.5 Nature as cause or nature as background .....	11
2.2 Emotions .....	12
2.2.1 Core affect .....	12
2.2.2 Arousal.....	12
2.3 Cause of emotions.....	12
2.3.1 Stimuli .....	12
2.3.2 Appraisals.....	12
2.4 Remembering emotional experiences.....	13
2.5 Conceptual model .....	13
3. Methodology .....	14
3.1 Preparation .....	14
3.2 Data collection .....	14
3.3 Data analysis .....	15
4. Results .....	16
4.1 Summary of the results .....	16
4.2 The experience of emotion in nature .....	17
4.2.1 Overview of the emotional experience .....	17
4.2.2 The experience of peace.....	18
4.2.3 The experience of fear.....	20
4.2.4 The experience of annoyance .....	23
4.2.5 The experience of other emotions.....	24
4.3 Influences on the experience of emotion .....	26
4.3.1 The influence of animals .....	26
4.3.2 The influence of weather conditions.....	29
4.3.3 The influence of people.....	32
4.3.4 The influence of association .....	36
4.4 The effect of the experience of emotion on nature-related behavior .....	39
4.4.1 Change of mood.....	39
4.4.2 Remembering nature experiences .....	40
4.4.3 Visiting nature.....	42
4.4.4 Opinion of nature.....	44

5. Discussion .....	46
5.1 Limitations of the results .....	46
5.2 Fear and fascination .....	47
5.2.1 Comparison of both articles .....	47
5.2.2 Immensity and overwhelming situations .....	48
5.3 Core affect or PANAS? .....	49
5.3.1 Core affect and the PANAS scales .....	49
5.3.2 Results of the current research .....	49
5.3.3 Discussion .....	50
6. Conclusion .....	51
6.1 Suggestions for further research .....	51
6.1.1 Literature study .....	51
6.1.2 Further qualitative research .....	51
6.1.3 Quantitative research .....	51
6.1.4 Virtual nature .....	52
6.2 Answers to the research questions .....	52
6.2.1 The emotions that people experience in nature .....	52
6.2.2 Aspects that cause and influence the experience of emotion .....	53
6.2.3 The effect of emotions on nature-related behavior .....	54
6.2.4 Understanding of the experience of emotion in nature. ....	54
6.3 Closing comments .....	54
References .....	55
Appendix A: Interview guideline .....	57
Appendix B: Personal questions for interviews .....	58
Appendix C: Summary of experiences .....	59

# 1. Introduction

The sun stood high in the Czech sky, and the lonely cottage in the middle of nowhere finally had some guests again. J was one of the respondents that was interviewed for this thesis. She, her boyfriend and two other friends had arrived at their destination a few hours ago. They were now lying in the grass, enjoying the nice weather. Little did they know about the massive rain clouds that were heading their way...

When the first drops fell, J was excited, because a little rain can be fun. While her friends quickly went inside, she stayed out to dance. But the rain kept coming and coming. Soon enough, the small river near the lonely cottage could not contain the water that was coming down the hill. After a while the water was everywhere around the cottage. J realized this was the time to go inside, where she put on some dry clothes. When she and her friends looked outside, they saw their car starting to slip away. That was when they started to get really scared. The car was quickly pushed to safety, where they had a very close-up view of the flood. Despite her fear, J could not help being fascinated by all this violence of nature. This was the kind of thing you saw on television, in documentaries and on the news. And here she was, experiencing their personal miniature nature disaster.

Her fear was quickly renewed when she and a friend almost fell into the river. The ground where they had stood a minute ago, had now collapsed into the dangerous water. The rain water even seeped through the walls into the cottage, and all fuses were blown.

Eventually the rain stopped, and with it the flood. But the small bridge over the river was destroyed, so they were stuck there. Help soon arrived, but they still could not leave the area in the following two days.

Nature had ravaged the area in less than two hours.

## 1.1 Background

Both nature and emotions can be fascinating. As the above story shows, emotions can play a big role in experiencing nature. Whether they are positive or negative, active or very passive emotions, they can all be experienced in nature. Watching the sun set over a calm lake can be a very positive, relaxing experience. A forest can provide a pleasant setting for a walk with some friends. And while encountering a wild animal causes for many a very positive emotion, for others it is a frightening experience.

The experience of emotion seems to play an important role in nature experience literature. Researchers have for example learned more about the health benefits of being in nature (e.g. Kaplan, 1995). One such a benefit is the recovery from stress (e.g. Ulrich, 1984). When people talk about the calming effect nature has on them, they often mention positive emotions. This is illustrated by a respondent from another research, who says: "I live close to the dunes and the sea, so I often go there. Standing at the edge of the land always gives me a feeling of freedom. You feel the wind through your hair, you smell the salty sea air, you hear the screaming sea gulls. You see the waves, and after that the eternity of the sea. The sea is always calling me. I can endlessly enjoy the endless view" (Berg & Berg, 2001, p. 19).

There are other specializations of nature experience where emotions seem to play a role. Hinds & Sparks (2008) for example conducted research which suggests that an affective connection with nature

motivates people to engage with nature. They hope that their research “offers a useful indication of the importance of affective factors in natural-environmental research” (p. 118). ‘Affective factors’ suggest that there are positive emotions involved. The authors also refer to Wilson (1984), whose ‘biophilia’ theory suggests that all people have an inherent love for nature. Wilson himself seems to acknowledge that his theory is related to the emotions that people experience in nature. He starts his book (1984) with a description of the strong emotions he felt while overlooking a forest in Surinam. He writes: “The emotions I felt were to grow more poignant at each remembrance, and in the end they changed into rational conjectures about matters that had only a distant bearing on the original event.”

These examples show that emotions definitely play a role in existing nature experience literature. However, very little is known about how exactly people experience emotions in natural environments. Even though psychologists have done extensive research on emotion (e.g. Barret *et al.*, 2007), they have not paid much attention to the emotions people experience in natural settings. Nature experience professionals have done some research on the topic, but their results appear segmented. Their research is often focused on the experience of fear (e.g. Berg & Heijne, 2005), emotions caused by animals (e.g. Jacobs, 2009) and wilderness experiences (e.g. Fredrickson & Anderson, 1999).

There is still little known about the full range of emotions experienced in nature. How are these emotions formed? Why do people experience the same nature area or situation in different ways? How do different natural and other aspects influence these experiences? Not much is known about the influence of experienced emotions on people's future nature-related behavior. How do people remember their nature experiences? And how do emotional experiences influence how people visit nature afterwards?

In 2007, Farber & Hall concluded: “As yet there has been relatively little research on the specific nature and causes of different emotions during [nature] recreation experiences” (p. 267). Manfredo (2008) comes to a similar conclusion: “As central as emotions may be in our personal experiences with wildlife, there is very little research on this topic directly” (p.50). He adds: “The exploration of emotional response to wildlife may be one of the most intriguing and fruitful areas for future investigation” (p.51).

## **1.2 Problem statement**

A quick analysis of existing nature experience literature suggests that the experience of emotion plays a crucial role in these studies. But there is little knowledge of how people experience emotion in natural environments, or how this fits into other important theories.

## **1.3 Research objectives and questions**

There is enough research to be done on the topic of emotions in nature. Because there is so little known about this topic, an explorative study can provide new insights. From the problem statement several research objectives and questions emerge. The three research objectives are followed by several more specific research questions.

- To explore the different emotions that people experience when they are in nature.
  - Which emotions do people experience in nature?



- To understand how these emotions are caused and influenced by natural and other aspects.
  - How does nature directly cause emotions?
  - How does nature influence emotions not caused by nature?
  - How do other factors influence emotions?
- To understand how (the memories of) these emotions influence people's behavior.
  - What is the effect of the experienced emotions on how people visit nature afterwards?
  - To what extent do people still associate (parts of) nature with their experienced emotions?
- To come to a better understanding of the experience of emotion in nature.
  - What role does emotion play in existing nature experience literature?

The results and discussion chapters try to answer these questions. But first, the next chapter provides an overview of the relevant scientific literature.

## 2. Literature review

As the introduction already pointed out, there is little literature on the specific topic of emotions in natural environments. Fortunately, there is much comprehensive literature on the experience of emotion. The following section discusses several studies on the experience of emotion in nature.

### 2.1 Nature experience

In this study, nature is seen in the broad sense and also includes urban nature like gardens.

The literature on emotions in nature seems to be limited to fear of nature, emotions caused by animals and those by wilderness experiences.

#### 2.1.1 Fear of nature

Berg & Heijne (2005) have done explorative research on fear caused by nature. In the first part of the study, respondents were asked to write about fearful situations they had experienced in nature. From the 27 described situations, the researchers identified ten different causes for fear. These are mentioned in the table.

They also identified four kinds of situations where different causes for fear were experienced. 'Close encounters' were situations where people were suddenly close to something they feared, mostly animals such as wild cows, snakes or insects. 'Foreceful situations' occurred when people were under heavy influence of the natural elements, for example when a thunderstorm started while they were in a forest. In 'overwhelming situations', people were confronted with the immensity of nature, such as a tall, intimidating forest. They were mostly alone when experiencing this. In 'disorienting situations', people got lost in nature, usually in a dark forest.

For the second part of the study, the researchers also asked people to answer questions about hypothetical situations. Emotional reactions to these situations varied as some respondents purely reacted with fear, others both fear and fascination. Because of the hypothetical aspect, the second part of the study did not leave much room for other details of specific situation that might influence experiences. The article further focuses on evolutionary explanations for fear of nature.

Characteristics that can cause fear in nature. After: Berg & Heijne, 2005.

Characteristic	Definition
Danger	Possibility of death or severe injuries
Dependence	A situation in which one cannot afford to make mistakes
Fierceness	Confrontation with the power of the elements
Immensity	The presence of vast elements, such as heights and tall trees
Suddenness	Caught unprepared by an unexpected event
Proximity	Being at a close distance of something
Novelty	Being in an unfamiliar area, or being confronted with unknown things
Invisibility	Being surrounded by darkness, hearing or touching something invisible
Repulsiveness	The presence of disgusting animals, smells or materials
Absence of others	Being alone in nature

The results of the research are useful for recognizing influential aspects in the experience of fear and fascination. The results of both this and the current research can be compared to come to a better understanding of fear and fascination in nature.

### **2.1.2 Emotions caused by animals**

Manfredo (2008) has argued that emotions are a basic response to wildlife. Jacobs (2009) has formulated 6 mechanisms why we respond emotionally to animals, based on theory and literature study. First, humans have an innate preference for biological movement. Second, we have innate quick learning programs to learn emotional responses toward some animals that were relevant for our ancestors very quickly. Third, conditioning can result in emotional responses toward animals. Fourth, we have a tendency to respond emotionally to emotional expressions of animals. Fifth, knowledge may influence the interpretations of an emotional bodily reaction into an emotional experience. Sixth, knowledge can cause emotional responses. All in all, the study of emotions toward animals has just begun and empirical evidence is largely absent.

### **2.1.3 Calm and positive emotions in nature**

Several authors, Kaplan and Kaplan being the most famous of these, have studied the effect of nature on mood and health (Kaplan & Kaplan, 1989; Kaplan, 1995). Studies show that viewing nature can reduce stress and thus have a positive effect on mood and health. According to Kaplan and Kaplan, this effect of stress reduction might be caused by the easiness with which nature can be perceived. Thus, it is not energy consuming to grasp nature and therefore nature can have a calming effect. Also, nature often raises interests and leads then to positive emotions.

### **2.1.4 Nature preference**

There is a long tradition of research into landscape preferences. Most studies do not mention emotions of affect. Recently, however, Hinds & Sparks (2008) have written that preferences for nature are ultimately affective. Only if nature evokes positive emotions, it is possible to have preferences for nature. The often reported finding that people prefer natural scenes over non natural scene would then indicate positive emotions toward nature.

### **2.1.5 Nature as cause or nature as background**

The natural environment, including animals and weather, is often the direct cause of emotion, as the above mentioned research shows. But when people are in nature, they can also experience emotions that are caused by something else. A person can be in nature when she gets the news that her father has died. Somebody might experience strong emotions because he is heavily meditating about his life, which he usually does during a walk through the forest. In all cases, nature is very likely to have at least an indirect influence on the experienced emotions. This is illustrated by a respondent's story in another research: "When I am tired, or angry, disappointed, sad or depressed, I walk to the park close by, in good and bad

weather. A few walks around the pond calms me down. I have been doing this for years” (Berg & Berg, 2001, p. 18).

## **2.2 Emotions**

There have been years of discussion of which basic emotions there are. Kemper (1987) distinguished fear, anger, sadness, satisfaction. Eckman (1984) distinguished fear, anger, sadness, happiness, disgust, surprise. Izard (1977) distinguished fear, anger, enjoyment, interest, disgust, joy, surprise, shame, contempt, distress, guilt.

In the last decades, researchers seem to have stopped focusing on deciding which emotions are basic, or even naming them. They rather try to understand the important aspects of emotion experience. Barret *et al.* (2007) provides a comprehensive explanation of the experience of emotion. Many researchers agree that an important aspect of emotions is ‘core affect.’

### **2.2.1 Core affect**

Core affect is the liking - disliking, or pleasure - displeasure dimensions of emotional experiences (Barret *et al.*, 2007). Every emotional experiences has a certain value on this negative to positive scale. Another dimension is arousal.

### **2.2.2 Arousal**

Arousal is the inactive - active dimension of emotions (Barret *et al.*, 2007). Some emotions are very activating, such as fear, while other emotions are not activating, such as sadness. Core affect and arousal are two basic dimensions of emotions that explain a lot of variation in emotional experiences.

## **2.3 Cause of emotions**

### **2.3.1 Stimuli**

External causes of emotions come to us as stimuli. Stimuli are sense data, or externally driven activations of our senses, that then send information to our brain.

### **2.3.2 Appraisals**

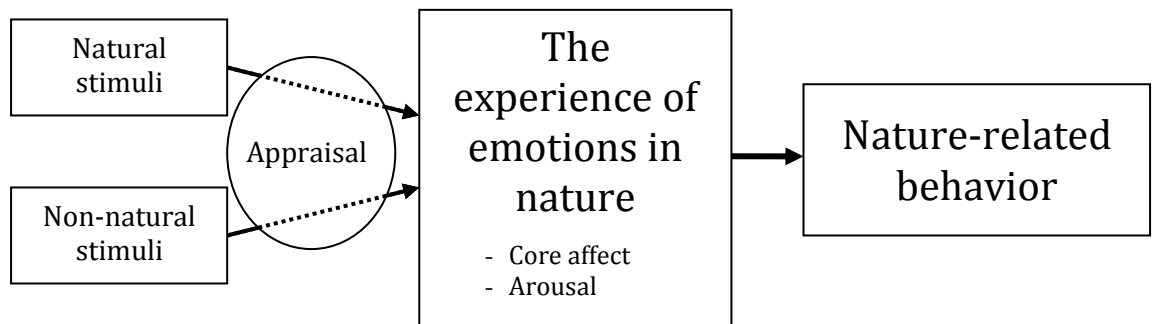
However, emotions are not caused only by stimuli. For example, one person might fear snakes and the other not. This can't be explained if there were only stimuli (then both persons would react the same). There is a process of appraisal before stimuli lead to emotions or not. That is, the emotional relevance of emotions is evaluated first. According to Barret *et al.* (2007), this emotional evaluation follow some criteria: the novelty of the event, the conduciveness or obstructiveness to one's current goal, whether the event is compatible (or not) with norms and values, and who is responsible for the event.

