A place-based cognitive approach to understanding wildlife tourism

A MIXED METHODS CASE STUDY OF THE REINDEER OF THE CAIRNGORMS NATIONAL PARK, SCOTLAND, AND THEIR TOURISM

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ABSTRACT

Nature-based tourism has become common around the world. Wildlife tourism is a subset of nature-based tourism that is generally considered the most popular form of animal-based tourism. A cognitive approach to understanding which perceptions people have for wildlife and wildlife tourism may enhance the management of human-animal interactions and of the destinations in which they occur. The elicitation of place meanings can spatially embed that approach in a particular landscape. Spatial embeddedness adds nuance to the constellation of values, beliefs, attitudes, and norms which constitute the relationships formed between humans and animals in tourism experiences. Therefore, this research assumed a place-based cognitive approach to investigate a unique and popular form of wildlife tourism based on a reindeer herd that was introduced in 1952 and now resides in the Cairngorms National Park of the central Scottish Highlands. That approach was operationalized through an exploratory sequential mixed methodology in two phases.

Phase 1 was a qualitative elicitation study of key reindeer stakeholders selected via network sampling. A qualitative analysis technique, known as 'rapid identification of themes from audio recordings', was chosen due to time constraints on fieldwork. The analysis revealed nine coding themes that were then deductively organized into two categories: 1) psychosocial meanings of reindeer, and 2) evaluations of their environmental consequences in the Cairngorms. Together these two constructs formed the *Reindeer Cognitions* scale. The wildlife value orientations (Domination/Mutualism), along with another cognition (*perception of reindeer identity*) and two personal characteristics of stakeholders, place of residence and their personal experiences with the Cairngorms reindeer, also emerged from analysis as relevant to the context and worth further investigation. Findings from Phase 1 were immediately used to design a bespoke survey instrument, a questionnaire customized exactly for the empirical context of this case study, used in the subsequent quantitative study, Phase 2. The questionnaire also tested the standardized Wildlife Value Orientations (WVO), valued for its predictive validity and generalizability across cultural contexts.

Phase 2 data were analyzed by descriptive and inferential statistical testing in IBM SPSS. Overall, most respondents viewed the Cairngorms reindeer as wildlife or semi-domesticated animals. They agreed that reindeer have high social and economic importance and should continue to roam free. They somewhat disagreed that reindeer have negative environmental impacts or that their management should be changed at this time. The two components of *Reindeer Cognitions* (*psychosocial meanings* and *environmental consequences*) exhibited a highly significant relationship with one another and were inversely correlated. The WVO scale proved reliable in a new cultural context, and the value orientations were significantly related to *Reindeer Cognitions*. However, the WVO's only explained only a small amount of their variance, impairing the scale's predictive validity in this case. In contrast, the *perception of reindeer identity* strongly influenced *Reindeer Cognitions* and was itself influenced by personal characteristics in turn. One such characteristic, *reindeer experiences*, had a substantial effect on both *perception of reindeer identity* and *Reindeer Cognitions*.

KEYWORDS: wildlife tourism; reindeer; cognitive hierarchy; place meanings; wildlife value orientations; mixed methods; Cairngorms national park.

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ANOVA	analysis of variance
App.	Appendix
bet.	between
CNP	Cairngorms National Park
CNPA	Cairngorms National Park Authority
CRH	Cairngorms reindeer herd
CRRP	Cairngorms Reindeer Research Programme
Environmental cognitions	*Cognitions about the environmental consequences of reindeer*
EFA	exploratory factor analysis
EFI	effect size index
Reindeer experiences	*experiences with reindeer*
Fig.	Figure
PCA	principal component analysis
Residency	place of residence
RITA	rapid identification of themes from audio recordings
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
Social cognitions	*Psychosocial meanings of reindeer*
SPSS	Statistical Package for the Social Sciences
UHI	University of Highlands and Islands

Chapter 1.   Introduction

This chapter consists of three sections. The first section describes the background and issues leading up to the problem statement of the study. The second section briefly introduces the mixed methods research design and the rationale for it. After that, the scientific objectives, research questions, and hypotheses are described. A third section lays out the structure of the thesis report.

1.1   Background and Problem Statement

This section will describe the background of the study, concluding with a concise problem statement. First, the general background of wildlife tourism is outlined. Then, the unique context of the Cairngorms National Park in Scotland and its resident population of reindeer is described. Following that, the current issues which have precipitated this study are discussed. A final section distills the context and the knowledge problem into a brief problem statement that served as the overall aim of this research.

1.1.1   General Background

Tourism is one of the key drivers of the globalized economy, and it is projected to only trend upwards in the future in terms of importance and impact (World Tourism Organization, 2018). Many types and typologies of tourism exist. Nature-based tourism is one form of tourism that has become common around the world. It is defined by Buckley (1994) as tourism wherein the principal attraction is the natural environment. Further, wildlife tourism is a subset of nature-based tourism that is generally considered the most popular form of animal-based tourism (Markwell, 2015; Newsome, Dowling, & Moore, 2005). For this reason, scientific research into human-wildlife interactions within a tourism context is also on the rise.

The word 'wildlife' is simply and conventionally defined as non-domesticated flora and fauna (Usher, 1986). In contrast, definitions abound for 'wildlife tourism research', perhaps because the field is relatively young. Some authors reduce wildlife tourism to the physical act of viewing of wild animals in the wild (Newsome et al., 2005). Other authors broaden the definition to include all tourism activities related to non-domesticated animals in both wild (*in situ*) and captive (*ex situ*) destinations (Skibins, 2015). Finally, others construct a complete definition: "Wildlife tourism is tourism in which tourists deliberately seek out relatively close encounters with wildlife in settings that range from completely wild and free through semi-wild to completely contrived or manufactured or constructed settings" (Markwell, 2015, p. 11). This last definition best

accommodates the ways in which reindeer tourism[1] is currently organized and experienced in the Cairngorms National Park (CNP), respectively the focus and empirical context of this case study.

In general, a distinction is made between consumptive and non-consumptive forms of wildlife (Higginbottom, Tribe, & Booth, 2009; Newsome et al., 2005). Consumptive wildlife tourism typically denotes those tourism activities which entail the deliberate killing of animals by tourists for sport or actual gustatory consumption, such as hunting and fishing (Burns, 2015). Whereas, non-consumptive wildlife tourism takes in a wider range of activities from those based on purely visual participation, such as wildlife watching and photography, to tactile interactions with animals, such as feeding and petting (Markwell, 2015). This report will deal only with a non-consumptive form of wildlife tourism, reindeer tourism.

Perhaps due to its highly-visible popularity (e.g., classic Serengeti safari), many authors tout the diverse benefits of wildlife tourism. These benefits range widely from generating support for wildlife conservation and natural area tourism development (Newsom, et al., 2005) to encouragement of direct financial giving to conservation projects (Higginbottom et al., 2004), to its documented contribution to psychological well-being (Burns, 2015), to providing empowering educational opportunities (Lemelin, 2015), and even more. In contrast, other authors point out the darker sides of wildlife tourism, such as inhumane treatment of animals (E. Cohen, 2015) and negative impacts to pristine wildlife habitats through poorly-regulated, mass tourism (Skibins, 2015). Because of these consequences, both good and bad, wildlife tourism is an important type of tourism in need of more investigation into its human dimensions.

A better understanding of the content and outcome of the experiences that wildlife tourism offers enable more appropriate management of those human-animal interactions(Markwell, 2015; Newsome et al., 2005). To gain that understanding, we must delve deeper into the ways in which people relate to animals. One way to investigate the complex constellation of meanings, values, attitudes, and beliefs which make up those relationships is through a cognitive approach to research (Vaske, 2008). The cognitive approach to social science theorizes that cognitive constructs, or collections of mental processes, are linked in a causal chain (Ajzen, 1991) or hierarchy (Vaske, 2008) that give rise eventually to observable behavior. For example, general values and beliefs about broad topics (e.g., wild animals, nature) influence attitudes and norms about specific topics (e.g., reindeer tourism), which, in turn, influence behavioral intentions and finally manifest in observable behavior itself.

By studying one or more cognitive links in the chain, we can begin to understand the underlying motives for human behavior and even anticipate it. This is the fundamental reason why a cognitive approach is especially useful to an applied management issue, such as the context of this case study. This research took a cognitive approach when investigating a unique form of wildlife tourism based on a reindeer herd found in a national park of the central Scottish Highlands, the Cairngorms.

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[1] 'Reindeer tourism' is herein defined as the voluntary act of either local inhabitants or visitors to the CNP engaging in any activity that has the express purpose of seeing or encountering the Cairngorms reindeer herd, whether money is intentionally exchanged or not.

1.1.2 Empirical Context of the Case Study

Cairngorms National Park

Established in 2003, the Cairngorms National Park is the largest national park of the United Kingdom. It contains many of that nation's highest peaks and plateaus and the most extensive stands of native Caledonian pine forest (Cairngorms National Park Authority, 2017a). The Cairngorms contain a wide range of ecosystems and, accordingly, a rich diversity of flora and fauna, many of which are rare or endangered.

The park is a rich cultural landscape as well. These days approximately 11,000 permanent residents live within its boundaries. The CNP also hosts 1.8 million tourists every year who are reported to "come largely for the exceptional quality of outdoor pursuits" (Cairngorms National Park Authority, 2017a, p.7). Outdoor pursuits, including kayaking, hillwalking, mountain biking, fly fishing and more, constitute a local economy based upon nature-based tourism and recreation (Fredman & Tyrväinen, 2010). For the many communities and their inhabitants which lie within park boundaries, tourism accounts for 43% of all jobs and 30% of the total economy (Cairngorms National Park Authority, 2017b). Therefore, the natural assets of the Cairngorms are inextricably tied to the livelihoods of its residents.

In a comprehensive 2015 survey, the Cairngorms National Park Authority (CNPA) reported that the most important motivations that visitors cited for visiting the Cairngorms were: 1) 'Beautiful scenery/countryside' (35%), 2) 'Enjoyed a previous visit' (18%), 3) 'Walking/hill walking' (18%), and 'Peace and quiet/relaxation' (17%). While it is not one of the most common activities, 5% of visitors reported that wildlife viewing was a motivation that drew them to the national park. Ultimately, 12% of total visitors reported viewing wildlife as an activity that they engaged in during their visit (Cairngorms National Park Authority, 2015). Strikingly, the Cairngorms has a very large base of return visitors that make frequent visits (over two-thirds of total visitors annually) and maintain lifelong relationships with the park landscape (Cairngorms National Park Authority, 2015). Therefore, people are likely to hold deep meanings for the landscape and its features.

The Cairngorms has been inhabited for centuries. In the past, the land was used predominantly for agriculture, forestry and pastoral activities (Fischer & Marshall, 2010; Hobbs, 2009). In recent decades, a shift has occurred away from these traditional uses. Now, there is a movement towards valuing and managing the landscape for conservation (Thomas, Paterson, Metzger, & Sing, 2015), as well as tourism and outdoor recreation (Fischer & Marshall, 2010; Hobbs, 2009). As tourism has replaced traditional livelihoods in the Highlands, the Cairngorms seem to be increasingly valued for their biodiversity and potential for enacting habitat restoration on a grand scale (Fischer & Marshall, 2010; Hobbs, 2009; Thomas et al., 2015). This dramatic shift in landscape values and management schemes has brought one prominent visitor attraction of the national park under new scrutiny: the Cairngorms reindeer herd.

Cairngorms Reindeer Herd

A herd of approximately 150 reindeer (*Rangifer tarandus*) inhabits the Cairngorms, spending most of the year in and around the Glenmore Forest Park. The modern Cairngorms reindeer herd (CRH) consists of the descendants of a few individuals introduced from Sweden in 1952 by Sami reindeer-herder Mikel Utsi. The reindeer were originally imported with the aim of becoming an alternative

source of meat in the impoverished, post-WWII Highlands region (A. Moore & Smith, 1993). While the Scottish never took to eating them as planned, the reindeer have nevertheless thrived on the sub-arctic Cairngorm Plateau despite not existing as a naturally-occurring, native animal of Scotland in over 8000 years by most estimates (Clutton-Brock & MacGregor, 1988). Today, the charismatic animals are estimated to draw approximately 30,000 visitors to Glenmore each year (personal communication, anonymous, 25 September 2018). At present, the Reindeer Company Ltd is a private enterprise owned by the family of Allan and Tilly Smith who own and manage the reindeer herd and Centre, operate all related tourism activities and lease land for their grazing and calving from landowners (personal communication, anonymous, 25 September 2018).

The reindeer are a well-established tourism draw in the Cairngorms offering a special visitor experience. In addition to offering simple observation visits to their reindeer paddock and educational center in Glenmore, the Reindeer Company provides its signature tourism product, the 'Hill Trip'. On this guided, ~2-3-hour tour, reindeer herders provide educational anecdotes and lead groups of visitors to a very large fenced enclosure (i.e., the 'Hill Enclosure', cf. Fig. 6, §3.3.1) on the mountainside above the Glenmore forest. Once inside, tourists can approach the herd on foot, learn about their natural history, take photos with individuals of the herd and even encouraged to feed or stroke the animals by hand (Visit – The Cairngorm Reindeer Herd, 2018). Perhaps due to this utterly unique experience, the Reindeer Centre in Glenmore was specifically listed by 7% of total visitors as a top attraction in 2015 (Cairngorms National Park Authority, 2015). What's more, the reindeer are featured prominently in tourism marketing materials for the region, as well as on the official website of Cairngorms National Park Authority (2017). In short, the reindeer herd and the wildlife tourism based on it are meaningful and high-profile parts of the Cairngorms landscape and its economy.

The Reindeer Company advertises the reindeer to be "the only freely roaming reindeer herd" in the UK and promote this aspect as part of their special appeal to visitors (Visit – The Cairngorm Reindeer Herd, 2018). Although some portion of the herd is always kept inside the Hill Enclosure and the Centre's paddock, the majority of the herd ranges without restrictions in the surrounding valleys, forests, hills, and mountains throughout most of the year (History – The Cairngorm Reindeer Herd, 2018). The Reindeer Company maintains that this free-roaming is necessary for the health and well-being of reindeer, who forage on lichen and vegetation on the high plateau to gather essential micro-nutrients otherwise lacking in their diet (personal communication, anonymous, 25 September 2018). However, it is this very ability of the reindeer to free range and graze where they please that has caused some stakeholders to scrutinize the management regime of the reindeer and their place in the Cairngorm's social and ecological landscapes.

1.1.3   Current conservation issues of the Cairngorms

In recent years, the CNPA and collaborative conservation organizations, such as Cairngorms Connect and Cairngorms Nature, have articulated a cohesive vision for the future of the Cairngorms landscape. A major component of that vision is the restoration of the rare Caledonian pine forest and upper montane scrub communities that exist nowhere else in the UK (CNPA, 2017a). Habitat restoration is the means by which the CNPA, along with partners agencies and private landowners, hope to achieve their long-terms conservation goals for the entire Cairngorms landscape.

One primary method of encouraging reforestation and revegetation in Scotland is the lethal control of resident deer populations (Clements, 2016; Hobbs, 2009) which include native red and roe deer and non-native fallow and sika deer (Ward, 2005). Deer are targeted because they graze heavily on the foliage of young trees and shrubs, trample or consume young seedlings, and damage saplings plus mature trees and shrubs through antler rubbing (Clements, 2016). Since apex level predators are wholly absent in the Highlands now, deer reduction is accomplished primarily through culling, or removal of individual deer via targeted hunting. Years of aggressively culling deer across Scotland have effectively reduced the population numbers of deer in the central Highlands (Clements, 2016; Hobbs, 2009). Restoration of rare forest and montane scrub habitats finally seems possible to some stakeholders.

In stark contrast to their wild cousins, the reindeer of the Cairngorms are allowed to roam and graze freely without the threat of either culling or sport hunting. The Reindeer Centre closely controls the breeding of the reindeer through contraception, tries to avoid hefting (when a cow gives birth in the wild), and limits their number to roughly 150 individuals (personal communication, anonymous, 25 September 2018). However, the free-roaming behavior has led some local landowners and stakeholders to speculate on the environmental consequences of the CRH. The issue has gained enough attention that it eventually led to the establishment of the Cairngorms Reindeer Research Programme (CRRP). This study and a parallel ecological study through Inverness College - University of Highlands and Islands (UHI) were commissioned and funded by the CRRP.

Although the ecological study has yet to fully document the dietary habits of the Cairngorms reindeer, some stakeholders believe the reindeer are having negative environmental impacts. These stakeholders have reported observed and filmed the reindeer browsing on woody plants, such as the young leaves of birch or willow trees, and thrashing rowan trees (personal communications, anonymous, 1 October 2018), important tree species in the reforestation effort. In contrast, other individuals believe that the reindeer have but a slight impact on the landscape due to their small population size, preferred diet of lichens, and soft splayed hooves(personal communication, anonymous, 5 October 2018). The distance between these two perspectives has the potential to result in tension or even conflict at a local level.

1.1.4   Background summary and problem statement

In summary, nature-based tourism is a vital sector of the economy for Cairngorms National Park communities, such as Aviemore and Glenmore. Visitors to the CNP enjoy viewing wild animals and the scenic beauty of the landscape, amongst other activities. Furthermore, one form of wildlife tourism unique to the Cairngorms is reindeer tourism. However, even sixty years after their introduction, much is still unknown about the basic meanings and cognitions which people hold for the reindeer. Despite their relatively high profile in the UK, no previous scientific research has been conducted on the sociocultural significance of the Cairngorms reindeer and associated tourism.

A variety of regional stakeholders, such as large private landowners, conservation charities and government agencies, seek to preserve and enhance the biological diversity and sensitive habitats of the Cairngorms. At the same time, they want to support the livelihoods of residents and nature-based tour operators, such as the Reindeer Company Ltd. In order to so, managers must know how different stakeholders, both resident and visitor, think specifically about the reindeer of the CNP.

Knowledge of the cognitions and meanings for reindeer is needed to foster effective collaboration between stakeholders situated in a complex mosaic of overlapping landscape values and uses, ownership, policies, and management regimes.

Taking into account the background of the case, current issues, and lack of prior scientific knowledge, the author undertook this research with the goal of addressing the following knowledge problem: ***How do different stakeholders think about the reindeer in the local context of the Cairngorms National Park?***

1.2   Introduction of research design, objectives, questions and hypotheses

This section details the decisions flowing from the problem statement. First, the mixed methods approach chosen to fulfill the knowledge problem is introduced. It must be introduced now because of the consequences the research design has for the overall structure of this report that will be seen by the reader immediately afterward. Arguments will be made supporting this choice. The individual methods chosen for each study will be detailed in their respective chapters. Second, the objectives of this research, both scientific and practical, are presented. Finally, qualitative research questions and quantitative hypotheses will be presented briefly to let the reader know what to expect from this thesis overall.

1.2.1   Introduction of a mixed-method design

The problem statement above, which accounts for the current lack of knowledge regarding the Cairngorms reindeer, led the author to select mixed methods as the most appropriate approach to address this knowledge problem in an exploratory manner. This choice was driven by the substance of this case study, as well as a doctrinal commitment to Pragmatism, discussed below.

