UNIVERSITY OF TWENTE

MASTER THESIS

Branding through Nature: Effects of Spaciousness and Unpredictability on Brand Awareness and Brand Image

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"There is no end to education. It is not that you read a book, pass an examination, and finish with education. The whole of life, from the moment you are born to the moment you die, is a process of learning."

Jiddu Krishnamurti

UNIVERSITY OF TWENTE

Abstract

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OBJECTIVE: Direct human-nature interactions, as well as indirect exposure to nature via surrogates (e.g., imagery, audio, or design elements), have been proven beneficial for information processing, task performance, and well-being. In the marketing and advertising domain, first indications of nature's positive effects on consumer memory and brand perceptions have been given. Still, not all natural settings are equal and understanding of specific nature characteristics' potential is scarce. In this regard, research hints spacious and unpredictable nature settings as triggers of cognitive and creative enhancement. The purpose of the present study is to contribute to knowledge about the role of nature imagery in advertising and to assess the influence of unpredictability and spaciousness on brand awareness (recall and recognition) and brand image.
METHOD: Applying a 2x2 between-subjects design, nature photography, varying in the amount of unpredictability (high vs low) and spaciousness (high vs low) depicted, was integrated into advertising material of a fictitious corporate brand. The stimulus material was complemented by a control condition with urban imagery. Participants (n=153) were randomly assigned to one of the five experimental conditions and exposed to the ad, embedded into an online survey. Subsequently, a questionnaire assessed brand awareness through memory measures and brand image through bipolar rating scales.
RESULTS: The analysis of data leads to the conclusion that nature, especially nature imagery high in spaciousness, influences in-depth brand awareness (i.e., the memory of brand characteristics) rather than peripheral brand awareness for brand logo, name, or type. The effects of nature visualizations on favorable brand responses and creativity perceptions were not significant. Still, nature interaction enhanced brand perceptions of a relaxed atmosphere and ecological awareness, the latter especially when non-spacious scenery was depicted in the ad. Brand associations with freedom and a lack of structure were stronger when spacious scenery was displayed, while positive curiosity and predictability associations were affected by unpredictable nature scenery.
CONCLUSION: Overall, these results provide a contribution to previous research, supporting an awareness-enhancing benefit of nature over urban imagery and revealing a key role of spaciousness. The findings also indicate that spaciousness and unpredictability inherit the potential to influence the formation of concept-congruent brand associations. Moreover, the study outcomes offer input for selection criteria of advertising imagery based on desired brand perceptions, leading to more control

over visual communication tools in marketing. Future studies are addressed to further clarify the role of nature and its characteristics in branding, as well as to have an in-depth look at other potential contexts to strengthen existing theory around nature's qualities.

KEYWORDS: nature, advertising, Attention Restoration Theory, spaciousness, unpredictability, brand awareness, brand image

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Contents

Chapter 1

Introduction

1.1 Imagery in Advertising

Advertisements not only inform consumers about functional capabilities of a brand or product, they simultaneously denote values and symbolic meaning to it. Consequently, advertising plays a central role in creating brand awareness and enables marketers to control for brand perceptions, whether at the corporate, retail, or product level (Martinez & Montaner, 2009; Meenaghan, 1995; Percy & Rossiter, 1992). Research zooming in on the features of advertisements found that images play a central role in influencing consumer responses. Rossiter and Percy (1980) show that visual ad content enhances the consumers' imagination and can be as effective as an actual experience in guiding behavior. The combination of a high visual emphasis and explicit verbal claims in advertisements was found most effective in shaping brand and product attitudes (Rossiter & Percy, 1980).

1.2 The Potential of Nature

Looking at one specific type of advertising imagery, Hartmann, Apaolaza, and Alija (2013) found that nature scenery provides essential benefits (as opposed to other pleasant imagery) for brand memory as well as brand attitude formation. With the help of an eye-tracking experiment, examining the viewer's fixation behavior and visual gaze, Hartmann et al. (2013) measured whether cognitive elaboration was affected by nature imagery in advertising. Results showed longer fixations, more attention to the ad's written text, and enhanced ad- and brand-recognition in the nature-imagery condition. Nature visualizations also resulted in a more favorable brand attitude, indicated by an emotional response rating (Hartmann et al., 2013).

The study by Hartmann et al. (2013) linked advertising and branding effects of nature to a general stream of research on the benefits of direct and indirect nature interactions for cognitive performance, psychological well-being, as well as physiological measures.

The most accepted framework in this context is Attention Restoration Theory (ART, Kaplan & Kaplan, 1989; Kaplan, 1995), demonstrating nature's potential to restore mental resources and enhance attention and affect. Various follow-up studies on ART confirmed nature's superiority over urban interactions. Berman, Jonides, and Kaplan (2008) found an improvement in directed-attention abilities (i.e., cognitive control) and working memory measures after a walk in nature, as well as after exposure to nature imagery. Similarly, Bratman, Daily, Levy, and Gross (2015) demonstrated that a walk in nature resulted in increased positive affect and working memory performance, while it decreased anxiety levels.

In professional settings, nature imagery improved task performance and work engagement (Bellini, Ramaci, & Bonaiuto, 2015; De Bloom, Kinnunen, & Korpela, 2014; Pilotti, Klein, Golem, Piepenbrink, & Kaplan, 2015). Windows with a nature view in the workplace lowered the negative impact of job stress on intention to quit (Leather, Pyrgas, Beale, & Lawrence, 1998).

Moreover, neuropsychological studies support restorative effects of nature in comparison with built environments through an activation of brain areas related to involuntary attention after exposure to natural settings (Martinez-Soto, Gonzales-Santos, Pasaye, & Barrios, 2013).

Consequently, nature has proven to affect multiple aspects of human cognition and is therefore proposed to represent a subject to information processing theory, such as the Elaboration Likelihood Model (ELM, Petty & Cacioppo, 1986). ELM, as a dual process theory, commonly applied in the consumer context, considers two possible routes of information processing, varying in intensity and extent of message elaboration. Linking ELM to the presented past research findings, the question arises if nature would also enhance the central (i.e., in-depth and more effortful) processing of advertisements.

1.3 Aim of this Study

Apart from the findings of Hartmann et al. (2013), research provides to date little evidence for nature's effects in advertising. Additionally, there is a lack of insights on the potential of specific nature features to influence consumer perceptions of a brand. In this regard, nature characteristics, such as spaciousness or unpredictability, were demonstrated to enhance task-performance, creativity, and self-disclosure (e.g., Okken, van Rompay, & Pruyn, 2013; Szolosi, Watson, & Ruddell, 2014; van Rompay & Jol, 2016). Even though these factors may also display relevance to the marketing context, the effects of spaciousness and unpredictability on branding outcomes have not been researched yet.

In order to address the gaps in existing research (i.e., the lack of studies on nature in the advertising context and the lack of studies on more specific natural features affecting brand perceptions), this study assesses to what extent nature imagery (high vs low in spaciousness and unpredictability) affects corporate branding. More specifically, the consumers' awareness and image formation of a newly introduced brand in the context of higher education marketing is examined. The findings of Hartmann et al. (2013) are projected from product-focused advertising to the (corporate) branding of a fictitious study program. A detailed description of the study design will follow after a closer look at the theoretical research basis.

Chapter 2

Theoretical Framework

2.1 Why and How Does Nature "Work"?

Even though research has established evidentiary value for nature's cognitive benefits in various context frames, it is not always distinct why these effects occur and which underlying mechanisms prompt cognitive enhancement.

An explanation for the general human affection for nature comes from the field of biophilia research, arguing that an inherent familiarity with nature draws us to natural environments (Kellert & Wilson, 1995). The fractal geometry in natural patterns proved to combine an aesthetic experience with a reduction of the observer's physiological stress levels (Hagerhall, Purcell, & Taylor, 2004; Mandelbrot, 1982; Bies, Blanc-Goldhammer, Boydston, Taylor, & Sereno, 2016). Biophilic elements, such as gardens, plants, fountains, and walkways in the physical environment of service processes were indeed shown to work restorative for psychological state, mood, and attention of consumers, which enhanced service preferences as an evaluative response (Purani & Kumar, 2018; Rosenbaum, Ramirez, & Camino, 2018).

Stress reduction theory by Ulrich (1981, 1984) assumes a general human precondition of psychophysiological stress as a response to a situation that challenges well-being. Thus, according to Ulrich (1981, 1984), exposure to urban, or other non-natural environments, is more likely to cause mental depletion. The restoration of these resources is the result of an initial affective response to natural environments.

In line with stress reduction theory, Valtchanov and Ellard (2015) tested the effects of visual properties of natural (vs urban) scenery on preference and cognitive load with an eye-tracking experiment. Results support an initially positive affect due to a preference and longer fixation duration for nature scenes. Higher cognitive load and stress were associated with urban environments (Valtchanov & Ellard, 2015).

The aforementioned ART (Kaplan & Kaplan, 1989; Kaplan, 1995) emanates from the assumption of directed attention fatigue, the depletion of cognitive resources needed for mentally demanding tasks. Their restoration unfolds through exposure to environments that fulfill four criteria: fascination (i.e., effortless attention), psychological or spatial distance from one's usual surroundings (i.e., a sense of being away), immersion in a coherent environment that engages the mind and promotes exploration, as well as compatibility with personal purposes, needs and demands for action (Kaplan & Kaplan, 1989; Kaplan, 1995). These criteria are met more often in natural than in urban environments and correlate with the perceived pleasantness of a place (Herzog, Maguire, Nebel, et al., 2003; Korpela & Hartig, 1996).

2.1.1 (Soft) Fascination

Due to its potential to capture attention effortlessly, literature on the beneficial qualities of nature for cognition frequently refers to the concept of fascination. Joye, Pals, Steg, and Evans (2013) assessed different dimensions of fascination and found that it functions affectively positive with an attentional bias to natural rather than urban environments.

Soft fascination, defined as the gentle or peaceful attraction of interest through elements of nature (Herzog et al., 2003; Kaplan, 1995), and used synonymously with effortless attention (Herzog, Black, Fountaine, & Knotts, 1997; Kaplan & Kaplan, 1989; Kaplan, 1995), bases on two characteristics: It captures attention involuntarily, in a bottom-up manner, and it is aesthetically pleasant (Berman et al., 2008; Herzog et al., 1997).

Basu, Duvall, and Kaplan (2018) define soft fascination as the interaction of attentional effort and mental bandwidth. An activity can thus be categorized as softly fascinating when it ranks high in available mental bandwidth (i.e., space for mind wandering and reflection) and low in attentional effort. In the context of this study, soft fascination can be regarded as a superordinate mechanism of the effects of nature on cognitive performance, present in a multitude of pleasant sceneries (Williams et al., 2018).

2.2 Advertising and Nature

Apart from Hartmann et al. (2013), only few studies have focused on distinct effects of integrating nature into advertising, but some demonstrated benefits must be noted in the framework of the current study. Hartmann, Apaolaza, and Eisend (2016) found that emotional responses towards advertisements containing nature imagery (as opposed to urban imagery) stimulated the retrieval of positive personal memories, which consequently enhanced the consumer's attitude toward the ad and brand. Wang, Tsai, and Tang (2018) compared tourist hotels that were advertised in a nature-based servicescape to those presented in a built-based servicescape and showed that more visual attention and higher behavioral intentions were aroused through a natural environment.

Another stream of research on the effects of nature in advertising deviates from the cognitive focus of the present study. In product advertisements with a 'green' (i.e, environmental) appeal, brand perceptions and brand attitude were found to be impacted by both informational environmental claims (i.e., functional appeals) and pleasant nature scenery (i.e., emotional appeals) (Hartmann & Apaolaza-Ibáñez, 2009). Especially a combination of nature visualizations and functional environmental product attributes in advertisements positively influenced brand attitudes and purchase intention, mediated by the consumers' green involvement (Schmuck, Matthes, Naderer, & Beaufort, 2017).

Based on these indications for nature's potential to positively affect information processing in the advertising domain, dependent measures of interest in the current study are defined as follows.