## 2.4 Remembering emotional experiences

Special emotional experiences seem easier to remember than normal experiences. Also, normally we are very confident that our memory is correct in these cases. But research indicates that our memory is fallible, even when it comes to these vivid memories of emotional experiences.

## 2.5 Conceptual model

The following model was constructed from the data provided in the literature review.



The aspects can be explained as following. Further explanation can be found in the sections above.

**Stimuli:** The factors that cause or influence the experience of emotion. They can either be natural factors (the environment, weather, animals, etc.) or non-natural ones (other people, familiarity with the area, etc.). There are always multiple stimuli that influence the experience of emotion. Some stimuli play a bigger role than others.

**Appraisal:** Not everybody experiences a situation in the same way. Each person appraises the situation differently. Two factors seem to play important roles in this process: whether situations are new or unexpected, and whether they are conducive or obstructive to a goal.

**The experience of emotions in nature:** People can experience multiple emotions in a single experience. Core affect refers to the negative or positive affect that people experience. The arousal level refers to how inactive or active the emotion is experienced.

**Nature-related behavior:** The behavior that people show towards nature can include the way they visit it, the way they leave it, and how they think of it. This behavior can be influenced by other factors, but these will not be researched in this thesis.

**Memory:** Not always reliable. But what matters for our behavior is the way we remember it, not how it actually happened.

### **3. Methodology**

The research was divided in three phases. In the first phase the research was prepared, by conducting a literature study and deciding how to execute the other two phases. The second phase consisted of collecting the raw data through interviews. In the final phase this data was analyzed, and the thesis report was written.

#### ***3.1 Preparation***

Before the gathering of data, a literature study took place (for the results, see chapter 2). Topics that received special attention were the experience of emotions, aspects that influence emotions and the experience of nature.

Because very little research has gone into emotions in natural settings, an explorative, qualitative study was deemed most suitable. Semi-structured interviews with 17 people were used to gather the information. A purposive sampling method was used: the respondents were chosen in order to form a diverse sample (in age, gender, interest in nature, etc.). The risk of a purposive sampling method is bias towards more nature loving respondents, because the researcher knows more of those than of people who do not particularly like nature. Some bias is allowed, because the amount does not have to be representative for the Dutch population. For the same reason, the researcher sometimes tried to steer respondents towards telling emotions that the researcher had not encountered yet. The researcher for example ask some respondents about their most positive and negative emotions. Others were asked about more recent emotion in nature.

Because of the small sample and the limited information per interview, the goal was not to compare respondents with each other, but rather to understand how each individual has experienced emotions in nature. Nonetheless, a goal of this study was to find patterns and structures in how people experience emotions in natural environments.

As section 2.4 discussed, memories can be unreliable. It can not be expected that the emotions actually happened as they are told. But this does not have to be a problem. Perhaps the memories of emotions are more important than the actual experiences. The influence that a visit to nature has on us a year later is not determined by the actual experience, but by the way we remember it.

Personal questions (e.g. "how often do you visit nature") were asked on order to explore possible indirect influences. See appendix A and B for the interview questions.

#### ***3.2 Data collection***

The collected data was the remembered information about previously experienced emotions in nature. This was primary data, directly collected by the researcher. The researched population consisted of Dutch speaking inhabitants of Holland, who could communicate about their emotions.

A number of seventeen Dutch people were the information sources. A purposive sampling method was used to form a heterogeneous sample. The respondents were all personal acquaintances of the researcher. An advantage of this was that they all seemed to talk very openly about their emotions.

Semi-structured interviews were used to derive the data from the information sources. Respondents were asked to think of two or three remembered emotions that they experienced in nature. It did not have to be an emotion experienced in Dutch nature. Because of the broad topic, respondents were allowed to talk about emotions in any type of nature. They described each emotion, its cause and the natural environment the emotion was experienced in. The researcher asked them to determine the core affect and arousal level on Likert-type scales of 1-7. When respondents did not understand what was meant, the researcher gave some examples. To avoid bias, these examples were very different from the experience that the respondent gave.

Respondents also used a scale of 1-7 to determine aspects that might have influenced their emotion, such as the beauty and wildness of the nature they experienced the emotion in. They were asked how this emotion influenced their nature visiting behavior.

Of the four appraisals discussed in section 2.3.2, only 2 were applied in this research: novelty and conduciveness to goals. The other two (compatibility with norms/values and responsibility) were deemed less relevant for this research.

After talking about two or three emotions this way, respondents were asked to fill in some personal information (birth date, in what kind of environment they grew up, etc.).

Interviews took between 22 and 74 minutes, with an average of 49 minutes. The interviewer had the literature of the theoretical framework in mind and had sufficient knowledge on emotions. The guideline that was used for the interview can be found in Appendix A, the personal questions in Appendix B.

Interviews were held in Dutch, in a settings that the respondents were comfortable with. Before the interviews began, respondents were assured that their data would be handled in an anonymous way. The interviews were recorded with an mp3-player for personal use. The interviews were transcribed not exactly ad verbatim, but very precisely on catching the meaning, which seemed precise enough for the research.

### ***3.3 Data analysis***

After the data collection, there were transcriptions of 17 interviews, describing 38 experiences of emotion (for a summary, see Appendix C). The transcriptions were carefully scanned for interesting information, patterns and existing literature. Themes were for example how people experienced animals, or how experienced emotions influenced how they visited nature later. Sections were written by analyzing the interview transcripts for the themes. All relevant experiences were gathered in sets, which were further analyzed and divided into sub-categories. Writing of the text was heavily based on quotes from the respondents.

## 4. Results

The interviews provided the raw data of interview transcripts. These were analyzed for certain themes. Section 4.1 starts with an overview of the experiences that respondents told about. Section 4.2 describes the experiences of peace, fear, annoyance and other emotions. Section 4.3 discusses the following stimuli that influenced the experiences: animals, weather conditions, other people and association. Section 4.4 describes the effect that experiences had on the respondents.

### 4.1 Summary of the results

The 17 interviews provided descriptions of 38 emotional experiences in natural environments. Appendix D provides a summary of these experiences. Sometimes more than one emotion per experience was described. There were six experiences where respondents detailed multiple emotions. In three of these cases, respondents had two emotions at once. In two cases respondents told about two emotions that were experienced in succession. And respondent J (experience 23) told about eight emotions that she had either at once or in succession. This resulted in a total of 50 emotions. For every emotion, respondents were asked to indicate its core affect and arousal level. They did this using Likert-type scales of 1 to 7. For core affect, 1 stood for very negative, 7 for very positive. For arousal, 1 stood for very inactive, 7 for very active.

Location	Amount of experiences
The Netherlands	23
Germany	3
Norway	2
United States of America	2
Austria	1
Canada	1
Czech republic	1
France	1
New Zealand	1
Romania	1
Sweden	1
Virtual nature	1

All the experiences were influenced by multiple factors. Respondents were asked to indicate the main factors that caused their experiences. 30 of the experiences were mainly caused by natural aspects, four by non-natural factors. In four cases, both aspects played important roles.

23 of the 38 experiences took place in the Netherlands. The table shows where the other experiences took place. Types of nature they visited include forests, beaches, mountains, rivers and urban nature. On average, respondents rated the wildness of these nature areas with a 5.4 on a scale of 1 (a garden) to 7 (pristine nature). The different weather conditions respondents were in include thunder, fog, clear skies, bright sunshine and a flood.

Rating given to the wildness of nature areas from 1 (a garden) to 7 (pristine nature)	Amount of experiences
1	5
2	2
3	3
4	6
5	8
6	12
7	2

In 10 of the 38 experiences, respondents were alone. In 19 cases, respondents felt like they were familiar with the area they visited, in the other 19 cases the nature was new to them.

The experiences had several future effects on respondents. Among these were changes in nature visiting behavior and nature preference. Section 4.4

Type of company	Amount of experiences
Alone	10
Family	10
Partner	7
Friends	7
Colleagues	4



There were several factors that influenced respondents experiences of emotion. Before going into detail with several of these factors in section 4.3, the following paragraphs give an overview of what kind of positive, negative and mixed emotions respondents experienced.

## 4.2 The experience of emotion in nature

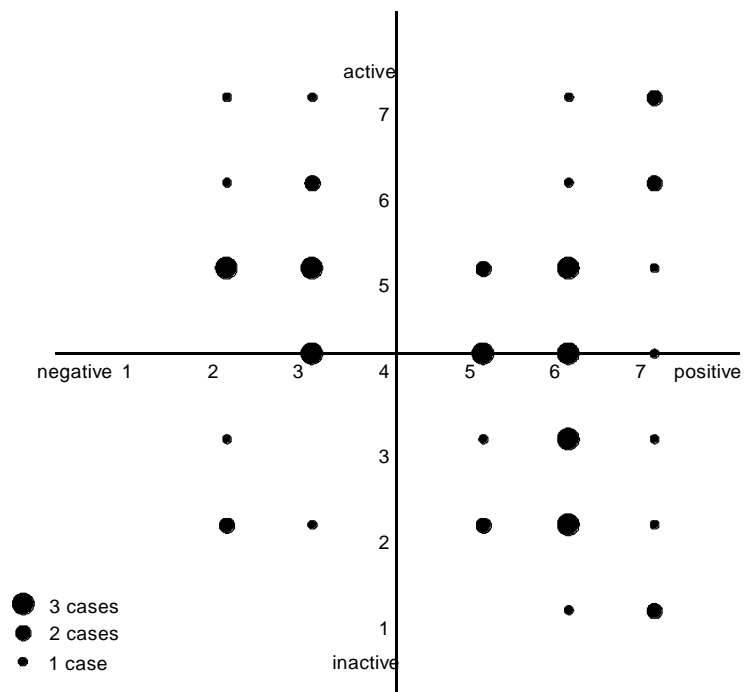
### 4.2.1 Overview of the emotional experience

The figure shows how respondents rated the core affect and arousal level of their emotions. The average core affect of all emotions was 4.9. The average arousal of all emotions was 4.1. In total, respondents described 33 positive and 17 negative emotions. Because of the explorative nature of this research, these numbers do not represent how respondents (or other people) experience emotions in natural environments.

25 of the 38 experiences were positive. Respondents rated the core affect of these emotions with an average of 6.2 on the used Likert-type scale of 1 (very negative) to 7 (very positive). There were seven negative experiences, of which the core affect was rated with an average of 2.6. There were six cases where respondents experienced multiple emotions. The core affect of these was rated with a 4.1 on average.

All respondents gave clear descriptions of their positive emotions. In some cases they had trouble giving a name to their emotions, or they did not name them at all. Respondent C (experience 5) for example described a very positive emotion in the Nevada desert, but she could not find one word to describe it.

While many experiences had a high variety of characteristics, there were several experiences that showed large similarities with each other. These were the experience of peace, of fear and of annoyance. The next sections detail these emotions and what aspects had influence on them, followed by an analysis of the other experiences.



Amount of combinations of rating given to the core affect and arousal level of emotions.

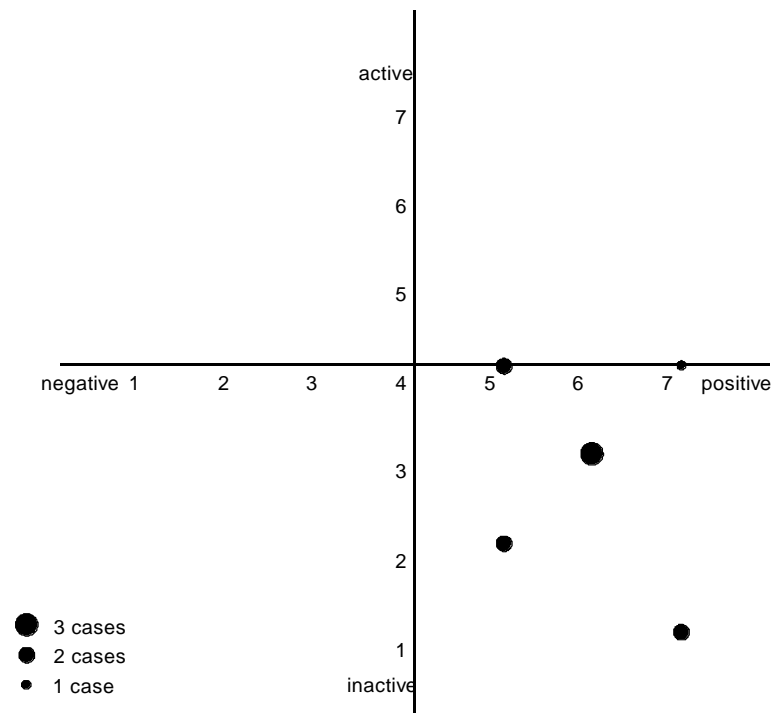
## 4.2.2 The experience of peace

An emotion that respondents described ten times was ‘peace’ (Dutch: ‘rust’, meaning rest, calmness or peace). These were positive and inactive emotions. Respondent A (experience 1) described this as “almost a sort of meditation, an emptiness.” She adds she usually gets happy when her head is empty. The reason of this emotion was the forest that had turned red because of the setting sun. It was very quiet, she heard no birds. She said “there was something hanging in the air, a sort of serene peace in the forest.”

There were at least six factors that played roles in most experiences: the environment was quiet, it was beautiful, the situations were not new or unexpected, respondents were familiar with the area, they forgot their troubles, and they felt safe.

All ten experiences took place in quiet environments. Respondent F (experience 15) for example tells: “It’s a place where you can think quietly. There is a wide view, there are horses, so you can see some movement. It is a nice spot to just sit down and feel the sun on your face. Just a spot to find yourself.” Some other respondents specifically told that the nature around them was quiet, in the other cases it was obvious. This was for example the case with respondent D (experience 10), who told he was on a deserted beach with nobody around.

Respondent #	Experience #	Core affect (1-7)	Arousal (1-7)	Description
A	1	6	3	Experienced peace when the nature around her was very quiet and beautiful.
B	3	5	4	Experienced peace in a forest because no strangers were around and he felt like that part of nature was his own.
D	10	5	2	Spent hours studying a small part of nature and playing in it.
E	11	5	4	Said that seeing some Roe Deer very close to him had a calming effect on him.
F	15	6	3	Experienced peace on a ‘reflective spot’ that she often visits with her boyfriend.
H	19	7	1	Watched northern lights while he was lying in his tent.
J	23a	5	2	Was lying on the grass with friends, enjoying the sun and each others company.
K	25	7	4	Enjoyed the quiet nature around him, and sat on a bench for almost 2 hours.
K	26b	6	3	While he was suffering from a burnout, the quiet nature calmed him down and made him feel better.
N	32	7	1	Often sits at home, thinking about the nature around his house. This has a positive and calming effect on him.



Amount of combinations of rating given to the core affect and arousal level of the experience of peace.

In all ten cases, respondents thought the environment was very beautiful. On average they rated the beauty of the area with a 6.1 on a scale of 1 (very ugly) to 7 (very beautiful). One thing that respondent E (experience 11) specifically enjoyed were some roe deer. He tells: "The animals didn't run away and that made it beautiful. Because they weren't immediately afraid. There were a few that started to walk, but it was just beautiful to see those animals. [...] Usually animals shy away from people, they immediately



The beauty of nature seemed a factor in all ten experiences.

run away so you can barely see them. But these ones stayed there and I had a nice view of them."

Respondent B (experience 3) says about the forest he was walking in: "It looked gorgeous! It was all white from the snow, which was melting. Everywhere were pretty streams of water."