Substantive argument for multiple methods and their sequence

The author chose an overall research design known as exploratory sequential mixed methods (Creswell, 2014) to draw on the strengths of both methodological traditions within social science research. Two distinct phases of research were conducted in temporal sequence (i.e., one after the other), rather than parallel (i.e., at the same time). Field research began with an elicitation study: an inductive exploration of the views of stakeholders related to reindeer and reindeer tourism using qualitative methods (also referred to herein as 'Phase 1'). Given the lack of scientific knowledge about reindeer in the Cairngorms, it did not make sense to the author to begin with quantitative research guided by a pre-selected theoretical framework. By coming first, the qualitative study holistically elicited the complexity of the Cairngorms reindeer and current issues in the minds of real, local people and suggested certain approaches for Phase 2. Without this added depth, a quantitative study based only on the general wildlife tourism literature would likely have missed the nuanced meanings that emerged. In this way, the research design allowed the author to enter into a relatively unknown context and purposefully move from a general understanding to increasingly specific knowledge (Tashakkori & Teddlie, 2002).

In an unknown context such as that of the Cairngorms reindeer, the choice to operationalize any given construct in the research design would have been driven by an *a priori* paradigmatic affiliation of the researcher. Instead, the substance of the preliminary qualitative findings informed the conceptualization of the follow-up quantitative study, established the requirements for that phase, and directly translated into the design of custom survey items to measure those concepts suggested as important. The second phase of data collection (questionnaire) was designed drawing on the most salient themes to emerge from the first phase, instead of applying predetermined measures or ideas (Tashakkori & Teddlie, 2002). To enable the exploratory sequential methodology, the interview data from Phase 1 was rapidly analyzed in the field. That process is explained in §2.3.2.

Finally, the qualitative findings, while surely meaningful in of themselves, had an insufficient sample size to rigorously generalize results to all reindeer stakeholders (i.e., the population of local residents and visitors of the Cairngorms at the time of the study). In order to statistically assess the relationships suggested by the elicitation study, a quantitative survey instrument was needed to achieve a sufficiently large sample size and produce generalizable results. Through the sequencing of methods, the author was able to sketch the range of existing cognitions towards the reindeer and then go on to explore the relationship of these cognitions with other perceptions of reindeer tourism and the wider landscape. This approach of complementary methods gave a more complete picture of the research problem then either quantitative or qualitative methods alone (Creswell, 2014).

Paradigmatic argument for mixed methods

Pragmatism is the broadest scientific paradigm steering the methodological choices in this thesis report. Pragmatism in the social sciences is defined by Tashakkori and Teddlie (2002) as "a deconstructive paradigm that debunks concepts such as 'truth' and 'reality' and focuses instead on 'what works' as the truth regarding the research questions under investigation, [while also acknowledging] that the values of the author play a large role in the interpretation of results" (p. 713). The author sought to avoid engaging in the 'paradigm wars' (Tashakkori & Teddlie, 2002) that in his view stifle the transdisciplinary cooperation necessary to understand the complex issues of tourism today.

Furthermore, a practical research objective was to deliver findings to the Cairngorms Reindeer Research Programme. A desire to enhance the impact and legitimacy of social science findings was a core concern for this novice researcher when entering into the CRRP, which is composed primarily of land managers, natural resource policy decision-makers, and other conservation professionals trained in the assumptions and language of the natural sciences. Some authors argue that the ontological inclusivity which comes from mixing methods can increase the impact of findings for skeptics of qualitative data (Onghena, Maes, & Heyvaert, 2019) and enhance the legitimacy of research findings for its intended audience by combining descriptive precision with numerical precision (Kitchenham, 2010). The author felt that, by delivering final results in the quantitative language of statistics also used by the natural sciences, these social science findings would be more accessible and useful than qualitative results alone.

Finally, this methodology was chosen in order to honor and incorporate diverse forms of expertise and knowledge production (N. Denzin & Lincoln, 2011). Creswell (2014) notes that the Pragmatic investigator acknowledges the postmodern, or critical, turn in the social sciences and remain

attuned to social justice, political aims, and pluralism of knowledge creation. This was an important epistemological consideration given the decades of experiential knowledge generously shared by reindeer herders and other local residents of the Cairngorms. Their place-based knowledge of the reindeer and the Cairngorms, while not scientifically validated *per se*, was nonetheless very valuable in understanding the empirical context of the case study. In conclusion, the combination of contextual substance and paradigmatic commitments led the author to adopt a mixed-method design which could most completely achieve the research objectives, presented in the next section.

1.2.2   Scientific Objectives

The broadest objective of this research is also that of all scientific inquiry: to produce valid and relevant knowledge claims that contribute to improved understanding of the conceptual models which were operationalized through data collection and analysis. Specific research objectives were multiple. The first two objectives guided the qualitative elicitation study.

1) Explore what place meanings the stakeholders in the reindeer issue associate with the Cairngorms landscape and with the reindeer herd itself.

2) Determine which cognitive constructs these stakeholders hold in relation to the reindeer issue, which includes their natural and cultural history, their management, and the tourism based on the reindeer.

The following objectives were predicated upon the first two and guided the follow-up quantitative study.

3) Verify the existence of these diverse cognitions about reindeer within the general public and understand their relative strength in the minds of that population.

4) Assess the relationships within and between these cognitive constructs regarding reindeer and a variety of other possible variables influencing those cognitions, as suggested by the elicitation study.

5) Deepen theoretical knowledge of the Wildlife Values Orientations scale by applying it in a novel cultural context. Taken together, these five objectives steered the author's decision-making process for the conceptual and operational choices presented in this report.

The next two subsections introduce the questions and hypotheses crafted to implement the research objectives. They are succinctly stated in order to inform the reader's expectations for the report as a whole. The next two chapters (one for each phase of the study) will provide the full background and rationale for each specific research question or hypothesis.

1.2.3   Phase 1 Research Questions

As a qualitative study, Phase 1 sought to answer two research questions:

- What place meanings do stakeholders assign to the Cairngorms landscape and its resident reindeer herd?

- Which cognitions (values, beliefs, attitudes, and norms) do stakeholders of the Cairngorms National Park hold in regard to the reindeer, their management by the Reindeer Company Ltd, and the tourism associated with the Cairngorms reindeer?

1.2.4   Phase 2 Hypotheses

The following hypotheses (H) were tested in Phase 2, the quantitative study:

H1 – Wildlife value orientations are related to *Reindeer Cognitions*
    H1a – The two wildlife value orientations (Domination, Mutualism) are related to *Reindeer Cognitions*
    H1b – The four basic wildlife beliefs (Social Affiliation, Care, Appropriate Use, Hunting) are related to *Reindeer Cognitions*
    H1c – Wildlife value orientation clusters are related to *Reindeer Cognitions*

H2 – Personal characteristics are related to *Reindeer Cognitions*
    H2a – Place of residence is related to *Reindeer Cognitions*
    H2b – *Experiences with reindeer* are related to *Reindeer Cognitions*

H3 – *Perception of reindeer identity* is related to *Reindeer Cognitions*

H4 – Place of residence is related to wildlife value orientations

H5 – Place of residence is related to *experiences with reindeer*

H6 – Personal characteristics are related to *perception of reindeer identity*
    H6a – Place of residence is related to *perception of reindeer identity*
    H6b – *Experiences with reindeer* are related to *perception of reindeer identity*

H7 – Membership in wildlife value orientation clusters is related to *perception of reindeer identity*

1.3   Structure of the report

In this research, the author implemented a sequential, mixed-methods approach to research design, data collection, and analysis. Therefore, the structure of this report will be sequential as well, mirroring how research actually proceeded. In other words, the qualitative study and the quantitative study will be presented in separate chapters. Each stand-alone chapter is functionally a self-contained report with some cross-references and transitions between the two. Each chapter has equivalent sections consisting of:

1) a literature review of the theoretical frameworks which guided the study and the conceptual models used to operationalize these theories

2) methodology, including research design, data collection, and analysis

3) results of data analysis

4) a brief discussion of the findings and limitations of each study

Chapter 2 explicates Phase 1 of the research project, a qualitative elicitation study. Chapter 3 explicates Phase 2 of research, the quantitative survey. Chapter 4 presents a synthesis of the two phases of research, bringing the overall findings together in a comparative discussion related to previous research. The chapter concludes with some remarks about the relevance of results, the strengths versus challenges of the mixed-methods research design, and the possibilities for future research.

Chapter 2.   Qualitative Study

2.1   Introduction

In this chapter, the first phase of the overall research, the qualitative elicitation study, is fully described over five sections. First, the literature pertinent to the study of nature-based tourism, human-wildlife relationships, and other human dimensions of natural area management is reviewed in order to construct a theoretical framework for Phase 1. The first section concludes with the presentation of a conceptual model. Second, the methods used to collect and analyze the qualitative data are presented. Third, the thematic results of qualitative data analysis are shown. Fourth, those findings are discussed along with some limitations of the qualitative study. Finally, Chapter 2 concludes with a section that bridges the initial qualitative and subsequent quantitative study, described in Chapter 3.

2.2   Theoretical Framework

The first phase of research was situated within two theoretical frameworks. First, the author chose a cognitive approach to investigating the meaning of reindeer, as conceptualized by the Theory of Reasoned Action and the cognitive hierarchy. Second, the author chose a landscape approach, and the contained concept of sense of place, to elicit place meanings attached to the Cairngorms and its reindeer.

2.2.1   A cognitive approach to understanding reindeer

Many theoretical frameworks are used for the study of nature-based tourism. Some of the most common concepts guiding tourism research include motivation, satisfaction and cognitive approaches (Vaske, 2008). Other frameworks employed to investigate tourism include destination image (Tasci, Gartner, & Tamer Cavusgil, 2007), affective approaches (Kim & Fesenmaier, 2015), and decision-making (Smallman & Moore, 2010), just to name a few. The author chose a cognitive approach to studying the Cairngorms reindeer because it proposes a model for how thoughts influence behavior, a useful tool for reindeer managers and stakeholders that might wish to estimate how the public might respond to proposed management interventions in the future.

The Theory of Planned Behavior

Ajzen's (1991) seminal work on the Theory of Planned Behavior was an essential starting point for investigating perceptions of the Cairngorms reindeer. The central argument of this theory is that, within the human mind, attitudes inform our intentions to act. Subsequently, those intentions catalyze human behavior through reasoned action (Ajzen, 1991). It is, therefore, possible to study attitudes and other cognitions to better understand what motivates behavior. Ajzen's basic insight

needed more explanation to make the theory truly operational for researchers. The Theory of Planned Behavior has been further conceptualized in many ways by researchers over the years. One conceptualization that has been well-supported by evidence is the cognitive hierarchy, which is discussed next.

The Cognitive Hierarchy

When delving into the literature on cognitive approaches to tourism, a bewildering array of concepts are encountered, such as perceptions, meanings, attitudes, beliefs, values, memories and more. These psychosocial constructs are unified in their broad categorization as thought processes, or cognitions, in contrast to emotions. According to Jacobs, Vaske, and Sijtsma (2014), cognitions are "the collection of mental processes used in perceiving, remembering, thinking, and understanding" (p. 1). While the Theory of Planned Behavior hypothesized the basic mechanism of how cognitions translate into behavior (Ajzen, 1991), the cognitive hierarchy model posits a more orderly typology of mental constructs and arranges them into a tiered model following a theoretically logical sequence (Cf. Fig. 1). Each mental process in the inverted pyramid will now be explained, starting from its base.
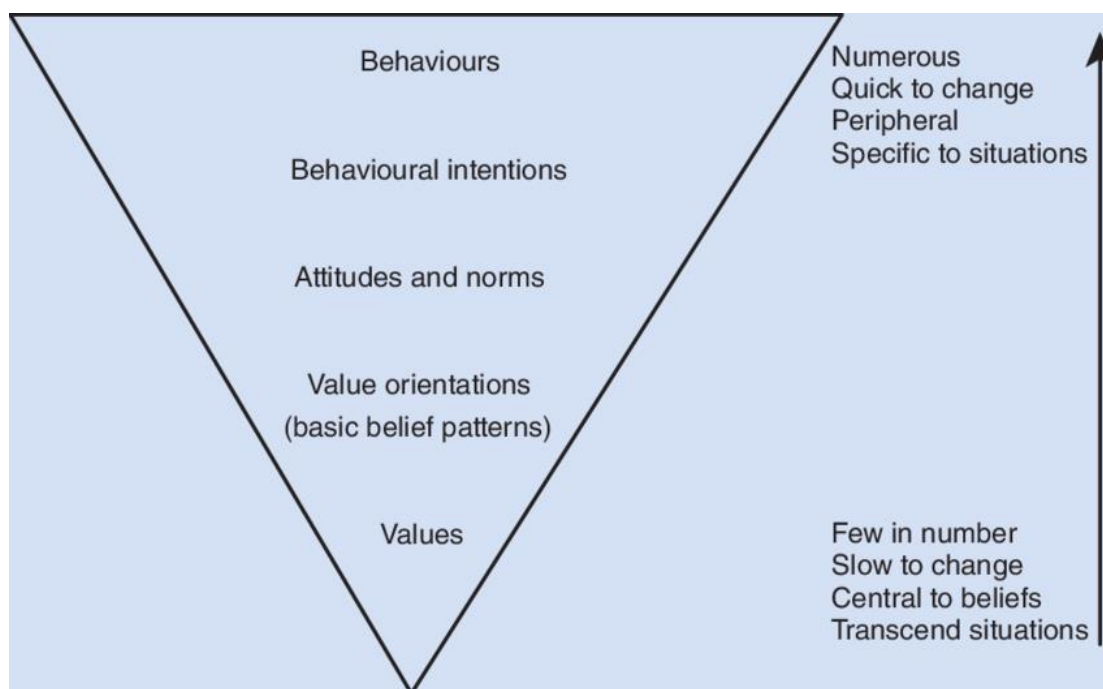
Figure 1. The cognitive hierarchy framework (adapted from Vaske & Donnelly, 1999)

Values

An important early definition of human values was established by Rokeach (1973), who typified a value as "an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence" (p.5). First, values as "appropriate modes of conduct" (Vaske, 2008) in society are referred to as 'instrumental values' and include *honest, brave, polite, helpful*, *responsible* and so on (Rokeach, 1973). Second, values as 'desirable end states of existence' (Vaske, 2008) are referred to as

'terminal values' and include *pleasure, equality, freedom, self-respect, wisdom* and so on (Rokeach, 1973). Because they lack specificity, values tend to be shared by a majority of the members of a given culture, or subculture and are relatively fixed or at least slow to change (Jacobs et al., 2014; Vaske, 2008; Vaske & Donnelly, 1999).

Early research into values went in several directions before later becoming somewhat codified. One direction was provided by the work of Kellert, which became particularly embraced in natural resource and wildlife management and is still used by environmental managers today (Vaske, 2008). The appeal of Kellert's work can be attributed to the orderly and fairly comprehensive typology of ten basic values which it offered to managers unfamiliar with social science but eager to incorporate its insights into their work. Some of Kellert's values, such as Utilitarian, enjoy widespread usage even now (Manfredo, 2008). Other values include Naturalistic, Aesthetic, Humanistic, Dominionistic and so on (Grumbine & Kellert, 1997). A vital difference from Rokeach's socially constructed values was that Kellert asserted that values are "biologically based, inherent human tendencies that are greatly influenced and moderated by culture, learning, and experience" (Grumbine & Kellert, 1997, p. 1444). While a lot of worthwhile research was sparked by Kellert's work, many social scientists have moved on from that starting point due to its methodological and conceptual weaknesses in claiming an evolutionary basis for values (Manfredo, 2008).

Schwartz, a social psychologist like Rokeach (Vaske, 2008), shifted the focus back to human culture through his theory of 'fundamental life values' (Manfredo, 2008). He typified values as relatively stable cultural ideals, or "shared conceptions of what is good and desirable in the culture" (Schwarz, 2006, p. 139) that simultaneously shape and justify the beliefs, actions, and goals of individuals and groups. However, values do not directly guide specific thoughts or actions (Jacobs et al., 2014) and therefore, form the foundation of the cognitive hierarchy, at the farthest point away from observable behavior. Schwartz's concepts, like Kellert's, remain popular even now in wildlife and other natural resource management fields (Manfredo, 2008).

For this author, idealized taxonomies of values are inherently interesting, but they do not illuminate why values have become so commonly studies. Manfredo (2008) clearly spells out the critical role that values play in the human mind. First, values are representative of a person's unique goals and standards in life, which he uses to determine good/bad and right/wrong. Second, values prescribe the way in which a person interprets new information and occurrences in life. Third, values are stable across most events and situations that a person experiences (Manfredo, 2008). These three characteristics of values have made them quite useful to study in the domains of conservation and tourism where praxis is especially emphasized.

To summarize, values are useful for understanding modern conservation issues because they are basic thought patterns typically shared by all members of a social group, and they guide behavior over a range of issues and contexts (Manfredo, Teel, & Dietsch, 2016). However, because values are somewhat 'universal' (i.e., held by many members of a culture), they lack the specificity required to explain variability in other cognitions, intentions, and behavior (Vaske, 2008).

Basic Beliefs and Value Orientations

Traveling upwards from values in the cognitive hierarchy, we arrive at basic beliefs. In contrast to values, basic beliefs shed add layers of meaning to how a person thinks about specific issues and objects by (Vaske, 2008). For example, the value of *freedom* held by an individual could be causally

linked to a basic belief, such as 'all people deserve to be free'. Jacobs et al. (2014) maintain that basic beliefs reflect thoughts about general classes of issues and objects in a given domain. In the example above, the general object is 'humans' and the issue is 'human freedom' within the broad domain of 'human rights'. Perhaps because beliefs are somewhat vague, much recent research in the field of human-wildlife interactions instead seems to focus on the related cognitive construct of 'value orientations.'

In the model of the cognitive hierarchy, basic beliefs share their place in the causal chain with value orientations. An early theory of value orientations posited simply that they contain both values and beliefs (Kluckhohn, 1951). Adding nuance to this, Vaske and Donnelly (1999) assert that value orientations are patterns of "basic beliefs relative to a particular topic" (p. 534). Vaske (2008) clarifies this further by adding that value orientations are patterns of beliefs, organized by direction and intensity. So a pattern of basic beliefs that 'all people deserve to be free' might form a 'human rights' value orientation. An example of a value orientation that is operationalized in this research is the 'wildlife value orientation' (Vaske & Donnelly, 2007). This will be explained in full detail in §3.2.2. For now, it is enough to know that this project's application of the cognitive hierarchy is predicated upon the long-term application of that theory to understanding how the range of cognitions about wildlife and wildlife management intentions and influence behavior (Jacobs et al., 2014).

Attitudes and Norms

Another step up the cognitive hierarchy, attitudes, and norms are also found together. These two cognitions are closely related because they are both evaluative in nature (Vaske, 2008). At this stage in the hierarchy, cognitions become more closely linked to actual intentions which give way to actual behavior (Ajzen, 1991; Jacobs et al., 2014), and evaluating real-world events, issues, and objects is a crucial step in that causal chain. Teel, Manfredo, and Stinchfield (2007) found that value orientations are predicted to influence an individual's attitudes and norms. An attitude is defined as the favorable or unfavorable evaluation of an entity, such as a person, object, or action (Vaske, 2008). Another way to think of attitudes is that they can be expressed as pleasant vs unpleasant, or pro vs con, opinions (Jacobs et al., 2014). To extend the example from above, a favorable human rights attitude could be, "It is good all people deserve to be free", or simply "Imprisoning people is bad."