2.2.1 Brand Awareness

Brand awareness measures brand accessibility in consumer memory, combining brand recall and brand recognition (Rossiter & Percy, 1987). Various studies have brought memory-enhancing features of advertisements into focus, highlighting a key role of

imagery and visual cues. Childers and Houston (1984) found that consumer memory is in general superior for visual over verbal ad messages and McCracken and Macklin (1998) propose a coherence of visual imagery and target information (such as brand name) in ads as a trigger for brand memory.

A differentiation between recognition and recall has to be made with regards to communication effects in decision-making contexts. Brand awareness is either created through brand recognition that induces a category need (i.e., recognition awareness), or through an existing category need that subsequently drives brand awareness (i.e., recall awareness) (Percy & Rossiter, 1992).

Moreover, brand awareness influences whether a brand becomes part of the consumer consideration set, as well as how a brand is reflected by brand associations in memory (Keller, 2003). In line with ELM, brand awareness is proposed to represent a heuristic cue in low-involvement decision-making contexts (Petty & Cacioppo, 1986). In literature, awareness is often closely tied to attention, with attention being the process that enables selected information to reach conscious awareness. Attention can thereby operate on, or be cued by, unconscious and conscious stimuli (Cohen, Cavanagh, Chun, & Nakayama, 2012).

The current study links these findings to nature's potential to restore attention and enhance cognitive processing. Especially the mechanism of softly fascinating nature that captures and restores attention is implied in the expected outcomes. Hence, it is generally proposed that:

Hypothesis H1a: Nature imagery (as opposed to urban imagery) enhances brand recall.
Hypothesis H1b: Nature imagery (as opposed to urban imagery) enhances brand recognition.

2.2.2 Brand Image and Brand Associations

Low and Lamb Jr. (2000) define brand image as reasoned (functional) or emotional (symbolic) perceptions or beliefs that consumers hold about a brand. The formation of the consumer's brand image is determined by a network of associations in consumer memory, organized in some meaningful way. These brand associations are regarded as intangible properties of a brand, related to its name and symbol (Low & Lamb Jr., 2000). On the one hand, brand associations include perceived brand quality (Keller, 1993), defined as an evaluative response of the consumer, displaying in how far a brand is regarded as superior to its competition and as an added value to purchase evaluations (Low & Lamb Jr., 2000). On the other hand, the attitude towards the brand accounts for brand associations, portraying the meaning attached to the brand in consumer memory and affecting purchase behavior (Low & Lamb Jr., 2000). Moreover, the nature of a brand's personality (i.e, assigned characteristics usually owned by humans) also contributes to the formation of the consumer's attitude towards the brand with favorable brand personalities enhancing consumer preference, trust, and brand loyalty (Aaker, 1996; Aaker, 1997; Keller, 1993).

Therefore, brand associations contribute to brand equity since they facilitate the processing and retrieval of information, the differentiation of the brand from competitors, create (positive) attitudes, and provide purchase intentions (Aaker, 1991). Favorable responses (i.e., perceptions of high brand quality and a positive brand attitude) can as well be translated into the concept of pleasantness, which reoccurs in the characteristics of softly fascinating nature. Hence, the current study proposes

that:

Hypothesis H2a: Nature imagery (as opposed to urban imagery) enhances the consumer's brand image.
Hypothesis H2b: Nature imagery (as opposed to urban imagery) enhances brand associations.

2.3 Nature Characteristics

Apart from the mechanism of soft fascination in natural environments, research hints that specific nature properties may influence the human mind in various ways. Experiments focusing on preferences in natural settings show that the ideal nature scene is based on social requirements such as the need for open space (people prefer to have an overview but at the same time the opportunity to escape a scenery), the need for resources (such as water, reflected in a preference for blue landscapes), or signs of human habitation to display a certain degree of familiarity and control (Dutton, 2010).

With unpredictability and spaciousness, this study focuses on two selected characteristics that have been, both separately and in combination with each other, indicated as insightful for the context of information processing. The aforementioned study conducted by van Rompay and Jol (2016) tested spaciousness and unpredictability displays in nature and found the combination of spacious, unpredictable nature as most influential for creativity measures. Both features and their ascribed attributes are outlined in the following.

2.3.1 Unpredictability

Kaplan and Kaplan (1989) refer to a two-sidedness of the human need for control and safety on the one hand, and explorative opportunities and challenges on the other hand. The latter is referred to as 'mystery' in various studies, defined as perspectives in a scenery that leave room for suggestion and ambiguity (Appleton, 1996; Kaplan & Kaplan, 1989). Mysterious nature scenes are often among the most preferred and have the potential to enhance recognition, an effect that is mediated by perceptions of fascination (Szolosi et al., 2014).

Hence, mystery is proposed to be an essential variable in assessing how nature affects cognitive and affective measures, even though the term is rather vague and hardly tangible. The scientifically more straightforward term 'unpredictability' was introduced by van Rompay and Jol (2016) who found that interactions with unpredictable nature enhanced creative performance. Unpredictability better comprises the idea that details within a scenery cannot be foreseen from the observers' point of view (van Rompay & Jol, 2016). Hence, unpredictability is regarded as potentially ambiguous, triggering both negative and positive associations, such as uncertainty and (positive) surprise, and is used as a construct under discussion in the context of this study.

2.3.2 Spaciousness

As a second central feature of nature, spaciousness proved to generate room for thoughts and enhance openness to external idea input, self-disclosure, and feelings of freedom (Meyers-Levy & Zhu, 2007; Okken et al., 2013; Plambech & van Den Bosch, 2015; Stetler & Magnusson, 2015). Moreover, research suggests that spacious

nature settings promote a restful feeling of immersion and stress-relief (Annerstedt & Währborg, 2011). Regarding the effects of environmental design on human performance, Attaianese (2019) highlights that spaciousness, combined with natural design elements or nature views, enhances creativity, learning performance, and communication. Moreover, spacious architectural settings alter the physiological reaction to psychological stress and facilitate attention recovery (Fich et al., 2014). Awe is defined as a complex emotion triggered by feelings of vastness and the need for accommodation, which has been closely related to spaciousness in existing research (Chirico, Glaveanu, Cipresso, Riva, & Gaggioli, 2018). Feelings of awe were found to enhance the main elements of creative thinking, such as fluency, flexibility, and elaboration (Chirico et al., 2018).

Nevertheless, spacious nature settings are not invariably regarded as beneficial over less spacious environments in research. Several studies have demonstrated more positive effects of contained, intimate settings on self-disclosure, especially when experienced threat is low (Okken et al., 2013). When depicted in an advertisement, spacious nature scenery without a road (as opposed to an integrated road as a sign of structure) was shown to influence perceptions of missing goal-orientation within an organization (Cuperus, 2018).

Based on the presented literature, Table 2.1 gives an overview of attributes of unpredictability and spaciousness that display relevance to the current study context.

TABLE 2.1: Study-relevant attributes of the nature characteristics under discussion as derived from literature.

Attributes		
	Unpredictability	**Spaciousness**
positive	self-discovery explorative opportunities curiosity vs. boringness challenge positive unexpectedness	awe open-mindedness personal freedom independence stress-relief
negative	uncertainty	feeling of being lost unstructuredness

Thus, research indicates that spaciousness and unpredictability affect memory and elaboration, prompting that these findings may be referred to the advertising context. Still, scientific evidence for this assumption is missing, and ambiguity, as well as influence factors such as mind wandering or mental bandwidth (Basu et al., 2018; Williams et al., 2018) impede the tangibility and operationalization of spaciousness and unpredictability. The analysis of the two factors in the branding context is therefore kept explorative with the following research questions:

Question Q1: What are the effects of spaciousness (high vs low) and unpredictability (high vs low) in nature imagery on brand awareness (recall and recognition)?

Question Q2: What are the effects of spaciousness (high vs low) and unpredictability (high vs low) in nature imagery on brand image?

Insights on brand associations are expected from testing if the presented attributes referred to spaciousness and unpredictability are associated with the brand in dependence on the type of nature depicted in its advertisement:

Question Q3a: Are attributes of spaciousness (awe, open-mindedness, personal freedom, independence, stress-relief, feeling of being lost, unstructuredness) associated with the advertised brand in (dis)congruence with the depicted scenery?

Question Q3b: Are attributes of unpredictability (self-discovery, explorative opportunities, curiosity/ boringness, challenge, positive unexpectedness, uncertainty) associated with the advertised brand in (dis)- congruence with the depicted scenery?

To allow a preferably complete and versatile overview of brand associations triggered by nature, the current study controls for respective green brand associations by including the following research question:

Question Q4: To what extent are the green traits sustainability and ecological awareness associated with the brand when nature (varying on the two constructs of spaciousness and unpredictability) is depicted in the advertisement?

Chapter 3

Method

3.1 Research Design

The conducted research is an experimental 2 (high spaciousness vs low spaciousness in nature imagery) x2 (high unpredictability vs low unpredictability in nature imagery) between-subjects design with the goal to determine the extent to which nature imagery (varying on the constructs under discussion, and in contrast to urban imagery) influences corporate branding outcomes (brand awareness, brand image, and brand associations). On a narrower scope, this research examines in how far concepts that are connected to spaciousness and unpredictability are associated with the advertised brand. The research design is visualized below in Figure 3.1.

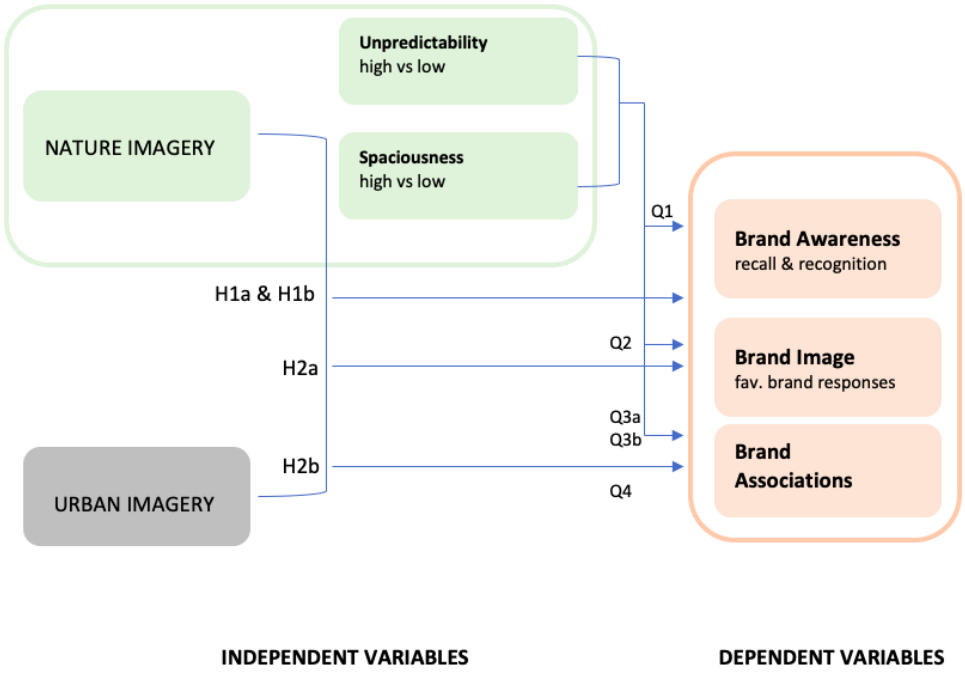


FIGURE 3.1: Research conceptualization.

3.2 Stimulus Material

3.2.1 Pre-Study Imagery

In order to assess spaciousness and unpredictability in a variety of nature imagery, and to find suitable images for four main study conditions varying on these two constructs, a pre-test was conducted. Upon prior consent, 16 images (see Appendix A) were curated from a photographer's archive (Podt, 2018) and standardized in size (500x300 pixel). 15 randomly selected participants (aged between 18 and 34; 10 female and 5 male respondents) rated four pre-selected images per condition category in an online survey. The four different categories were not labelled as such for respondents.