In eight of the ten cases, there were no new or unexpected situations. Respondent H (experience 19) for example saw northern lights when he was traveling on the Norwegian tundra. He tells: "I looked out of my tent every half hour, I assumed I would see it sooner or later. So in that way it was not unexpected." It was only a new situation for respondent B (experience 3), and a unexpected situation for respondent E (experience 11).

During eight of the ten experiences, respondents were familiar with the area they were in. Respondent K (experiences 25 and 26b) for example has known the area his whole life. Also respondent A (experience 1) knows the area well, because she cycles through it every day. For two respondents, the area was so familiar that they felt it was 'their' nature. This was the case with respondent D (experience 10). He says: "It's part of yourself at that moment. I think that if somebody else would come there, I would say 'Hey, what do you want on my part of the beach, get out of here!'"

In seven cases, respondents said they forgot most of their troubles when they experienced peace. They were glad to be away from their daily situations. Respondent D (experience 10) was 15 years old when he and his family were on vacation in France. Every day he went to the beach by himself. He tells: "You go there every time because you know you feel good there, you can relax there. I remember that there was a lot of stress in the family. My brother and father really didn't get along, they were often arguing back then. And I could go there and go around my own business." Respondent A (experience 1) cycles home from her work every day. She cycles through the woods because she wants her head to "be empty" when she gets home. Respondent O (experience 33) did not tell about a peaceful experience, but he did tell he went into nature because he was tired and stressed. He had to get out into nature and calm down.

For two of the ten experiences, respondents told they felt safe. Respondent F (experience 15) explains about the spot she often visits: "A feeling of 'nobody can see me, while I can see everybody.' I think it's a

safe feeling.” Respondent H (experience 19) was traveling on a tundra on his own when he saw northern lights. He had already visited the same area in summer. He tells: “You know you’re doing things safe. [...] I knew that there would not be any grave situations.” Although the other respondents did not mention their safety, the interviews suggest that they were all in safe situations. This might have subconsciously played a role for them as well.

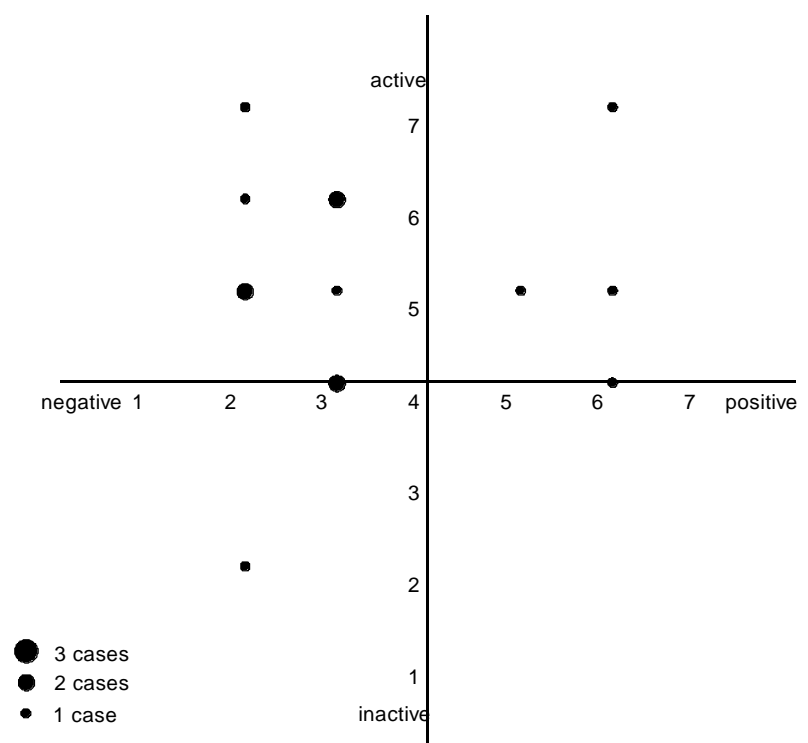
These ten cases show that peaceful experiences helped respondents forget their troubles for a while. They were positive, inactive emotions that took place in quiet environments. The situations were usually not new or unexpected, and most respondents were familiar with the nature they were in. Respondents rated the beauty of the area high, and two of them specifically mentioned a feeling of safety.

Another emotion that respondents often experienced was quite different from peace.

### 4.2.3 The experience of fear

Eight respondents experienced fear in nine situations<sup>1</sup>. These were negative and active (4 to 7 on a scale of 1 (very inactive) to 7 (very active)) emotions. Four of these experiences took place in Holland, the other four in Canada, the Czech Republic, Romania and Sweden. There were several aspects that often played a role in the experience of fear: danger, unexpected and new situations, unfamiliarity with the area, invisibility of the surroundings and being alone. There were also a few cases where respondents felt both fear and fascination at the same time.

In six cases respondents faced a dangerous situation. Respondent M (experience 30) and her family for example had to cycle through thick fog. Because the road was right next to a canal, there was the danger of falling into the water. She tells: “There was such a thick fog that you couldn’t see. There were of course not many lights. So we had to look at the trees to see where to cycle. I was scared to death!” Respondent J (experience 23c) was watching how a flood



Amount of combinations of rating given to the core affect and arousal level of the experience of fear (and simultaneous fascination).

<sup>1</sup> Respondent D (experience 9) and F (experience 14) had experiences that showed similarities with fear. But their emotions were less active, and in the interviews they themselves did not call it fear. See section 5.2.2. for an analysis of these two experiences.

was filling a small river with rapid water. After they had taken a step back, a part of the river bank collapsed into the river. She says: “A minute ago we were standing there, what would have happened if we still had stood there?”

There were two cases where respondents (I, experience 21, and L, experience 28) were lost in a forest. Even though there was no immediate danger, the situations could become dangerous if the respondents did not find their way back. Respondent G (experience 16) knew he was not in danger when his car got stuck in a dark forest. But he had just seen a scary movie. He says he was “afraid, mostly because your car is stuck of course, but you also associate it with the movie. You think ‘we have to get out of here, it’s scary!’” See section

4.2.4 for further analysis of this experience.

All respondents said that the situations were unexpected. Respondent F (experience 13) tells about her and her boyfriend’s experience in Canada: “We went there with the idea of taking an evening walk. [...] And suddenly it was like ‘... I’m looking at a wolf...’” The other respondents had similar experiences. Respondent M (experience 30) states about when she had to cycle through thick fog: “It was totally unexpected.”

For at least six respondents it was also a new situation. Respondent A (experience 2) was afraid of running into a bear in Swedish nature. She explains why it was a new situation for her: “You don’t get that in the Netherlands, having to fear anything in nature.” Respondent I (experience 21) had been doing field work in a Romanian forest for six weeks. All this time she had not encountered any problems. So when she got lost, it was a new and scary experience.

A sometimes related aspect was how familiar respondents were with the environment. Four respondents indicated that they were not familiar with the natural area they were in. This played a role for respondent M (experience 30), who was lost because she did not know the forest she was in. Respondent G (experience 16) on the other hand knew the area he was in. When his car got stuck in the

Respondent #	Experience #	Core affect (1-7)	Arousal (1-7)	Description
A	2	3	6	Found berries in a Swedish forest, which made her afraid of possible bears.
F	13	2, 6	7	Stood eye in eye with a wolf, which was scary and fascinating at the same time.
G	16	3, 5	5	Got stuck with his car in a dark forest, after just having seen a scary movie.
I	21	3	4	Was afraid when she and a fellow student got lost in a big Romanian forest.
J	23c	2	6	Almost fell into a dangerous river when the ground where she had just stood collapsed into the river.
J	23d/e	3, 6	6, 5	Was in the middle of a miniature nature disaster, which was both scary and fascinating.
L	28	2	5, 2	Got lost in a forest with 3 younger friends when she was 15 years old. She was scared, but also because she was the oldest, she tried not to show it.
M	30	2	5	Had to cycle with her family through very thick fog when she was about 19 years old. It was dangerous because they were cycling next to a canal.
P	36	3, 6	4	Was scared when he was between 7 and 10 years old and his family had to leave their camping tent because of a heavy thunder storm. When they had found shelter, he was fascinated.

mud, this familiarity had influence on his emotion. He explains: “You know exactly where you have to go, how you get back home, you know where you can get help if needed. So yes, it matters.”

Five respondents were in situations where their surroundings were difficult to see. This played a role for respondent M (experience 30) who was surrounded by thick fog, and for respondent G (experience 16) who was stuck in a dark forest. Respondent A (experience 2), who was afraid of a possible bear, says about the reason of her fear: “Probably also because it was in a forest. So you can’t really look around you. You see bushes... you can’t see what’s around the next corner, or what’s behind that tree.”

Only one of the eight respondents was alone while she experienced fear. Respondent A (experience 2) tells about her fear for a possible bear: “It was also because I was alone. In the United States I’ve also walked in areas with bears, but then I was always together with somebody else. That wasn’t so scary.” Respondent J (experience 23d) was not alone, but with three friends. She tells: “It definitely influenced the situation. First of all I was glad that I had two strong guys with me, especially when the car started to slip away. I think we were calmer with the four of us than if I had been alone. Then I would have been more afraid.”

Several respondents not only experienced fear, but also fascination for that what scared them. Three respondents experienced both these emotions at once. Respondent F (experience 13) for example was afraid of the wolf she saw, but at the same time enjoyed the situation. When asked what she felt, she says: “At the same time fear and fascination. You’re also glad you get to see a wolf.” She later compares it to watching a scary movie. “That is actually something frightening, but you also enjoy it. That is how I experience it.” She also tells



Several respondents got scared when they were lost or stuck in a forest.

that this ended up as her most beautiful nature experience. Respondent J (experience 23d/e) also felt both positive and negative emotions when she was in the middle of a dangerous flood. She tells: “It wasn’t necessarily very negative, because it was also very impressive to experience: ‘Wow, this is how powerful nature can be.’ On the other hand, maybe mostly afterwards, it was very special to experience how fast and fierce something like that can go. And how you can’t do a thing about it. At that moment you’re completely in the hands of the situation.” There was also one case where fascination followed after fear. When respondent P (experience 36) was in a big thunderstorm as a child, he first was afraid. But when he and his family had found shelter, his fear was replaced with fascination. He explains: “I was just impressed by the thunder. I wasn’t scared.”

The above mentioned examples show how different aspects played roles in the experience of fear. All situations were unexpected, most of them were new for the respondents. Danger was a big influence in

many cases, while all the situations had been unexpected. Not being able to see the surroundings and being in new situations sometimes played a role. Half of the respondents were in areas they were not familiar with. Even though only one respondent was alone during her experience, others also thought that they would have been more afraid if they had been alone. And several respondents have shown that the same situation can cause both positive and negative emotions at the same time.

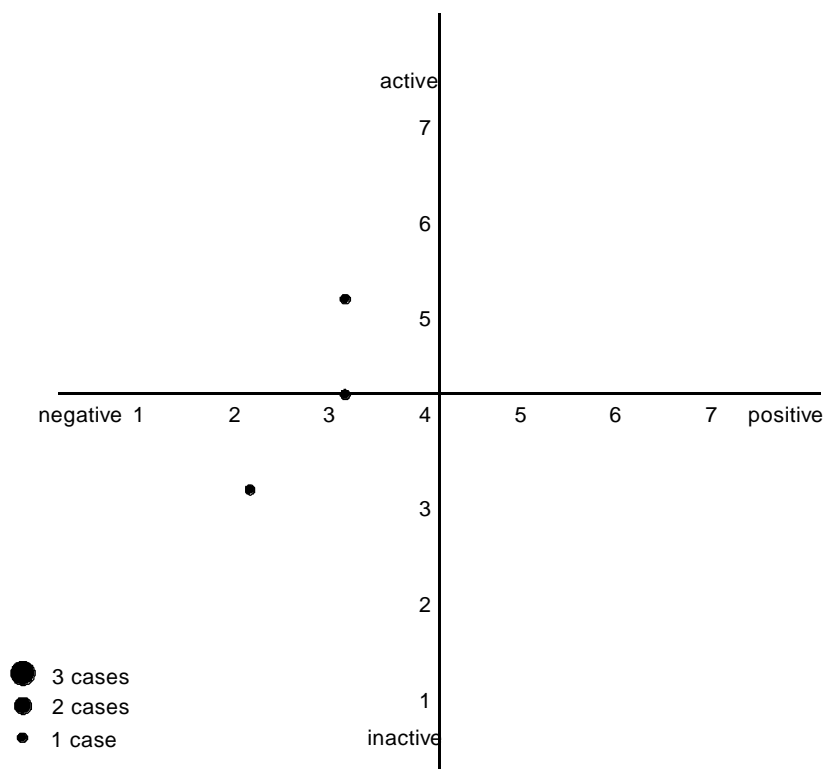
But fear was not the only negative emotion that respondents had experienced in nature.

#### 4.2.4 The experience of annoyance

Three respondents told about experiences where they were annoyed in nature. The emotions were negative and of average arousal. All three emotions were caused by other people. Respondent B (experience 4) for example, who rarely visited nature, says: “I really hate running into other people. When I’m in nature, I think ‘the spot where I walk is mine.’ It’s just my quiet environment, where I try to find peace and beauty. [...] And then a bunch of other people comes to disturb that picture.” In two cases the people involved were strangers, in the other case it was a colleague. A more detailed discussion of the influence of people can be found in section 4.2.3.

In two cases respondents were annoyed because they faced a recurring problem. Respondent I (experience 21b) and a fellow student for example were doing field work in a Romanian forest. When they got lost, they did not agree on how to find their way back again. She tells: “Before that I had already been annoyed by the fellow student a few times, so this added to it. Like: ‘You see? There he goes again.’” Respondent H (experience 18) was also extra irritated because the unpleasant situation was something that happened on a regular basis.

Respondent #	Experience #	Core affect (1-7)	Arousal (1-7)	Description
B	4	3	5	When he was walking in a forest with some friends, he was annoyed by the presence of some strangers.
H	18	2	3	When he cycled to his work, a car passed him with high speed, causing an annoying dust cloud. Because this happens very often, it frustrated him.
I	21b	3	4	When she and a fellow student were lost in a forest, she was annoyed by him because they did not agree on where to go.



Amount of combinations of rating given to the core affect and arousal level of the experience of annoyance.

The above examples show that other people were the only cause of the experience of annoyance. The recurrence of the negative situations played a role in two of the three experiences.

Although the above three described experiences of emotion each showed many similarities, they were of course not the only emotions that respondents experienced in nature.

## 4.2.5 The experience of other emotions

There were several other emotions that respondents experienced in nature. Nineteen of them were positive, five were negative. In contrary to the experience of peace, fear and annoyance, these emotions did not show many similarities.