In contrast to attitudes, norms are evaluative but also prescriptive ideas about how people should behave in society. Two distinct categories of norms are theorized to exist. Descriptive norms refer to 'what most people are doing' and injunctive norms refer to what people 'should or ought to do' in a given situation (Cialdini, Kallgren, & Reno, 1991). In addition, norms can exist as either social norms that are culturally-situated) or personal norms that are individually dictated (Vaske, 2008). Finally, norms can be differentiated from attitudes because of their extra dimensions of personal obligation and social sanction that go beyond simple good/bad evaluations of a given behavior (Vaske, 2008). To complete my example, a norm linked to the value of freedom could be, "Most people believe in the inherent existence of human rights", or "I should not restrict another individual's personal freedom."

Strengths of the Cognitive Approach

Overall, this model was chosen because it attempts to holistically explain how societal forces shape cultural values and their orientations (Teel et al., 2010). By organizing cognitions, intentions and

behaviors in a logical, hierarchical relation to one another, the cognitive hierarchy model allowed the author to organize his thinking about how the various concepts are interrelated and then purposefully choose which 'level' of the hierarchy was the most useful to study for the knowledge problem. Since it was not possible to thoroughly study the behavior of reindeer stakeholders in the time given for this study, the author elected to focus on the middle-to-lower portions of the hierarchy, which include attitudes, norms, basic beliefs, and values. A special focus on wildlife value orientations was later integrated for the quantitative study; this is detailed in §3.2.2. Finally, as Fig. 1 illustrated, the fundamental cognitive constructs (values and value orientations) are more fixed and less numerous than behavior and intentions (Vaske, 2008; Vaske and Donnelly, 1999), making them easier to study in a short-term case study such as this. For all of these reasons, the cognitive approach was chosen to study the reindeer and reindeer tourism over other approaches common in nature-based tourism research, such as motivation, satisfaction or affect.

2.2.2   The Sociocultural Landscape

A place-based approach to understanding the Cairngorms landscape was selected as a second theoretical framework to steer the qualitative study. This framework is also cognitive in nature and uses many of the same cognitive constructs described in the previous section, making it a good complement to the cognitive hierarchy. However, the cognitive hierarchy proposes a universal model of human thought and behavior that can be generalized to all situations. In contrast, landscape and place theories go in the opposite direction away from universality by grounding cognitions and meanings in space and distinct, spatial contexts, otherwise known as places (Cacciapaglia, Yung, & Patterson, 2012). Thus, the findings of the elicitation study not only complemented the quantitative findings but supplemented them as well, providing a more nuanced and grounded picture of the Cairngorms landscape and the place of the reindeer in it.

In its English vernacular usage, the word 'landscape' commonly refers to the geophysical, natural world and its abiotic features. However, in the social sciences, 'landscape' has also come to indicate the social construction of that landscape as well. According to Knudsen, Metro-Roland, Soper and Greer (2008) "each landscape is not static but can more precisely be seen as a complex layering of meaning evolving over time [as] tourists and locals" (p. 4) both participate in actively making meanings. This statement acknowledges the dynamism and diversity of the multiple perspectives that construct each landscape. It is important to acknowledge the existence of 'insider' and 'outsider' perspectives in a tourism destination such as the Cairngorms National Park (Knudsen et al., 2008) where visitors mix with local residents in economic and social interactions. Setting economics aside for future research, this study focused on the social meanings attached to reindeer and reindeer tourism. Landscape theory allowed the author to remain attuned to the differences and similarities between visitors and residents in this study through the lens of place.

Place-based Concepts

In recent decades place-based approaches from a wide variety of academic disciplines have begun to inform decision-making in domains as diverse as tourism, urban planning, and protected area management (Knudsen et al., 2008). As such, place research has become a fertile place for the natural and social sciences to meet. Authors have claimed that improving our knowledge of human relationships with places can improve resource management (Kruger & Jakes, 2003), enhance relations between institutions and local communities (Moore & Scott, 2003), foster greater

collaboration (Kemmis, 1990), and increase trust and citizen involvement in management of natural resources (Payton, Fulton, & Anderson, 2005). At its essence, place research is designed to uncover those meanings, memories, values, interests, and ideas that are situated in particular locations within a bio-physical landscape (Cacciapaglia et al., 2012; Cacciapaglia & Yung, 2013). In doing so, the contours and complexities of the sociocultural landscape emerge.

To trace the specific contours of the Cairngorms landscape and the reindeer's place in it, the author chose the strand of place-based approaches known as 'place meanings.' Jacobs and Buijs (2011) conceive of place meanings as "any general belief, value, or affect in the mind of a subject that relates that subject to a particular place in some way" (p. 2). In this case of the Cairngorms reindeer, a deeper understanding of residents' and visitors' place meanings connected to the reindeer may enable managers and decision-makers to not only estimate stakeholder responses to proposed management interventions in the future, but also to have a more empathetic understanding of why people think and act certain ways about the reindeer. This causal, holistic view of *Reindeer Cognitions* can inform better, more bespoke management interventions from the start.

2.2.3   Conclusion - A Conceptual Model for Phase 1

This section of the chapter devoted to Phase 1 reviewed the literature relevant to the theoretical frameworks operationalized in the elicitation study. First, two models based on a cognitive approach, the theory of Reasoned Action and the cognitive hierarchy, were introduced. Then, a landscape approach employing place meanings was added to the research design. In order to synthesize these two approaches, Fig. 2 presents a simple conceptual model to illustrate how the theories of place meanings and the cognitive hierarchy were combined to investigate the research questions for the elicitation study. In the next section, the methodology designed by the author to operationalize these frameworks is presented.
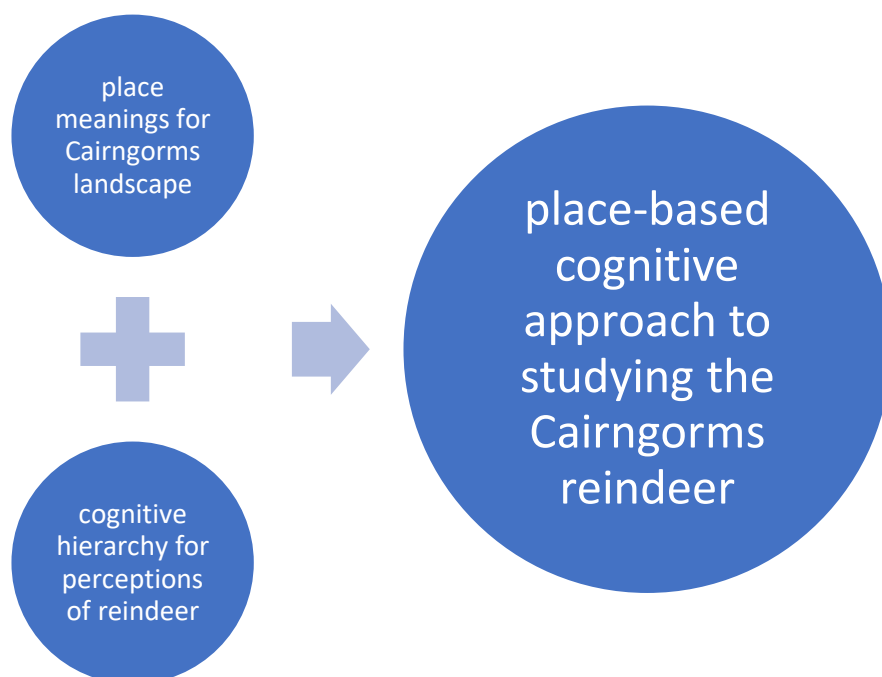
Figure 2. A simple conceptual model illustrating the synthesis of theoretical frameworks

2.3 Qualitative Methods

2.3.1 Data collection via semi-structured interviews

In-depth interviews allowed the author to gain a deeper, more nuanced understanding of the meanings, beliefs, attitudes for reindeer than possible with quantitative methods alone (Creswell, 2014). These qualitative interviews were semi-structured by loosely following an interview guide. (cf. App. A) A range of questions and spontaneous conversational probes were used to explore broad topics such as sense of place, reindeer, tourism management, wildlands restoration, and national park management.

Sample

In October 2018, a total of 11 interviews were conducted with 13 local or regional reindeer stakeholders representing communities and organizations of the Cairngorms National Park. Adapting Freeman's (2010) pioneering definition of the generic stakeholder, 'reindeer stakeholder' is herein defined as any group or individual who can affect or is affected by the natural resource management decisions and wildlife tourism sector associated with the Cairngorms reindeer herd owned by the Reindeer Company Ltd at Glenmore Forest Park, Scotland. Nearly all reindeer stakeholders were inhabitants of the area of Badenoch & Strathspey, the name for the local government ward of the Highland Council which contains most of the reindeer herd's range and the Reindeer Centre. Two stakeholders were not local, and so they are referred to as regional stakeholders. They were included because their professional duties included managing lands within the local area.

The kernel of the sample was purposively selected for their direct relation to the ongoing Cairngorms Reindeer Research Program and/or expertise in the matter. Dr. Louise de Raad of Inverness College-UHI acted as field supervisor and gatekeeper by recommending, and in some cases contacting, members of her network of core reindeer stakeholders. This technique can be best described as network sampling (Jennings, 2001), rather than snowball sampling, a similar and common sampling technique in qualitative research. Network sampling was chosen for its time efficiency and ability to choose stakeholder participants with a wide diversity of views to maximize representation within a small sample (Jennings, 2001). An anonymous key of all interview participants can be found in Appendix B. Each participant (P) was assigned an alphanumeric code to protect their confidentiality. This code is used to refer to the quoted excerpts presented as support of themes in §2.4, Results.

The amount of time available to implement the elicitation study was constrained in order to ensure that Phase 2, the quantitative study, could be conducted during the UK's autumn school holiday. Therefore, the elicitation study's sampling of reindeer stakeholder perspectives was expressly not designed to be random. It can be described as convenience sampling, which is not considered statistically valid not is its aim to achieve saturation of views within the population. It is, however, time-effective, an important consideration (Heckathorn & Cameron, 2017). The goals of Phase 1 were to develop a general context of the research problem issue and inform the design of Phase 2, so this was an appropriate choice.

In order to expand the scope of the Phase 2 survey instrument beyond the views of local/regional reindeer stakeholders alone, the author also spoke with the wider circle of reindeer stakeholders (i.e., the general public at the time of sampling): Cairngorms National Park visitors, 'reindeer tourists'[2] and local residents. Due to logistical limitations, conversations with the general public were informal chats, conducted opportunistically, and documented in field notes, not recorded. Overall, in Phase 1 data collection, the author strove to represent a wide range of viewpoints within the population of visitors and residents of the Cairngorms using both the formal and informal means described here.

Interview Guide

An interview guide was used to steer the semi-structured interviews in the data collection of Phase 1 (Cf. App. A). Semi-structured interviews were chosen to allow for natural conversations to occur with participants (Denzin & Lincoln, 2011). In creating a naturalistic flow of conversation, the author could flexibly respond to the interviewee. By allowing participants to talk openly and freely about topics of their own choosing, complex meanings could emerge (Dwyer, Gill, & Seetaram, 2012). A fully structured survey, while potentially more streamlined and time-efficient, can restrict what is discussed and be too direct to fully evoke sensitive issues (Denzin & Lincoln, 2011). To ensure that findings could later be compared across interviews, the author used probing questions and prompts, verbal and nonverbal, to ensure that data was collected on the issues most relevant to this case study and instructive for the design of the survey instrument.

Appendix A displays the full roster of questions and probing questions that could be used to elicit responses so as to reveal deeper place meanings [partially adapted from Jacobs and Buijs (2011)], perceptions of the Cairngorms reindeer herd, and future directions for management and tourism development. By design, no one interview proceeded exactly in order of how the themes are presented in this guide, and questions were not necessarily posed to the participant exactly as they are written here. Additionally, not all questions were covered in each interview for reasons such as time constraints of the participant or avoiding redundancy. These questions served as reminders to stimulate dialogue and to enable comparison across interviews during analysis.

The desired outcome of Phase 1 was not to produce a complete representation of all stakeholder views on reindeer. Rather, the goal was to provide a broad understanding of the sociocultural context of the reindeer and the issues surrounding them, which could then aid the design of the quantitative survey to follow. Furthermore, the results of Phase 1 allowed the author to refine the conceptual model operationalized in the second phase of data collection, hypothesize which psychosocial constructs (e.g., wildlife value orientations) contribute to cognitions regarding the reindeer, and select the measurement scales most appropriate for assessing them.

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[2] 'Reindeer tourist' is herein defined as any person whether local inhabitant or visitor that: 1) intentionally pays for the right the visit the Reindeer Paddock and interpretation center at the Reindeer Centre, 2) intentionally pays for the right to participate in a guided Hill Trip, 3) intentionally spends money in the Reindeer Centre gift shop, or 4) undertakes activities while visiting the Cairngorms with the express purpose of seeing the reindeer, whether money is intentionally exchanged or not.

2.3.2 Procedure for qualitative data analysis

In this section, the process and methods by which the author performed the analyses of data are described. Qualitative data from the semi-structured interviews were analyzed via a technique known as *rapid identification of themes from audio recordings,* or RITA (Neal, Neal, van Dyke, & Kornbluh, 2015). RITA made it possible to bypass the time-consuming process of full transcription (Neal et al., 2015) while still allowing codes to emerge naturally through induction, rather than applying rigid, pre-set codes (Denzin & Lincoln, 2011). In order to follow the exploratory sequential mixed methodology, *in situ* data analysis was required to Phase 2 possible within the time allotted. Although a reasonable choice at the time, the RITA method did have limitations which are detailed in §2.5.2.The full procedure for qualitative analysis following the RITA method can be seen in Fig. 3 on the next page.

The author listened to the first two interviews and fully transcribed them as soon as possible after conducting the interviews. Using open coding of those transcriptions, field notes, and topics from the interview guide, a preliminary RITA codebook was developed. Next, a RITA coding form was developed based on the codebook. As per the advice of Neal et al. (2015), interviews were coded in three-minute segments to increase the efficiency of the coding process, capture each instance of a theme, and avoid overly taxing the abilities of the researcher. Some sensitivity may have been lost by using time segments of this length, rather than shorter segments (Neal et al., 2015). The author compensated for this by taking the additional step (not part of RITA) to transcribe verbatim those passages that exemplified complex, interwoven themes with multiple facets. Exemplary quotes representing each theme are presented in the next chapter. Next, the author listened to the first two interviews a second time, filled in the matrix on the coding form, made additional notes, and selected those excerpts to be used as examples to support the themes. Based on the iterative analysis of that small subset of interviews, some minor refinements were made. Finally, the author verified that the codebook and coding matrix were adequate to proceed. An example of a filled-in, custom RITA codebook that was used in this analysis is attached in Appendix C.

Initial preparations complete, the RITA technique was then performed on the 11 semi-structured interviews (approximately 709 minutes of recorded audio). Using a dictation software called Transcribe from Wreally Studios (https://transcribe.wreally.com), the author could simultaneously listen to interviews and transcribe key passages of audio in real-time without having to alternate between an audio player and a text editor. In addition, timestamps were applied to each coded excerpt so that the original audio could be easily accessed and listened to again during analysis. Finally, the coding form data and partial transcriptions were imported into the qualitative data analysis software Atlas t.i. in order to catalog coded passages for cross-checking during report writing.

The audio recordings were listened to at least once, and in some cases, multiple times. Transcriptions were produced nearly verbatim. Some light editing was done to clean up the verbal tics (remove repeated use of "um", "yeah", "like", etc.) of some participants and make the data more readable. In the Results section, whole sentences and passages have been presented. In some places, the ellipsis punctuation mark (...) has been inserted to indicate one of two things. First, it was used where a speaker trailed off mid-sentence. Second, it can indicate where a passage was edited for brevity and/or clarity. In those instances, the ellipsis has been placed between brackets [...]. Finally, some words or phrases in excerpts have been bracketed to indicate changes made by

the author, either to provide clarity to the reader or protect the anonymity of individuals being discussed. Unless a passage begins with 'I' (indicating that the interviewer was speaking), all excerpts are from participants (P) speaking.

Step 1
Specify research/evaluation foci

These should be restricted to the core aspects of the larger project for which rapid feedback is needed.

Step 2
Identify themes, create codebook

These may be deduced from the foci, and/or induced from reviewing field notes and audio recordings.

Step 3
Create a coding form

Select (a) length of time segments and (b) coding for theme presence or valence. [see appendix for template]

Step 4
Test/Refine codebook & form

Code a subset of recordings: revise theme definitions, add/remove themes, expand/contract time segments.

Step 5
Coding

Code interviews following the codebook and coding form; assess reliability using multiple coders.

Figure 3. Steps in rapid identification of themes from audio recordings (RITA). [Adapted from Neal et al. (2015)]

This hybrid RITA process enabled the author to quickly analyze all interviews and selectively transcribe the most useful excerpts as evidence to support his conclusions. It was chosen especially for speed and coder efficiency. After establishing the codebook and coding form, performing the analysis with RITA took approximately 1.395 minutes. Dictating excerpts for transcription added some time over original estimates. On average, it took about twice as long to perform the RITA as the original length of the audio (a factor of 1.97). In other words, it took the author 118 minutes to code a 60-minute interview broken into 3-minute time segments, as suggested by Neal et al (2015). This is a major improvement in coding efficiency over traditional coding of full transcripts, which has a factor of 3. Britten (1995) estimates that the more traditional method takes 360 minutes for a transcription of a 60-minute interview plus the extra time taken to then actually code the full transcript.

2.4 Qualitative Results

The purpose of this section is twofold. First, the aim is to represent the range, diversity, and complexity of views elicited by Phase 1. Second, the purpose is to guide the reader in understanding how the qualitative findings influenced the design of Phase 2, specifically the questionnaire. The goal is not to exhaustively detail all themes that could possibly be found within the dataset. While RITA was chosen for its speed and coder efficiency, one acknowledged weakness of the method is that it lacks nuance and thoroughness (Neal et al., 2015). In order to compensate, additional relevant data supporting each theme have been placed in Appendix E. In this way, the readers may examine further evidence if they choose.

This outline of this section is as follows. First, the themes which emerged from the initial analysis of the qualitative data set are described. Next, the data and results supporting these themes and their component subthemes are presented in two ways. First, the valence of each theme is presented and discussed. Second, the main body of this section presents the qualitative data from the semi-structured interviews as evidence for the existence and relative importance of these themes. Finally, a concluding section briefly touches on the final result of the Phase 1 data analysis, the bespoke survey implemented in Phase 2. This section also serves as a bridge from the qualitative study to the quantitative study.

2.4.1 Themes used in RITA procedure

According to the method for rapid identification of themes from audio recording (RITA) described at length in the previous chapter, nine themes were ultimately chosen by the author to guide RITA analysis. A physical coding form (cf. App. C) was created as the first step in the RITA process, using themes 1 through 8 shown in Table 1, below.