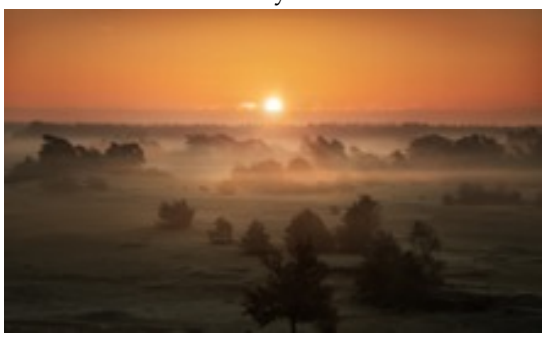
On a 5-point Likert-scale (scale anchors "I strongly disagree" and "I strongly agree"), accordance or discordance with eight given statements was indicated. Two statements to control for general perceptions of fascination and aesthetics were combined with three statements reflecting each construct under discussion (spaciousness and unpredictability). Example items for the latter were "This scenery makes me feel free." or "This scenery makes me curious to explore more of it."

Comparison of means verified that spaciousness and unpredictability evaluations (high vs. low) determined prior to the pre-test, were generally confirmed by participants (see Appendix A, Table A.1). The means of the three spaciousness items were combined to an overall spaciousness mean per image, the same procedure was applied for unpredictability ratings. The control items fascination and aesthetics were rated similarly high in the majority of images. Only image 14 was rated comparatively low in both fascination (M= 2.77, SD= 1.01) and aesthetics (M= 2.69, SD= 1.11) with answers spread over a relatively high range of values. It was therefore not considered for use in the main study.

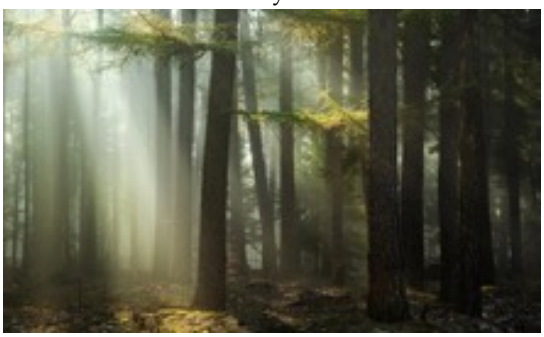
The four images ranked as best matches with the given categories were selected to represent one experimental condition (C1-C4) each. In addition, urban scenery as a basis for the experimental control condition (C5) was retrieved from a free online archive. The final images can be found in Figure 3.2 below (see additionally Appendix A for an overview of means and standard deviations of the assessed concepts and the complete pre-test questionnaire).

(A) C1: high spaciousness-low unpredictability

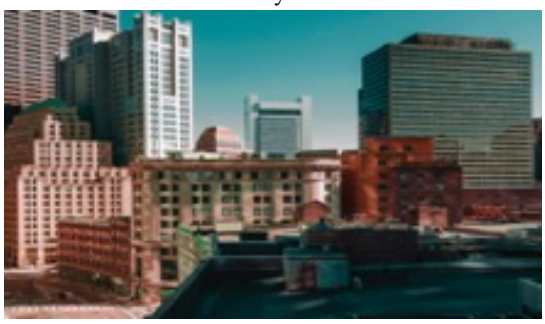
(B) C2: low spaciousness - low unpredictability



(C) C3: high spaciousness-high unpredictability



(D) C4: low spaciousness-high unpredictability



(E) C5: urban control condition

FIGURE 3.2: Final images for 5 manipulations.

3.2.2 Main Study

To test the formulated research hypotheses and answer the exploratory questions, a representative advertisement of a fictitious study program (European Multidisciplinary Degree Program, 'EMDP') was generated and used as the stimulus material of the main study, integrated into an online questionnaire. In line with the pre-test results, the image content of the advertisement was manipulated in order to obtain five experimental conditions (four nature groups and one urban control group). Next to the opportunity to collect data from a large population, the web-based character of the questionnaire qualified for this study context since it is consistent with real life interactions with this sort of marketing material.

The on-screen advertisement consisted of two pages (format 1200px:800px). While the first one functioned as a cover page, displaying only imagery of the respective visual condition, the second one included a repetition of the image and a text block. The written content was inspired by information material of the University College

of Amsterdam and kept identical between the five different conditions. It emphasized, with a total word count of 80, that the multidisciplinary degree program represents a holistic, science-centered education and an inclusive learning environment (for more information see Amsterdam University College (2018)).

Moreover, color and design elements (such as logo, fonts, or graphic elements other than the depicted scenery) were kept identical between conditions to control for potential group differences (see Appendix B for a note on the choice of typeface in this study's stimulus material). All five final manipulations are depicted below.

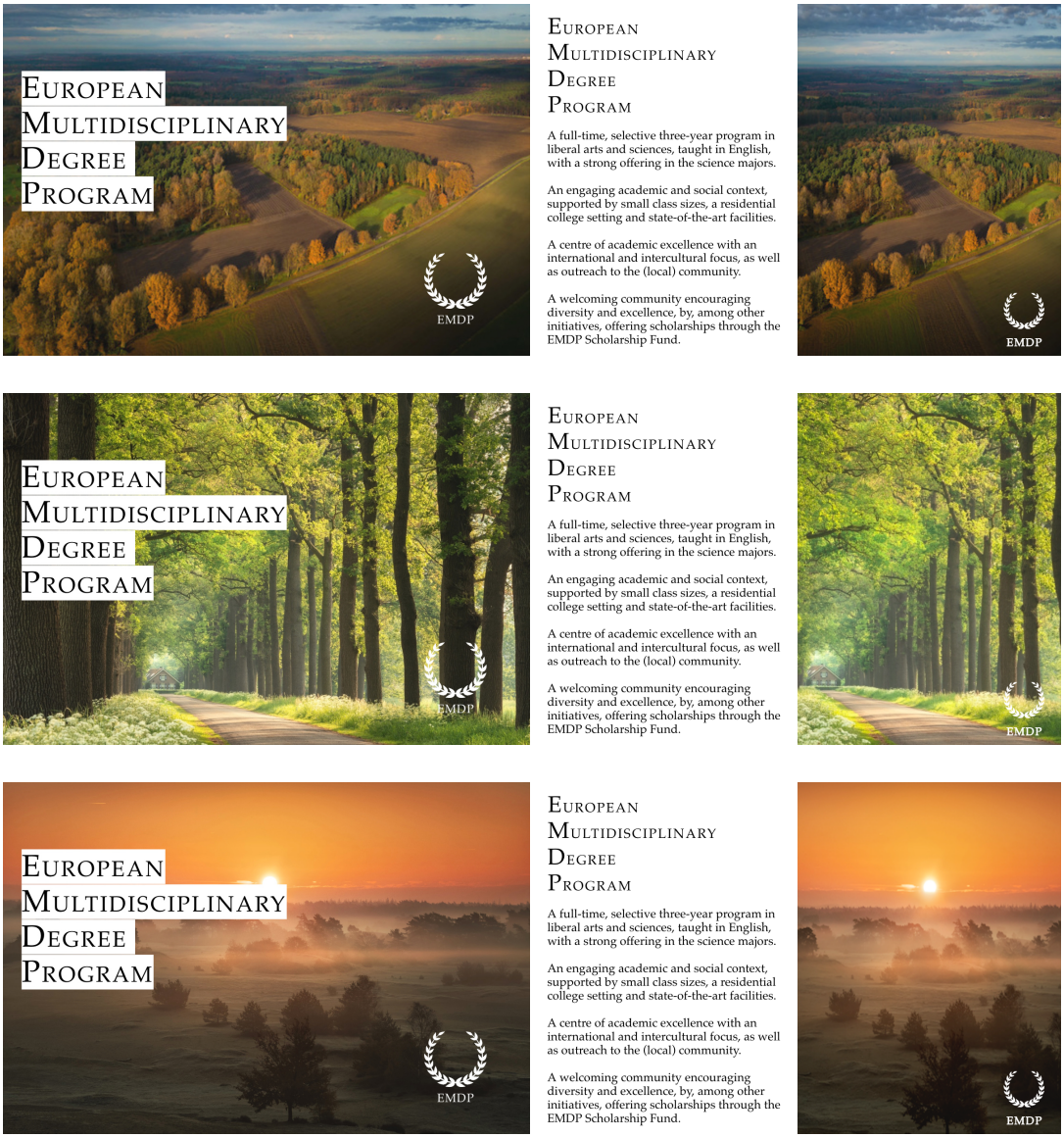


FIGURE 3.3: Experimental stimulus conditions 1-3.

FIGURE 3.4: Experimental stimulus conditions 4-5.

3.3 Measures

3.3.1 Brand Awareness

The concept of brand awareness, referring to the strength of a brand's presence in consumer memory (Aaker, 1996), was used to test hypothesis H1a and H1b about the impact of nature on brand recall, respectively recognition. Also, effects of spaciousness and unpredictability on brand memory were explored. All brand awareness measures were based on literature on advertising memory (e.g., Leigh, Zinkhan, & Swaminathan, 2006; Singh, Rothschild, & Churchill Jr, 1988; Zinkhan, Locander, & Leigh, 1986; Hartmann et al., 2013) and adapted to the study context.

In marketing research, brand awareness is commonly divided into the memory measures of unaided recall (i.e., no response cues are present) and recognition (i.e., aided or triggered by response cues) (e.g., Bagozzi & Silk, 1983; Wells, 2000).

In order to measure unaided recall, participants were asked to recall the type of study program (multidisciplinary), the name of the program (EMDP), and as many claims or characteristics about the program as possible, made in the advertisement. All answers were placed in open text fields.

For these items, a 0,1, or 2 coding system was applied. Respondents received two points for each fully correct answer (the exact wording was recalled from the ad, e.g., naming the type of program 'multidisciplinary'). One point was given for partially correct answers (e.g., naming the program 'interdisciplinary'). Other given answers, or no answer at all, were rated as incorrect and scored zero points. A total recall score per case was generated as the sum of program type recall, program name recall, and program claim recall scores.

In this study's recognition task, participants were exposed to retrieval cues (brand name, brand logo, and brand claims) and asked to indicate if they had seen the distinct items in the presented advertisement. To test the program name and program logo recognition, five alternatives (none of which had been shown in the survey) were given next to the correct answer. These items were coded as 0 or 1 (for each item that was recognized correctly, one point was given, while an incorrect answer resulted in zero points).

For the recognition of product feature claims, a true-false-test was applied (Singh & Rothschild, 1983), including an 'I don't know' alternative (Hartmann et al., 2013). Six program features were presented and respondents had to state if the claims had been previously advertised for 'EMDP' or not. Scores for these items were 0, -1, or +1. One point was given for each correctly recognized feature, one minus point for each incorrect answer, the 'I don't know' option resulted in zero points. Also for recognition measures, a total recognition score per case was generated as the sum of program name recognition, program logo recognition, and program claim recognition scores.

3.3.2 Brand Image and Brand Associations

Since associations with a brand's image are largely unique and dependent on specific brand categories (Bearden & Etzel, 1982; Park & Srinivasan, 1994), their measurement is proposed to be customized (Low & Lamb Jr., 2000). Therefore, this study combined established universal measures of brand image, such as brand personality (Aaker, 1997; Martinez & De Chernatony, 2004), brand attitude (Low & Lamb Jr., 2000; Yoo & MacInnis, 2005), and perceived brand quality (Keller, 1993; Low & Lamb Jr., 2000) with literature-generated items to test associations between the concepts of spaciousness or unpredictability and the brand.

The first set of scale items described favorable responses towards the brand, including ratings of general liking, personal interest, benefits over competition, excitement, perceived high brand quality, and competence. A test of internal consistency found the six items reliable (Cronbach's α= 0.81). A principle component analysis was conducted, revealing that all items loaded high on the same construct, which will for the remainder be referred to as the dependent variable *favorable brand responses*.

The battery was complemented by one single item measuring *creativity* perceptions (related to both spaciousness and unpredictability in existing literature), as well as two items measuring perceptions of *green brand traits* (*sustainability* and *ecological awareness*, which were highly correlated, r= 0.80).
The second set of scale items consisted of seven statements measuring the strength of associations with concepts related to spaciousness. An internal consistency analysis revealed that the five items awe, open-mindedness, personal freedom, independence, and stress relief were inter-correlated. The overall scale reliability for the five items showed a value of α= 0.76 (no individual item decreased this alpha value if deleted). A subsequent principle component analysis showed that only freedom, independence, and open-mindedness loaded high on one component. For further analyses this concept was named *freedom*.