### 4.2.5.1 Other positive emotions

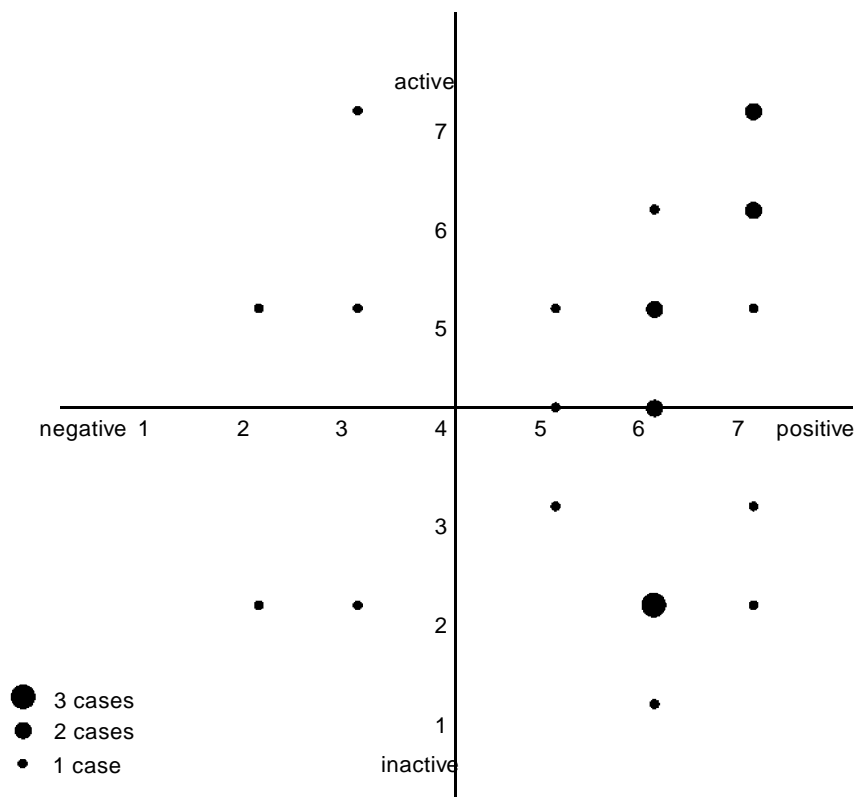
The nineteen positive emotions strongly vary in descriptions given to them. Some terms that were used were fun, fascination and happiness.

Two respondents called their positive emotion 'fun.' Both emotions were caused by humans (see section 2.3.3.1).

In the case of fascination, the attention of respondents was

grabbed by elements of nature. They mostly consisted of unexpected close encounters with animals (discussed in section 2.3.1.1).

There were around a dozen experiences where respondents experienced an emotion that can best be described as 'happiness.' They felt positive emotions with varying arousal. Respondent C for example had trouble describing emotions in all her three experiences. When asked what she felt when she drove through the Nevada desert (experience 5), she does not tell what she felt, but what she thought: "We live so packed together here... in contrary to there, that huge desert." When asked if it was a positive or negative emotion, she stated it was positive. With experience 7 she had less trouble describing her emotion. She said the situation made her "happy and content." When respondent I did not meet a single person in a very wild forest, she experienced a feeling of happiness and 'euphoria.'



Amount of combinations of rating given to the core affect and arousal level of the experience of other emotions.



#### **4.2.5.2 Other negative emotions**

There were five cases where respondents experienced negative emotions. Two of them were inactive, three were active.

Two respondents experienced emotions which were comparable to fear. But they did not call it fear, nor did the experience show many of the characteristics discussed in section 4.2.3. Their experiences are further discussed in section 5.x.

There was one respondent (K, experience 26a) who told about a sad emotion. The experience was not caused by or in nature. He was already coping with feelings of depression, and went into nature to try to improve his mood. It was a very active emotion, the respondent was very worried about his problems.

Respondent J (experience 23g and h) experienced two negative emotions because of the flood that had destroyed the area around their vacation cottage. They were both emotions that lasted for a long while, but were not very dominant. The emotion of experience 23h for example lasted for the two days that she and her friends could not leave the area. In the meanwhile they also experienced other emotions, but this one was often present in the back of her head.

These examples show that not all emotions are as easily determinable as peace, fear and annoyance. They did not show much similarities, and sometimes respondents did not clearly state what exactly they had felt. Determining more emotions in detail might have been easier with a bigger research sample.

Even though some emotions showed many similarities, they were all caused by very different situations. The next section focuses on the aspects influencing the experiences.

### 4.3 Influences on the experience of emotion

The discussed experiences were influenced by many different aspects. Some of these were natural, some non-natural. In some cases they were the main causes of experiences, in others they only had a small influence. Four aspects that often played big roles in experiences were animals, weather conditions, other people and the association that respondents made.

#### 4.3.1 The influence of animals

Animals played an important role in eleven experiences<sup>2</sup>. There were nine cases where contact with animals caused only positive emotions. There was one negative experiences caused by an animal, and one case where both positive and negative emotions were experienced. Nine of these experiences took place in Holland, one in Sweden and one in Canada.

In the interviews some respondents reported very similar experiences. In these cases they unexpectedly met wild animals from up close.

##### 4.3.1.1 Unexpected close encounters with animals

Six of the eleven experiences with animals had a lot of similarities. Respondents saw wild animals when they did not expect it. They experienced positive emotions (with an average of 5.5 on a scale of 1 (very negative) to 7 (very positive)). Emotions were mostly active (with an average of 5 on a scale of 1 (very inactive) to 7 (very active)). The following factors played a role in these encounters: they were unexpected situations, new situations, close encounters and respondents felt no fear.

In all six cases, respondents saw the animals unexpectedly. O (experience 33) and his girlfriend for example were taking a walk in urban nature near the respondents home. Suddenly an owl flew over their heads. He was surprised and felt a kind of sensation. He says: "Especially because it's unexpected, that only makes it more fun." Surprise also played a role for respondent M (experience 29). She was a sixteen

Respondent #	Experience #	Core affect (1-7)	Arousal (1-7)	Description
A	2	3	6	Was afraid of a possible bear when she found berry bushes in Swedish nature.
C	7	6	2	Enjoyed watching magpies building a nest in a tree behind her home.
E	11	5	4	Suddenly saw and enjoyed a group of roe deer which didn't run away from him.
E	12	7	7	Often went into the forest with family to play and catch crickets.
F	13	2, 6	7	Stood eye to eye with a wild wolf on the other side of a river in Canada.
G	17	6	5	Was excited when he was around 8 years old and encountered a roe deer on a few meters' distance.
I	22	7	6	Enjoyed seeing a wild boar and its young crossed the path right in front of her.
K	26	6	3	Improved his mood when he paid attention to bugs and other details of the nature he was sitting in.
M	29	6	5	Was overwhelmed when she was suddenly surrounded by a dozen red deer in a forest.
N	31	6	1	Enjoyed watching a nest of white storks together with some friends.
O	34	5	3	Was fascinated when an owl flew over his head in the dark.

<sup>2</sup> Respondent D (experience 10) probably had contact with animals when he enjoyed discovering a small marine ecosystem. But because he did not mention animals at all when talking about this experience, it is not discussed in this section.

year old girl in World War II when she and her father were in a forest suddenly surrounded by a dozen red deer. She says she was overwhelmed by it. "So beautiful, it was such a moving moment."

In four of the six cases, respondents indicated it was a new experience for them. Only respondents E (experience 11) and O (experience 33) had been in similar situations before. It is worth noting that the arousal of their emotions was lower (3 and 4 on the scale of 1 to 7) than those of the other respondents (5 to 7). For respondent I (experience 22) it was a new situation. She tells: "I was walking there and suddenly I heard a noise. Then an older boar crossed the path with some younger boars. That was a special experience, because it was the first time I saw wild boars." For five of the six respondents their experiences involved animals they did not meet often. They were all wild animals which are usually only encountered outside cities.

Five of the six respondents were very close to the animals they encountered. When respondent G (experience 17) for example was around eight years old, he and his sister were exploring a forest. He says: "Then a roe deer appeared right in



Three respondents had positive experiences with deer.

front of us, I think it was one or two meters away. And the animal wasn't scared at all. That was a very special event." Only in the case of respondent F (experience 13) was there a longer distance between her and the animal. In Canada she stood eye to eye with a wolf. They stood on opposite sides of a river. It can be argued that this was still a short distance, considering the animal was a large predator.

Another aspect that seemed to play a role in five of these six experiences was a perceived absence of danger. Even though animals like red deer and wild boars are potentially dangerous, none of these five respondents were scared. Only respondent F (experience 13) felt some fear for the wolf she saw in Canada. This experience was the only one where an animal caused both positive and negative emotions at the same time. She says the positive emotion was stronger than the negative.

These six emotions showed remarkable similarities in that they were usually unexpected, new close encounters with animals, where respondents were not scared. But there were other positive encounters with animals.

#### **4.3.1.2 Other positive experiences with animals**

Beside the above described six positive encounters with animals, there were four other ones which do not fit the description. They involved animals that are not very wild or rare in the Netherlands.

Two respondents experienced a positive and inactive emotion when they were watching some birds. Both experiences took place in urban nature. Respondent C (experience 7) was sitting in her home while she watched some magpies build a nest in a tree. She was very interested in the process. She says: "How is

that possible, that they can find a good spot. A nest has to start with one twig.” Respondent N (experience 31) was shown a few white storks by a friend. He tells that the mother was sitting on the nest while “the father stood on it proudly. It really was a pretty sight. And some nice nature around it. [...] It was impressive, very pretty!”

Two respondents had positive experiences with insects, both taking place in a forest. Respondent E (experience 12) often went with his family to play in the forest. They used to catch crickets and see who could find the biggest one. The respondent experienced a very positive and very active emotion. The animals here were not a direct cause of the emotion, because he tells that the game and the contact with his family were the primary reasons for his emotion. Respondent K (experience 26) had a different experience where insects played a role. When he was suffering from a burnout, his doctor advised him to visit nature more often. On one of these visits he sat on a bench and looked at the ground. After a while he started noticing small aspects of nature, like moss, beetles and butterflies. This hugely improved his mood. He tells: “Then suddenly you start noticing things, [...] the world is opening up to you. [...] And that gives me peace.” For a further description of this effect, see section 4.4.1.

These experiences with smaller, more common animals show a high variety in characteristics. Two cases involved watching birds, the other two involved a small role of insects. But animals did not only cause positive experiences.

#### **4.3.1.3 Fear of animals**

There were two respondents who were afraid of animals. Both situations involved predators in wild nature. Respondent A (experience 2) was walking alone in a Swedish forest. When she saw some bushes with berries, she was suddenly reminded of bears. She realized she was in a dangerous situation, even though she saw no actual bear. She tells: “A bear also eats berries, what if it suddenly comes around the corner? So that’s when I went back. All this time I was thinking of how to run away from a bear!” As discussed in section 4.2.1.1, respondent F (experience 13) was in a Canadian nature area when she saw a wolf. She was fascinated by this, but at the same time she also felt some fear. She tells that she was glad it was a wolf and not a bear, because bears are known to be more dangerous than wolves.

It is interesting to notice that in the only case of a pure negative experience, there was not even an animal around. The chance of encountering a bear was already negative enough to scare the respondent out of the forest. Another natural aspect that sometimes caused fear was the weather.

### 4.3.2 The influence of weather conditions

In 20 of the 38 experiences, weather had an influence. Weather conditions included sunsets, rain, darkness, thunderstorms, clear skies and northern lights (Aurora Borealis). The table provides some examples of the experiences where weather played a role. In total there were twelve positive experiences, five negative ones and three experiences where multiple emotions were felt.

The way weather influenced the experience of emotion in natural areas varied, and can be roughly divided into four categories. Weather conditions could be a direct cause of experiences, or an indirect one. They could just augment the experiences, or invite respondents to go into nature.

#### 4.3.2.1 Direct cause of experiences

In ten cases, weather was the main reason why respondents experienced an emotion. Without these certain weather conditions, they would not have experienced these emotions.

There were seven cases where the weather caused positive emotions. The beauty of nature was the reason of four of these emotions. Respondent C (experience 6) for example

watched the sun rise over the Grand Canyon. She says: "That was really special, the sun coming up in that very impressive landscape." When asked what she felt, she says she thought about "how mighty nature is, how beautiful. And also how tiny humans are." Respondent H (experience 19) tells: "My most beautiful experience ever is when I saw gigantic northern lights, in north Scandinavia. I was alone, in a tent. [...] I'm not going to describe it to you, because that won't work. [...] It made me very happy."

In three cases, weather caused negative emotions. The respondents said in all 3 cases that they experienced fear. Respondent P (experience 36) was between 7 and 10 years old when he went on vacation with his family several times. He tells: "There was always one night where it would storm and rain very hard, so we had to leave our tent. That was always thrilling. [...] When the storm is at its worst and you have to leave your tent, it's still a long walk to the sanitary building. Then you can get hit by lightning. [...] You're just afraid at that moment. Look, as a small boy you're afraid of lightning anyway. At

Respondent #	Experience #	Core affect (1-7)	Arousal (1-7)	Examples
A	1	6	3	The setting sun gave a beautiful red color. The sight of this made her peaceful.
B	3	5	4	Because of the softly melting snow he really enjoyed walking in the forest.
C	6	6	2	She enjoyed watching the sunrise over the Grand Canyon.
D	9	3	2	Because of the clear weather, he could see very far over a dead forest. The slightly sad weather made his mood even worse.
E	12	7	7	He and his family only visited the forest when the weather was nice.
F	14	2	5	It was a hot and dry day on a large beach, which gave her a nasty feeling. Later a thunderstorm scared her.
F	15	6	3	She went into nature because the weather was nice for the first time in weeks. After a while the sun came through the clouds, which made her happy.
H	18	2	3	Dry weather had caused a lot of dust. The passing cars, kicking it up into clouds annoyed him.
H	19	7	1	He enjoyed watching northern lights.
J	23	5, 6, 2, 3, 6, 5, 3, 3	2, 6, 6, 5, 6, 5, 4, 5	She first enjoyed the sun while lying in the grass. After that, she enjoyed the rain while dancing in it. Heavy rainfall then caused a dangerous flood near their bungalow. She experienced many emotions because of the flood's effect.
M	30	2	5	She got afraid when thick fog made it very hard to see where she and her family were cycling.
P	36	3, 6	4, 4	Lightning scared him when he was between 7 and 10 years old. Moments later he enjoyed the view every time a lightning flash lighted the area.
Q	37	7	4-2	A clear sky gave him a beautiful view of an Austrian mountain area.

least I was.” Moments later, when they were safe, he was fascinated by how the lightning lighted the area. This in turn caused a positive emotion.

Another negative emotion was from Respondent J, who experienced a small nature disaster (as also described in the introduction). She tells: “But then it just kept on raining and raining. You could see more and more water coming from that forest. After a while there was a real flood coming from the forest. The small river got bigger and bigger. [...] After a while the water actually came into the house, through the walls. Also in a trickle of water through an electrical outlet. In the meanwhile the electricity was gone and all lamps were blown. That’s when I started to get scared.”

These examples show how weather conditions itself were the direct cause of both positive and negative emotions. But there were cases where weather was important, without being a direct influence.

#### **4.3.2.2 Indirect cause of experiences**

In 7 experiences, weather itself was not the cause of emotions, but it was important in creating the setting for the experiences. So even though weather conditions did not directly cause these emotions, without them the experience of the emotions would not have been possible.

When respondent H (experience 18) for example cycles from and to his work, he is often annoyed by cars that drive past him with high speed. Especially the dust that these cars kick up bothers him. When asked what the weather was at this and similar experiences, he answers: “Dry weather. With dry weather people drive much harder through the roadside, and the dust is very nasty then.”

Four respondents experienced an emotion when they had a good view of a large area. If the sky would have been cloudy at that moment, their experience would not have taken place. Respondent J (experience 24) explains about her positive emotion when she and her boyfriend watched the stars: “I only know that there was a clear sky. Also it wasn’t too cold, because then we wouldn’t have stood there for so long. It was clear and dry and not very cold, that’s all I know.”

Weather conditions played a large indirect role on emotions a few times, but sometimes it only slightly influenced the emotions.