Following the guidance of Neal et al. (2015), these themes were deduced from the study's objectives and the interview guide (cf. App. A). Additionally, they were induced from field notes, iterative listening of recordings, and full transcription of the first two interviews. The author operationalized the cognitive hierarchy model when coding themes and named them according to the cognitive construct that he felt they represented (e.g., **Attitudes** towards reindeer tourism,

Beliefs about reindeer identity, Attitude, and **Norms** regarding reindeer management). The place meanings framework was also used to categorize the first theme. After testing the coding form on several audio recordings (Neal et al., 2015), the codebook was refined by the addition of the ninth theme, *Wildlife values and beliefs,* which consisted of the two primary wildlife **value orientations**. RITA analysis was then performed on all interviews by coding these 9 themes.

Table 1. Final themes for RITA used to create codebook and conduct coding

Final RITA Coding Themes
1   Landscape and place meanings
2   Attitudes towards reindeer tourism
3   Past experiences of reindeer
4   Attitudes and norms regarding reindeer management
5   Beliefs about reindeer ecological impacts
6   Beliefs about reindeer identity
7   Attitudes and norms to reindeer roaming behavior
8   Future of the reindeer
9   Wildlife value and beliefs

A typical RITA analysis concludes with simply compiling the themes and their valence. However, RITA is meant to include multiple coders coding each recording in order to increase inter-coder reliability and enhance the validity of the findings overall (Neal et al., 2015) However, this was not possible 1) in the field, or 2) as an independent MSc research. In its place, the author took an additional step beyond the RITA method and selectively transcribed those passages from interview audio that typified each theme best. Those data are shown in the next section (and App. E) in order to allow the readers to see evidence for each theme themselves to increase the validity of the results of the elicitation study. Finally, subthemes based on the most common opinions found in the sample were developed inductively through an iterative process of listening to audio files and readings transcribed passages multiple times. The subthemes tend to be closely interrelated and overlapping; however, the author asserts that each one has a subtle connotation or flavor unique from its mates.

2.4.2   Data supporting themes

Valence

After completion of the RITA method, the valence for each theme was calculated by counting the row totals on each coding form and tallying them up. According to Neal, et al. (2015), valence in the RITA methodology refers to the occurrence of each code (i.e., every time it was mentioned by a participant) in the recording. This valence is listed for each individual interview and also as the sum total of mentions across all 13 interviews. The valence results are displayed in Table 2 on the next page. The themes were later reorganized by descending valence for the discussion in the following section.

Table 2. Valence of final codes used for RITA

Theme	Number of occurrences per interview (I)											Total occurrences across all interviews
	I1	**I2**	**I3**	**I4**	**I5**	**I6**	**I7**	**I8**	**I9**	**I10**	**I11**	
1. Attitudes towards reindeer **tourism**	15	5	32	7	11	16	6	5	9	5	7	118
2. Attitudes and norms regarding reindeer **management**	1	13	17	9	10	9	24	7	5	10	3	108
3. Landscape and **place meanings**	14	10	13	14	9	13	5	3	7	9	4	101
4. Beliefs about reindeer **ecological impacts**	0	11	6	8	6	6	7	6	2	5	7	64
5. **Future** of the reindeer herd or Centre	0	5	11	10	6	7	13	1	1	5	2	61
6. Beliefs about **reindeer identity**	2	8	8	3	5	6	9	1	3	2	5	52
7. Attitudes and norms to **reindeer roaming** behavior	5	7	5	5	4	3	7	1	3	5	2	47
8. Past **experiences** of reindeer	5	4	6	0	4	8	2	2	7	3	4	45
9. **Wildlife values** and beliefs	0	2	0	4	5	3	1	1	1	2	3	21

Transcript data

The nine themes seen in Table 2, organized from highest to lowest valence, are now described. Each theme is supported by relevant selections of data from interviews. Only the very best excerpts (1-3) are included here in the body of the report. More supporting data can be found in Appendix E. The stakeholder interviewees were intentionally kept entirely anonymous in this text in order to protect confidentially. In some cases, a viewpoint was expressed by only one stakeholder in the interviews, and thus precluded from this section and placed in the appendix to save space. The discussion of each theme, subtheme or meaning unit is kept brief because this was not a typical qualitative study, but rather an elicitation study to support the subsequent quantitative study.

Theme 1. Attitudes towards reindeer **tourism**

The topic of tourism based on the Cairngorms reindeer was mentioned a total of 118 times across all interviews, giving it the highest valence of any theme. While this topic elicited many views, perceptions, thoughts, feelings, evaluations, and so on, it was initially labeled as 'attitudes' for the sake of simplicity and because many of the excerpts had negative/positive evaluations either implied or directly stated. Three subthemes that expressed a particular opinion or thought were

detected: 1) the Reindeer Centre is an important attraction, 2) reindeer tourism is both a highlight of and potential motivation for visiting the region, and 3) reindeer tourism makes a significant contribution to the local economy.

The Reindeer Centre is an **important tourism attraction** of the Cairngorms.

The first subtheme drew together interview data pertaining to the Reindeer Centre as a prominent, high-profile destination in the Cairngorms National Park. Strikingly, this opinion was agreed upon by all stakeholders to some degree, even those that disagreed with the overall importance of the reindeer elsewhere. A variety of views were detected within this praise for the Reindeer Centre.

This participant (P3) was unabashed in their high praise for the business savvy of the Reindeer Company and its success over the years: "I feel like [the Reindeer Company] needs to be honest with themselves, and they should be really proud from a business point of view. They've got a brilliant business there, and they're making it really successful. "

Another stakeholder asserted that the Reindeer Centre was primarily known to the public as a family destination: "Yes, the reindeer would definitely be an attraction and part of the branding overall of the national park as a visitor destination... particularly families with children" (P1). In contrast, this next stakeholder pointed out the reindeer actually draw a wider variety of visitors in: "[The Reindeer Centre] is not just attracting families, which obviously immediately think of Rudolph the Red-Nosed Reindeer. [It] gets a lot of adults, couples, coming in the offseason, retired couples, families in the school season, school parties in May/June time. The list is endless" (P8).

Several stakeholders commented on another aspect of the Reindeer Centre as an important tourist attraction, which is that is attracted visitors throughout the entire year, unlike most other local destinations which tended to have distinct summer/winter, off/on seasons. Of this, one person said: "But it's amazing, [reindeer tourism] is all year though. It's not just Christmas at all actually. It's an all-year-sort-of visitor attraction, so actually, I'd say it's easily the biggest [attraction] in this [Glenmore] locale" (P4).

The reindeer are a **highlight of visiting** the Cairngorms

Another subtheme consisted of statements which indicated that the stakeholder judged reindeer tourism to be a highlight of visiting the CNP (i.e., the best, most enjoyable or favorite activity): "The [average tourist] is absolutely over the bloody moon when they see reindeer and that you can see on the social media, the number of people who post pictures of reindeer saying 'Wow, look what I found!', 'This is amazing!', 'Look what I saw when I was up at Cairngorm Mountain'. Because [the reindeer] will come down to the ski car park, and yet right next to them will be a bloody snow bunting in a bonnet and they'll just walk straight past it and they won't see it. Because it's a big, iconic mammal that even a 5-year-old can ID, so they love it. They absolutely love it" (P6).

In this same vein, several stakeholders asserted that the Reindeer Centre was the prime motivator bringing visitors to Glenmore. For example, this respondent said: "P11: It's on pretty well the top of the list things to do for people, particularly with kids... I'll always recommend it... If [the Reindeer Centre] wasn't there, there will be less for the tourists to do. So it won't hold them up in that [Glenmore] area. The fact that it is there, you will get some, that is their main purpose for going up

to Glenmore...If you go up there, what attractions are there in Glenmore? It's the Reindeer Centre, that's it [...]
I: So you reckon it's one of the top draws?
P11: Oh yeah, yeah, yeah. It's a big draw in the area."

Reindeer tourism makes a significant contribution to the **local economy**

More than any other tourism subtheme, this one found all stakeholders in agreement. When asked about the economic contribution of the Reindeer Centre and reindeer tourism, the answer was a straightforward as this: "We totally recognize the value of the Reindeer Center as a tourism attraction and its contribution to the local economy. Absolutely no problem with that whatsoever" (P2).

One stakeholder went so far as to speculate that the economic value of reindeer tourism is so great that it is the primary reason the herd has been allowed to roam freely for so long: "Clearly from our point of view, we appreciate as well the value of that [Reindeer Company] business and the Reindeer Centre to the economy of the north national park and the jobs, etc. that are engaged in the business. And I've always thought that is possibly why this issue hasn't come to the fore sooner because of the fear from the land managers' point of view of 'upsetting the apple cart' with respect to what is quite a popular tourist attraction in business on Aviemore-side" (P12).

Taken all together, the meaning units found within these three subthemes display a consistent favorable attitude towards the tourism sector of the Cairngorms directly related to the reindeer herd at Glenmore.

Theme 2. Attitudes and norms regarding *management*

The next coding theme in descending order of valence was *Attitudes and norms regarding management of the reindeer*. This topic was mentioned a total of 108 times. This theme deals specifically with stakeholders' positive/negative evaluations of the current management of the reindeer by the Reindeer Company.

Negative

The preponderance of meaning units was unmistakably negative. Nine out of eleven interviews elicited negative attitudes, such as this one: "So if you have a small herd of reindeer going around thrashing trees, that's an issue. And basically, you've got people who are potentially on the ground, if there is a red deer or roe deer they will be shot. But they can't shoot [reindeer], and they don't gather them up. So it's a slow, slow process, potentially frustrating for some of the neighbors" (P9). Like this one, some stakeholders were vague in their frustration and did not indicate how they thought reindeer management might be changed.

Other stakeholders with negative attitudes were more specific and prescriptive as they described injunctive norms for managing reindeer. Several stakeholders compared the reindeer to domestic livestock, sheep in particular: "If you leave sheep on the Hill, you're supposed to manage them and keep them on your own ground. So, if [the reindeer herders] have left the reindeer out on the hill, they should have to come to some management arrangement with the people roundabout" (P11).

Three stakeholders went a step further and directly stated that they thought the reindeer need to be managed just the same as sheep: "Affectively, what [the reindeer] need is a permanent shepherd on the ground basically pushing animals back in, permanently, every day of the year. While there 's animals free-ranging, they need to be pushed back in daily. That's really what should be happening. But that's not what's happening" (P9).

Another norm expressed by those with negative attitudes was that the reindeer should be managed like other wild deer in the Cairngorms, where deer are seen as a nuisance by the conservation-minded. This stakeholder was diplomatic in making a somewhat controversial statement: "If [reindeer] were classified differently then they will be taken like a wild animal. We need to work out ways... People need to work out ways in which you can mitigate the damage by moving them somewhere else" (P5). Other landowners were more direct in their assertion: [The reindeer] are on a SAC (special area of conservation), and they are wild deer whether they are native or not. They're pretty much uncontrolled. They're free-roaming. Even if they don't come under the legislation of wild deer, they should be just put under there for the sake of simple thinking, and just treat them as if they are" (P2).

Positive

Only two stakeholders of the thirteen total had positive attitudes towards reindeer management. One was unaware of the current issues with the reindeer: "I've never heard anything negative about reindeer. I've only heard positive things. Even amongst the conservation community that I speak to you, everyone always seems to regard the reindeer as a fairly benign presence and a nice thing to have in that environment" (P10). In contrast, the second stakeholder was aware of the issue but still positive: "The situation with the reindeer, I don't know what the problem is with them. I don't know why... I'm just not great at seeing why neighboring landowners are upset" (P11).

Theme 3. *Landscape* and *place meanings* related to reindeer

As a theme, place meanings specifically related to the Cairngorms reindeer herd were mentioned 101 times across all interviews (cf. Table 2), giving this theme the third-highest valence. The four subthemes are place meanings specifically linking the reindeer a sense of place of the Cairngorms landscape:1) Reindeer as an essential feature of the Cairngorms landscape, 2) Reindeer as part of a wild landscape, 3) Reindeer make the Cairngorms a unique landscape, and 4) Reindeer belong in the Cairngorms landscape.

Reindeer as **essential** feature of the Cairngorms landscape

Many stakeholders described the reindeer as an essentialized, intrinsic feature of the Cairngorms landscape as if it was impossible to imagine the Cairngorms without them. For example, several employed the same analogy of 'wallpaper' to discuss the reindeer. In British vernacular to describe something as "part of the wallpaper", or "part of the furniture", is to indicate that a thing, person or issue is so familiar as to be rendered invisible, unnoticeable and taken for granted as permanent. "P9: From living here for thirty-odd years, they are just part of the wallpaper.
I: The reindeer?

P9: Yeah. They are part of the wallpaper if you put them in the same context as the Highland Wildlife Park or Cairngorm Mountain. They are all part of the wallpaper in that context, and they're all part of Strathspey."

While the above excerpt represents the personal experience of the individual, other stakeholders implicitly referred to a collective sense of history attached to the reindeer. And it was this history that made the herd an essential element of the landscape and could trigger a public outcry if they were removed: Yeah, we know it's a very political place that we work in here, and obviously the reindeer are connected just down the road. So I would think that if there was a scenario where the reindeer...if there was not going to be any more reindeer here, I think it would be a huge public backlash because, since the [19]40's, they're ingrained within people's mind that they should be here" (P13).

However, not every stakeholder agreed with the implication that the reindeer "as part of the furniture' made them essential or holding a special place of importance over other for the public:
"I: In the sense that [the reindeer herd] have been here for 60 years now, do you think that it has become an intrinsic or essential part of the Cairngorms landscape?
P3: I wouldn't say essential, no. I think it is familiar but not essential. [...] I don't really hear locals talking about [the reindeer] especially or saying good or bad. I think [the reindeer] are just part of it, part of the furniture. [Locals] are not up or down about them if you know what I mean. We got so much, massive wildlife, I don't think they're high on anyone's agenda really. "

Reindeer as part of a **wild landscape**

A somewhat fainter place meaning detected in this theme was that the reindeer enhance a feeling of wildness/wilderness. This feeling is typically experienced by most visitors to the vast Cairngorms landscape, and it is even used to advertise the national park and the region. This place meaning was not mentioned in all interviews. However, several stakeholders specifically mentioned that the reindeer contribute to that wild image, and that the Reindeer Company's Hill Trip leading tourists out onto the slopes of Cairn Gorm plays a big role: "I guess for the Reindeer Centre as well, you know, being able to take people across into the Cairngorms on an open moorland just above the forest here, is a big, big attraction for people. They believe they are out in the wilderness and you know, they're getting away from it all and that kind of thing" (P13).

Reindeer make the Cairngorms a **unique** landscape

Nearly all stakeholders mentioned another reindeer-related place meaning, which was that, because the herd is unique/unusual in the UK, the presence of reindeer heightens the 'uniqueness' of the Cairngorms overall. And by unique it is meant that the reindeer make the Cairngorms unlike any other natural area in all of the Highlands, Scotland and the entire UK: "These [reindeer] are one of the things that's quite unique about the national park. That they are here. That they do roam out in the mountains. And that people can come and feed them by hand. It's pretty amazing. So yeah, it's unique" (P1). In some instances, the stakeholder connected this unique feeling to images of Norway, Fennoscandia, or the Artic that the reindeer naturally evoke.

One stakeholder extended the feeling of uniqueness from the reindeer to the Reindeer Centre as well: "*I: Do you feel that the Reindeer Centre is, not iconic, but...?*

P3: Unique! It's unique, yeah.
I: And so it's part of the image that people have of Glenmore, of the Cairngorms?
P3: Yeah, I think so."

Reindeer **belong** in the Cairngorms landscape

This place meaning was described in very similar language to the 'Essential' subtheme above. However, the crucial difference is that the reindeer are not described as just a familiar or historical part of the landscape. Instead, the stakeholders also explicitly linked the reindeer to the ecology and natural history of the Cairngorms: "Well, [the reindeer] are part of the natural heritage – whether they're introduced, reintroduced, semi-domestic or whether they, you know" (P6). Another stakeholder, one of many in fact, drew direct links between the subarctic Cairngorms ecosystem and the original artic home of the reindeer in Scandinavia: "[The reindeer] sort of fit, you see them on the plateau and, I'm always a bit reluctant to say this because I'm still concerned about the ecology, but as a personal point of view I look at them and I think they look right and I've been to the arctic quite a bit and I've seen them in these places and they do look right. I have to sort of battle with that in my head, but that's what this is all about" (P7).

One stakeholder went a bit further in evoking both Scandinavian and historical associations with the reindeer by describing how the founder of the Reindeer Centre, a native Sami reindeer herder, chose the place to reintroduce reindeer because of it meeting the habitat requirement for reindeer: "Personally, I do see them as an asset to the Cairngorms. Because Mr. Utsi would not have chosen this place unless he thought it was the right place for reindeer. And it is the right place for reindeer" (P8).

For another respondent, the feeling of the reindeer belonging was more intuitive and emotional: "When you see [the reindeer] out on the [mountainside]... on a nice day where they are just sitting in the mosses and that, they just look like they belong there, at home. It does look like they're part of the landscape [...] For hillwalkers and that, in coming across that, it's pretty magical, you know?" (P13).

However, an equally strong meaning for the reindeer as NOT belonging was espoused by some interview participants, despite their presence in Scotland up until the last Ice Age: "And I also think they're not really meant to be here. I mean, yes, they were native, but it was a hell of a long time ago" (P12). Another stakeholder also thought the reindeer did not belong in the Cairngorms due to their consumptive impact on vegetation: "As I said I guess because I don't have reindeer in my current mindset as that they belong in their landscape...just sometimes it's just the way you think about things, I just think "Oh, the last thing we want is another thing that eating stuff" (P11).

Theme 4. Beliefs about reindeer environmental Impacts

The next theme is related to beliefs about what impacts the reindeer have on the ecology of the Cairngorms, as an introduced species. With a valence of 64 occurrences in total, there is a big decrease in valence from the first three themes, all of which had over 100 mentions, to this theme and the rest that follow. Three opinion subthemes were found within this theme: 1) the reindeer have impacts on the vegetation within their range, 2) the reindeer are interfering with reforestation

efforts, and 3) due to negative impacts, the number of reindeer should be reduced in the Cairngorms.

Reindeer have impacts on **vegetation** within their range

Three predominant stances were detected amongst stakeholders from these responses. First, some stakeholders staunchly believed that the reindeer had negative impacts on the environment. Second, others argued that it was possible that the reindeer have had a positive impact on the environment. However, these stakeholders seemed to be less firm in their views than the first category. Finally, several stakeholders were decidedly neutral on this topic. Whether their reservations or silence on the matter were political or personal in nature remains unknown. Given the current tensions surrounding this theme, the author did not probe deeply on this particular issue.

Negative impacts

Many stakeholders described simple feelings or thoughts that demonstrated an assumption that the reindeer, as an herbivorous ungulate, must by its nature have a negative impact on the flora of the national park: "I just look at [the reindeer] and think, 'Oh, what are they eating? What damage are they doing?'" (P12). A few stakeholders were more specific in their concerns about the native vegetation and sensitive species, such as lichen, being affected not just only by ingestion but all activities of the reindeer: "So, we're concerned about that given that [the reindeer] principally browse on lichens. But also, it's a very sensitive habitat, high altitude habitat, and in places that habitat in Cairngorms SAC, I think I'm right in saying, is in unfavorable condition due to browsing and trampling. So, we felt that there was, principally I think, by deer in other locations, but potentially by reindeer. And some of these communities, late snow bed communities, really rare community types, really rare lichen, and bryophyte assemblages. We really didn't want to see trampling, dunging and grazing" (P2).