Stress-relief differed marginally significant between groups (F(4, 147)= 2.14, p= 0.08). Therefore, it will be treated as a single item for the remainder. Interestingly, the single item analyses of awe did not show significant group differences between

the experimental conditions (F< 1, ns). Since *awe* is so closely related to spaciousness in literature, this lack of significance will be taken on in the results of this study.

The two negative items, unstructuredness and the feeling of being lost, were inter-correlated but captured a sufficiently unique variance (r= 0.32). In the principle component analysis they loaded high on one component and were assigned to the concept *lack of structure*.

The third set of scale items displayed seven statements that assessed in how far concepts related to unpredictability were associated with the advertised brand. A reliability analysis indicated that the items surprise, self-discovery, challenge, and exploration were reasonably homogeneous while measuring the same construct. All items seemed to be worthy of retention, resulting in a decrease in the sufficient alpha value (α= 0.75) when removed. To verify the construct, a principle component analysis was performed, revealing that the items self-discovery, exploration, challenge, and surprise loaded high on the same component. These four items measured the concept of *positive curiosity*.

The two remaining items, predictability and boringness (reverse item of curiosity), aiming at negative brand associations based on predictable scene content, showed an inter-item correlation of r= 0.49. They loaded on one component which will be referred to as the concept *predictability* for the reporting of results.

All items were measured on 5-point Likert scales, asking participants to indicate their level of agreement with respective perceptions of the brand, ranging from 1 "I strongly disagree." to 5 "I strongly agree.".

All brand image and brand association scale items and their derivation can be found in Appendix C, Table 3.1 below gives an overview of all dependent variables in this study after reliability and principle component analyses.

TABLE 3.1: Overview of the present study's dependent variables as applied in the analyses of results.

Brand Awareness		**Brand Image**	**Concepts Spaciousness**	**Concepts Unpredictability**
Brand Recall	**Brand Recognition**			
Recall Type of Study Program	Recognition Name of Study Program	Favorable Brand Responses	Freedom	Positive Curiosity
Recall Name of Study Program	Recognition Logo of Study Program	Creatvity	Awe	Predictability
Recall Claims & Characteristics	Recognition Claims & Characteristics	Green Brand Traits	Stress-Relief	
			Lack of Structure	

3.4 Participants

The general concepts proposed in the theoretical framework (the influence of nature imagery and its properties on brand perceptions) are not limited to a certain target group. Nevertheless, since the presented brand is situated in a student-oriented context, the recruitment of participants at a university (the Dutch University of Twente), via the online student survey exchange platform Survey Cycle, and social media was regarded as favourable. 188 subjects participated in the online survey, 35 responses

had to be deleted due to incompleteness. The final convenience sample of this research is therefore N= 153, each participant was randomly assigned to one out of five experimental conditions.

86 respondents were female (56.0%) and 67 male (44.0%), the average age of the participants was 24.23 years (SD= 4.56). Most participants were of German (N= 62, 40.6%) or Dutch (N= 29; 19.0%) nationality. In line with the sampling method, 143 (93.5%) subjects indicated that they were current or former students, the majority had completed an undergraduate education (i.e., Bachelor's degree, 50.3%), followed by participants with a secondary education (i.e., graduated high school, 30.7%). The academic field of humanities and social sciences was most prevalent in the sample (N= 96; 62.7%), the second largest group was represented by engineering studies (N= 20; 13.1%). An overview of the participants' demographics can be found below in Table 3.2.

TABLE 3.2: Participant demographics per experimental condition; U= unpredictability, S= spaciousness.

Demographic Construct	**low U x high S N= 31**	**low U x low S N= 29**	**high U x high S N= 31**	**high U x low S N= 35**	**urban N= 27**
Gender, N (%)					
female	20 (64.5%)	13 (43.3%)	17 (54.8%)	19 (54.3%)	17 (65.4%)
male	11 (35.5%)	17 (56.7%)	14 (45.2%)	16 (45.7%)	9 (34.6%)
Age, M (SD)	25.26 (7.38)	24.32 (4.33)	23.07 (2.52)	24.62 (3.09)	23.60 (3.58)
Education, N (%)					
sec. education	12 (30.7%)	10 (33.3%)	13 (41.9%)	5 (14.3%)	7 (26.9%)
trade/techn./voc. training	0	0	2 (6.5%)	1 (2.9%)	1 (3.8%)
undergrad. degree	15 (48/4%)	16 (53.3%)	13 (41.9%)	17 (48.6%)	16 (61.5%)
postgrad. degree	3 (9.7%)	2 (6.7%)	3 (9.7%)	11 (31.4%)	2 (7.7%)
doctorate degree	1 (3.2%)	2 (6.7%)	0	1 (2.9%)	0
Nationality, N (%)					
German	13 (41.9%)	14 (46.6%)	12 (38.8%)	14 (40.4%)	9 (34.6%)
Dutch	6 (9.3%)	5 (16.7%)	8 (25.8%)	6 (17.1%)	4 (15.4%)
other	12 (48.8 %)	10 (36.7%)	11 (35.4%)	15 (42.5%)	14 (50%)

3.4.1 Homogeneity between Conditions

In order to determine whether the sample characteristics were homogeneously distributed between the experimental groups, ANOVA and Chi-square tests were run. A Chi-square test showed that there were no significant differences ($\alpha > 0.05$) between the expected and observed distribution of gender in the five conditions ($\chi^2(4)= 3.86$, $p= 0.43$).
Additionally, a one-way analysis of variance (ANOVA) stated that there were no significant age differences in the experimental groups ($F(4, 141)= 1.03$, $p= 0.40$). The distribution of different educational backgrounds among participants between the five manipulations was tested through a Chi-square test. Results indicated that there were no significant differences between the expected and observed distribution of educational level among the five conditions ($\chi^2(16)= 23.80$, $p= 0.10$).

These results show an equal distribution of sample characteristics between the five manipulations which can therefore be compared and used for further evaluation.

3.5 Procedure

The experiment was conducted in April 2019 in the form of an online survey, administrated through the survey software Qualtrics (the complete main study questionnaire is available in Appendix D).

The first section of the survey contained a brief introduction to the topic, stating the research focus on first impressions about a new study program that could be introduced to higher education. Participants were informed about the anonymity of results and gave their active consent to take part in the study. They were then randomly assigned to one of the five conditions and exposed to the respective stimulus material in the form of an advertisement. The time that each participant spent on the two advertisement pages was self-determinable and registered in the background (not visible for participants).

After the advertisement, socio-demographics including age, gender, nationality, current educational situation, and highest level of education were assessed. This question block served a twofold purpose in this study: Next to the proposed insights into group differences based on the defined variables, the placement of the questions immediately after stimulus exposure created a time span between target information and questions for recall and recognition. A time lag in the form of a distractive task, with a sufficient duration of 18 seconds (Peterson & Peterson, 1959), prevents participants from rehearsing newly learned information and blocks some of the limited resources of working memory (for a methodological review see Conway et al., 2005).

Subsequently, the participants answered questions about the study's dependent branding variables, as defined above. The respondents were thanked for their participation and informed about the fictitious character of the brand and advertising material used in the survey. Contact information of the researcher was provided for future questions and concerns.

Chapter 4

Results

Various statistical tests were conducted with the software IBM SPSS 23 in order to test the formulated hypotheses and to determine the relevance of the explorative research questions generated based on theory. First, a general comparison of effects of nature imagery, in contrast to urban imagery, on all dependent variables was performed. Then, in a second step, analyses were narrowed down based on a 2 (spaciousness high vs low) x 2 (unpredictability high vs low) design. The following sections give an overview of the conducted analyses and their results.

4.1 Nature vs. Urban Imagery - Hypotheses H1a to H2b

Hypotheses H1a, H1b, H2a, and H2b focused on a distinction between the type of imagery (nature vs urban). A positive influence of nature on brand awareness and brand image was expected.

4.1.1 Brand Awareness

The effect of type of imagery (including all five experimental conditions) on brand awareness was assessed by multi- and univariate analyses of variance for brand recall (with the recall scores for *type of program, name of program*, and *program claims made in the ad* as dependent variables), as well as brand recognition (with the recognition scores for *program name, program logo*, and *program claims made in the ad* as dependent variables).

Brand Recall

An initial one-way multivariate analysis of variance (MANOVA) revealed no significant multivariate main effect for recall (Wilks' λ= 0.89, F(12, 386.57)= 1.43, p= 0.15). Nevertheless, a look at the tests of between-subjects effects revealed that the *recall of program claims and characteristics* was significantly affected by the type of imagery depicted (F(4, 148)= 2.68, p= 0.03). In contrast, neither the *recall of program name* nor the *recall of program type* were significantly different between sample groups (both F's <1, ns).

In a subsequent ANOVA with type of imagery as a fixed factor and the *recall of program claims* as a dependent variable, claim recall group means of the nature groups were compared to those of the urban control group. An LSD post-hoc test revealed that only participants who had seen unpredictable, spacious nature imagery scored significantly higher in *claim recall* than the urban group (p< 0.01). Yet, recall scores in the urban group were the lowest within the sample (see Table 4.1).

Therefore, Hypothesis H1a about the positive influence of nature imagery on brand recall can be partly supported. Not all aspects of recall differed between

groups, but content claims were better recalled after nature (as opposed to urban) exposure when both spaciousness and unpredictability were highly present in the ad imagery.

TABLE 4.1: Group mean and standard deviation values for recall of brand claims; U= unpredictability, S= spaciousness.

	Condition	Mean	SD
NATURE IMAGERY	C1: low U x high S	4.71	3.20
	C2: low U x low S	3.73	3.07
	C3: high U x high S	5.45	3.80
	C4: high U x low S	3.31	3.03
	Total Nature	4.28	3.35
URBAN IMAGERY	C5: urban control group	3.08	3.72
Total Sample		4.07	3.43

Brand Recognition

Similarly, results of a second MANOVA showed no significant multivariate main effect of type of imagery on recognition (Wilks' λ= 0.90, F(12, 386.57)= 1.25, p= 0.25). Looking at the three categories of recognition independently, neither *program name recognition* nor *program logo recognition* were significantly affected by the type of imagery (both F's< 1, ns), while the *recognition of program claims* differed significantly between the experimental groups (F(4, 148)= 2.55, p= 0.04).

A comparison of means within an ANOVA LSD post-hoc test showed that, just as in the claim recall analysis, only subjects assigned to the condition high unpredictability - high spaciousness recognized claims significantly better than the urban control group (p< 0.01). The difference between the urban and the low unpredictability - high spaciousness condition can be noted es marginally significant (p= 0.05; see Table 4.2).

Also Hypothesis H1b "Nature imagery enhances brand recognition." can be partly supported. The recognition of content claims was significantly better in the nature condition, compared to urban scenery, when at least the amount of spaciousness displayed in the ad imagery was high. More peripheral features such as logo or brand name were not significantly better recognized.

4.1.2 Brand Image

A performed MANOVA showed no significant multivariate effect of the type of imagery on the dependent variables *favorable brand responses, creativity perceptions, ecological awareness*, and *sustainability* (Wilks' λ= 0.88, F(16, 437.51)= 1.18, p= 0.28). Subsequent univariate analyses of variance revealed that perceptions of *ecological awareness* differed marginally significant between groups (F(4, 148)= 2.40, p= 0.05), while the main effects of type of imagery on *sustainability* (F(4, 148)= 1.13, p= 0.35), *favorable brand responses*, as well as *creativity perceptions* (all F's< 1, ns) did not reach significance.

Pinpointing the difference between nature and urban scenery in *ecological awareness* ratings, only participants exposed to non-spacious, unpredictable nature imagery

TABLE 4.2: Group mean and standard deviation values for recognition of brand claims; U= unpredictability, S= spaciousness.