Watching the stars is not possible with cloudy weather

#### **4.3.2.3 Augmentation of experiences**

Four respondents told about emotions where weather conditions had played a small role in their experience. In these cases, the respondents would have experienced practically the same emotions without the influence of weather.

This was for example the case with respondent I (experience 22), who enjoyed seeing some wild boar in a forest. She thought the nature there was beautiful. She says: "I think that was also because of the weather conditions. It was one of those winter days where the ground was a bit frozen, and where the sun was shining. That is pretty much my favorite weather, so that made it even prettier." If she would have seen those boar on any other day, she still would have enjoyed them. But it might not have been such a positive experience as she had with her favorite weather.

Respondent L (experience 28) and a few friends were lost in a forest. This was already a negative experience, but it got worse because of the weather. She explains: "It was getting foggy when we were lost. [...] When we got lost, dusk was setting in. Before we got out, it was already dark. [...] We got extra scared when it was getting dark." If they would have been lost in the middle of the day, she says it would "not have been that scary."

These examples show that the weather sometimes had a small influence on the emotions that respondents experienced. In other cases the weather was very inviting to go outside and into nature.

#### **4.3.2.4 Influence on nature visiting behavior**

Weather played a role in how respondents visited nature at least five times. Because of certain weather conditions, respondents went into nature, where they experienced emotion.

Sunny weather was a reason to visit nature in four cases. Respondent E (experience 12) for example often visited the forest with his family. He says: "It was usually sunny spring or summer weather." When asked if they ever went there when for example it was raining, he answers "Not that I can remember." Respondent L (experience 27) suddenly noticed how nice some flowers smelled. She says she was in that situation because "it was dry weather. Maybe not as hot as now, but it was already spring. There was sun. If not, I probably wouldn't have been outside." Rainfall was the reason for respondent J (experience 23b) to go outside. She enjoyed dancing in the rain.

The interviews show that there were many different ways how the weather influenced the experience of emotion in nature. Weather conditions were the direct cause of an emotion, or created the setting for one. It had small influences on emotions, and sometimes invited people to go out and visit nature.

There was one interesting case where weather seemed to have multiple kinds of influences. Before it started to rain heavily, respondent J was lying on the grass, enjoying the sun (experience 23a). It seems that the sunny weather invited her to lie on the grass. It was not discussed in which of the above described categories the influence of the weather on this emotion fitted. The sun can have been a direct cause of the emotion. It is also possible it was an indirect cause, where the sun only provided the setting for something else that caused the emotion (for example the joy of being with friends). Or perhaps it was only a pleasant addition to an emotion that she would have experienced anyway.

When moments later respondent J (experience 23b) was dancing in the rain, there was another cause of the emotion. The people she was with.

### 4.3.3 The influence of people

Respondents were asked whether they were alone or with other people during the discussed experiences. In most interviews they were also asked what effect that had on their emotions, and how it would have been different if it had been the other way. In 10 of the 38 experiences they had been alone in nature, in the 28 other cases they had been with others. Respondents often reported that this aspect had played a role in their nature experience, sometimes even a big role (see the table for some examples).

The presence or absence of other people had influence in roughly three ways. People were sometimes the direct cause of emotion. In other cases (the absence of) people slightly influenced the emotions that respondents felt. And last, being alone or with others had an influence on how people visited nature.

Respondent #	Experience #	Core affect (1-7)	Arousal (1-7)	Description EXAMPLES
B	4	3	5	He only visited nature because he was going together with friends. When they met some strangers, those annoyed him.
C	5	7	2	She visited the Nevada desert on her honeymoon. She enjoyed the presence of her husband and uncle.
D	8	6	4	He experienced freedom when he and a friend were on a mountain with nobody around. He enjoyed sharing the experience with his friend.
E	12	7	7	He especially enjoyed the contact with his family when they were playing in the forest.
F	15	6	3	She went with two friends to a favorite spot in the forest. After a while she distanced herself from the friends to get some rest.
G	16	3, 5	5	He went into a dark forest to scare a friend. When his car got stuck, he was glad he was not alone.
H	19	7	1	He had gone alone into nature to find peace. There he saw northern lights.
I	20	7	5	She was amazed when she did not meet anyone else in a large forest in New Zealand.
M	30	2	5	When she cycled through thick fog, she trusted her father who was there with her.
O	34	6	2	He saw a huge dead forest. While he was with a group of about 40 people, he wanted to be alone to experience the situation.
P	36	3, 6	4, 4	When he was a child and he experienced a thunder storm, he was glad he was together with his family.

#### 4.3.3.1 People as a direct cause of experience

Six experiences were mainly caused by other people. Three of them were positive emotions. Respondent E (experience 12) for example remembers when he and his family often went into the forest to play. He explains the reason of his positive emotion was not the nature around him, but rather the fun they had in it. He tells about his family: "We saw them very often back then, and for us it was the best part of the day. For somebody that age, it was a large group. Having fun with your family, that's great." Respondent Q (experience 38) also told about an experience that took place in a natural environment, but was not caused by it. He and some colleagues were working in a big garden when he came up with a joke. The fun he had with his colleagues caused a positive emotion.

People were also the reason for three negative emotions. As also discussed in section 4.2.4, other people were a source of annoyance in three cases. Respondent H (experience 18) for example was annoyed by car drives who pass him with high speed when he's cycling. In the interview he also mentions another annoyance: "I never visit the forest on Sunday afternoon, because it always ends in pure frustration. [...] Always small children and dogs running loose in the forest on Sunday afternoon."



Although people were the direct cause of emotion a few times, in more cases the presence or absence only had a little influence on the experiences.

#### 4.3.3.2 The influence of being with others

In sixteen cases respondents said that being with others had had an influence on their experience. In all but one case respondents said it had made their emotions more positive. This was the case with both positive and negative experiences, as the following examples show.

Being with other people had a positive effect on six negative experiences. Respondent G (experience 16) and a friend for example got stuck with their car in a dark forest. The respondent said that if he would have been alone, “things would have been worse. First of all, I wouldn’t have gotten out of there. And when you’re alone in such a situation, you’re more afraid. When you’re together you achieve more, you can solve things more quickly and you can support each other. So being together was an advantage, definitely.” Respondent D (experience 9) felt very uncomfortable when he overlooked a very big, dead forest. He tells: “You’re with a group, and that’s why it’s not so bad. But if you would have walked there all alone, especially when you don’t know what has happened, you will think ‘A bomb dropped here, or something terrible happened.’ That is quite scary and upsetting. [...] We were with a whole group, about 30 or 40 people. It really matters. [...] If you’re with a group, you always feel more comfortable.” In the other four



Being together with friends or family had a positive influence on many experiences.

cases where other people had a positive influence on a negative emotion, respondents also experienced fear.

In nine cases, the presence of others had a positive effect on an already positive emotion. This usually involved the joy that came from sharing the experience with others.

Respondent C (experience 7) for example was watching a few birds build a nest in a

tree behind her house. She was together with her daughter. She says: “That was nice, I pointed it out to her.” Respondent D (experience 8) climbed a Norwegian mountain together with a friend. He explains about the influence of the friend: “It’s nice you can share it with somebody, I think. I think that when you’re standing there alone, the feeling of vastness and freedom is maybe even bigger. But achieving something together is always more important than on your own. Being able to share it with somebody, or talking and thinking about it later on. Being able to say ‘Hey, do you remember we were there’, that’s also important. That’s part of the fun.”

For one respondent, the presence of other people had a negative effect on him. Respondent O (experience 34) was with a big group (the same as respondent D, experience 9) when he was looking out over a big dead forest. He tells: "I had a strong urge to walk away from the group, because I didn't want to hear any chatter from anyone. I preferred to be alone, to absorb the moment. I just wanted to sit down and look around." This negative influence of other people is related to another influence: the absence of other people in nature.

#### **4.3.3.3 The influence of being alone**

Respondents told about ten experiences where they had been alone in nature. This varied from cycling home from work, to going on a hiking vacation in the wilderness of Norway. In nine of the ten cases, respondents said that their experiences were influenced by the fact that they were alone.

Six times the absence of other people had a positive influence. Respondent I (experience 20) for example was alone when she made a trip through a forest in New Zealand. She did not meet any other people all day. When she realized there was nobody else around, she experienced a feeling of euphoria. It ended up as her most beautiful nature experience. Respondent K (experience 25) enjoyed the peace when he was alone in nature. He tells: "I was a bit disappointed, because some people were cycling there, so it was getting a bit busier. I'd rather be in nature all alone." When respondent L (experience 27) was suffering from a burnout, she went into nature more often. One time she suddenly noticed the smell of flowers. This greatly improved her mood. She says that if she would not have been alone, she probably would not have noticed the smell. "Then you're always busy talking."

Three respondents indicated that being alone had a negative effect on them. When respondent P (experience 35) visited to a virtual jungle (in an online computer game) for the first time, he was very impressed. He was alone, but he states that he would have preferred to have been with somebody else. Being able to talk to somebody else about the environment would have made the experience more positive. Respondent A (experience 2) was alone when she became afraid of a possible bear. She compares the situation with a similar one, where she had not become scared because she had been with somebody else.

These examples show that the presence or absence of people in nature had influence on the experience of emotion. Sometimes respondents enjoyed being alone, while in other cases they would have liked to share their experience with others. In many cases (the absence of) people also influenced how respondents visited nature.

#### **4.3.3.4 Influence on nature visiting behavior**

In eleven cases, the presence or absence of other people was an important factor for respondents' nature visiting behavior. Most of the times, respondents visited nature together with other people. In a few cases, respondents wanted to be alone in nature.

For nine experiences, respondents made clear that they wouldn't have been in that place if they had been alone. Respondent B for example was generally not fond of nature and would never visit it on his own. In both his discussed experiences (3 and 4), he went together with friends. When respondent F was

in Canada, she and her boyfriend took a walk along a river. It was getting dark and they had been warned about wild bears. After a while they noticed a wolf watching them from the other side of the river. It ended up as her most beautiful nature experience. When asked if that experience would have been different when she had been alone, she replies: "If I had walked there on my own, I don't think I would have gone that far." While some respondents specifically said they wouldn't have been there when they had been alone, in several other cases this seemed to play a role even though respondents did not explicitly mention it. Respondent C for example visited the Grand Canyon on her honeymoon. If she had not just gotten married and visited the United States of America with her husband, she would not have been to the Grand Canyon, or at least not at that time.

The opposite can also be true. Two respondents went into nature with the specific goal to be alone. Respondent H for example goes on a lone vacation at least once every few years. As he puts it: "I travel to search for peace, and to think about myself." Respondent A (experience 2) also visited nature with the desire to be alone.

A few respondents mentioned multiple influences of other people, or the absence of them. Respondent F (experience 15) for example was with two friends when they went to a favorite spot in a forest. After having spend some time sitting on a bench with the friends, she distanced herself from them to sit at the river edge. In the interview she both mentioned the positive effect of being with friends (including her boyfriend) and the peace she experienced from being alone. Respondent D (experience 8) had climbed a Norwegian mountain together with a friend. He experienced a feeling of freedom that has many similarities with the description that respondent I (experience 20) gave. Both respondents did not meet other people. Respondent D experienced the positive effect of being 'alone', and that of being with a friend.

To summarize, in eleven cases, respondents indicated that (the absence of) other people had a direct influence on their nature visiting behavior. There were sixteen experiences where being with others had a positive or negative influence. In nine cases, respondents said that being alone had had influence on their emotion. And six experiences were directly caused by other humans.

In several cases, experiences were influenced by the knowledge that respondents had. The next section talks about how a certain type of knowledge had influence on the experience of emotion.

### 4.3.4 The influence of association

In section 2.1.2 it is discussed how prior knowledge can influence the emotion that people experience. Most people for example know that bears are dangerous. Knowing that wild bears lived in the forest she was walking in, respondent A (experience 2) got afraid of a possible bear. Without that knowledge, she would not have experienced that emotion.

Some respondents told about a certain way that knowledge influenced their emotions. The memory of certain knowledge was triggered by something they encountered. They *associated* the situation in nature with something else. In the above mentioned experience of respondent A, the knowledge of bears was triggered when she saw bushes with berries. Bears eat berries, so she associated those bushes with bears.

Respondents were for every experience asked if they had associated the situation with anything else. In 17 of the 38 examples they said this was the case. In some cases the association played a large role in the experience. Some respondents said it played a small role, while others said it had no influence at all.

Respondent #	Experience #	Core affect (1-7)	Arousal (1-7)	Description
A	1	6	3	Thinks she might have associated the pine trees with past positive experiences, but only in the back of her head.
A	2	3	6	Found berries in a Swedish forest, which reminded her there was a danger of bears.
D	9	3	2	Associated a large dead forest with the apocalypse, which caused a nasty feeling.
E	12	7	7	Associated visiting the forest together with his family with previous times he had done that.
F	14	2	5	Associated a hot beach with a desert, which made her want to go home.
F	15	6	3	Associated visiting a favorite spot with other times she had been there.
G	16	3, 5	5	Associated a dark forest with the horror movie he had just seen.
H	18	2	3	Associated annoying cars with other times they had annoyed him.
I	21	3	4, 6	Associated being lost in a forest with another student who had had to spend the night in the same forest because he was lost.
J	23d	3	6	Associated a local flood with nature disasters she had seen on TV, but says that did not influence her experience.
K	25	7	4	Associated the natural environment with his youth, and also with spring.
L	27	6	4	Suddenly remembered the previous time she had a similar experience of smelling flowers.
N	31	6	1	Associated a nest of white storks with the beauty of flying storks. He says the association did not really influence the experience.
O	33	5	3	Associated seeing an owl with nature in general, and also with similar experiences.
O	34	6	2	Was reminded by a large dead forest that nature can take care of itself.
P	36	3, 6	4, 4	Associated a thunderstorm with other ones, but he does not think it influenced his experience.
Q	38	7	6	Associating a dead plant with flowers was the joke that caused the emotion.

#### 4.3.4.1 A direct influence on emotion

In seven cases, the association with something else was so strong that it was the direct cause of emotion. Respondent D (experience 9) for example saw a completely dead forest from a hill top.<sup>3</sup> Everywhere he looked were dead trees. This environment itself was not very unpleasant, he even admits that from an aesthetic point of view it was beautiful. But it was the association that made it a negative experience. It made him think of the apocalypse. “You think: ‘this is what the world looks like when it’s going down the drain.’ [...] I could imagine that it was a bomb after Hiroshima. Imagine you were in Hiroshima and you would look at the forest, this is what you would see. [...] That is why you feel so creepy.

<sup>3</sup> The monoculture forest was damaged by the bark beetle *Ips typographus*.

It is the association that makes you feel creepy. The fact that there is a dead tree... a dead tree doesn't affect you. Ok, a dead tree, perhaps you prefer a live one. But the fact that there are so many of them and that you think 'it looks a bit like when it goes down the drain', that is why you think it's so creepy." This feeling was so strong that it was a negative experience and he never wanted to visit a dead forest again.

Respondent O (experience 34) was on the same mountain at the same time, but he did not have this feeling at all. He paid more attention to the young trees that started growing between the dead ones and this made him realize that nature can take care of itself. This caused a positive emotion, and he would like to visit that same area again.