Positive impacts

Since hard evidence for negative impacts directly caused by the reindeer has not been presented yet, a few stakeholders were cautiously optimistic that the herd might actually have some unforeseen and positive impacts on vegetation: "P7: And we must always remember that it is possible that [reindeers'] impacts might be positive as well.
P6: Yeah, they're part of the...
P2: I mentioned how expansive *Salix herbacia* is among the plateau. For all we know, that's because of the bloomin' reindeer poking them or knocking back the grass so it's not competing with it or something. Who knows?"

Neutral perspective on impacts

Just two stakeholders adopted a neutral, or wait-and-see, stance on the impacts of the reindeer. The first seemed to be reserving judgment until a scientific verdict has been rendered: "I don't think

we can make any comment about the potential impacts, from an ecological point of view, of the reindeer until we know more about what... Quantify that some more. But maybe when that does come out, there's another issue, of their impact on the montane vegetations" (P12). Another respondent was more convinced that, due to their physiology adapted to the Arctic, the reindeer were not having any observable effects on their hill enclosure, for example: "Well, look with your own eyes, this [reindeer hill] enclosure has been an enclosure for 50 years, and it actually doesn't look any different from what's outside the fence. You know, [the reindeer] are very low impact on the ground, and they've got these lovely big feet which aren't just for walking in the snow and to spread weight, but they also mean that they don't poach the ground like the little deer with their little pokey feet, and the sheep as well. They're not heavy animals. They're not like cattle. You don't get poached areas" (P8).

The reindeer are interfering with **reforestation**

A majority of stakeholders talked about how the reindeer are potentially slowing down the process of natural regeneration of trees and interfering with reforestation across their range. In direct contradiction to the last excerpt above, several stakeholders asserted that the reindeer hill enclosure was the most visible evidence for reindeer hindering habitat restoration: "And interestingly we've done quite a lot of natural-regeneration-of-tree-surveys and everywhere, except that [reindeer hill] enclosure, has tree regeneration. And so even though [one person] says they don't eat trees, they're certainly preventing them from growing somehow...that might be exaggerated because of the confined space and the number of animals. But it's still an example of the impact they're having over the site" (P10).

A few stakeholders acknowledged that the reindeer might damage regenerating trees but qualified it by implying that the overall effect was negligible and not necessarily negative: "Well, so obviously, I've seen reindeer. I know...some other landowners about are quite concerned with the reindeer sort of eating trees, young seedlings, and things like that. I don't really witness that very often, but I have seen them brushing against their antlers and sort of ripping trees on their lower ground, you know, just trying to get the velvet off. So, a natural process, and I'm sure the trees will be okay in the long run" (P13).

Due to these negative impacts, number of reindeer should be **reduced**

One often mentioned perspective was linked to a negative attitude in the first subtheme. These stakeholders stated that, if an ecological study provides solid evidence that the reindeer are indeed having a detrimental effect on the Cairngorms ecosystems, then the number of individuals animals in the herd should be reduced. One stakeholder linked this idea to resolving some of the current tensions amongst landowners in the area and the Reindeer Company: "I'm hoping that the best solution that will come out of this is where we got a figure of say 50 animals and we can say to [them], " you can run your business but 50 animals is the maximum. [The reindeer] are not going to have an impact on the environment because that's too small of a number over a huge area. And we can then I'll go happily holding hands into the sunset. But I don't if that will happen or not. [...] We might not have some of the issues that we've got if there were less animals [in the reindeer herd]" (P10). Another person heartily agreed and had a specific idea about how to decrease numbers: " Obviously numbers need to be kept in check. So from a personal point of view, I'd like to see us reducing them or having numbers down by using the meat" (P13).

In contrast, other stakeholders took the alternative stance that the number of reindeer currently present may or not be big, but that the environmental impacts thus far have been insignificant: "Well, sometimes we do see big groups and think, "Well, that probably is a bit big" when you see 30 or 40 at a time in groups...But it doesn't seem to do much damage from what we're seeing" (P13). The people that described this perspective did not mention reducing the number of individual reindeer as a solution to any perceived problems: "Well, [the reindeer] are not doing us any harm. And if anything, they're a bit of a curiosity. If they happen to come over, and they could come over, and a few of them could stand in those trees you've just seen planted. And because there's so many trees and so few reindeer they could probably, would only have impacts on them rather than devastating the trees. They couldn't possibly" (P5).

Theme 5. *Future* of the reindeer herd or Centre

Approximately equal in occurrences to the previous theme, the theme of *Future challenge and opportunities for the reindeer* and reindeer-based tourism had a valence of 61. Generally speaking, meaning units in this theme tended to overlap with passages that were also coded for the themes of Tourism, Management and/or Impacts but took in ideas about the future, rather than the current or historic situation of the reindeer. In some cases, the content was as relevant to those themes as the Future them. Amongst these future-looking statements, most were optimistic, and a couple were pessimistic. One subtheme that stood out, in particular, was Education because the stakeholder was simply more specific.

Optimistic

Nearly all stakeholders were optimistic about the future of the reindeer in the Cairngorms. However, how the current tensions might be resolved was less clear to them, "We need to get a better handle on what's going on from everybody's point of view, so that we can protect [her] interests so that she can still have a business running up there, but we can deliver in terms of designated site plans and in terms of the new habitat that were trying to create up there" (P10).

Pessimistic

A couple of stakeholders, such as this one, felt that the reindeer herd's future prospects were not absolutely guaranteed: "She [Dr. Lindgren, one of the founders of the Reindeer Centre] said to me one day, 'The Scots love history. They will love the day when they say the reindeer *used* to be here.' She also saw that maybe in the future there would be a kickback" (P8).

Education

Only one interview participant introduced a specific and novel idea about the future of the reindeer. This person discussed their idea in detail multiple times throughout the interview. The stakeholder spoke about the prospect of using the reindeer for environmental education related to climate change, species loss, and landscape-scale change: "So there was a potential to utilize reindeer, a significant potential in terms of environmental education and understanding about things like climate change from the past and the present. And also understanding other species,

large species, that we have lost [from Scotland] in the past either through climate change and/or human influence. So they have the potential role be utilized almost as a focus, to be able to talk about the bigger picture stories. I'm sure the reindeer staff do that a lot of the time... They probably have the potential to have a bigger narrative in environmental matters, then they possibly have to date" (P9).

Theme 6. Beliefs about reindeer *identity*

The next theme was Beliefs about the identity, or classification, of the reindeer. This theme was mentioned 52 times across all interviews. Five categories of classification were found within this theme. First, many stakeholders spoke about the overall ambiguity of the reindeer's status. Some of them went further to comment, implicitly and explicitly, on how they viewed the reindeer personally. These comments were split into four subthemes on specific reindeer identities: 1) Wildlife, 2) Semi-domesticated, 3) Livestock, 4) Pet.

Ambiguous identity of the Cairngorms reindeer

Nearly all stakeholder equivocated about the categorization of the reindeer and described it as ambiguous or confusing, before going on to settle on one of the other four categories: "[The reindeer] could be classed as wild, and they could be classed as domestic stock. And when people try to sort out the argument, because they don't fall into either category, [the Reindeer Centre] can use the one most suitable for their argument at the time" (P5).

A small number of stakeholders also touched on whether the reindeer are a native Scottish species or not as it related to the ambiguous identity of the reindeer: "I mean if [the reindeer] were a non-native invasive species like rhododendron for instance then we wouldn't have them. Simple as that. But because there is this question of their nativeness. RSPB (Royal Society for the Protection of Birds) are quite adamant that they're not native... Other people are quite adamant that they are native. So we haven't really gotten the definitive answer on that. So we're treating them... Well, we're not treating them as anything. We're regarding them as this kind of middle ground, that we're not really sure about" (P10).

Wildlife

Just a few stakeholders implicitly revealed their personal view of the reindeer as wild animals: "And [the reindeer] are a wild beast anyway. So, you could just let them roam to get their feed really" (P4). Another said of the reindeer: " Of course it makes sense that we have this attraction of these wild animals living in the park that people can come connect with while they are here" (P1).

Some stakeholders talked about the reindeer as wildlife only in reference to how the general public was assumed to see them: "I think to the public [the reindeer] are not viewed as wild living deer, that they're here as a tourist attraction" (P9).

Semi-domesticated

A common viewpoint that emerged from these interviews was that the reindeer were 'semi-domesticated', a hybrid identity between wild and domesticated, that has no statutory standing in the UK: "[The reindeer] are an interesting combination of an animal that has been domesticated by man yet lives in the wild. That's quite important I think... A lot of people describe them as semi-domesticated animals. And I think the Sami [indigenous reindeer herders of Lapland] bit is because they're not enclosed in fields like cows and sheep. They're just as handleable and tractable but they live in their natural environment" (P8).

Domesticated/Livestock

As touched on in the Management theme, many stakeholders compared the reindeer directly to sheep: "At the moment they're letting the [reindeer] animals free range. It's almost like a sheep, hill-sheep-farm sort of scenario" (P12). Other people were less specific in which type of livestock the reindeer were most like but nonetheless very certain in their depiction of the reindeer as a fully domesticated animal, not wild, not semi-domesticated: "I mean these [reindeer] are domesticated animals, they're not wild animals. They're wild-living but they're not wild animals. They are managed in some stage throughout the year...They are not reintroduced. They are a managed animal. They are non-native... Yeah, they're a past native, but basically, they are managed. So they are not a native animal in the sense of it's been reintroduced free-living. They are managed by people. So they're still domesticated" (P9).

Finally, some stakeholders shared less of their own viewpoint and speculated more about the general public's view of the reindeer and its implications for the ongoing research program: "It would be quite interesting to talk to locals and ask them just the question, "Do you think they're wild animals?" Because if people don't think they're wild animals, and they're just a domesticated farm animal, then they don't really care about them as much" (P3).

Pet

'Reindeer as pet' was the least mentioned identity, but it was nevertheless present in two distinct ways. First, one stakeholder with a deep knowledge of the herd's history discussed how in the past some people had referred to the reindeer as the pets of the founders of the Reindeer Centre: "In the days of Dr. Lindgren and Mr. Utsi, people just thought, what is the reindeer? It's just a plaything for Mr. Utsi and Dr. Lindgren. There was just a little bit of that I think. They were quite an eccentric couple" (P8). In contrast, a few stakeholders labeled the Reindeer Centre a "petting zoo" without explicitly calling the reindeer pets *per se*: "So yes, I think there's that cultural value [for the reindeer] and beyond that, I think it's almost a petting zoo equivalent really. Come and see a reindeer. Come and feed it a handful of nuts. Come and walk it up a track. Not dissimilar to the experience you get going and looking at the animals you find in a petting zoo. They're just different and quirky and they're in the Cairngorms and they're near the mountains. So, I think there's that kind of association." (P2) Another respondent was less circumspect in their analysis: "I think [the Reindeer Centre] is a petting zoo!" (P4).

*Theme 7. Attitudes and Norms to reindeer **roaming** behavior*

The singular position of reindeer as a completely free-roaming animal in the Cairngorms was mentioned 47 times across all interviews. This was a relatively low valence, placing it just third from last. However, just as with the Identity theme above, the Free-roaming frequently coincided with other themes, particularly Management. Despite the low valence, the theme was attitudinal as it evoked strong feelings of either approval or disapproval, with stakeholders in equal numbers on each side. Additionally, these passages were meaning-filled and sometimes emotional. A small number of stakeholders remained neutral on the topic. This theme was later renamed 'Norms regarding Free-roaming'.

Positive attitude toward roaming

Many stakeholders expressed a particular management preference through a strongly positive attitude towards the free-roaming behavior of reindeer. This attitude was almost always linked to the place meanings for the Cairngorms, such as 'wildness' and 'uniqueness': "P6: It's a selling point for the Cairngorms as well because it's the only place that you could have a free-ranging herd [of reindeer in the UK].
I: I've heard you mention that you were aware of the fact that [the reindeer] are free-roaming around here. Do you think that's an important part of their image or hand-feed attraction to people?
P6: Yeah, I think, well, people may think that you might bump into them. I think that for anybody that wants to say that animals shouldn't be kept in captivity, it's good that they're roaming free as well. They're well looked after. So yes." Additionally, as this person touched on at the end of the previous passage, the notion of free-roaming was connected to the well-being of the reindeer as well.

One stakeholder emotionally asserted that the future health and welfare of the reindeer herd was entirely dependent on their ability to continue to roam free across the Cairngorms: "So [free-roaming] is really important... The health and wealth of the reindeer would be massively compromised, if the whole herd whatever size, doesn't matter what size it is, doesn't matter. That will be the end of it. You might as well tick the days before there would be no reindeer [...] I would like to continue to see reindeer roaming, free-roaming, in the Cairngorms. I don't see why not. I would like to think that somebody makes a living out of them, people get to enjoy them... I would like to see that there is a future for reindeer in the Cairngorms. I would be [sad] if I thought that wasn't going to be the case" (P8). Furthermore, this person also implied that continued economic benefits of reindeer tourism and visitor satisfaction with *reindeer experiences* were predicated upon free-roaming.

Negative attitude towards roaming

A similar number of stakeholders described strong feelings of frustration with the free-roaming behavior of the reindeer: "You can't really have it both ways. I think but they are having it both ways. And I do understand with the landowners that are finding that free-roaming tricky. Like, you got an estate that's trying to control its deer numbers to allow the natural [regeneration], and then you got these reindeer wandering around. It's difficult for them as well… They're free-roaming, but they have to be managed-free-roaming. if they start having their calves on the hill then they get

hefted. What does free-roaming really mean? I guess that's what I'm saying. Free-roaming sounds like you're just leaving them to their own devices. Whereas their free-roaming, they go out there with food and keep pulling them back in all the time. In my mind's eye that's not free-roaming. So you can't have it both ways. I think that's where the conflict is" (P3).

A few stakeholders went further than speculation and proposed that the reindeer should be barred from roaming freely in the Cairngorms by land managers: "I mean maybe the answer is that at Aviemore they only have their hill enclosure and the Centre. And that when they're free-ranging, the [rein]deer, doing that in the Cromdale site or whatever, so they don't have free-ranging reindeer in the Cairngorms" (P12). Perhaps due to the controversial tone of propositions such as this, a statement similar to this one only occurred three discrete times in two interviews.

Neutral perspective on roaming

A small group of stakeholders talked about free-roaming in a more neutral manner. However, several neutral stakeholders were keen to make a clear distinction between free-roaming within the land specifically leased to the Reindeer Company for that purpose of reindeer grazing and completely unmanaged free-roaming at large: "I think it's fine that [the reindeer] are free-roaming in the areas where they have a lease to free roam. I don't personally think they should be roaming anywhere outwith that lease...Now, whether or not Rothiemurchus Estate or Glenfeshie Estate or other estates that may get reindeer have the same concerns, I don't know. I mean my view is that they should just be confined to where the lease is. And that's all we want really is for the reindeer to stay in the right place and not go to the wrong places, which is what they have been doing" (P2).

Theme 8. Past experiences of reindeer

The eighth theme, *Past experiences of reindeer*, had a valence of 45 mentions in total, nearly the same valence as the seventh theme.   Altogether, this topic yielded five subthemes based on the places (or ways) in which stakeholders had previously encountered the Cairngorms reindeer: 1) while participating in a Reindeer Centre-guided Hill Trip, 2) at the Reindeer Center paddock in Glenmore, 3) while taking part in outdoor recreation the national park, 4) at the upper carparks of the Glenmore corridor, and 5) at a community Christmas parade where the reindeer made an appearance. Since all interview participants were local/regional residents, all had seen a reindeer at least once. Many of them had experienced the reindeer in multiple ways over the years if not all.

Hill Trip

As the signature tourism product of the Reindeer Company, many stakeholders had experienced the herd in this way. They recounted positive memories of going along with a reindeer herder to visit and hand-feed the reindeer in their hill enclosure above the Glenmore forest. Some stakeholders were fairly simple when describing the experience or its impact on visitors: "I think the Hill [Trip] experience is very special, and I think a lot of people want that. So it's a great experience. People are always really positive about what they've seen" (P3).

One stakeholder described the whole experience for a reindeer tourist in great depth, speculating on why it is such a meaningful encounter for many people and how it may be related to broader

landscape values: "I think the reason people enjoy coming to see the reindeer is because they have seen them in their home, they have seen them in their natural environment.   Perhaps it's their semi-natural environment when they're enclosed in their enclosures... And then they love that combination of an animal that's free to come and go as it pleases but likes to come and hand-feed because that's how the reindeer come up to us. So their experience is a real reindeer-mountain experience...Those people coming to the reindeer could well just see the Cairngorms as the reindeers' home" (P8).

Paddock

A few stakeholders had only encountered the reindeer at the paddock adjacent to the Centre. A few reindeer are always kept there for educational and accessibility purposes. That experience was less evocative in the memory of this respondent: "I've seen the [reindeer] paddock from up on high on the mountain and I've been to the Reindeer Centre and had a wander about. I've been in to see them in their stables. Is that what they call them for reindeer? But yeah, that's my experience" (P1).

While recreating in the wild

A majority of stakeholders had come across the reindeer out in the wild of the Cairngorms without a tour guide/reindeer herder present and far from the Hill Enclosure. All of these people described a fond memory of it. The recreational activity most frequently mentioned in connection with the reindeer was hillwalking (as hiking is called in Scotland) and skiing. "I used to do a lot of hill walking, up particularly in that [Glenmore] area, and I used to see the reindeer everywhere on the hill regularly... Oh, it was always, 'Oh, there's the reindeer!' And it was better as well if they were out, the ones that are free-roaming and that" (P11). This next stakeholder supposed that a wild encounter with the reindeer was a positive experience for many people recreating in the national park: "I think a lot of people rather like encountering the reindeer at some point while they're out in the hills, not necessarily [...] through the Reindeer Centre" (P8).

Upper carparks

Many stakeholders colorfully described reindeer encounters at the high elevation carparks of the Cairngorm Mountain ski resort: "[Driving up to Cairngorm Mountain] I turned up the hill, all of a sudden, all the reindeer were stood on the road, and I never seen them before either. This was when I had just moved up. So it was a real sight! They were all just milling about on the road. It's quite a grey misty morning. It looked fantastic!" (P1).

These upper carparks service not only the ski resort in wintertime, but also the funicular mountain railway itself, a major tourist attraction year-round. Additionally, these carparks serve as the primary trailheads for many popular treks leading to destinations on the Cairngorm Plateau. Several stakeholders specifically recounted fond memories of hand-feeding the reindeer at these carparks: "And you'd always find the reindeer in the carparks [at Cairngorm Mountain]. And they tried to get in your pockets" (P11). Others told of secondhand experiences: "I hear stories of [the reindeer] hanging about the ski centre carpark but I think that is it really like that. It's quite endearing, you know, you're eating your sandwiches and there is this reindeer coming up to scavenge" (P3).