	Condition	Mean	SD
NATURE IMAGERY	C1: low U x high S	3.06	1.37
	C2: low U x low S	2.80	1.99
	C3: high U x high S	3.42	1.26
	C4: high U x low S	2.40	1.71
	Total Nature	2.91	1.64
URBAN IMAGERY	C5: urban control group	2.19	2.02
Total Sample		2.78	1.72

associated *ecological awareness* significantly stronger with the study program than the urban control group (p= 0.03; see Table 4.3).

Consequently, also Hypothesis H2a 'Nature imagery (as opposed to urban imagery) enhances the consumer's brand image.' can be confirmed with restrictions. Only a distinct dimension (*ecological awareness*) was significantly stronger associated with the brand after nature exposure, when the type of nature displayed involved low amounts of spaciousness and high amounts of unpredictability.

TABLE 4.3: Group mean and standard deviation values for associations of ecological awareness; Likert scale from 1- strong disagreement to 5- strong agreement; U= unpredictability, S= spaciousness.

	Condition	Mean	SD
NATURE IMAGERY	C1: low U x high S	3.16	1.04
	C2: low U x low S	3.33	1.03
	C3: high U x high S	2.81	0.91
	C4: high U x low S	3.46	0.95
	Total Nature	3.20	1.00
URBAN IMAGERY	C5: urban control group	2.88	1.14
Total Sample		3.14	1.03

4.1.3 Brand Associations

Multiple univariate analyses of variance regarding brand associations with spaciousness- or unpredictability-related concepts were performed to obtain first insights on potential relationships between the manipulations and the measured associations. In-depth analyses of group differences between the nature conditions based on the type of nature will be presented in a subsequent section.

Spaciousness Concepts

An ANOVA with type of imagery as independent variable revealed that the main effect on associations with *freedom* was significant (F(4, 147)= 2.54, p= 0.04). Interestingly, *freedom* was rated higher in the urban control group than in nature groups exposed to non-spacious scenery. Also, the overall mean rating of freedom was lower in the nature conditions than in the urban condition. Nevertheless, group differences were only significant between the four nature conditions and not between urban and nature imagery (all p's in LSD post-hoc test > 0.05). As stated above, these differences will be further examined in an individual section (see Table 4.4 for all group means).

TABLE 4.4: Group mean and standard deviation values for associations of freedom; Likert scale from 1- strong disagreement to 5- strong agreement; U= unpredictability, S= spaciousness.

	Condition	Mean	SD
NATURE IMAGERY	C1: low U x high S	3.49	0.90
	C2: low U x low S	3.08	0.92
	C3: high U x high S	3.61	0.93
	C4: high U x low S	3.03	0.97
	Total Nature	3.30	0.96
URBAN IMAGERY	C5: urban control group	3.43	0.86
	Total	3.32	0.94

An ANOVA including associations with *awe* as the dependent variable showed no statistically significant main effect of type of imagery (F< 1, ns). Therefore, associations of awe with the presented brand were not dependent on nature interactions.

A marginally significant main effect of type of imagery on *stress-relief* was revealed within another ANOVA (F(4, 146)= 2.14, p= 0.08). The urban control group rated a relaxed atmosphere within the advertised study program lower than the rest of the sample (see Table 4.5). Here, significant group differences between nature and urban interactions were found for spacious, predictable nature (p< 0.01), as well as spacious, unpredictable nature (p= 0.05). Since the group exposed to non-spacious, predictable imagery also perceived the brand marginally significantly (p= 0.06) more relaxed than the urban group, spacious nature is not the clear driver of stress-relief at this point of analysis.

Also perceptions of a *lack of structure* in the study program were significantly affected by the type of imagery in the ad (F(4, 147)= 2.59, p= 0.04). Comparing urban and nature scenery, the mean value of a perceived lack of structure is the same for both groups (Table 4.6). Only a marginally significant group difference could be revealed between the urban and the high unpredictability - low spaciousness condition (p= 0.06) with greater perceptions of a lack of structure after urban interaction. Accordingly, *lack of structure* was rather associated with the brand after exposure to urban scenery than after interaction with non-spacious, unpredictable nature.

TABLE 4.5: Group mean and standard deviation values for associations of stress-relief; Likert scale from 1- strong disagreement to 5- strong agreement; U= unpredictability, S= spaciousness.

	Condition	Mean	SD
NATURE IMAGERY	C1: low U x high S	3.48	1.09
	C2: low U x low S	3.20	1.27
	C3: high U x high S	3.23	1.09
	C4: high U x low S	3.12	1.25
	Total Nature	3.25	1.17
URBAN IMAGERY	C5: urban control group	2.62	0.94
Total Sample		3.14	1.16

TABLE 4.6: Group mean and standard deviation values for associations of lack of structure; Likert scale from 1- strong disagreement to 5- strong agreement; U= unpredictability, S= spaciousness.

	Condition	Mean	SD
NATURE IMAGERY	C1: low U x high S	2.62	1.04
	C2: low U x low S	2.40	0.79
	C3: high U x high S	2.60	0.80
	C4: high U x low S	2.06	0.50
	Total Nature	2.46	0.82
URBAN IMAGERY	C5: urban control group	2.46	0.86
Total Sample		2.42	0.83

Unpredictability Concepts

The main effect of type of imagery on *positive curiosity* associated with the study program was statistically significant ($F(4, 146)= 2.72$, $p= 0.03$). Looking at a comparison of means within a performed ANOVA, participants associated *positive curiosity* stronger with the brand after interaction with urban imagery than with nature imagery. Marginally statistically significant in an LSD post-hoc test was the group difference between the urban group and the predictable, spacious nature group ($p= 0.06$) with higher curiosity ratings on the urban side. Nevertheless, unpredictable nature interactions resulted in the strongest associations of *positive curiosity* (see Table 4.7).

Furthermore, the main effect of type of imagery on *predictability* associations was significant ($F(4, 146)= 2.46$, $p= 0.05$). In general, exposure to urban scenery increased predictability associations with the brand. Only when nature displays involved predictability, mean ratings were higher after nature interaction. Nevertheless, comparing the urban control group with the four nature conditions, no statistically significant difference was detected (all p's in LSD post-hoc test > 0.05, see Table 4.8).

Hypothesis H2b 'Nature imagery (as opposed to urban scenery) enhances brand

TABLE 4.7: Group mean and standard deviation values for associations of positive curiosity; Likert scale from 1- strong disagreement to 5- strong agreement; U= unpredictability, S= spaciousness.

	Condition	Mean	SD
NATURE IMAGERY	C1: low U x high S	3.02	0.71
	C2: low U x low S	3.16	0.76
	C3: high U x high S	3.49	0.79
	C4: high U x low S	3.48	0.60
	Total Nature	3.29	0.74
URBAN IMAGERY	C5: urban control group	3.37	0.66
Total Sample		2.42	0.83

TABLE 4.8: Group mean and standard deviation values for associations of predictability; Likert scale from 1- strong disagreement to 5- strong agreement; U= unpredictability, S= spaciousness.

	Condition	Mean	SD
NATURE IMAGERY	C1: low U x high S	2.70	0.88
	C2: low U x low S	2.78	0.98
	C3: high U x high S	2.26	0.85
	C4: high U x low S	2.28	0.75
	Total Nature	2.49	0.89
URBAN IMAGERY	C5: urban control group	2.60	0.83
Total Sample		2.51	0.88

associations.' can only be fully supported concerning the positive association of *stress-relief*. Interestingly, some of the tested concepts were affected by urban imagery. For instance, the negative association of *lack of structure* was enhanced through urban interactions with indications of a beneficial role of non-spacious nature for perceptions of a structured brand. The association of *freedom* was generally stronger in the urban category than in the nature condition, unless the nature displayed was spacious.

These detected group differences linked to a certain type of nature will be further outlined in the subsequent second step of analyses.

4.2 Main and Interaction Effects of Spaciousness and Unpredictability

To further pinpoint the emerging role of nature-inherent characteristics within the detected relationships, the following section gives an overview of main effects comparing only the four experimental nature manipulations.

4.2.1 Brand Awareness

Brand Recall

As stated above, *claim recall* scores differed significantly between all sample groups with the two groups exposed to spacious nature scenery showing the highest claim recall scores (see Table 4.1). A look at significant group differences between the four nature conditions revealed that participants exposed to imagery depicting high amounts of both spaciousness and unpredictability performed better in *claim recall* than those exposed to non-spacious, unpredictable scenery ($p= 0.01$), or to non-spacious, predictable scenery ($p= 0.05$).

To pinpoint this indicated benefit of spaciousness for *claim recall*, a 2 (spaciousness low vs high) x 2 (unpredictability low vs high) analysis of variance was performed. The main effect of spaciousness on program *claim recall* was significant ($F(1, 123)= 7.14$, $p< 0.01$). *Claim recall* measures of participants who interacted with spacious nature scenery were higher ($M= 5.08$, $SD= 3.50$) compared to those who had interacted with non-spacious scenery ($M= 3.51$, $SD= 3.03$). The main effect of unpredictability was not significant ($F< 1$, ns), as well as the interaction effect of spaciousness and unpredictability ($F< 1$, ns).

Brand Recognition

Furthermore, looking at the whole sample, significant group differences were found for the *recognition of program claims and characteristics*. The results of an ANOVA LSD post-hoc test showed that the two conditions exposed to nature high in spaciousness scored highest among the test groups (Table 4.2). A significant difference between the nature manipulations could be revealed in better *claim recognition* scores of participants who had seen spacious, unpredictable nature compared to those who had seen non-spacious, unpredictable nature ($p= 0.02$), strengthening the anticipation of spaciousness' key role for claim memory.

Accordingly, also for the *claim recognition* analysis, a 2 (spaciousness low vs high) x 2 (unpredictability low vs high) analysis of variance was performed. A significant main effect of spaciousness was supported ($F(3, 123)= 5.03$, $p= 0.03$). When spacious nature imagery was displayed, participants recognized product claims and characteristics significantly better ($M= 3.25$, $SD= 1.31$) than respondents exposed to non-spacious nature ($M= 2.58$, $SD= 1.85$). There was again no significant main effect of unpredictability ($F< 1$, ns).

Therefore, it is suggested that high amounts of depicted spaciousness in an ad may enhance the awareness of in-depth brand features, while unpredictability had no significant effect. Nevertheless, the experimental manipulation combining high amounts of both spaciousness and unpredictability in nature could be referred to the best claim memory performance, indicating that a certain degree of unpredictability may be beneficial. Nevertheless, also for *claim recognition*, no interaction effect of unpredictability and spaciousness was detected ($F(3, 123)= 1.74$, $p= 0.19$).

4.2.2 Brand Image

No significant differences were found regarding the group means for *favorable brand responses* (all p's< 0.05). Therefore, this study cannot confirm that spaciousness or unpredictability within nature imagery affect favorable responses towards the brand (as operationalized for the purpose of this research).

Ecological awareness was found to differ marginally significant between all sample groups with participants exposed to non-spacious imagery relating ecological awareness significantly stronger to the brand than the group exposed to spacious, unpredictable imagery (both p's< 0.05; Table 4.3).

To clarify if non-spacious imagery drives perceptions of *ecological awareness*, a 2 (spaciousness high vs low) x 2 (unpredictability high vs low) analysis of variance was performed, showing that indeed only spaciousness had a significant effect on *ecological awareness* perceptions (F(3, 123)= 5.35, p= 0.02). Respondents perceived the brand as more ecological aware after exposure to non-spacious nature imagery (M= 3.40, SD= 0.98) than to spacious nature (M= 2.98, SD= 0.98). The main affect of unpredictability was not significant (F< 1, ns) and again, no interaction effect of spaciousness and unpredictability was detected (F(3, 123)= 1.88, p= 0.17). Hence, it is anticipated that low amounts of spaciousness may drive associations of *ecological awareness* with the brand.

Brand Associations

Spaciousness Concepts

Looking at significant group differences in brand associations with *freedom* between the four nature conditions, exposure to spacious, unpredictable scenery resulted in a significantly stronger association of the concept with the brand than both conditions displaying non-spacious nature (both p's< 0.05). A spacious, predictable nature visualization in the ad also resulted in significantly stronger *freedom* associations than a non-spacious, unpredictable one (p= 0.04, see Table 4.4 for all group means).