Another respondent (G, experience 16) and his friend had just seen a scary movie ("The Blair Witch Project") before they went for a nightly car trip into the local forest. The movie they had just seen took place in a forest. The respondent thought it would be fun to scare his friend by visiting a forest in the dark. This worked a little better than expected when the car got stuck in the mud. They had to go outside of the car to push it out. Normally this would not be very scary, but in this situation it was. He explains: "The movie takes place in a forest, and in the dark. The scariest parts of the movie take place in the dark. So when your car is stuck and your headlights shine into the forest, it is of course a 100% connection you're making. With the movie you have just seen. Definitely."



Because of different associations, this forest caused two totally different experiences for respondent D and O.

Association can of course also cause positive emotions. Respondent K has been living in the same town for 60 years. One of the experiences (25) he told about was when he went cycling in the nature that he has known all his life. One of the biggest reasons he often goes on such trips is the nostalgia he then experiences. When he sat on a bench for more than one and a half hour, the environment reminded him of things he had experienced there in the past. Playing soccer every Saturday as a kid. Spending his vacation in the forest because his parents could not afford to go on vacation. All these memories, together with the peaceful surroundings, caused a very positive experience. "The only negative aspect is that I know I have to go back home. I would like to hang onto that moment for eternity."

The previous examples show how association can play a big role on emotional experiences. But in many cases it only influences emotion in a small way.

#### **4.3.4.2 A small influence on emotion**

Association had a small influence on six experiences. When respondent I (experience 21) for example was lost in a Romanian forest, she remembered that a fellow student had had to spend the night in the forest because he got lost. This had happened only a few days earlier and in the same forest. In the interview she said this association made her own experience a bit scarier. Sometimes the made associations were very unspecific. Respondent O (experience 33) associated an owl that flew over his head with nature in general. "It is a feeling I almost always get when I go into nature and I see something, or when something happens."

Three respondents told about emotions they experienced in places they visited on a regular basis. They all said they associated the experience with the previous times they had been there. Respondent H (experience 18) for example was annoyed by a car that passed him with high speed. Because he associated this experience with the previous times something similar happened, he was extra frustrated. Two other respondents made similar associations with previous times they had visited the area. While association had some influence in these cases, there were also respondents who said there was no influence at all.

#### **4.3.4.3 No influence on emotion**

In four cases, respondents had made certain associations, but they thought those had not had an effect on their emotions. Respondent J experienced a miniature nature disaster, which she associated with the earthquakes and floods she had seen on TV. But she said that she only made the association in the back of her head, and that it did not really influence her experience. Respondent A (experience 1) stated: "I think I make a lot of associations, but on a subconscious level. At that moment I am only there, I am not consciously making associations."

## 4.4 The effect of the experience of emotion on nature-related behavior

In most cases, respondents said their experiences had effect on them even after it had ended. Some respondents occasionally remembered the experience, for others the experience was so influential that they changed the way they visit nature. Respondent I for example tells about her experience (20): “I noticed that I really like being in large areas and walking there on my own. [...] I’d like to visit forests more often.” Some respondents were not really sure if their experiences had had an effect. This shows that what people said might not have been totally correct.

The following four different effects of emotion can be distinguished in the interviews. Some respondents said that the emotion had a positive influence on their mood. Many respondents sometimes think about their experience, and some also indicated that they can really enjoy remembering them. The experience of emotion had often influenced the way respondents visited (or planned to visit) nature afterwards. A few times it had influenced their opinion of nature.

### 4.4.1 Change of mood

Four respondents told about experiences that had improved their mood for a longer period. In two cases the effect had influence for months, in the other two cases it did not last longer than a day. All the respondents had their experiences in nature that they were familiar with.

Respondents K (experience 26) and L (experience 27) were suffering from a burnout when their doctors advised them to visit nature more often. They both recall specific emotions that made them feel much better. Respondent K tells about when he was in nature: “I know it

Respondent #	Experience #	Core affect (1-7)	Arousal (1-7)	Description
A	1	6	3	Seeing a beautiful sunset on her way home from work had a calming effect on her.
E	11	5	4	Seeing a group of roe deer had a positive effect on him for the whole day.
K	26	3, 6	7, 3	Being in nature was a big help in recovering from his burnout.
L	27	6	4	Suddenly smelling some garden flowers helped her recover from her burnout.

doesn’t mean everything, but the fact that you’re outside feels very good. Then you see things in perspective.” Both respondents say their emotion was specifically caused by small details of nature. Respondent K was sitting on a bench when his attention was grabbed by a bug, while L suddenly noticed how nice some flowers smelled when she passed them by. They both had been visiting nature for a longer period before it had a considerable effect. Respondent K also tells about his walks through the forest: “If we went home pretty soon, the feeling didn’t go away. But I noticed that when [...] I walk a bit longer in nature, a certain peace comes over me. And that is the reason why we stay in the forest a bit longer.”

A difference between these two respondents was that respondent K already loved being in nature, while respondent L did not particularly enjoy it. She says she went into nature reluctantly, at least until she noticed how nature had a positive influence on her.



Two respondents had a change in mood for a shorter period. Respondent E (experience 11) says about when one morning he saw a group of roe deer: "That day I was a bit more optimistic than usually. It was a nice beginning of the day." Respondent A (experience 1) tells that she always cycles through the forest when she comes home from work, because she wants to calm down. In the experience she described, a beautiful sunset helped to achieve this goal.

Because the interviewer did not especially ask what effect the experience of emotion had on the mood of respondents, there might have been more experiences where this was the case.

The fact that the respondents told about their experiences, means they remember it and sometimes think about it. Other respondents shed more light on this aspect.



Nature helped two respondents recover from a burnout

## 4.4.2 Remembering nature experiences

All the experiences that were analyzed in this thesis were remembered by the respondents. In some cases, the memory was very fresh, with experiences having taking place only days before the interview. In other cases, the memories were decennia old. Their interviews show how memories can be unreliable, how negative experiences can be positively remembered, how respondents sometimes think about their experiences and enjoy doing so.

### 4.4.2.1 Memories of experiences

Like section 2.x has also discussed, memories are often imprecise and incorrect. This is illustrated by two respondents who experienced the same situation. Respondent D (experience 9) and O (experience 34) both stood on a certain mountain at the same moment. They both overlooked a large, dead forest. For respondent D it was a negative experience, for O a positive. In the interviews, it became clear that their memories of that situation were different. Respondent D for example seems to remember that the whole forest was dead, that there was no green at



all. He also mentions the sad and cloudy weather. Respondent O remembers that although most of the trees were dead, young trees started to grow everywhere. He was very impressed by the strength of the recovering nature. He remembers the weather as nice and sunny.

As section 4.3.4 has discussed, the experiences of these respondents were strongly influenced by the association they made. What is interesting to notice here, is that their different experiences seem to have resulted in different memories of the situation. Respondent D, who experienced negative feelings, mostly remembers the negative aspects of the situation. Respondent O experienced positive feelings, and his memory is focused on the positive aspects.

Respondent #	Experience #	Core affect (1-7)	Arousal (1-7)	Description EXAMPLES
C	5	7	2	When she sees deserts on television, she associates them with her experience in the Nevada desert.
D	8	6	4	He thinks remembering and talking about positive experiences is important.
G	17	6	5	He associates roe deer with the one he and his sister ran into when they were young.
J	24	7	7	She thought of her experience when she had a similar one.
M	29	6	5	She sometimes thinks about her experience with a dozen red deer.
N	32	7	1	Thinking of the nature around him, and the things he experienced there, is a positive experience in itself.
Q	37	7	4-2	He thinks of the experience when he sees the vacation pictures.

Negative experiences did not always become negative memories. Respondent J (experience 23) for example was in a small nature disaster. She tells: "Maybe mostly afterwards, it was very special to experience how fast and fierce something like that can go." She now enjoys remembering it, and during the interview she gave a very vivid and positive description of the experience.

#### 4.4.2.2 Remembering experiences

In sixteen cases, respondents told that they occasionally think about their experience, sometimes because they associate something else with it. When respondent M (experience 30) for example sees fog, she sometimes thinks about her fearful experience with thick fog. She states: "Then I think 'Oh, it's not as bad as that one time!'" When respondent Q (experience 37) was asked if he ever associated anything with his experience on a mountain top, he mentioned the vacation pictures his family took. Respondent F (experience 13) does not know if she associated anything in particular with her wolf experience, but she says: "I often think about it, but I don't really know at what kind of moments."

#### 4.4.2.3 Enjoying memories of experiences

There were three cases where respondents not only said they thought about the experience, but also enjoyed thinking about it. Respondent N for example told about the experience (32) of thinking about the nature around him, and what he has experienced there. This in itself caused a very positive emotion for him. Respondent D (experience 8) tells: "Being able to share it with somebody, or talking and thinking about it later on. Being able to say 'Hey, do you remember we were there', that's also important. That's part of the fun."

These examples show that the memory of experiences in nature were sometimes incorrect. Some negative experiences later became positive memories. Many respondents occasionally remembered their emotions, some also indicated the joy that comes from those memories. These memories of the experiences were sometimes so strong that respondents changed their nature visiting behaviour, as the following section shows.

#### 4.4.3 Visiting nature

Nineteen experiences had influence on the nature visiting behavior of respondents (see table for some examples). This sometimes involved the way they visit nature. In some cases the experience made them (not) want to revisit a specific place, in other cases it had influenced the desire to visit a certain type of nature. In a few cases, the experience had helped respondents discover their nature preference.

##### 4.4.3.1 The way of visiting

In nine cases, past experiences had influenced the manner respondents visit nature. It either influenced whether respondents wanted to be with others or not, or how aware they were of certain aspects.

Three respondents changed whether they wanted to visit nature alone or with others. After respondent A (experience 2) for example had become afraid of a possible bear, she did not want to visit nature all alone if there was the possibility of encountering bears. Respondent I (experience 20) had also visited a forest alone, but for her it was a positive experience. She discovered that she really liked walking in forests on her own, and wanted to do so more often.

Six respondents told that their experiences had made them more aware of certain aspects when they visit nature. Two of them were now more aware of possible animals in forests, because they had encountered them earlier. Respondent E (experience 11) tells: "When I see a forest, I think 'There might be roe deer in there. [...] Will I be able to see them?'"

Two respondents stated that they have become more aware of the emotions they (can) experience in nature. Respondent L (experience 27) for example noticed how the smell of garden flowers had a very

Respondent #	Experience #	Core affect (1-7)	Arousal (1-7)	Description EXAMPLES
A	1	6	3	She became more aware of the calming effect that nature has on her.
C	5	7	2	She would like to visit the Nevada desert again.
D	8	6	4	After having enjoyed a huge view in Norway, he wants to visit similar areas.
E	12	7	7	Because he and his family always had fun in a forest, they often revisited that same area.
F	14	2	5	A negative experience on the beach made her discover she does not like beaches.
G	16	3, 5	5	He avoids situations where his car can get stuck in the mud again.
H	18	2	3	He avoids areas where car drivers pass him with high speed, even though it means he misses out on beautiful nature.
I	20	7	5	She discovered that she really enjoys walking in forests on her own.
I	22	7	6	She tries to be more aware of possible wildlife when she is walking through forests.
L	28	2	5, 2	After she had been lost in a forest, she did not visit forests for years. It also made her realize she did not like forests.

calming effect on her. She tells that since then, she is more aware of things like flowers when she is in nature. She says: "I try to grab that moment."

Two respondents had become more aware of certain situations. Respondent P (experience 36) for example had experienced a heavy thunder storm. This has changed how he acts in similar situations. He says: "It's just a certain degree of caution in the case of thunder."

#### **4.4.3.2 Visiting the same area**

In ten cases, the emotion had influenced how respondents (want to) visit the exact same area. There were eight positive and two negative influences.

In four of the eight positive cases, the experience had already had influence at the time of the interview. Respondent H (experience 19) for example says that seeing the northern light probably influenced his decision to visit north Scandinavia again. In the other four positive cases, respondents indicate that they have not revisited the same area yet, but that they do plan to. Respondent C (experience 5 and 6) for example talks about the Nevada desert and the Grand Canyon in the United States of America: "I always wanted to go back when [the kids] were a bit bigger." Respondent O (experience 34) would also like to revisit the mountain where he overlooked a dead forest.

In two cases, the experiences had negative influences on revisiting the same area. Respondent D (experience 9) overlooked the same dead forest as respondent O. For him it was a negative experience, which makes him not want to revisit the area. He says: "It is not something I want to experience again." When respondent H (experience 18) cycles to and from his work, he is often annoyed by the behavior of most car drivers. He explains: "That is really a frustration. [...] I try to take another route because I encounter less cars there. Even though the nature there isn't that pretty."

#### **4.4.3.3 Visiting similar nature**

Eight experiences in nature also influenced how respondents visited not exactly the same, but similar nature. Respondent O (experience 34) for example visited a dead forest. He tells: "Since then I have had an inclination to see other damaged things, or to see forces of nature. I always thought it was spectacular, but since then that feeling has only become stronger." Respondent K tells that his experience (26) contributed to why he likes to visit nature in general.

Respondent L (experience 28) was 15 years old when she and a few friends got lost in a forest. This negative experience contributed to her aversion of forests. She says that after the experience she did not visit forests for several years.

#### **4.4.3.4 Nature preference**

Three respondents said that their experiences had influenced their nature preference. Respondent D (experience 10) for example tells about his experience on a rocky beach: "It was the first time that I had a fascination for the sea and coast. [...] Since then I know that when there's a beach, when there's a sea... you won't find me on the sandy beach, I'm going where it's rockier. [...] You know you'll have fun there." Respondent F (experience 14) had a negative experience on

a beach. She says: "Since then I know I don't really like [beaches]. [...] I like mountains and forests better than beaches. [...] I'm not going to make any more long walks there."

The experiences of emotion in nature had various influences on nature visiting behavior. Experiences sometimes enhanced the awareness of respondents. The case of respondent L (experience 28) demonstrates the other influences. After she and a few friends had been lost in a forest, she never visited that same forest again. She says she also avoided other forests for a few years. She discovered that she preferred beaches to forests, because "I want to be able to see where I walk." After a few years she would visit forests again, but those times only with people who knew their way.

Several respondents also told that their experiences had influenced how they think of nature.

#### 4.4.4 Opinion of nature

Even though the interviewer did not ask questions about the influence of experiences on their opinion of nature, respondents did mention this six times. Some said that their experience had had an effect on their expectations, others talked about their general feeling for nature, one expressed her wish of having a specific part of nature conserved.

Three respondents explained that their experiences had changed their expectations from nature. Respondent F (experience 13)

Respondent #	Experience #	Core affect (1-7)	Arousal (1-7)	Description
C	7	6	2	She enjoys watching birds in the trees behind her house. She wants those trees to be conserved.
F	13	2, 6	7	Seeing a wolf gave her high expectations of seeing more wildlife.
K	25	7	4	A warm day early in spring raised his expectations of summer.
O	33	5	3	An owl that flew over his head confirmed his love for nature. It also made him raise his expectations of the local nature.
Q	37	7	4-2	A beautiful view from a mountain top confirmed his feeling for nature.

for example saw a wolf at the beginning of her vacation in Canada. When asked whether the experience had influenced how she and her boyfriend visited nature, she first thinks it did not. She then says: "Except for the effect maybe that we had a lot of expectations. We thought 'we're going to see so much wildlife!' Seeing a wolf on our first day [...] gave us certain expectations which weren't correct. It's just a coincidence that you see it on that first day." A beautiful day in spring gave respondent K (experience 25) high expectations of the summer that would soon follow.