Christmas parade

All four of the previous *reindeer experiences* occurred within the general vicinity of Glenmore and Badenoch & Strathspey. However, one other experience that stood out as distinct from the others was seeing the Cairngorms reindeer at a Christmas parade. It was mentioned frequently. This encounter that is described next could have happened both within the CNP or all across the UK, as this stakeholder pointed out: "At Christmas time they have the Christmas parade that goes through the village [Aviemore].... then the reindeer come down and they're part of the parade. That's, I think, a massive attraction for people. Not only do we have the Christmas parade, but we actually have the reindeer pulling Santa along the road and... Not only that but I believe the Reindeer Centre basically... if you see reindeer on the map there or anywhere, then it's probably the Cairngorms Reindeer Centre. So, I suppose that does put the name Cairngorms into the heads of many" (P1). As this stakeholder pointed out, the Cairngorms reindeer make annual appearances at local Christmas parades all over Great Britain and bring extra attention to a certain image of the Cairngorms, perhaps the wild and romantic place meaning discussed earlier.

Another stakeholder touched on how the association of the reindeer with holiday traditions made the animals especially meaningful to many local residents, even referring to them as 'our reindeer': "Reindeer have been walking down Grantown high street for decades and, you know, and that sense of we're different from the UK because we have actual real live reindeer pulling Santa's sleigh through our villages; they're our reindeer. It's a really, really, emotional, sensitive subject" (P6).

9. Wildlife values and beliefs

The theme with the lowest valence was *Wildlife values and beliefs.* It had 21 occurrences across all interviews. One direct reason for this low valence is that it was the only theme not elicited by the interview guide. In the course of discussing the reindeer and the Cairngorms landscape, stakeholders drew on their wildlife values and beliefs to explain their positions on various topics, especially management issues. The occurrence of this theme contributed to applying the theoretical framework of wildlife value orientations to Phase 2. This theory is reviewed fully in §3.2.2. In short, the WVO model posits the existence of two primary wildlife value orientations, called Mutualism and Domination (Jacobs et al., 2014). Both of these values were evident in the stakeholder interviews.

Domination value orientation

Briefly, the Domination value is typified by the beliefs that 1) humans are entitled to manage animals for their own use and benefit, and 2) animal rights are subordinate to human rights (Jacobs et al., 2014). Some stakeholders implied a basic belief about the appropriate use of animals when discussing current issues with the reindeer: "Obviously [reindeer] numbers need to be kept in check. So from a personal point of view, I'd like to see us reducing them or having numbers down by using the meat. But I know that that's quite controversial because what people are sponsoring the reindeer. But I think that could be a big plus side for local businesses and actually selling the meat. But obviously if people are sponsoring them, they've got names and things like that, I think they thought it was better to chemically castrate them and keep the numbers down that way" (P13). This stakeholder indirectly acknowledged that the actions he described would be upsetting

for the people who sponsor the reindeer through donations, perhaps because the stakeholder assumes that they will have different wildlife values.

The general topic of hunting came up frequently, along with the management intervention of killing deer for population reduction. It is known as 'culling' in Scotland. When the interviewer asked this person about culling, the response was immediate and strongly negative: "*I: Is there any interest in [culling] the reindeer?*
P9: No, no, not shooting, no, no. No, it's too politically sensitive. It did happen a few years ago at least up on the Cromdale Hills, where the other part of the herd is. I think one animal was shot up there, and it got into the headlines. It's not good. It's just not. It's not part of Scottish culture." This passage highlighted how some stakeholders automatically drew on their basic beliefs about hunting wildlife when thinking of the reindeer.

Mutualism value orientation

On the other end of the spectrum, some stakeholders expressed a Mutualism value orientation for the reindeer and animals in general. The Mutualism value is tied to basic beliefs that 1) animals and humans are part of an extended family, and 2) animals are worthy of rights and care (Jacobs et al., 2014). In reference to culling, this stakeholder drew upon these beliefs when describing how supporters of the Reindeer Company anthropomorphize the reindeer: "We don't use [the reindeer] for meat, we don't cull. They are just a display herd. So we are attracting that sort of treehugger-type, it has to be said. Particularly when it comes to supporting the herd and adopting the reindeer. They've all got names. They're all individually recognizable. But there is no harm in that, you know. It makes people happy" (P8). Another stakeholder accounted for the success of the Reindeer Centre when referring to the deep affiliation that people feel for the reindeer as 'a Bambi-effect': I mean [the Reindeer Company] is a thriving thing that's popular. [...] It's a bit of a Bambi-effect thing, isn't it? It's reindeer! The public are really sensitive to anything detrimental happening, or undoubtedly will be. So it has to be handled quite carefully" (P12). Furthermore, this respondent links the Mutualism value orientation amongst the reindeer-loving general public to a fear of public backlash should the management of the Cairngorms reindeer be altered.

2.5   Discussion of qualitative study results

2.5.1   Themes and subthemes

The RITA method of coding qualitative data led to the initial designation of eight primary themes: 1) *Attitudes towards reindeer tourism*, 2) *Attitudes and norms regarding reindeer management*, 3) *Landscape and place meanings*, 4) *Beliefs about reindeer ecological impacts*, 5) *Future of the reindeer*, 6) *Beliefs about reindeer identity*, 7) *Attitudes to reindeer roaming behavior*, and 8) *Past experiences of reindeer*. A twin conceptual framework led to most of the themes being classified as either cognitive constructs or place meanings. The author used the cognitive hierarchy to classify themes as various cognitions. Landscape/sense of place theory guided the designation of place meanings.

When reviewing the themes and their supporting data, it became clear that many of the cognitive themes are closely interlinked. An obvious example here is the similarities and overlap found between theme '*Attitudes to reindeer roaming behavior*' and theme '*Attitudes and norms regarding reindeer management*'. The overlap is especially evident amongst the subthemes within certain themes, but the author intentionally grouped them this way and attempted to tease out subtle differences in meaning between them. During analysis, the author tried to merge themes and rearrange them, but eight themes still surfaced, distinct enough to retain their own flavors and justify a separate category. Another outcome of the iterative analysis was the emergence of two basic beliefs about wildlife, as represented by thoughts about the reindeer and other wildlife of the Cairngorms. These cognitions, Mutualism and Domination, were coded together as a ninth theme: Wildlife values and beliefs.

The first theme with the highest valence was '*Attitudes towards reindeer tourism*'. Some different opinions, coded as subthemes, found within this theme were 1) 'the Reindeer Centre is an important attraction'; 2) 'reindeer tourism is both a highlight of and potential motivation for visiting the region'; and 3) 'reindeer tourism makes a significant contribution to the local economy'. These cognitions were attitudes in the sense that they all expressed a favorable/positive/pleasant evaluation of the specific class of tourism experiences enabled by the presence of the reindeer herd in the Cairngorms and/or the activities and facilities of the Reindeer Centre.

The second theme was '*Attitudes and norms regarding reindeer management*'. The meaning units in this theme described both negative and positive evaluations of particular actions, or inaction, that the Reindeer Centre took in managing their herd. However, most mentions were negative attitudes about Reindeer Centre management of the reindeer both within and outwith their leased grazing areas. Other mentions took the form of injunctive norms in which the stakeholder expressed a preference that the reindeer ought to be managed differently. Specifically, a common norm was that the reindeer should be managed like other wild deer. This theme was broader than the related, and often overlapping, Theme 7, which was specific to management decision to allow the reindeer to range freely.

The third theme was '*Landscape and place meanings*.' These meaning units clustered together as personal memories, cultural-historical landscape values, and place meanings that were all related to evoking a sense of place of the Cairngorms and how the reindeer contribute to it. The four, interrelated place meanings for reindeer most commonly expressed by stakeholders were 1) 'reindeer as essential feature of the Cairngorms landscape'; 2) 'reindeer as part of a wild landscape'; 3) 'reindeer make the Cairngorms a unique landscape'; 4) 'reindeer belong in the Cairngorms landscape'.

The fourth theme was '*Beliefs about reindeer ecological impacts*. The three opinions which were most commonly described by these passages were 1) 'the reindeer have impacts on the vegetation'; 2) 'the reindeer are interfering with reforestation efforts'; and 3) 'the number of reindeer should be reduced in the Cairngorms due to their impacts.' The first and second statements tap into a widespread belief expressed by several interview participants. Their belief was seemingly based upon anecdotal observations and secondhand stories since the first scientific research on this topic is currently underway by the Reindeer Project. Later reflection revealed the third subtheme to be an injunctive norm related to the first two beliefs.

The fifth theme was '*Future of the reindeer*'. This theme encompassed statements that were a mixture of thoughts, meanings, and evaluations. Sometimes these passages touched on management, roaming, tourism, and so on. But they are united by their forward-looking nature. Almost all stakeholders expressed optimism about the future prospects of the reindeer in the Cairngorms. Only one person was somewhat pessimistic about the future of reindeer in Scotland. Another lone stakeholder went further than just expressing an attitude about the CRH. That person discussed the positive future possibilities of using the reindeer to educate visitors about climate and ecological change.

The sixth theme was '*Beliefs about reindeer identity*'. At a later stage in the analysis, the author began referring to this construct by the more general term 'perception of reindeer identity.' Regardless of the label, five unique categorizations of reindeer were contained in this theme. First, nearly all stakeholders described the ambiguous nature of the reindeer as hard to define exactly. However, when probed, reindeer identity could be narrowed down to four other categories: wildlife, semi-domesticated, livestock, or pet. Sometimes, the same person would label the reindeer as more than one type during an interview. Most stakeholders described the reindeer as either wild or semi-domesticated, especially those that emphasized the ambiguity of their classification. A small minority of interview participants referred to the reindeer as livestock, specifically sheep. Just one person referred to the reindeer as 'pet' in reference to a historical story. However, two stakeholders called the Reindeer Centre a 'petting zoo'.

The seventh theme was '*Attitudes to reindeer roaming behavior*'. While this theme overlapped with Theme 2, it was specific to just the reindeer behavior of ranging freely across the Cairngorms outside of their leased grazing areas without regulation. Many people seemed to see free-roaming as separate from other management regimes, likely because the reindeer have been permitted to free-roam for decades already, prior to the designation of the region as a SAC. The attitudes encompassed in this theme were split somewhat evenly between positive and negative. Additionally, in contrast to other attitudinal themes, a neutral position was also evident in this theme. It may also be related to just how long the reindeer have been free-roaming so that it has become taken for granted by locals.

The eighth theme was '*Past experiences of reindeer*'. Although some of these meaning units were intertwined with place meanings and other landscape values, this theme described those memories which stakeholders recounted of direct encounters with the Cairngorms reindeer herd, often with fond associations. The five ways in which stakeholders had directly experienced the reindeer were, 1) while participating in a Reindeer Centre Hill Trip; 2) at the Reindeer Center paddock in Glenmore; 3) while taking part in outdoor recreation in the national park/in the wild; 4) at the upper carparks of the ski resort; and 5) at a community Christmas parade where the reindeer made an appearance. The last memory, in particular, was meaningful or 'warm and fuzzy' for several people. It was associated with a certain civic pride that the reindeer represent the Cairngorms, and Aviemore/Glenmore specifically, all over the UK and even in television and movies. Frequently, this theme was also associated with perceptions of reindeer identity.

The ninth theme was '*Wildlife values and beliefs*'. This theme has the lowest valence of any of the major themes. However, it was distinct enough to warrant inclusion as coding went along. The sample of interview participants was roughly split between the two primary wildlife value orientations, Domination and Mutualism. These value orientations were evoked in particular by

discussions of hunting/culling as reindeer populations control techniques and the consumption of reindeer meat. This is unsurprising given that hunting and appropriate use are the two basic beliefs which constitute the Domination orientation. The occurrence of this theme and the strong reactions it evoked influenced the author's decision to subsequently work the wildlife value orientations scale into the survey instrument.

2.5.2 Implications for Phase 2 of research

As an elicitation study, the preliminary findings from Phase 1 research, had a direct bearing on the quantitative study, Phase 2, through the design of the questionnaire. This topic is fully explicated in §3.3.1, but it must be introduced here to guide the reader across the gap between the two phases of the case study.

The ninth theme of 'Wildlife values and beliefs' was interrelated with the themes of Reindeer Identity, Management, Free-roaming, and Environmental Impacts. These themes and the cognitive hierarchy model influenced the choice of the WVO scale for the standardized part of the survey instrument, 'Section 1' (cf. App. D). The customized parts of the survey instrument, 'Sections 2' and 'Section 3', were designed on the basis of the nine themes and their subthemes. Section 2 was initially labeled 'Attitudes towards Reindeer' and later renamed *Reindeer Cognitions* after the author became more familiar with each cognitive construct in the hierarchy. Table 3 in the next chapter will show the reader precisely how the author translated the nine themes and their subthemes into discrete items (statements) to be measured on the questionnaire.

In later stages of data analysis, after fieldwork concluded, the author consulted with supervisor M. Jacobs in order to better interpret the results of statistical testing and data reduction, such as exploratory factor analysis (EFA). At that time, testing revealed that *Reindeer Cognitions* were not simply the nine cognitive constructs initially identified by the author using RITA. Instead, the EFA showed that these themes, subthemes, and their corresponding survey items were roughly grouped as either 1) psychological and social meanings for the reindeer or 2) cognitions about the environmental consequences of the herd. The first group was named 'psychosocial meanings for reindeer', and it included subthemes from the RITA themes of *'Attitudes towards reindeer tourism'*, '*Landscape and place meanings*, and '*Attitudes and Norms to reindeer roaming behavior*'. The second group was named 'perceptions about environmental consequences of reindeer', and it included subthemes from the themes of *'Attitudes and norms regarding management'* and '*Beliefs about reindeer environmental Impacts'.*

Finally, reflection upon all of the data collected in the elicitation study (RITA themes, observations as field notes, and the author's experience of the empirical context) led the author to hypothesize that perceptions about the categorical identification of the reindeer along with personal characteristics and demographic traits of people must influence their cognitions about reindeer. These items were later measured in survey Section 3. The coding theme '*Beliefs about reindeer identity*' became the construct '*perception of reindeer identity*', and the theme '*Past experiences of reindeer*' became survey item '*reindeer experiences'.* Demographic data were collected only on place of residence and nationality.

In summary, the elicitation study results revealed four things: 1) the wildlife values orientations scale was appropriate to use in the context; 2) the two main components of cognitions about reindeer were psychosocial meanings and evaluations of their environmental impacts; 3) beliefs or evaluations of how the reindeer should be classified (wild, livestock, etc.) seemed meaningful and somewhat contentious; and 4) personal characteristics, such as past experiences and place of residence, were somehow relevant to the cognitive image of reindeer and worth a deeper look.

2.5.3 Limitations of Qualitative Methodology

Further reflection on the qualitative methods revealed limitations that may have affected results. Such limitations were found in both the sample and the methods for data collection and analysis.

Sampling Limitations

The sample for the elicitation study was limited in a few ways. The most obvious limitation was its size. While 11 interviews began to reveal the diversity and complexity of meanings attached to the reindeer, it was simply too small of a sample to achieve saturation of perspectives in the population of reindeer stakeholders. The sample is therefore not representative of that population. However, this sample size was typical for an MSc research project and adequate as an elicitation study for the quantitative phase to follow. Further, given the time available, it was the biggest sample that could be collected in that span of time between the (delayed) approval by the Inverness College-UHI Ethical Committee and the beginning of the autumn school holidays in the UK, the period allotted for collecting surveys. One final weakness was that the sample lacked an interview with a true reindeer tourist. The author attempted to compensate for this during the elicitation study through observations of tourists on several Hill Trips, informal conversations with reindeer tourists before and after Hill Trips, and personal visits to the Reindeer Centre and paddock.

Method Limitations

Interviews

The process of gathering interview data presented some limitations. A challenge in two of the interviews was that two people were interviewed simultaneously. Despite the participants suggesting and consenting to this arrangement, this could compromise the confidentiality of the interviews. Additionally, the presence of a colleague in both cases may have led to self-censure and limited the freedom of the participants to completely articulate their perspectives in the same way as if alone with the interviewer. Another limitation was that participants had different amounts of time available for the interview. This resulted in not all topics being covered in each interview, making it difficult to compare results. The greatest limitation was that there was very little time between interviews due to the time constraints described above. As all 11 interviews occurred in the span of just 2 working-weeks (10 days), some interviews were conducted with hours of each on the same say and others one day apart at most. This condensed timeframe meant there was insufficient time for the author to process data, analyze and then reflect deeply upon it. It was for this reason that the RITA procedure was chosen over more typical methods of qualitative data analysis.

Rapid identification of themes from audio recordings

Because the author was using the RITA method for the first time, some challenges arose. Due to limits on time in the field and the cognitive capacity of the author, the place-based research findings were narrower in focus than initially planned. Only those place meanings that were directly related to the reindeer and reindeer tourism were analyzed and presented in this thesis. This narrow focus meant that some nuance was missed by this analysis. Loss of nuance is an acknowledged and unfortunate side effect of the RITA method (Neal et al., 2015). If the reader would like a full description of stakeholders' place meanings for the Cairngorms landscape, please consult the Cairngorms Reindeer Research Programme Report, Phase 1: April 2019.[3] It contains an alternate analysis of the interview data conducted by my thesis co-supervisor, Dr. Jessica de Koning. That analysis is similarly grounded in sense of place concepts, but it differs from this case study in both its methodological approach to analysis and some of its overall conclusions.

Another shortcoming of the RITA process was that it was prone to confirmation bias. Once the coding form was established from the preliminary analysis of two interviews and refined through using it on a few recordings, it was essentially fixed. Although wildlife values did emerge as a final theme during the whole RITA, it is possible that subtle themes were missed by the author. As the coding form was a literal reification of the themes set in place at the outset of analysis, it likely influenced the author to search intently for those obvious themes to the exclusion of more oblique or subtle themes in the data. Furthermore, if bias existed in the interpretation, it may have been potentially exacerbated by a lack of multiple coders. Neal et al. (2015) specifically indicate that when analyzing a dataset using RITA, more than one researcher should code the recordings and compare findings in order to enhance the inter-coder reliability of the findings. As this fieldwork was conducted by one student alone, this was not possible while still in the field and under the time constraints.

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[3] To receive a copy of that unpublished report, plese email the author of this thesis report, Michael Cacciapaglia at cacciapaglia1@gmail.com.

2.6 Conclusion: Bridging the two phases of research

Phase 1 results revealed the two most salient components of cognitions about reindeer were psychosocial meanings of the reindeer and perceptions of their environmental consequences. As these are both cognitive constructs, a cognitive approach was chosen for the quantitative study as well. It should be noted that emotions regarding reindeer also seemed to be important in the qualitative study, but it was outside of the scope of this research to investigate an affective approach as well. But an affective approach to understanding the reindeer might be an interesting starting point for future research. In this case, study cognitions were preferred because of their strong causal link to intentions and behavior. Phase 1 findings also revealed that *perceptions of reindeer identity* and two personal characteristics of stakeholder, place of residence and *reindeer experiences*, were relevant to the context and worth further investigation in Phase 2.

While the analysis of the qualitative data was still underway, the survey instrument (see App. D) was immediately drafted to reflect the preliminary findings from the RITA. Field notes, additional literature review, and multiple draft consultations with WUR academic supervisors and the UHI field supervisor all contributed to shaping the final version of the survey instrument that was used. That survey instrument, and the conceptual model which framed its approach to the reindeer context, along with survey results, will be fully presented in the next chapter.