To pinpoint this emerging benefit of spaciousness for perceptions of *freedom*, another ANOVA with the independent variables of spaciousness (high vs low) and unpredictability (high vs low) was performed. Results showed that the main effect of spaciousness on associations with *freedom* was significant (F(3, 122)= 9.05, p< 0.01), while unpredictability had no significant main effect (F< 1, ns). Spacious imagery positively affected *freedom* ratings with significantly higher group means (M= 3.71, SD= 1.05) compared to the non-spacious manipulations (M= 3.03, SD= 1.18). No interaction effect of spaciousness and unpredictability was found (F< 1, ns).

Perceptions of *stress-relief* in relation to the brand differed significantly between all sample conditions (Table 4.5). Nevertheless, neither spaciousness (F< 1, ns), nor unpredictability (F< 1, ns) were found as drivers of perceptions of a relaxed atmosphere within the study program. Likewise, no interaction effect of the two independent variables was revealed (F< 1, ns).

Regarding the dependent variable *lack of structure*, non-spacious, unpredictable nature resulted in a significantly lower group mean compared to spacious, unpredictable nature, as well as compared to spacious, predictable nature (both p's < 0.01, see Table 4.6). When spacious scenery was displayed, participants perceived the lack of structure in the brand as higher (M= 2.61, SD= 0.92) than when non-spacious scenery was displayed (M= 2.22, SD= 0.67), indicating that perceptions of a lack of structure were enhanced by spaciousness. Results of a subsequent ANOVA, including both spaciousness and unpredictability as independent variables, showed that the main effect of spaciousness was significant (F(3, 122)= 7.21, p < 0.01), while unpredictability had no main effect (F(3, 122)= 1.71, p= 0.19). Moreover, no interaction effect was present (F(3, 122)= 1.17, p= 0.28).
Consequently, only exposure to spacious nature in the ad imagery enhanced brand associations with concepts generated based on spaciousness attributes (freedom and

lack of structure). Unpredictability, as the second factor under discussion, did not affect the associative strength of concepts related to spaciousness. Interestingly, the spaciousness-concept of stress-relief was found significantly stronger associated with the brand after nature interaction, but not specifically triggered by spaciousness.

Unpredictability Concepts

Associations with the concept of *positive curiosity* differed significantly between all sample groups (Table 4.7).

Significant differences between the four nature conditions were found for the experimental group exposed to spacious, predictable nature scenery that showed weaker associations of positive curiosity with the study program than both conditions involving unpredictable scene content (both p's< 0.01).

An ANOVA with spaciousness and unpredictability as independent variables showed indeed a significant main effect of unpredictability on perceptions of positive curiosity ($F(3, 122)= 9.72$, $p< 0.01$). Respondents who had seen unpredictable nature imagery in the ad associated positive curiosity stronger with the study program ($M= 3.48$, $SD= 0.69$) than those who had seen predictable nature scenery ($M= 3.09$, $SD= 0.73$). Spaciousness had no significant main effect on positive curiosity ($F< 1$, ns) and also the interaction effect of spaciousness and unpredictability reached no significance ($F< 1$, ns).

Furthermore, the study program was perceived as less *predictable* when unpredictable nature was displayed in the ad (see Table 4.8). An analysis of variance with LSD post-hoc test, looking at unpredictability and spaciousness as independent factors, revealed that the main effect of unpredictability on perceived brand predictability was significant ($F(3, 122)= 9.28$, $p< 0.01$). Predictable scene content resulted in higher predictability ratings for the brand ($M= 2.74$, $SD= 0.92$) than an unpredictable nature display ($M= 2.27$, $SD= 0.80$). Neither the main effect of spaciousness on predictability ($F< 1$, ns) nor the interaction effect of spaciousness and unpredictability ($F< 1$, ns) was significant.

Overall, exposure to unpredictable nature in the ad imagery increased the associative strength with the unpredictability-related concept *positive curiosity*. Predictable nature induced perceptions of *predictability* in the brand. Spaciousness, as the second factor under discussion, did not affect brand associations with concepts related to unpredictability. Therefore, also (un)predictable nature scenery in an advertisement is proposed to inherit the potential to trigger congruent brand associations.

Chapter 5

Discussion

The aim of this study was to extend previous research findings indicating beneficial effects of nature in advertising on brand memory and brand perceptions. Furthermore, the current research wanted to clarify the inconclusive relationship between nature-constituting characteristics (spaciousness and unpredictability) and brand associations. A control group was added to monitor the impact of urban imagery on the dependent variables. In the following section, an overview of the main findings will be given, followed by a discussion reflecting on the existing research constructs proposed in the theoretical framework. Then, practical implications of this study will be outlined and results will be critically reviewed, including this study's limitations and prospects for further research.

5.1 Main Findings

One of the main conclusions that can be drawn from the results of this study is that the display of nature imagery (in contrast to urban imagery) in an advertisement had a positive effect on the recall as well as the recognition of in-depth brand content presented in the ad. More specifically, the nature characteristic of spaciousness was shown to enhance memory measures for content features, while no significant effect was found for unpredictability displays on brand awareness. Interestingly, more peripheral measures of brand awareness (i.e., recall of brand name or type, recognition of brand logo or name) were not affected by nature exposure.

Moreover, concerning the measure of brand image, ecological awareness associations with the brand were enhanced when nature was displayed and strongest when nature involved low amounts of spaciousness. General favorable responses towards the brand, including personal interest in the study program, or perceptions of a creative brand, were not significantly influenced by any nature interaction.

Another important aspect highlighted through this research concerns the notion that spaciousness as well as unpredictability triggered the association of some respectively congruent concepts with the brand. Related to the concept of spaciousness, freedom and a lack of structure were associated with the brand when spacious nature scenery was displayed. Interestingly, stress-relief, as a spaciousness-related concept, was enhanced by nature, but not distinctly by spaciousness. The concept of awe was, contrary to past findings, not connected to spaciousness at all.

With regards to unpredictability, brand associations of positive curiosity were dependent on unpredictable nature displays. The brand was furthermore perceived as more predictable after exposure to predictable nature scenery in the ad.

It is also noted that no interaction of spaciousness and unpredictability was found in any of the performed analyses of variance.

5.2 Theoretical Implications - Reflection on Theory

Previous studies on the influence of nature on cognitive performance mainly focused on a general differentiation between nature and urban scenery with coherent findings of nature's beneficial potential in various social and behavioral contexts (e.g., Bellini et al., 2015; Berman et al., 2008; Bratman et al., 2015; Dijkstra, Pieterse, & Pruyn, 2006; Kaplan & Kaplan, 1989; Korpela & Hartig, 1996; Leather et al., 1998; Pilotti et al., 2015). The role that distinct characteristics within nature may play was rather neglected. In this regard, spaciousness and unpredictability in nature were shown to positively affect creative performance, memory, and well-being (van Rompay & Jol, 2016; Okken et al., 2013; Plambech & van Den Bosch, 2015; Meyers-Levy & Zhu, 2007; Annerstedt & Währborg, 2011; Chirico et al., 2018). Also, research on the effects of nature and its characteristics on marketing measures has, to date, been in it's infancy. Still, the few past findings provided strong support for the assumptions made in the current study and the incentive to close the existing research gaps (e.g., Hartmann et al., 2013; Szolosi et al., 2014; Okken et al., 2013; van Rompay & Jol, 2016)

5.2.1 Brand Awareness

While Hartmann et al. (2013) found a general benefit of nature imagery on product and brand recall and recognition, the current research could only confirm an enhanced memory for rather abstract, in-depth features. Hypotheses H1a and H1b about improved brand recall and recognition through nature can therefore only be partly confirmed. It is noted that Hartmann et al. (2013) used pleasant imagery other than nature in the control group (while the present study selected urban scenery), and measured memory performance based on a greater time lag. These differences might have affected the divergent outcomes and need further attention in upcoming studies (see paragraph 5.3 on research limitations and suggestions for future research). Nevertheless, the current study expands findings around the beneficial role that (spacious) nature may play for brand memory by showing that spaciousness drives claim recall and recognition (with a combination of spaciousness and unpredictability resulting in the highest memory scores).

It seems furthermore interesting that in-depth brand features were recalled and recognized differently than more peripheral features (such as logo, name, or type). In the recall category, participants had to give open answers and reproduce the ad content without cues, which is proposed to be a more effortful task for undefined claims than for concrete features. Therefore, this enhanced cognitive performance could be considered as an extended finding and interrelation of ELM (Petty & Cacioppo, 1986) and ART (Kaplan, 1995). In line with ELM, the present study suggests that nature inherits the potential to trigger central information processing. Also ART's premise that exposure to nature enables the restoration of fatigued attention is strengthened by the current findings of better awareness for in-depth information. Consequently, the softly fascinating mechanism of nature, inherent in all nature visualizations in this study and not present in urban scenery, is proposed as a potential trigger of central information processing.

At this point, the lack of significant interaction effects of unpredictability and spaciousness displays particular relevance since both constructs have been connected to improved cognition in literature (e.g., van Rompay & Jol, 2016). Even though the experimental group exposed to spacious, unpredictable scenery performed indeed best in both recall and recognition of in-depth brand features, the insignificant

interaction of the two independent factors indicates that the relationship between spaciousness and memory of brand claims does not depend on the value of unpredictability (i.e, the entire positive effect of spaciousness is explained without knowledge of amounts of unpredictability). Nevertheless, the insignificant interaction effects do not necessarily suggest that an effect does not exist in the whole population. Consequently, the results of this study do not necessarily contradict theory, but are worth further research with , for instance, larger sample sizes.

5.2.2 Brand Image

Effects of type of imagery, or type of nature, displayed in the ad on favorable brand responses did not reach significance, even though previous research found a benefit of nature over other pleasant imagery for brand attitude formation (Hartmann et al., 2013).

Interestingly, also creativity was not ascribed to the brand in dependence on spaciousness or unpredictability. The finding of van Rompay and Jol (2016) of enhanced creativity measures after spacious, unpredictable nature interaction in an educational context induced the question in how far an advertised brand is perceived as creative after exposure to ad imagery varying on the two constructs. Since the current study cannot confirm the relationship, a transfer to the marketing context is not suggested.

An ecological brand image was enhanced via nature exposure with a benefit of non-spacious nature. Since ecological awareness was integrated as a factor in this study to control for 'green' brand perceptions affected by pleasant nature scenery (Hartmann & Apaolaza-Ibáñez, 2009; Schmuck et al., 2017), this finding contributes to knowledge in the field of 'greenwashing' research. The indication that not only (pleasant) nature but specifically non-spaciousness as a characteristic may convey an ecological brand image, strengthens and expands previous assumptions. The benefit of low over high spaciousness can possibly be explained by perceptions of higher presence of nature in the scenery (compared to open space) and more dense impressions of nature. It is also possible that spaciousness is linked to an inefficient use of nature resources which contradicts ecological awareness. Yet, it is noted that the other assessed dimension of green brand traits, sustainability, was not significantly affected by the type of imagery or type of nature displayed. Possibly, sustainability may in general not be as strongly connected to nature as ecological awareness, but spread over a wider range of concepts (next to the environmental aspect, social or economical sustainability are established terms).

Hypothesis H2a "Nature imagery (as opposed to urban imagery) enhances the consumer's brand image" was rejected with regards to favorable brand responses, where past-findings could not be replicated. Still, perceptions of an ecological aware brand display an exception in this regard.

Brand Associations

The assumption that advertisements and their imagery shape brand perceptions has been well-established in research (Rossiter & Percy, 1980; Martinez & Montaner, 2009; Meenaghan, 1995; Percy & Rossiter, 1992). The results of the present study underline that visual features of nature imagery inherit the potential to be translated into abstract brand associations. Nature in general elicited stronger perceptions of a

relaxed atmosphere surrounding the advertised brand, which again strengthens assumptions made in ART (Kaplan & Kaplan, 1989) of attention-restoring and intriguing qualities of nature. Specifically in relation to soft fascination and its potential to trigger effortless reflection and mind wandering (Basu et al., 2018), this finding supports previous research indications.