Two respondents mentioned that their experiences had confirmed the feeling they had for nature. Respondent Q (experience 37) says about his experience on a mountain top: "It has only confirmed the feeling that I've already had." When an owl flew over the head of respondent O (experience 33), that experience confirmed his love for nature.

One respondent (C, experience 7) told how she often watched birds in the two trees behind her house. She mentioned how some neighbors would like those trees to be cut down. The respondent wonders where the birds will have to go when the trees are gone. She would like those two trees to be conserved.

The experience of emotion had many different effects on the nature-related behavior of respondents. Nature had a positive effect on the mood of at least four respondents, it even helped two of them recover

from a burnout. Many respondents occasionally thought about the experience, some also indicated that they enjoyed doing so. The emotional experiences sometimes had an effect on how and where respondents visited nature. In some cases their experiences had also changed their opinion of nature.

The results in this chapter have dealt with experiences of emotion in natural environments, aspects that influenced these experiences, and what different effects the experiences had on nature-related behavior. But how reliable are these results, and how do they fit into other scientific literature?

## 5. Discussion

The results of this thesis provide various insights into other literature. There are a few theories which might be better understood in the light of these results. But first the next section discusses the weaknesses and limitations of the current research.

### *5.1 Limitations of the results*

Because the research was an explorative, qualitative study, it is not representative of the Dutch population. Things as the amount of positive experiences compared to the negative do not say anything about how often respondents (or people in general) experience positive and negative emotions. Sometimes the interviewer deliberately asked respondents about certain situations, only because the goal was to encounter a wide variety of emotions.

Even though a purposive sampling method was used to try and get a representative set of respondents, most of the respondents had some affinity with nature. There was only one respondent (B) who did not like nature at all, and rarely visited it. Three other respondents (L, M and P) said they were not especially fond of nature, but they did not dislike it either. The other thirteen respondents all indicated that they (really) liked nature. It is not likely that this gives a representative picture of the Dutch population. Characteristics like the amount of positive feelings towards nature must be seen in this light.

The respondents were personal acquaintances of the interviewer. This was generally experienced as positive factor, because respondents spoke freely about their emotions. However, it is possible that some of them withheld details that they did not want to share with an interviewer that they knew personally. If this was the case, some possibly useful data may have been lost. Perhaps the respondents would have wanted to share these details with an anonymous interviewer.

Self-reports were used to gather information. These rely on honesty and memory of the respondents. Section 4.4.2 has shown that (details of) memories can be incorrect. Although this may not be a problem for researching how memories of experiences influence future behavior, it does reduce the reliability of the results of sections 4.2 and 4.3. The memory of experience 29 for example is 66 years old. It is unlikely that the respondent has correctly remembered all the details that had played a role in her experience. It is however analyzed as if the details are correct, which reduces the reliability of the results.

This thesis covers several emotional experiences and factors that influence them. However, there are several aspects that have not been fully analyzed yet. Some stimuli that could use further analyzing are the size and wildness of the area, the beauty of nature and the familiarity that respondents had with the area. Beside these, there are undoubtedly more characteristics that have not surfaced in this explorative research. Therefore, the results from chapter 4 are not inclusive and should not be treated this way.

With these limitations in mind, comparing the results with some other theories may provide interesting insights.

## 5.2 Fear and fascination

Eight respondents spoke about different situations where they had experienced fear. Section 4.2.3 also discussed four cases where respondents experienced both fear and fascination. Berg & Heijne (2005) researched exactly these two emotional reactions to natural threats. See section 2.x.x for a summary of their results.

### 5.2.1 Comparison of both articles

The article shows the results of two studies (which the authors acknowledge are only initial explorations). Their results show several similarities and differences with the current research. In their first study, Berg & Heijne discovered ten characteristics that can evoke fear and/or fascination. These are: *danger, dependence, fierceness, immensity, suddenness, proximity, novelty, invisibility, repulsiveness, absence of others*. Most of these factors also played roles in the fearful experiences of the current research, although not all have been specifically mentioned in section 4.2 (or by respondents). Fierceness for example ('confrontation with the powers of the elements') played a role in experience 23 of respondent F. She was afraid of and fascinated by the fierceness of the flood. Dependence ('a situation in which one cannot afford to make mistakes') was a factor in experience 30 of respondent M. When she and her family were cycling through thick fog next to a canal, they could not afford to make cycling mistakes.

In the current research there were two experiences that do not seem to fit into the four categories that Berg & Heijne identified. Respondent A (experience 2) was in a forest when she suddenly realized the danger of bears. She was not disoriented and she did not actually have a close encounter with a bear. Neither did it seem a forceful or overwhelming situation. The situation seemed to be a combination of the knowledge of possible danger, plus not being able to look around.

The invisibility of the surroundings also played a role in experience 16 of respondent G. He and a friend had just watched a horror movie before they went into the forest. When their car got stuck, they were scared. This also does not seem to fit in any of the four categories that Berg & Heijne identified. The biggest cause of their fear was the association with the horror movie.

While Berg & Heijne mention the role of cognitive processes (p. 263), it is not given much further attention. The experiences of respondents A and G demonstrate that this factor can play a big role in the experience of fear and the perception of danger. Experience 16, where respondent G got scared in a forest because he had just seen a scary movie, suggests that people can become afraid even though they know there is no actual danger. It was the association that mainly caused the fear.

The current research also supports their argumentation that these areas or characteristics do not always cause fear and/or fascination. Respondent M (experience 29) for example was surrounded by a dozen red deer in the middle of a forest. This was a new and unexpected experience, they were close to the animals and they could not see much around them. The animals could have been dangerous, even though she apparently did not experience it that way. While there were several factors that might have evoked fear, she tells "I was not scared at all." Almost 70 years later she still remembers it as a very positive experience.

Berg & Heijne mention two characteristics that seem to be absent in the fearful experiences of the current research. These are repulsiveness ('the presence of disgusting animals, smells, or materials') and immensity ('the presence of vast elements, such as heights and tall trees'). While it must just be coincidence that no respondents told about repulsive experiences, the other aspect deserves some attention with the results of the current research in mind.

### **5.2.2 Immensity and overwhelming situations**

Immensity is an interesting characteristic that the authors identified. They explain that this played a role in 'overwhelming situations', where their respondents "were overwhelmed by the greatness of a forest, the immensity of the sea, or the impressiveness of a vast plain" (p.265). The article does not provide much explanation why exactly these situations were fearful to the respondents of their first study. Some of the respondents even stated that the situation only caused positive emotions. In the second study the authors themselves had trouble describing these situations to the new respondents. As a result, they excluded the overwhelming situations (including immensity) from the study.

There were two experiences in the current research where immensity might have played a role. Both respondents did not call their emotion fear, and the descriptions of their experiences also did not really fit this category. Respondent F (experience 14) and her boyfriend were on a large beach when she experienced "an uncomfortable feeling." She also associated the dry, hot beach with a desert. Her description might shed some light on the characteristic 'immensity.' She tells: "It was so empty, so desert-like, as if there was no end to it. [...] After a while I felt abandoned or something. [...] You didn't see anyone, everything looked far away because there was no perspective. It was just a very empty, deserted area." She adds it gave her a "very nasty feeling."

The characteristic 'immensity' might also have played a role in experience 9 of respondent D. When he stood on a mountain top, overlooking a huge dead forest, he experienced a 'creepy feeling.' He associated the situation with the apocalypse, as if something terrible had happened there. He says: "That was quite alarming and upsetting." He mentioned the sad weather as something that played a role in his experience. Being together with other people made the experience less negative.

Perhaps these examples describe the aspect that Berg & Heijne found in their research. If this is the case, a few aspects seem to have played roles in the experiences of these respondents. Both respondents associated the area with something scary. The feeling of being alone had an influence on respondent F, and perhaps also on respondent D. Both respondents mentioned unpleasant weather conditions. Perhaps these overwhelming situations strongly rely on a specific combination of such factors. It may be interesting to conduct more in-depth interviews with respondents who have experienced such overwhelming situations.

The results of the current research seems to supplement those of Berg & Heijne. A new fear-evoking characteristic may have been found in the form of association. The complex characteristic 'immensity' and overwhelming situations might be further clarified with the narratives of respondent D and F. Both



articles also stress that the mentioned characteristics not always cause fear. There were some respondents who faced many of these aspects, but only experienced positive emotions.

### **5.3 Core affect or PANAS?**

As chapter 2 pointed out, there are multiple ways of treating emotions. Two of them appear to be incompatible with each other. How can the results of this thesis shed light on the matter?

#### **5.3.1 Core affect and the PANAS scales**

The last decades has seen a trend of thinking of emotions in terms of core affect. Core affect implies that all emotions are either negative or positive, and never both. Barrett *et al.* (2007) explain: “At its core, a mental representation of emotion is a contentful state of pleasure or displeasure, termed ‘core affect.’ The word ‘core’ signifies a form of affective responding that functions as a kind of core knowledge about whether objects or events are helpful or harmful, rewarding or threatening, calling for acceptance or rejection” (p. 377).

However, another stream of research puts the emphasis on how experiences can have both negative and positive aspects. Watson *et al.* (1988) state: “In recent studies of the structure of affect, positive and negative affect have consistently emerged as two dominant and relatively independent dimensions” (p. 1063). They point out that respondents often describe their experiences with both positive and negative emotions, but in varying strengths. They developed the Positive And Negative Affect Schedule (PANAS) scales. This method asks respondents to indicate how strongly they experienced twenty emotions at a given time. The twenty emotions are represented by words such as distressed, inspired, scared and alert.

The results of this thesis might shed some light on the advantages and disadvantages of both methods.

#### **5.3.2 Results of the current research**

The current research was conducted with primarily the thought of core affect in mind. Most respondents described a single emotion per experience. They were asked what had caused that emotion, and what the core affect of it had been (on a Likert-type scale of 1 (very negative) to 7 (very positive)).

Here it should be noted that a more precise scale might have provided better insights into how positive or negative emotions were. Because core effect implies that each emotion is either positive or negative, the neutral 4 on the scale of 1-7 could not be used. What was left was a 3-level scale for either negative or positive emotions. This was less precise than for example the rating of arousal levels.

In cases where the respondents evaluated their experience as both positive and negative, the interviewer asked if there might have been multiple emotions. This was always the case. The interviewer then asked about both emotions and their core affects. Respondents usually had little trouble telling the emotions apart. Respondent J (experience 23d/e) for example agreed with the interviewer that she had experienced two emotions. She rated the core affect of her fear with a 3 on a scale of 1 (very negative) to 7

(very positive), that of her fascination with a 6. Only respondent G (experience 16) needed some more time to find out whether his fear or his fascination had been a stronger emotion at that time.

In the case of respondent I (experience 21), two different negative emotions were analyzed. She indicated herself that she had felt two emotions at the same time. She had been both scared because she was lost, and angry with her colleague student. She rated both emotions with a 3 on the scale from 1 to 7.

The results of the current research can be seen in the light of both the core affect and the PANAS method.

### 5.3.3 Discussion

The results of the current research support the thought of multiple emotions with each their own core affect. An experience can consist of multiple emotions, which is clearly demonstrated by results from the PANAS scales. Core affect is theoretically always linked to objects or events. This implies that every emotion has a cause. Multiple emotions experienced in a single episode would have multiple causes.

Barret *et al.* (2007) also support the thought of multiple emotions in one experience, with each a core affect. They argue: “It is easy to shift back and forth between alternative experiences very quickly, and to summarize both experiences in a memory-based judgment. [...] It is very unlikely that pleasure and displeasure co-occur in real time, although people can quickly shift experience contents from one moment to the next, and summarize all of the experienced contents in memory” (p. 378).

In the current research it is possible that the respondents did not describe all the different emotions they experienced at that moment. The PANAS scales might have been useful to discover more emotions per experience, also the ones which were not experienced very consciously. (It can however be questioned if the respondents would have remembered these if the experience had taken place a long time ago.)

Treating simultaneous emotions as a single emotion with one core affect would be a methodological shortcoming. But asking respondents to indicate how strong they experienced twenty emotions only gives a quick impression of how positive and negative their experience was. It does not explain what caused these emotions.

The best understanding of what how respondents experience emotion might be to ask them the different emotions they experience at a given time, what factors caused these emotions, and what the core affect of each emotion was.

## **6. Conclusion**

The results and discussion chapters have provided interesting insights that allow for suggestions for further research. This chapter concludes with a short summary of the most important findings of the thesis.

### ***6.1 Suggestions for further research***

The current research has shown that there is still a lot to discover about the experience of emotion in natural environments. As an explorative study it has discovered several aspects that seem to play roles in nature experience. While it already provided some useful insights, the results also point toward possible further research.

#### **6.1.1 Literature study**

The literature that exists on the topic of emotional experience of nature is very segmented. During the process of writing this thesis, several interesting articles were discovered. A literature study that searches for and combines relevant research could provide new insights. An overview of what is and what is not studied would show the current gaps in knowledge, which in turn would point new research into the right direction.

#### **6.1.2 Further qualitative research**

This thesis has not covered all the aspects that influence the experience of emotion in natural environments. It also has not analyzed the full range of emotional variety. Similar qualitative research could further explore the many characteristics that play roles in nature experience.

In the current research, respondents were interviewed about experiences that they remembered. Those had often taken place years earlier. It seemed that the older the experiences were, the more special they had been. Even though the researcher tried to also discuss very small and unimportant experiences (for example the small and temporal joy of seeing a beautiful plant), there were not many of such experiences discussed. All these small emotions together might play an important role in the experience of nature. Interviewing people while they are in nature would provide the right setting to ask respondents about such smaller experiences.

Respondents D and O have been in the same situation, but their experiences of it were very different. This allowed for an interesting comparison between their appraisals of the situation. Future research that focuses on respondents who have experienced the same situation might provide even more interesting results.

#### **6.1.3 Quantitative research**

The current and other research (e.g. Berg & Heijne, 2005; Farber & Hall, 2007) seem to provide enough characteristics of the experience of emotion in nature to justify the first steps into quantitative research.

Respondents could in a questionnaire for example be asked to quantify the importance of certain aspects in their nature experience. They could indicate how big the influence of emotion experience is in their nature preference, and how big the percentage of positive emotions is compared to that of negative ones.

#### **6.1.4 Virtual nature**

Although experience 35 of respondent P has not been discussed much, it does show that experiencing virtual nature in a computer game has similarities with experiencing real nature. The respondent said for example that he was very impressed by the jungle environment and that he prefers to play in beautiful landscapes. Virtual worlds are constantly growing more advanced, beautiful and usually more realistic. They often have lush virtual nature in great varieties.

Not only would it be interesting to further study how gamers experience this virtual nature, the environments might also be a cheap setting to do nature experience research in. Researchers have already been using photographs and videos of nature to study how people experience environments. The advantage of virtual 3D environments over the existing methods is that people can mostly act as if they are in real nature: they can explore the area, choose where to spend their time, they can interact with natural elements and other people. Researchers can stage certain situations which are not possible with photographs or video.

The interview with respondent P already points out one disadvantage. He not only paid attention to the nature, but also to the game design. He states that he thought the environment was “well made” and “realistic.” This effect might be a bigger factor than in the case of photographs or video (which can also be ‘well made’). But if this factor can be eliminated or taken into account, nature experience researchers could have a very useful new tool at their disposal.

### **6.2 Answers to the research questions**

The introduction chapter ended with four research objectives, each followed by a few research questions. The following thesis has provided answers to these questions.