Chapter 3.   Quantitative Study

3.1   Introduction

In this chapter, the second phase of research, the quantitative study, is described in detail across four sections. First, the theoretical framework of the cognitive hierarchy, introduced in Chapter 2, is revisited because it guided the second phase of research as well. However, an additional cognitive approach is added to the framework: the wildlife value orientations scale. The literature on the WVO scale and its many uses is reviewed. The first section concludes with the construction of a conceptual model that synthesizes the findings of the elicitation study with the theoretical frameworks. Second, the methods used to collect and analyze the quantitative data are presented. Third, the results of quantitative data analysis by IBM SPSS (Statistical Package for the Social Sciences) are shown. Fourth, those findings and some limitations of the quantitative study are discussed. A final section concludes Chapter 3 with a brief summary of both research phases, setting the stage for a comparative discussion that forms the bulk of Chapter 4.

3.2   Theoretical Framework

In this section, the theoretical frameworks that guided Phase 2 are explored. First, the theory of the cognitive hierarchy used to frame the qualitative study is revisited. Then, an additional model, still based on a cognitive approach to human dimensions of wildlife, is introduced: wildlife value orientations. Lastly, a conceptual model combining all three theoretical elements (cognitive hierarchy, WVO's, and place meanings) used to guide hypothesis testing during the quantitative study is presented and described.

3.2.1   The Cognitive Hierarchy, revisited

The theoretical framework of the cognitive hierarchy, reviewed in detail in §2.2.1, was carried forward to frame the second phase of this research, the quantitative study. Through iterative reflections upon the results of the elicitation study, the eight themes used in the qualitative data analysis were chosen to serve as the main variables and factors for the quantitative study. Later during analysis, those eight thematic factors were dubbed *Reindeer Cognitions*. Factor analysis eventually proved that rather than eight separate factors, these themes could actually be aggregated into just two, simplifying further testing. These two cognitive factors were labeled *psychosocial meanings or reindeer* and *environmental consequences of reindeer*.

3.2.2   Wildlife Value Orientations

The final theme which emerged from the qualitative analysis was *wildlife values and beliefs*. The emergence of that theme led the author to choose the wildlife value orientations scale as an additional dimension for measurement in Phase 2. That choice was reinforced by observations of reindeer tourism Hill Trips, informal conversations with research commissioners, reindeer herders, tourists and local residents and the process of reviewing literature. The next section presents a literature review of this third and final piece of the theoretical framework.

The cognitive patterns held by individuals can be categorized as value orientations and their constituent beliefs (Fulton et al. 1996; Vaske 2008). One thoroughly studied domain of values and beliefs is the wildlife value orientations (WVO). The WVO measurement tool enables identification and measurement of patterns of belief regarding human-animal interactions and relationships, held by the individual to be true (Fulton et al., 1996). The theory of WVO distinguishes between two opposing orientations: Domination versus Mutualism. The domination orientation describes people who think that wildlife should be managed for human benefit. The mutualism orientation describes people tend to think of wildlife as part of an extended family (Vaske, 2008). The WVO model further distinguishes between four basic wildlife beliefs that constitute the higher-order value orientations. The two beliefs of Domination are *appropriate use* and *hunting.* The two beliefs that constitute Mutualism are *social affiliation* and *caring* (Jacobs, Vaske, & Roemer, 2012).

The WVO model was chosen for several reasons. The wildlife beliefs and value orientations have been refined through extensive theorizing and prior research (Teel et al., 2010; Teel, Manfredo, & Stinchfield, 2007; Vaske et al., 2011). Thanks to a thorough publication record, the WVO's have become recommended for their generalizable results across cultural contexts (Teel et al., 2007). According to the theory of the cognitive hierarchy, general values and beliefs give rise to more specific attitudes and norms, which in turn directly influence behavioral intentions and behavior (Vaske, 2008). Furthermore, as a conceptual model, the WVO scale has demonstrated its predictive potential for a variety of constructs such as acceptability of management interventions (Vaske et al., 2011) and wildland preservation voting intentions (Vaske & Donnelly, 2009). In other words, the dreaded 'public outcry' over proposed management interventions, mentioned in several reindeer stakeholder interviews as a cause for concern, might be avoided, mitigated, or at least anticipated. Regarding the application of the WVO scale to the specific circumstances of reindeer in the Cairngorms, it is a well-established instrument that was chosen for its relevance to this case study on wildlife tourism and protected area management (Teel et al., 2010; Vaske 2008).

A final driver in the decision to adopt the WVO scale was to test it in a novel cultural context, that of the central Scottish Highlands. In an influential article Teel et al. (2007) laid out the vision driving their Wildlife Values Globally project. Ample evidence (cited throughout this report) exists to demonstrate that wildlife values influence attitudes and behaviors in contexts related to wildlife. Furthermore, WVO's may contribute to conflict about issues of wildlife management (Teel et al., 2007). Therefore, gathering data on human-wildlife relationships and wildlife values both within and across societies should be immediately useful for "guiding policy development, management, and educational efforts related to natural resource conservation" (p. 298). The article also argues that a global shift in wildlife values is underway and that this shift is tied to most human societies transitioning from industrial system and materialist cultures to post-industrial and post-materialist culture (Teel at al., 2007). However, the authors argue that many more studies are needed to

provide supporting evidence for their hypothesis, promote cross-cultural understanding of the phenomena and the applicability of the WVO concept. This case study was motivated in part by their call to action.

3.2.3 Place Meanings

Although the Phase 2 theoretical framework was primarily based on the cognitive hierarchy, the landscape/sense of place theory which partially guided the Phase 1 elicitation study was also part of the equation. Place meanings, landscape values, and other place-based concepts are not explicitly included in the conceptual model for quantitative research. One reason for this was methodological incompatibility, as place meanings have almost exclusively been investigated via qualitative methods. However, the design of two variables tested by the survey instrument, *perception of reindeer identity* and *reindeer experiences*, was directly influenced by responses to the first section of the Interview Guide, 'the Cairngorms landscape' (cf. App. A). That section was designed expressly to elicit place meanings.

The emphasis on place was also intentionally carried forward into Phase 2 by testing the demographic variable *place of residence*, while other demographic variables were excluded. Together, *place of residence* and *reindeer experiences* comprised personal characteristics of the survey respondent. Another reason for their inclusion in the survey was the practical goals of this research. The funding commissioners of this study were particularly keen to understand differences between local residents and visitors' views on the Cairngorms reindeer and reindeer tourism. It was assumed prior to the research that significant differences would exist. Therefore, a place-based approach also seemed appropriate.

3.2.4 A conceptual model for Phase 2

Drawing upon the preliminary results of the elicitation study, a conceptual model was constructed, combining elements of the three theoretical concepts discussed above, 1) the cognitive hierarchy, 2) the wildlife value orientations, and 3) place meanings. This model can be seen in Fig. 4, below.

A hypothesized flow of causal relationships is visually depicted in Fig. 4 via one-way, directional arrows from independent variable to dependent variable. This is meant to mimic a conventional description of quantitative testing hypotheses (seen immediately below Fig. 4), whereby the independent variable comes first in the sentence, followed by the dependent variable (Vaske, 2008). For an example of this, look at Hypothesis 1 (H1): 'Wildlife value orientations are related to *Reindeer Cognitions'.* The independent variable, wildlife value orientations, is hypothesized to have an effect on the dependent variable, *Reindeer Cognitions*. The hypothetical relationship between the two variables in H1 is represented visually in Fig. 4 as WVO → *Reindeer Cognitions*. The arrow is labeled H1 to make the model more legible. All other arrows are labeled in the same way.

The author categorized most of these variables (independent/dependent) based on an understanding of the upward-trending influence of values and value orientations at the foundation of cognitive hierarchy (cf. Fig 1., §2.2.1). Therefore, WVO's lower in the hierarchy are predicted to affect *Reindeer Cognitions*, a bundle of meanings, norms, attitudes, and evaluations that sit higher in the hierarchy. However, the author must admit that some amount of his personal intuition,

perhaps informed by informal conversations, anecdotal observations and his own unique experiences with the reindeer and the Cairngorms landscape, contributed to designing some elements of the model.
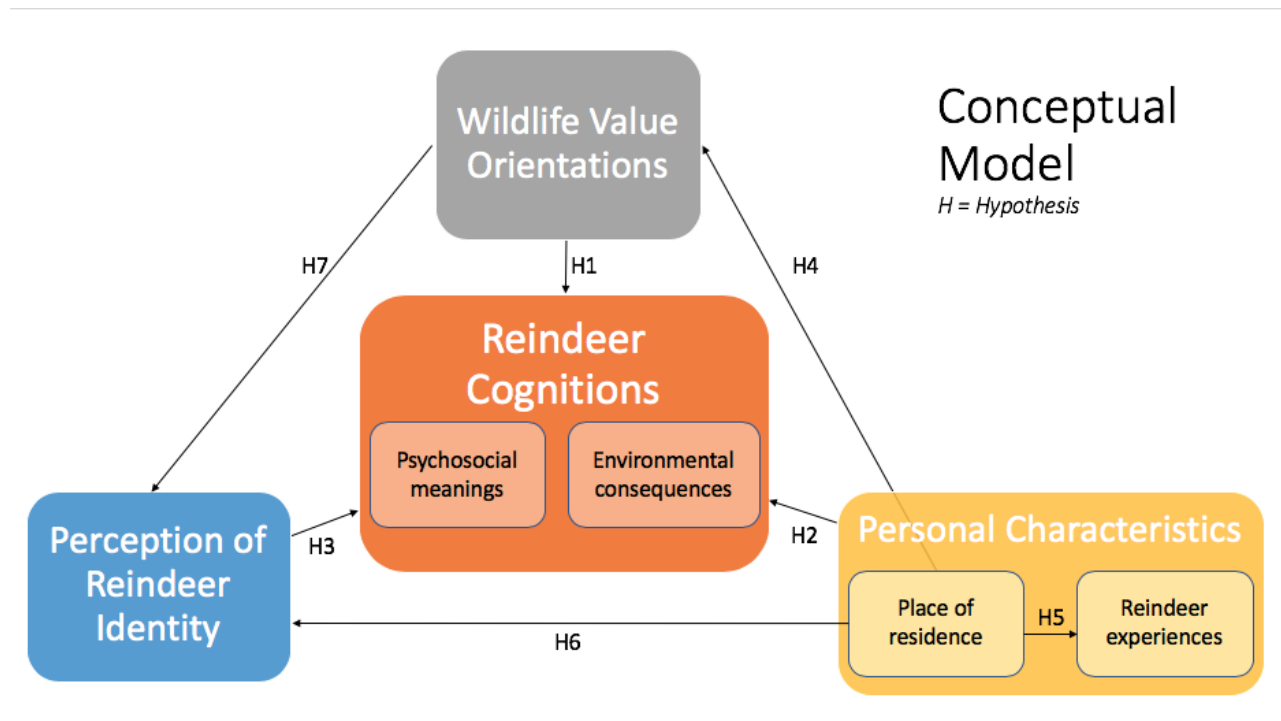
Figure 4. Conceptual model of Reindeer Cognitions, illustrates the hypotheses tested in Phase 2.

The following hypotheses (H) were tested in the quantitative study:

H1 – Wildlife value orientations are related to *Reindeer Cognitions*
    H1a – The two wildlife value orientations (Domination, Mutualism) are related to *Reindeer Cognitions*
    H1b – The four basic wildlife beliefs (Social Affiliation, Care, Appropriate Use, Hunting) are related to *Reindeer Cognitions*
    H1c – WVO clusters are related to *Reindeer Cognitions*

H2 – Personal characteristics are related to *Reindeer Cognitions*
    H2a – Place of residence is related to *Reindeer Cognitions*
    H2b – *Experiences with reindeer* are related to *Reindeer Cognitions*

H3 – *Perception of reindeer identity* is related to *Reindeer Cognitions*

H4 – Place of residence is related to wildlife value orientations

H5 – Place of residence is related to *experiences with reindeer*

H6 – Personal characteristics are related to *Perception of reindeer identity*
    H6a – Place of residence is related to *Perception of reindeer identity*
    H6b – *Experiences with reindeer* are related to *Perception of reindeer identity*

H7 – WVO cluster membership is related to *Perception of reindeer identity*

Phase 2 conceptual model in place, we move now to a section that lays out the methods used to operationalized that model through survey data collection and statistical analysis.

3.3   Quantitative Methods

3.3.1   Data collection via structured questionnaire

Sample

The population of interest for this study was the widest possible circle of stakeholders of the Cairngorms reindeer herd and the various issues associated with it at present, (i.e., essentially the general public within the CNP at the time of sampling). See §2.3.1 for a definition of stakeholder. The population of reindeer stakeholders sampled included visitors to the area and local residents. 'Visitor' is defined here as any person not residing permanently in the Badenoch & Strathspey region. Visitors were composed of general visitors/tourists of the Cairngorms National Park and reindeer tourists (cf. p. 16, footnote 2 for definition), that subset of general visitors who intentionally engaged in some act of reindeer tourism (cf. p. 1, footnote 1 for definition). 'Local resident' (or 'local') is herein defined as someone residing permanently within Badenoch & Strathspey, which includes many towns and villages such as Aviemore, Grantown-on-Spey, Glenmore and so on. The decision to designate residents of this region as 'local' was based on the advice of the UHI field supervisor, Dr. L. de Raad, a local resident herself. Initially, a third choice for place of residence was also included to capture data on individuals residing within the Cairngorms National Park boundary but outside the Badenoch & Strathspey area. In the end, only 11 respondents fell into this category, so it was decided that these 11 respondents would be added to the general visitor population after consulting with thesis supervisor, Dr. M. Jacobs, during data analysis.

In order to implement the Phase 2 research design and sample the population described above, a total of 428 questionnaires were collected from the population of reindeer stakeholders via non-probability sampling. Although a probability (i.e., random) sample is generally preferred (Vaske, 2008), a non-probability sample was taken because of the small window of opportunity to conveniently sample visitors before the tourism high season ended for the year. The author set an initial goal of 350 completed surveys for the sample prior to data collection. Conventionally, a sample of 100 respondents is considered to be the minimum sample size necessary to perform statistical analysis (Field, 2013; Vaske, 2008). Therefore, the sample size of this study is conventionally considered to be a large sample for an MSc thesis project. Having a large sample enhances the validity and representativeness of the study (Vaske, 2008). Only English-speaking adults were surveyed (18 years or older) in keeping with the ethical plan for data collection approved by UHI. In total 285 respondents were visitors to the region, and 131 respondents were

local residents of Badenoch & Strathspey. An additional 12 respondents did not fill in their place of residence.

Sampling sites and protocol

All survey collection was conducted between 18/10/2018 and 10/11/2018. First, convenience sampling of visitors (and the odd local) was conducted within the Glenmore Forest Park from 18/10 to 18/30. This period was intentionally chosen as it spanned the autumn school holidays of the United Kingdom and many European countries. The author was advised by several stakeholders and the field supervisor that visitation numbers for the Reindeer Centre, the Glenmore Forest Park, and the CNP would be higher at this time before going into the winter 'off-season' for the region, a period of decreased visitation.

An effort was made to sample both general CNP visitors and reindeer tourists by sampling at six primary sites dispersed along what is known as the 'Glenmore Corridor'. The corridor is defined as the stretch of road (officially signed as 'Coylum Road') that leaves Aviemore heading east by southeast through the Rothiemurchus Estate, passes through Glenmore itself on the banks of Loch Morlich (cf. Fig. 5), and then ascends up into the hills where it terminates on the flank of Cairn Gorm at the carparks of the Cairngorm Mountains ski resort (cf. Fig. 6, next page). Altogether, four sites were chosen in the lower Glenmore Forest Park area, and two sites were chosen in the upper mountain area.
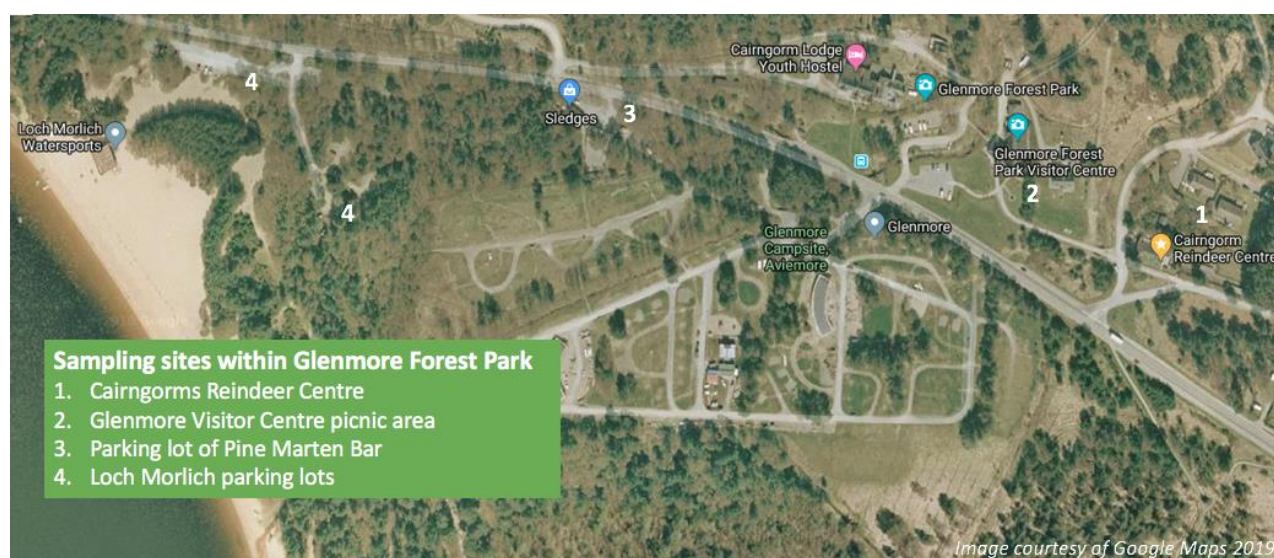
Figure 5. Survey sampling sites in the Glenmore Forest Park, CNP

A variety of sampling sites were chosen to increase the likelihood of sampling a diversity of visitors with different agendas, motivations, and demographics. For example, sampling in the lower Glenmore area accessed many families with young children, while the two upper carparks allowed the author to approach recreation-oriented visitors, often solo young adults or couples of all ages that began hill walks there. Looking at Fig. 6 below, Site 6 at the carparks actually overlooks the reindeer hill enclosure itself, and reindeer are reported to frequent these car parks, especially during wintertime. By including a variety of sites, there was an added bonus of also occasionally

surveying local residents who regularly used the Loch Morlich carparks (site 4) for dog-walking and the upper sites (5 and 6) to begin hill walks, especially on the weekends.

After the end of the school holidays, the sampling effort was then non-probabilistically focused on surveying local residents from 18/31 to 10/11. Sampling sites at five communities across the Badenoch & Strathspey region (Cf. Fig. 7, next page) were chosen in consultation with the field supervisor. The author first attempted to survey locals in front of grocery stores, which are the main community gathering points of many villages, but this approach was met with very few positive responses. People were too busy, already walking quickly to their car, or annoyed by what they seemed to find a strange request. Eventually, sampling effort became focused almost solely on community events in the Strathspey villages of Aviemore, Carrbridge, Grantown, & Boat of Garten. These public events took place at libraries, village halls, hotels, and church halls and included weekly lunches for community members, fundraising events, movie showings, informative talks, and so. Wherever possible, the author sought out gatekeepers to gain permission before beginning sampling at a given location or event. Anecdotally, the response rate at these community events was extremely high.