The current findings represent an addition to research on spaciousness and unpredictability by demonstrating that spacious nature drives brand associations with freedom and a lack of structure, while unpredictable nature triggers associations with positive curiosity and an unpredictable brand. Particularly, a twofold view on spaciousness (Cuperus, 2018; van Rompay & Jol, 2016) is supported by these findings and H2b "Nature imagery (as opposed to urban imagery) enhances brand associations" supported for selected concepts that functioned as brand associations in this study.

5.3 Practical Implications

Besides the contribution of the current study results to the academic approach to the context, the findings also represent practical implications for advertising and branding, especially with regards to the implementation of nature imagery into marketing material. Since the experiment conducted for this study already involved a practical setting with realistic advertising material and a matching target group, the outcomes display a high practical relevance for the field of higher education marketing.

Nature imagery (in contrast to urban imagery) within an online advertisement enhanced the recall and recognition of brand claims. Especially spacious nature triggered the memory of in-depth brand characteristics with the highest memory scores after interactions with spacious, unpredictable nature. Interestingly, awareness of more peripheral features surrounding the brand (name, type, logo) was not affected by the type of imagery. Consequently, a strategic use of (spacious) nature scenery within visual brand communication is suggested to improve consumers' awareness of brand characteristics.

With regards to concrete attributes one may associate with a brand or product, marketers should incorporate nature imagery not solely based on aesthetic pleasantness or brand relatedness (e.g., in a geographical context), but based on perceptions that are meant to be conveyed. It has to be noted that favorable responses, including brand liking or further interest, were clearly unaffected by nature displays. This underlines that the selection of nature imagery should rather serve the purpose to communicate concept-related associations with the brand. In the example of this study, spacious nature exposure resulted in perceptions of an open-minded brand that values independence and personal freedom, but also in a perceived unstructuredness and the consumer's feeling of being lost. Through unpredictable nature displayed in the ad, the brand was associated with an appreciation for self-discovery, explorative opportunities, challenge and surprise. The brand was also perceived as less boring and less predictable after exposure to unpredictable nature. These potential associations were initially tailored to the experimental context of higher education marketing and might therefore need adjustments in other brand or product frameworks. Nevertheless, the findings emphasize the importance for (new) brands to carefully consider the integration of attribute-rich imagery, especially nature imagery, to shape brand associations.

5.4 Limitations and Future Research

There are several possible limitations of this research that need to be considered when interpreting the results and giving incentives for future studies on this topic.

5.4.1 Influence of Other (Nature) Characteristics

Based on insightful findings in past research, the current study examined not only a general influence of nature (vs urban) interaction on the dependent variables, but focused specifically on spaciousness and unpredictability in nature. With regards to the study results, supporting a potential of both nature features to impact branding outcomes, it seems reasonable to assume that other nature dimensions could as well be influential. Yet, to control for visual factors such as photography style or geographical type of landscape, all photos used in the study were curated from one photographer's portfolio (Podt, 2018). Nevertheless, elements like the perspective, ratios of water and land, colors, light, or seasons varied more or less across manipulations and display potential influence factors that were not included in the current research conceptualization. Therefore, they are of special interest for future studies in the field.

Moreover, nature scenery that varied systematically in spaciousness and unpredictability was compared to random urban imagery which was not assessed based on its characteristics. Obviously, urban imagery varying on specific constructs might affect the regarded outcomes as well (van Rompay & Jol, 2016). In this study, the brand was, for instance, stronger associated with positive curiosity after exposure to urban scenery than to predictable nature. Literature also discusses restorative qualities of urban settings and regards order and coherence in built environments as intuitively preferred forms that are beneficial for human cognitive functioning (Thwaites, Helleur, & Simkins, 2005). Hence, a comparable study set-up with urban imagery and its inherent characteristics would be worthwhile to test the effects of urban settings on branding outcomes.

5.4.2 Experimental Environment

Furthermore, it must be noted that the experiment took place online which led to uncontrolled and divergent experimental environments. Participants might have taken the survey outdoors, and therefore under an increased influence of nature. Environmental factors such as noise, music, or distractions of any kind were also not homogeneous within the sample. Moreover, the devices that were used to complete the questionnaire are anticipated as potentially influential. Since information processing, attention, and awareness were shown to depend on external stimuli (e.g., Lavie, 2010), a follow-up study in a laboratory setting is suggested to validate the findings.

5.4.3 Generalizability

Also, the demographics of the respondents and the higher education focus of the brand are limiting the study. While the young target group with an academic background was useful in this study (focusing on a fictitious study program as a corporate brand), the results are only generalizable to this quite concrete part of the population. The study program as a brand in this study was not only fictitious, but represented a corporate and comparably serious context as well. Projecting the current finding to another type of brand (e.g., lifestyle brands, fashion, or other store products) could reveal insightful follow-up results.

The majority of respondents was moreover from either Germany or the Netherlands (two countries from a similar cultural context) which also restricts the generalization of findings since advertising research has highlighted the need for cultural adaptations of branding strategies (De Mooij & Hofstede, 2010). Therefore, future research is needed to examine whether the findings are transferable. A comparison of the effects of nature and its inherent characteristics between individualistic and collectivistic cultures (De Mooij & Hofstede, 2010) could, for example, reveal interpretative differences of the visual and written ad content.

5.4.4 Influence of Graphic Content and Design Elements

All graphic elements besides the imagery condition were kept constant between manipulations in order to avoid respective differences between test groups. Yet, it is recognized that graphic features such as color, font, logo, image position, or size may in general drive branding outcomes (Bottomley & Doyle, 2006; Childers & Jass, 2002; Huchendorf, 2007; Labrecque & Milne, 2011; Zinkhan et al., 1986).

Therefore, graphic elements of an advertisement represent additional independent factors for follow-up studies on nature in combination with written content in marketing material.

Semantic processing effects of visual ad features are also supported by the matching activation hypothesis (Janiszewski, 1990), stating that the two human brain hemispheres evolved into specialized processing units for specific types of information. The right hemisphere is more active in picture processing and holistic, creative information, while the left hemisphere is tailored towards textual and bottom-up, data-driven information. The location of information in the visual field determines the hemisphere where it is processed (with physically left image placements activating the right brain hemisphere and vice versa), and can therefore be a marketing tool to consciously affect consumer responses. In the stimulus material of this study, written content was placed on the left and the picture on the right side of the ad. This orientation would cause, referring to the theory by Janiszewski (1990), a less effective processing of the image content. Manipulations in text and picture orientation are consequently another option for future research.

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Appendix A

Pre-Study Imagery

This section gives an overview of all 16 pre-tested images and the scale to assess the concepts under discussion in this study. Participants were asked to indicate their agreement with the eight statements depicted below, preceded by the sentence initiation "This scenery...".

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
...fascinates me.	○	○	○	○	○
..is beautiful.	○	○	○	○	○
...is spacious.	○	○	○	○	○
...makes me feel free.	○	○	○	○	○
...is open.	○	○	○	○	○
...is unpredictable.	○	○	○	○	○
...is challenging.	○	○	○	○	○
...makes me curious to explore more of it.	○	○	○	○	○

FIGURE A.1: C1: Low unpredictability x high spaciousness.

FIGURE A.2: C2: Low unpredictability x low spaciousness.

FIGURE A.3: C3: High unpredictability x high spaciousness.

FIGURE A.4: C4: High unpredictability x low spaciousness.

TABLE A.1: Ratings of 16 pre-selected images with mean and standard deviation values, N=15; Likert scale 1- strong disagreement to 5- strong agreement.

Image	Category	Fascination		Aesthetics		Spaciousness		Unpredictability	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	C1	3.23	0.83	4.00	0.58	4.17	0.61	2.51	0.99
2	C1	3.45	0.97	3.83	0.84	3.21	1.05	2.77	1.01
3	C1	3.46	0.97	3.85	0.99	3.75	0.82	3.41	1.07
4	C1	3.62	0.77	4.00	0.41	3.74	0.79	2.67	.93
5	C2	3.69	0.63	4.83	0.51	3.13	0.95	2.64	0.83
6	C2	3.46	0.97	3.54	1.05	2.80	1.06	2.93	1.06
7	C2	3.15	0.80	3.85	0.69	2.85	0.82	2.90	0.93
8	C2	3.15	0.80	3.77	0.44	2.92	0.79	2.75	0.86
9	C3	4.08	0.64	4.08	0.64	4.08	0.63	3.33	0.86
10	C3	3.54	0.88	3.77	0.60	3.61	0.80	3.61	0.88
11	C3	3.23	0.93	3.69	0.48	3.05	0.80	2.85	0.78
12	C3	3.31	0.95	3.77	0.60	3.49	0.67	2.93	0.80
13	C4	3.54	0.97	3.62	1.04	3.05	0.93	2.92	0.97
14	C4	2.77	1.01	2.69	1.11	2.79	0.96	2.86	0.97
15	C4	3.69	0.95	3.85	0.80	2.82	0.92	3.46	0.99
16	C4	3.38	1.04	3.77	0.73	2.72	0.75	3.46	0.71

Appendix B

Pre-Study Fonts

Research indicates that fonts are important design elements in marketing material (Henderson, Giese, & Cote, 2004) and tools to accomplish corporate communication objectives, such as perceptions of brand personality (Childers & Jass, 2002). Also, readability and memorability of ads are influenced by typeface (Henderson, 2005). Due to these findings, a pre-test to determine a font that is perceived as professional and appropriate for the potential use in higher education marketing material was conducted. This second pre-test was filled out by 10 students (5 male, 5 female) of a Dutch university with an age average of 23 years (M= 22.83, SD= 2.10).

Participants were exposed to ten text blocks displaying identical written content (with no relation to the study topic) in different commonly used font types, selected from Microsoft WORD. They were asked to indicate, on a scale from 1 to 10, how professional they perceive each typeface for marketing material in the higher education context (1 being not professional at all and 10 being highly professional). The names of the font types were not displayed to the participants.

Font 4 (typeface name Palatino) was rated as most professional among the choice set (M= 8.00; SD= 0.67) and therefore chosen as a font for the written content in the stimulus material of the main study. See Table B.1 for all results of this pre-study.

TABLE B.1: Perceived professionalism ratings of 10 fonts with mean and standard deviation values; Likert scale from 1- not professional to 10- highly professional.

	N	Mean Professionalism	SD
Font 1	10	4.71	0.95
Font 2	10	6.82	1.32
Font 3	10	6.90	0.88
Font 4	10	8.00	0.66
Font 5	10	7.02	0.94
Font 6	10	4.46	1.35
Font 7	10	5.53	0.97
Font 8	10	5.81	0.92
Font 9	10	4.90	1.52
Font 10	10	3.80	0.79

Appendix C

Scale Items Main Study

C.1 Scale Item Generation Brand Image and Brand Associations

The following three tables show the derivation of scale items to assess the dependent brand image and brand association variables in this study.

TABLE C.1: Scale items favorable brand responses and green brand traits.

Scale Item	Concept
"I like this study program."	**brand equity/ brand liking** (Aaker, 1996; Keller, 1993)
"This study program attracts my interest."	**brand equity/ brand liking** (Aaker, 1996; Keller, 1993)
"This study program is different from its competition."	**brand image** (Aaker, 1996) (Martinez & De Chernatony, 2004)
"This study program promotes creativity."	**spaciousness, unpredictability** (Szolosi, Watson, & Ruddell, 2014) (van Rompay & Jol, 2016)
"This study program is exciting".	**brand personality** (Aaker, 1997)
"This study program represents high standards of education."	**brand equity** (Yoo & Donthu, 2001)
“Teachers of this study program must be competent.”	**brand personality** (Aaker, 1997)
“This study program promotes sustainability.”	**green brand associations** (Matthes, Wonneberger, & Schmuck, 2014) (Hartmann & Apaolaza-Ibáñez, 2009)
“This study program promotes ecological awareness."	**green brand associations** (Matthes, Wonneberger, & Schmuck, 2014) (Hartmann & Apaolaza-Ibáñez, 2009)

TABLE C.2: Scale items spaciousness associations.