#### **6.2.1 The emotions that people experience in nature**

The seventeen respondents had experienced a wide variety of emotions in nature. The experience of peace, fear and annoyance were very distinctive. Peaceful emotions were positive, inactive emotions that took place in quiet environments. The situations were usually not new or unexpected, and most respondents were familiar with the nature they were in. Respondents rated the beauty of the area high, and two of them specifically mentioned a feeling of safety.

The experience of fear was quite different. Respondents who reported this emotion talked about unexpected situations where there was usually an element of danger. The emotions they experienced were negative and active. Respondents were usually unfamiliar with the nature area and they indicated that being alone would have made it worse. Some also had to deal with invisibility of the environment. Several respondents also reported feelings of fascination for the natural threat.

Three respondents experienced annoyance. All three experiences were caused by humans: twice by strangers, once by a colleague. Recurrence of the problem was a factor in two of the experiences.

Respondents experienced several other emotions. Most of these were positive. Respondents used different terms to describe their emotions, such as fascination, fun, happiness and euphoria. They were caused by many aspects and showed a great variety in influences. Negative emotions they experienced included sadness, worries and uncomfortable feelings.

### **6.2.2 Aspects that cause and influence the experience of emotion**

There were several factors that influenced the experience of emotion in natural environments. The following four were discussed in detail: animals, weather conditions, other people and association.

In experiences with animals, a very specific kind of encounter was distinguished. Six respondents reported close and unexpected encounters with wild animals. For most of the respondents it was a new experience (and those for whom it was not had a lower arousal level). Five of the six respondents also indicated an absence of fear for the animals.

There were four other positive experiences with animals, these concerned birds and insects. One pure negative experience with animals was reported. When the respondent had stumbled upon some berry bushes, she had suddenly become afraid of possible bears. There was also an experience where a respondent felt both fascination and fear while watching a wild wolf.

Weather conditions had influence in varying strengths. In some cases they were the direct cause of emotion, for example when a respondent enjoyed watching northern lights. In other cases the weather had been an indirect cause, for example when respondents could see very far because of a clear sky. In some cases the weather had only had a minor influence on the experience. Several respondents also stated that the weather had invited them to go into nature.

The influence of other people also varied in strength. Sometimes people were the main cause of either positive and negative emotions. One respondent for example enjoyed the fun he had with colleagues, while another was annoyed by strangers who came to disturb his peace in a forest. There were sixteen cases where being with other people had had a small influence on experiences. Experiencing something with others generally had a positive effect. There were ten experiences where respondents had been alone. Six of them reported that this had been a positive factor, three said it had been a negative one. The presence or absence of other people also proved a strong motivation to visit nature. Many respondents indicated that they had visited that nature area because they were with friends. Two mentioned that they had wanted to be alone in nature.

Association occurred when situations triggered certain knowledge of respondents. One for example had gotten scared in a dark forest because it reminded him of the horror movie he had just seen. There were several other cases where association had been the main cause of emotion, while in others it had had a small or no influence.

### **6.2.3 The effect of emotions on nature-related behavior.**

The experience of emotion in nature had several effects on respondents. They reported a change in mood, remembering the experience, a change in nature visiting behavior and a change in opinion of nature.

Nature influenced the mood of four respondents. For two of them the effect only lasted hours, the other two were greatly aided in their recovery from a burnout. The latter two both indicated that their attention was grabbed by very small details of nature, and that the effect only occurred after they had been in nature for a long while.

Obviously, all respondents remembered the experiences they reconstructed. Some of them said that they sometimes associate things with their experience, others pointed out the joy that comes from thinking about past experiences in nature.

Nineteen experiences had influenced how respondents visited nature. In some cases they wanted to revisit the exact same area, in others they planned to visit similar nature. There were also a few respondents who did not want to visit the same or similar nature. Some of the respondents had already executed their plans, others not yet. Several respondents reported changes in how they visit nature, for example with or without friends. Experiences had changed the nature preferences of three respondents.

A few respondents stated that their experiences had changed the way they thought of nature. One respondent wanted the trees behind her house to be conserved. Two respondents said their experiences had confirmed their feeling for nature, while three indicated that their expectations of nature had changed.

### **6.2.4 Understanding of the experience of emotion in nature.**

The results of this thesis provide a basis for further research of the topic. It also explored many aspects of how the experience of emotion in nature works. The discussion chapter shed some light on several other theories.

Berg & Heijne (2005) have done explorative research on fear and fascination in nature. They appeared to have trouble understanding and describing overwhelming situations and the fear-invoking characteristic of immensity. It seems that in two interviews of the current research, respondents talked about such experiences. Their narratives provided better insights in these aspects.

## ***6.3 Closing comments***

As emotions seem important for people in the way they perceive nature, research and policy involving nature experiences can greatly profit from a better understanding of the experience of emotion in nature.

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## Appendix A: Interview guideline

The following Dutch text was used as a guideline in the interviews.

Introductie.

Opname op geluidsrecorder voor persoonlijk gebruik. Het interview wordt schriftelijk uitgewerkt. U kunt eventueel geciteerd worden in de scriptie, maar dat zal dan anoniem gebeuren.

Hoe vaak komt u in de natuur?

Ik ga u vragen om te denken aan een paar specifieke emoties die u in de natuur ervaren hebt. Daar wil ik dan wat vragen over stellen.

Wat komt er in u op? Neem de tijd. (*Eventueel sturen.*)

Beschrijving emotie.

Beschrijving omgeving.

Reden/aanzet van de emotie?

(Core affect.) Was het een fijne of nare emotie? Pos of neg? Schaal van 1 (erg naar) tot 7 (erg fijn)?

(Arousel.) Actief of inactief? Druk of rustig? Schaal van 1 (erg inactief) naar 7 (erg actief)?

(Appraisal.) Wat betekende de situatie voor u?

- Was het nieuw of onverwacht?

- Hielp het u een doel te verwezenlijken, of stond het een doel in de weg?

- Was u alleen of met anderen in de natuur? Met hoeveel en wie?

- Associeerde u de situatie met iets anders?

- Associeert u sindsdien (stukken) natuur of andere dingen met de ervaring?

- Beïnvloedde deze ervaring uw gedrag wat betreft het bezoeken van de natuur? Voor alleen dat gebied of ook natuur in het algemeen? Op de korte termijn, of ook op de lange termijn?

Wat vragen over de natuur waar u de ervaring had:

- Hoe groot was het natuurgebied?

- Hoe mooi? 1 (erg lelijk) – 7 (erg mooi)?

- Hoe goed was u daar bekend?

- Hoe ver was het gebied van uw huis verwijderd?

- Wat voor weer (en seizoen) was het?

- Hoe wild of juist gecultiveerd was het gebied? Op een schaal van 1 (een tuin) tot 7 (ongerepte natuur)?

- Zijn er misschien nog andere aspecten die uw emotie beïnvloed kunnen hebben?

## **Appendix B: Personal questions for interviews**

Respondents were asked to answer the following questions at the end of the interview.

Geboortjaar:

Geslacht:

Hoe natuurlijk is het gebied waarin u nu woont? Schaal van 1 (drukke, grote stad) tot 7 (boerderij).

Hoe natuurlijk was het gebied waarin u opgegroeid bent? Schaal van 1 (drukke, grote stad) tot 7 (boerderij).

Hoe vaak komt u tegenwoordig in de natuur?

Hoe vaak kwam u als kind in de natuur?

## Appendix C: Summary of experiences

The following table provides a short overview of the experiences that were discussed in the interviews. For the full (Dutch) transcripts of the interviews, see Appendix E.

Respondent #	Experience #	Sex (male or female)	Age during the interview (years)	Age during the experience (years)	Description of experience	Core affect on a scale of 1 (very negative) to 7 (very positive)	Arousal on a scale of 1 (very inactive) to 7 (very active)
A	1	f	25	25	When she cycled through a forest on her way home, she saw a beautiful sunset. She experienced a very positive and slightly calm emotion.	6	3
	2	f	25	22	She went for a walk in a Swedish forest during her vacation. When she found bushes with berries, she suddenly got scared of possible bears. She quickly went home.	3	6
B	3	m	26	25	He and some friends had a night walk through a forest in winter. He felt a combination of tension and rest. Rest because the forest was quiet and beautiful, tension because he didn't know where they were going and all trees looked alike.	5	4
	4	m	26	25	When he was walking through a Dutch forest with some friends, they met some other people. Their presence annoyed him.	3	5
C	5	f	54	25	On her honeymoon, she crossed the Nevada desert with her husband and an uncle. She was impressed by the vastness of the area, and the high contrast with how compact we live in Holland.	7	2
	6	f	54	25	She watched the sun rise over the Grand Canyon with her husband and an uncle. She was amazed by the beauty and how mighty nature is compared to humans.	6	2
	7	f	54	54	A week before the interview she watched a couple of crows build a nest in a tree behind her house. She was happy and content with nature so close to home.	6	2
D	8	m	26	22	He had climbed a Norwegian mountain with a friend. Especially because not many people had come there, he had feelings of accomplishment, joy and freedom.	6	4
	9	m	26	22	Together with fellow students, he went on an excursion to Germany. When he oversaw a dead forest, he had a 'creepy' feeling. He thought that was how a forest would look like after the apocalypse.	3	2
	10	m	26	15	When he was 15 years old, he and his family went on vacation to the French coast. Every morning he would go to a rocky beach on his own. He spent hours observing the small ecosystem there.	5	2
E	11	m	19	19	A few days before the interview he and his brother were cycling through the forest close to home. They saw some deer which didn't run away. It made him calm and happy.	5	4
	12	m	19	5-9	More than 10 years ago, he often went to the forest with his grandparents, brother and sister. At one spot they always tried catching crickets. He especially enjoyed the contact with his family.	7	7
F	13	f	25	24	On a campsite in Canada, she and her boyfriend took a walk along a river. On the other side of the river they saw a wild wolf watching them. It was both a fearful (a) and fascinating (b) experience.	a: 2 b: 6	7 7
	14	f	25	24	When she and her boyfriend took a long walk on the beach on a hot summer's day, she felt uncomfortable. The long and wide beach reminded her of a dry desert. She only went on because her boyfriend really enjoyed the walk.	2	5
	15	f	25	25	She, her boyfriend and a friend have a spot in a forest that they often visit. She often goes there for rest and to think. A week before the interview she sat there near a creek and felt one with nature.	6	3
G	16	m	32	25	Right after watching a scary movie that took place in a forest, he and a friend visited a local, small forest. Because their car got stuck in the mud, they were both scared (a), but in a way also enjoyed the situation (b).	a: 3 b: 5	5
	17	m	32	8	When they kids, he and his sister were exploring their vacation environment. In the forest a deer suddenly appeared and passed them at a few meter's distance. He was excited.	6	5
H	18	m	32	32	Several days before the interview, he cycled home through a rural area. He was annoyed by the car drivers who always pass him with high speed.	2	3
	19	m	32	23	On December 31, 1999 he was alone in the wilderness of Norway, in the pole circle. In the middle of the night he saw northern lights. It was one of the most beautiful things he	7	1

					has ever seen.		
I	20	f	25	24	In New Zealand she made a long walk through a wild forest. She was alone and did not meet anyone the whole day. She experienced a feeling of euphoria.	7	5
	21	f	25	23	When she was doing field work with a fellow student in Romania, they got lost in the forest. Because it was getting dark, she was a bit scared (a). She was also frustrated with the other student (b), because they didn't agree on what way to go.	a: 3 b: 3	4 6
	22	f	25	23	She was walking alone in a Dutch forest when suddenly a boar and its young crossed the road right in front of her. It made her happy and content.	7	6
J	23	f	26	24	When she was on vacation in the Czech Republic with 3 friends, they were staying in a small house on the side of a hill. They were lying in the grass, enjoying the sun (a). When it began to rain, she was happy and started to dance in the rain (b). But it kept on raining and a flood of water came down the hill. When she and a friend almost fell into the river, she was very scared (c). They realized how serious the situation was. She was scared (d), but also fascinated by the force of nature (e). When it stopped raining after 2 hours they were glad for a few minutes (f). When they realized they were cut off from the civilized world, and the rest of their vacation might be jeopardized, they were worried until they met the owner of the house (g). In the following 2 days they were very limited in their freedom (h).	a: 5 b: 6 c: 2 d: 3 e: 6 f: 5 g: 3 h: 3	2 6 6 5 6 5 4 5
	24	f	26	21	She and her boyfriend watched the stars near her parental home. She suddenly felt very happy, as if everything came together.	7	7
K	25	m	59	59	A few weeks before the interview he visited an area he has known since his youth. He felt nostalgia, which made him happy.	7	4
	26	m	59	48	When he was suffering from a burnout, he made a forest walk with his wife. At first he was depressed and didn't have any attention for his surroundings (a). When they sat down on a bench, he slowly started to notice small aspects of nature: some moss, bugs crawling, etc. The world opened up for him again and he calmed down (b).	a: 3 b: 6	7 3
L	27	f	44	43	When she was suffering from a burnout, her doctor advised her to go into nature more often. One time she suddenly noticed how good the flowers smelt. It was the first time she noticed it, it gave her rest and made her happy.	6	4
	28	f	44	15	When she was a teenager, she and a few younger friends were lost in a forest. She was scared (a), but because she was the oldest, she tried to stay calm (b).	2	a: 5 b: 2
M	29	f	82	16	When she was a teenager in World War II, she and her father got lost in a forest. When they reached an open spot, they were suddenly surrounded by about 10 Red Deer. It was an amazing and very moving experience, they were not scared at all.	6	5
	30	f	82	20	When she was young, she, her father, and her sister often had to cycle past a long canal to go to a religious meeting. One time there was a very thick fog. Because they could hardly see the road, and there was the danger of cycling into the canal, she was very scared.	2	5
N	31	m	70	70	A few days before the interview, he and some friends found a nest with a couple of white storks. He enjoyed watching them for a while. Even when he had to go somewhere else, he still enjoyed seeing them in the distance and talking about them.	6	1
	32	m	70	70	He sometimes sits in his chair at home and thinks about all the nature around his house, and experiences he has had in it. Thinking about this makes him calm and happy.	7	1
O	33	m	27	27	A week before the interview he and his girlfriend went for a walk in the dark. It was in an urban area, with some trees on the side of the road. When they saw an owl flying just above them, they suddenly realized they were in nature. They were surprised and fascinated with the owl.	5	3
	34	m	27	23	He went on the same excursion as respondent D, experience 9. When he saw a dead German forest from the top of a mountain, he thought it was spectacular. Because he noticed the forest slowly regenerating, he also realized that nature can take care of itself.	6	2
P	35	m	18	16	When he was playing the computer game 'World of Warcraft', he once entered a (virtual) jungle for the first time. He saw large trees, panthers, waterfalls, etc. The thought it was beautiful and impressive.	5	4
	36	m	18	7-10	When he was a kid, he and his family experienced a thunder storm on their campsite. When they had to get out of their tent to find shelter, he was afraid of the lightning (a). A few minutes later, when they were taking shelter, he enjoyed the wide view he had with every lightning flash (b).	a: 3 b: 6	4 4
Q	37	m	19	16	Three years ago he and his family made a hiking trip through the Austrian mountains. When they reached the highest top there wasn't a single cloud in the sky and they could see very far. It made him respect God's creation and he got a kick out of the beautiful environment. His emotion got less active the longer he sat there.	7	From 4 to 2
	38	m	19	19	A day before the interview he was working with some friends in a big garden. They pulled out a dead bush and as a joke somebody gave it to him as a present for passing his school exams. The joke, the friends, the environment and having just passed his exams made him happy.	7	6