Scale Item	Concept
"This study program promotes a relaxed atmosphere."	**stress relief** (Annerstedt & Währborg, 2011) (Fich et al., 2014)
"I would feel lost in this study program."	**feeling of being lost** (Dutton, 2010) (van Rompay & Jol, 2016) (Okken, van Rompay, & Pruyn, 2013)
"This study program highly values independence."	**independence** (Meyers-Levy & Zhu, 2007) (Okken, van Rompay, & Pruyn, 2013) (van Rompay & Jol, 2016)
"This study program leaves space for personal freedom."	**freedom/ personal space** (Meyers-Levy & Zhu, 2007) (Okken, van Rompay, & Pruyn, 2013) (van Rompay & Jol, 2016)
"This study program is unstructured."	**lack of structure** (Cuperus, 2018; Dutton, 2010)
"This study program promotes open-mindedness."	**openness** (Meyers-Levy & Zhu, 2007) (Okken, van Rompay, & Pruyn, 2013) (van Rompay & Jol, 2016)
"I am impressed by this study program."	**awe** (Chirico, Glaveanu, Cipresso, Riva, & Gaggioli, 2018)

TABLE C.3: Scale items unpredictability associations.

Scale Item	Concept
"I would like to explore more of this study program."	**explorative opportunity/ curiosity** (Dutton, 2010) (Kaplan & Kaplan, 1989) (van Rompay & Jol, 2016)
"This study program promotes self-discovery."	**self-discovery** (Kaplan & Kaplan, 1989)
"This study program is challenging."	**challenge** (Szolosi, Watson, & Ruddell, 2014) (van Rompay & Jol, 2016)
"This study program is boring."	**boringness/ reverse item of curiosity**
"This study program is highly predictable."	**(un)predictability of scene content/ mystery** (Szolosi, Watson, & Ruddell, 2014) (van Rompay & Jol, 2016)
"This study program is full of surprises."	**positive unexpectedness/ surprise** (Appleton, 1996) (Kaplan & Kaplan, 1989)

Appendix D

Survey Main Study

The following section includes a complete questionnaire including one example manipulation, as available to participants in the experimental time frame. The online survey was administrated via the software Qualtrics.

UNIVERSITY OF TWENTE.

Welcome!

You are invited to participate in this online study which is part of scholarly research for my master thesis in Marketing Communication at the University of Twente.
The following survey brings the idea of a new study program into focus. I aim to gain insights into people's first impressions about the program that could be introduced to higher education in the future.

First, you will be exposed to two advertising images of the respective study program, followed by some socio-demographic questions and finally, you will be asked to answer questions in reference to the advertisement.
The participation in this study is anonymous and voluntary, and you are free to withdraw from it any time. Nevertheless, I hope you will complete the whole survey.

In total, participating should not take more than 10 minutes of your time. Be assured that the personal data you provide will be confidential and not be included in the report of this research.

Thank you for your participation!

○
○

Do you agree to participate in this survey?

o yes
o no

Instruction

Please look at the following two subsequent images of an advertisement. You are free to proceed to the next page at any time, but please note that you **cannot return** to a previous page within this survey.

EUROPEAN MULTIDISCIPLINARY DEGREE PROGRAM

A full-time, selective three-year program in liberal arts and sciences, taught in English, with a strong offering in the science majors.

An engaging academic and social context, supported by small class sizes, a residential college setting and state-of-the-art facilities.

A centre of academic excellence with an international and intercultural focus, as well as outreach to the (local) community.

A welcoming community encouraging diversity and excellence, by, among other initiatives, offering scholarships through the EMDP Scholarship Fund.

What is your nationality?

What is the highest level of education that you have completed?

- ◯ primary education (elementary school/middle school)
- ◯ secondary education (graduated high school)
- ◯ trade/technical/vocational training
- ◯ undergraduate education (Bachelor's degree)
- ◯ postgraduate education (Master's degree)
- ◯ doctorate degree

Are you currently, or have you been in the past, enrolled at an institution of higher education?

- ◯ Yes
- ◯ No

To which academic field does your study belong?

- ◯ Humanities & Social Sciences
- ◯ Life Sciences
- ◯ Natural Sciences
- ◯ Engineering Sciences
- ◯ not sure
- ◯ other, namely

In how far does the following statement describe you?

	Does not describe me	Describes me slightly well	Describes me moderately well	Describes me very well	Describes me extremely well
Currently, I am actively planning to enroll at an institution of higher education.	◯	◯	◯	◯	◯

How familiar with the following items do you describe yourself?

	Not familiar at all	Slightly familiar	Moderately familiar	Very familiar	Extremely familiar
the European system of higher education	◯	◯	◯	◯	◯
study programs involving multiple academic disciplines	◯	◯	◯	◯	◯

Please indicate to what extent you agree, according to your attitudes, beliefs, and experiences, with the following statements:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I enjoy having a clear and structured mode of life.	◯	◯	◯	◯	◯
I find that a consistent routine enables me to enjoy life more.	◯	◯	◯	◯	◯
I don't like situations that are uncertain.	◯	◯	◯	◯	◯

DV Questions Brand Awareness (Recall)

Coming back to the advertisement that you have seen within this survey, please answer the following questions in reference to it.

Which **type of study program** was advertised?

What is the **name of the study program** presented in the advertisement?

Please name **as many claims or characteristics about the study program** as you remember from the advertisement:

Number 1:

Number 2:

Number 3:

Number 4:

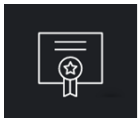
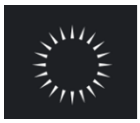
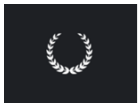
More (please seperate multiple entries by comma):

DV Questions Brand Awareness (Recognition)

Which of the following brand names have you seen in the presented advertisement?

- ◯ EEMG
- ◯ MOPD
- ◯ PMED
- ◯ EMDP
- ◯ EMVE
- ◯ ELFT

Which of the following logos have you seen in the presented advertisement?

- ○ 
- ○ 
- ○ 
- ○ 
- ○ 
- ○ 

Please indicate whether the following claims about the study program were made in the advertisement or not:

The program has an international focus.

- ○ True
- ○ False
- ○ I don't know.

The program has an intercultural focus.

- ○ True
- ○ False
- ○ I don't know.

The program is taught in multiple languages.

- ○ True
- ○ False
- ○ I don't know.

The program encourages diversity.

- ○ True
- ○ False
- ○ I don't know.

The program is situated in a campus environment.

- ◯ True
- ◯ False
- ◯ I don't know.

The program focuses on innovation.

- ◯ True
- ◯ False
- ◯ I don't know.

DV Questions Brand Perceptions

Please indicate to what extent you agree with the following statements about the study program:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I like this study program.	◯	◯	◯	◯	◯
This study program attracts my interest.	◯	◯	◯	◯	◯
This study program is different from its competition.	◯	◯	◯	◯	◯
This study program promotes creativity.	◯	◯	◯	◯	◯
This study program is exciting.	◯	◯	◯	◯	◯
This study program represents high standards of education.	◯	◯	◯	◯	◯
Teachers of this study program must be competent.	◯	◯	◯	◯	◯
This study program promotes sustainability.	◯	◯	◯	◯	◯
This study program promotes ecological awareness.	◯	◯	◯	◯	◯

Please indicate to what extent you agree with the following statements about the study program:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
This study program promotes a relaxed atmosphere.	◯	◯	◯	◯	◯
I would feel lost in this study program.	◯	◯	◯	◯	◯
This study program highly values independence.	◯	◯	◯	◯	◯
This study program leaves space for personal freedom.	◯	◯	◯	◯	◯
This study program is unstructured.	◯	◯	◯	◯	◯
This study program promotes open-mindedness.	◯	◯	◯	◯	◯
I am impressed by this study program.	◯	◯	◯	◯	◯

Please indicate to what extent you agree with the following statements about the study program:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I would like to explore more of this study program.	◯	◯	◯	◯	◯
This study program promotes self-discovery.	◯	◯	◯	◯	◯
This study program is challenging.	◯	◯	◯	◯	◯
This study program is boring.	◯	◯	◯	◯	◯
This study program is highly predictable.	◯	◯	◯	◯	◯
This study program is full of surprises.	◯	◯	◯	◯	◯
This study program provides a secure learning environment.	◯	◯	◯	◯	◯

Appendix E

Potential Covariates

Three potential covariates were controlled in the present study (personal need for structure, personal involvement and context familiarity). None of them had a clear effect on any significant relationship (the main effect sizes of independent on dependent variables stayed stable) and no significant group differences for the examined outcome variables were found based on educational status or background of participants (all p's < 0.05). The proposed covariate factors were therefore of no concern in the results section of this report.

Personal Need for Structure

As outlined before, spacious nature scenery elicits associations with concepts like openness, freedom, and awe, but is also referred to a lack of structure, a lack of goal-orientation, or the feeling of being lost (Dutton, 2010; Cuperus, 2018). The concept of structure is also associated with social–cognitive and behavioral implications (Neuberg & Newsom, 1993). Typically, individuals with a high need for structure perceive grey areas, ambiguity, or uncertainty in their lives as irritating and disruptive (Thompson, Naccarato, Parker, & Moskowitz, 2013). Based on these findings, the present research considered the personal need for structure (PNS) of respondents as a potential covariate of the relationship between spacious nature imagery and brand perceptions. Individual differences in the tendency to structure information were assessed with three (out of originally 12) selected statements of the PNS scale developed by Neuberg and Newsom (1993) and Thompson et al. (2013). Agreement with each item was measured through self-ratings on a 5 point Likert scale, ranging from 1 "I strongly disagree." to 5 "I strongly agree." The reduced scale with three items had a Cronbach's alpha value of $\alpha = 0.74$ which was considered sufficiently high since the items were adapted from an established scale in this research context.

Personal Involvement

In line with ELM (Petty & Cacioppo, 1986), personal relevance and involvement influence the individual processing motivation and ability (i.e., knowledge about the issue under discussion), and finally elaboration intensity (Petty & Cacioppo, 1986). Accordingly, also personal involvement was treated as a potential covariate. Participants who are actively engaged with the topic of university enrollment were assumed to ascribe the respective advertising material a higher relevance and therefore process information via the central route of ELM, while less involved participants may engage in peripheral processing (Petty & Cacioppo, 1986). Personal involvement was measured through a self-rating in reaction to the statement "Currently, I am actively planning to enroll at an institution of higher education." (on a 5-point Likert scale with scale anchors "Does not describe me" and "Describes me extremely well").

Context Familiarity

Information presented in more familiar contexts is better learned and recalled due to a more effective activation of associative frameworks in memory (Anderson & Pearson, 1984; Freebody & Anderson, 1983; Pritchard, 1990; Reynolds, Taylor, Steffensen, Shirey, & Anderson, 1982). Context familiarity with the context of European higher education or multidisciplinary study programs was therefore treated as the third possible covariate in the research design. The extent of participants' familiarity was assessed by two self-rating questions (on a 5-point Likert scale from 1 "not familiar at all" to 5 "extremely familiar"). The two items were inter-correlated but reasonably heterogeneous in measuring the same construct (r= 0.33, α= 0.49).

Moreover, both the binary question "Are you currently, or have you been in the past, enrolled at an institution of higher education?", and a question for the participants' educational background (highest level of education and academic field of study, if applicable), aimed at demographic insights and controlled for respondents' situation within the thematic context at the same time.

Appendix F

Ethical Approval from University of Twente

UNIVERSITY OF TWENTE.

APPROVED BMS EC RESEARCH PROJECT REQUEST

Dear researcher,

This is a notification from the BMS Ethics Committee concerning the web application form for the ethical review of research projects.

Requestnr. :	190014
Title :	Memory and Branding Effects of Nature Imagery in Advertising
Date of application :	2019-01-12
Researcher :	Kiwitt, J.
Supervisor :	Rompay, T.J.L. van
Commission :	Gosselt, J.F.
Usage of SONA :	N