Figure 6. Sampling sites of the upper Glenmore area, plus the reindeer hill enclosure

Sampling sites for local residents
of the Badenoch & Strathspey region

1. Glenmore Forest Park
2. Aviemore
3. Boat of Garten
4. Carrbridge
5. Grantown-on-Spey

Image courtesy of Google Earth 2019
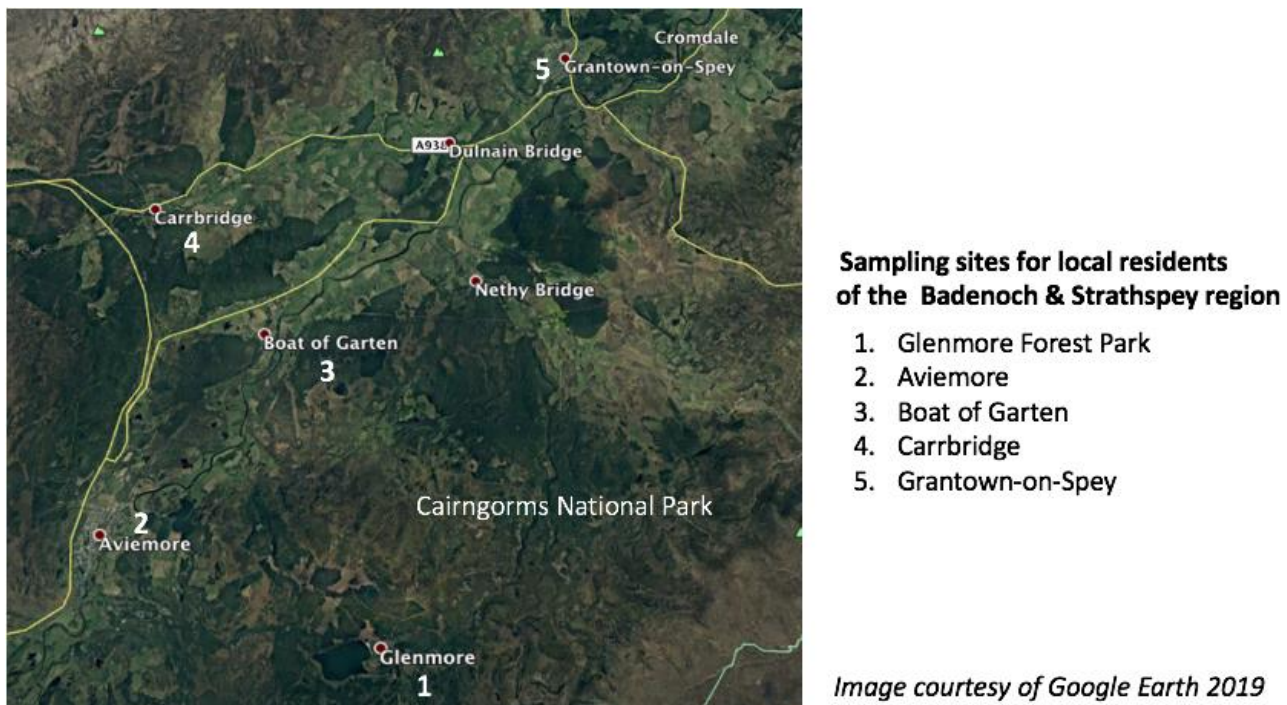
Figure 7. Sampling site for local residents across Badenoch & Strathspey

Survey Instrument

The survey instrument, a structured questionnaire consisting of three sections on both sides of one piece of A4 paper, was based upon the preliminary findings of Phase 1, the elicitation study. The survey instrument is reproduced in its entirety in Appendix D.

The first section on the front side of the survey was labeled 'General Beliefs about Humans and Wildlife' and composed of 18 items (out of a possible 19) transposed directly from the standardized WVO scale. The preliminary findings from the elicitation study guided the author to choose the wildlife value orientations scale as the most appropriate nature-based tourism measurement tool. This well-studied and reliable measurement tool was chosen for two main reasons. First, because qualitative results related to it were found in several themes, particularly *Beliefs about reindeer identity* and *Wildlife values and beliefs*. Second, because of the predictive potential, it has demonstrated across many contexts relating to human-wildlife relationships. Since the study of wildlife tourism is a relatively young field, a diversity of conceptual frameworks were possible to choose from. However, prior research has shown the WVO scale to be an especially powerful and generalizable tool in that field. It seemed ideally suited for the practical management interests and needs of the study's commissioners, the CRRP.

Respondents were directed to read each statement and choose one response on a 7-point Likert scale, ranging from Strongly Disagree (1) to Strongly Agree (7). Normally, the WVO scale begins with statements used to assess the Domination orientation of the individual. Many of the statements can seem quite provocative as they evoke hunting and killing of wildlife, a controversial topic in the UK. Therefore, the author chose to reverse the order of statements and put the 'softer' Mutualism

orientation statements first to give survey respondents a chance to 'warm up' before coming to the provocative hunting section. Additionally, other minor adjustments were made to the wording of a few WVO items to match the Scottish context (e.g., replacing 'hunting' with 'culling'). While drafting the WVO portion of the survey, the author made a major mistake. Inexplicably, one item (regarding the basic belief Caring) of the full 19-items of the standard WVO scale was left out entirely. What repercussions this may have had on the overall results is unknown.

The second and third sections were on the backside of the survey. In Section 2 of the survey, five thematic constructs were drawn from the qualitative findings (cf. §2.5.1) were measured on a continuous scale labeled 'Attitudes Regarding the Cairngorms reindeer' (Cf. App D). These general themes in abbreviated form were: 1) Tourism, 2) Landscape & Place Meanings, 3) Free-roaming, 4) Environmental Impacts, and 5) Management. Those five themes and their component survey items can be seen in Table 3, below. All of these items were measured using the same 7-point Likert scale as the first section. While initially labeled 'Attitudes' for the sake of simplicity, this section was actually measuring a variety of cognitive constructs represented by statements drawn directly from qualitative data analysis. It was later renamed *Reindeer Cognitions.* Full results are presented in the sections to follow.

In survey Section 3, the first two items gathered demographic data on the respondents pertaining to their place of residence and nationality. These were the only two factors of demography deemed to be relevant in this case study based on the interests of the CRRP.

Table 3. The Reindeer Cognitions scale, organized by 5 themes drawn from elicitation study

Thematic construct	Survey item
Beliefs about reindeer **Tourism**	The Reindeer Centre is an important attraction of the Glenmore area.
	Seeing the reindeer is a highlight of visiting the Cairngorms.
	Reindeer tourism is important to the local economy.
Landscape & **Place Meanings**	The reindeer are an essential part of the Cairngorms landscape.
	The presence of the reindeer makes the Cairngorms feel wilder.
	The presence of the reindeer makes the Cairngorms a more unique place.
	Reindeer belong in the Cairngorms.
Norms regarding **Free-roaming**	The reindeer should be allowed to roam freely all throughout the Cairngorms.
	The reindeer should be kept out of sensitive areas in the Cairngorms.
Beliefs about **Environmental Impacts**	The reindeer have a negative impact on the vegetation of the Cairngorms.
	The presence of the reindeer impedes habitat restoration and reforestation.
	The number of reindeer should be controlled to minimise environmental impact.
Norms regarding reindeer **Management**	The reindeer should be managed more like other species of livestock, e.g., sheep.
	The reindeer should be managed more like other species of wildlife, e.g., red deer.
	The reindeer are being managed properly just the way that they are now.

Two other themes from Phase 1 were measured in Section 3. The theme '*Past experiences of reindeer*' was incorporated into the questionnaire as a series of dichotomous variables in survey item 3.3 [*I have seen (or will see the Cairngorms reindeer...)*]. The item was designed to gather categorical data on the ways in which the respondent had encountered the Cairngorms reindeer either on their current visit to Glenmore, a previous visit, or at any other time and place previously, because the CRH appear at Christmas parades all over the UK each year. Respondents could also list an experience they expected to have with the reindeer in the near future. The choice to elicit 'future experiences' was made because many reindeer tourists were sampled either, 1) as they queued in front of the Reindeer Centre shop between 09.30 and 10.30 in order to buy tickets to enter the reindeer paddock or for that day's 11.00 Hill Trip, or 2) at the Sugarbowl car park between 10.30 and 11.00 just before departing on the Hill Trip. These respondents could say with almost total certainty that they would soon see the reindeer. The results associated with this item are referred to as *reindeer experiences* in the rest of this report.

Lastly, the thematic construct '*Beliefs about Reindeer Identity*' was measured as a categorical variable in the final item on the questionnaire (*I think of the reindeer of the Cairngorms as being...*). Interest in this construct stemmed directly from the Phase 1 interviews in which stakeholders discussed their '*perception of reindeer identity*', as the author later dubbed them. The four categories for reindeer identity were directly drawn from interviews, observations, and interactions with reindeer tourists. Additionally, while participating in Hill Trips and informally chatting with reindeer herders and tourists, the author heard several people compare the reindeer being to cows and sheep (livestock) or dogs (pets). This phenomenon was particularly associated with tourists hand-feeding the reindeer. The word 'identity' was chosen to denote the social construction of how the reindeer were being perceived, rather than 'status' or 'classification' which denote legal or scientific nomenclature.

The second and third sections of the survey were exploratory. The author designed these sections to gather data that could be used to triangulate Phase 1 findings. The process of triangulation is reported to enhance the reliability and validity of those initial findings. Some authors claim is one of the main strengths of mixing methods (Creswell, 2014). A discussion of attempts at triangulation is found in Chapter 4. Because Phase 1 yielded a fairly nuanced, if preliminary, understanding of the constellation of meanings, beliefs, and perceptions evoked by reindeer and the Cairngorms landscape, Phase 2 was able to shift from being purely exploratory in nature to also utilize the explanatory power of inferential statistics to test hypotheses (cf. §1.2.4).

In the process of revising the survey, one construct did not get carried forward from the elicitation study to the quantitative study, the theme '*Future of the reindeer*'. Upon further reflection, these data overlapped too much with data from the Tourism, Management, and Environmental Impacts themes. Therefore, the author dropped this theme as a separate category from Phase 2. Ultimately, 8 out of 9 RITA themes (cf. Table 1, §2.4.1) were turned into three survey sections. Next, the procedure by which these survey data were processed and analyzed is discussed.

3.3.2   Procedure for quantitative data analysis

In order to test relationships between the study variables, the IBM SPSS software package was used. First, the author entered all data from the hard copies of the questionnaires directly into the

program, creating a database. This database was then used to produce descriptive statistics, and it was subjected to a variety of statistical tests, the results of which form the bulk of findings in this study.

Descriptive Statistics

As a starting point, descriptive statistics were used to examine the overall demographic make-up of the sample by place of residence and nationality. Additionally, basic descriptive statistics such as frequencies, percentages, mean (average of total values, or central tendency of a single variable) and standard deviation (the amount of variance within the sample, or variability) were used to detect general trends in the dataset and produce visual representations to aid interpretation (Vaske, 2008; Vaske & Donnelly 1999). These statistics were first produced in SPSS for the two discrete constructs which were measured by a single, categorical survey item, *reindeer experiences* and *perception of reindeer identity*. Then, they were produced for two measurement scales on the survey, wildlife value orientations, and *Reindeer Cognitions*. Tables and figures are used to present these results in the next chapter.

Data Reduction

In order to proceed from descriptive statistics into more complex inferential testing, the number of factors and variables had to first be reduced to make the data set more manageable for the author (Field, 2013; Vaske, 2008). The scales were first analyzed for their internal consistency between items before reducing the data into composite indices. These indices are made up of multiple survey items that represent overall latent constructs (Vaske, 2008). Two methods are commonly used to analyze scales in service of data reduction, the first being the reliability test. Reliability tests were conducted on both orientations (Domination, Mutualism) and the four constituent basic beliefs (Social Affiliation, Caring, Appropriate Use, Hunting) in order to assess the internal consistency of the wildlife value orientations scale.

The second method is exploratory factor analysis. The scale initially titled 'Attitudes towards the Cairngorms Reindeer', and herein referred to as *Reindeer Cognitions,* was created by the author *in situ* based on initial results of qualitative interviews and the literature review. Therefore, EFA was used to detect which items measure the same cognitive constructs, group them together into composite indices (factors), and produce a data-driven model for testing. Essentially, EFA is able to detect patterns of responses, sometimes unexpected, in how people in the sample responded to statements on the questionnaire (Jacobs, 2018b). Vaske (2008) further explains that EFA is used to "uncover a cluster of related variables (i.e., a factor) in a larger set of variables" (p. 507). Once extracted, these new factors were tested for their reliability as well. The stages of the EFA are fully discussed in the following chapter.

One step prior to data reduction, several items from both the WVO scale and *Reindeer Cognitions* scale had to be reverse coded (i.e., have their values inverted on the 7-point Likert scale) because they actually represent ideas that are the inverse of other items within their composite indices. For the WVO scale, two items from Hunting belief were reverse coded: 1) *Hunting is cruel and inhumane to the animals* and 2) *Hunting does not respect the lives of animals*. For the *Reindeer Cognitions* scale, an additional items were recoded: 1) *The reindeer should be kept out of sensitive areas of the Cairngorms,* and 2) *The reindeer are being managed properly just the way that they are*

now. Data transformations and reduction complete, analysis by inferential statistical testing could proceed.

Inferential statistics

The true power of statistical testing and quantitative methods, in general, comes from inferential statistics, which are used to examine relationships between variables. Testing can occur for either the differences or the associations between variables, the two main types of inferential statistics (Vaske, 2008). In this research, both were used to makes inferences about the reindeer dataset. First, tests such as Independent sample t-tests, Analysis of Variance (ANOVA), Chi-square and K-means cluster analysis were performed to compare the responses of different groups within the sample (e.g., visitor/local) on a given variable (reindeer identity) and detect significant differences (Field, 2013; Vaske, 2008). Second, the associational (or relational) tests were performed to analyze if and how strongly different variables are related to one another. These tests included correlation tests, multiple regressions and the analyses of scales mentioned above (e.g., reliability test, exploratory factor analysis) (Field, 2013; Vaske, 2008). Some handy summaries of these tests and associated concepts are explained next.

Choosing a Statistical test and Effect size index

Before choosing a test, the variables must be properly identified as one of the three main types (Field, 2013; Jacobs, 2018a; Vaske, 2008). First, a dichotomous variable has just binary values, such as a question that can only be answered 'yes/no' or 'positive/negative'. Second, a categorical variable has more than two values that cannot be placed in any particular order. They are simply qualitatively different. For example, a question such as "What is your favorite color?" and the values are 'red, blue, green, yellow, orange, purple' and so on. Third, a continuous variable has 4 or more values that are logically arranged in some numerical order (i.e., increasing or decreasing), and the variable must be normally distributed (Jacobs, 2018a). A normal distribution (or Gaussian distribution) is when the test result values are symmetrically arranged around the mean and visually appears like the well-known 'bell curve' in graph form (Field, 2013). Once variables are determined, a test can then be chosen.

The two decision-making keys (Tables 4 & 5) are included here in order to justify the author's choice of each statistical test presented in the following sections. These easy-reference tables are adapted from Jacobs (2018a) and represent conventional standards and cut-off points that are generally accepted across the social scientific community (Field, 2013; Jacobs, 2018a; Vaske, 2008). They are very useful tools for a student, or anyone, just learning the basics of statistical testing.

Table 4 reflects the five most commonly used statistical tests. Jacobs (2018a) estimates that these tests account for approximately 90% of all statistical analyses found in leisure and tourism studies. An appropriate analysis strategy is chosen from the table by following these steps (also adapted from Jacobs, 2018a):

1. Determine the independent variable

2. Determine how the independent variable is coded (dichotomous/categorical/continuous)

3. Determine the dependent variable

4. Determine how the dependent variable is coded (dichotomous/categorical/continuous)

5. Determine how many independent variables are included in the hypothesis

The results from the tests in Table 4 (i.e. the test statistics in the fourth column from the left) primarily enable a researcher to determine the existence of statistical significance, or lack thereof, in a hypothetical relationship (Field, 2013). However, an extra step can be taken to assess the strength of that relationship by interpreting the value of the effect size index (EFI), found in the final column to the right of Table 4. The EFI value can be interpreted using the second table on the next page.

Table 4. Key to select the appropriate statistical test (Adapted from Jacobs, 2018a)

Independent variable	Dependent variable	Test strategy	Test statistic	Effect size index
Dichotomous or categorical	Dichotomous or categorical	Chi-square	χ^2	φ (2 by 2) or Cramer's V (2 or more by 2 or more)
Dichotomous	Continuous	Independent samples t-test	t	Cohen's d
Dichotomous or categorical	Continuous	1-way ANOVA	F	η^2
Continuous	Continuous	Correlation	F	Pearson's r
Dichotomous or continuous (1+)	Continuous	Regression	F	R^2

Also adapted from Jacobs (2018a), Table 5 gives the data analyst a roadmap to select the most appropriate EFI given the test strategy that was chosen using Table 4. For example, if a correlation test was conducted then the Pearson's *r* EFI should be interpreted. Once selected, Table 5 guides one in interpreting the effect size in practical terms, more comprehensible to the beginner. So we can see that there is a small effect size when Pearson's r = .10, or large effect size when Pearson's *r* = .50. A small effect size indicates that the significant relationship is minimal, whereas a large effect size implies a substantial significant relationship (Jacobs, 2018a). The veracity of this table is confirmed by Cohen's (1988) finding, which proved that the effect size values for different indices are mathematically equal and so enable direct comparisons between disparate tests and effect sizes. In essence, the effect size is a quantitative estimate of the portion of the variance of the dependent variable that is explained by the independent variable (Jacobs, 2018a). The more variance which the independent variable explains, the stronger its relationship to the dependent variable.

Table 5. Key to interpret effect size indices (Adapted from Jacobs, 2018a)

Effect size index	Associated test strategy	Small effect size (minimal relationship)	Medium effect size (typical relationship)	Large effect size (substantial relationship)
φ (2 by 2) or Cramer's V (2 or more by 2 or more)	Chi-square	.10	.30	.50
Cohen's d	Independent samples t-test	.20	.50	.80
η^2	1-way ANOVA	.10	.243	.371
Pearson's r	Correlation	.10	.30	.50
R	Regression	.14	.36	.51

The quantitative analysis could proceed with these tools in hand, along with the step-by-step directions and explanatory figures for running SPSS provided by Field (2013).

3.4 Quantitative Results

In this section, the results of the analysis of the quantitative data collected by the survey instrument are presented. Demographic data is first presented, which was gathered from each respondent on these personal characteristics: 1) place of residence, 2) nationality, and 3) personal experiences with the Cairngorms reindeer. Second, the descriptive results of the survey are shown. These descriptive results reflect total responses to survey items which measure: 1) wildlife value orientations, 2) cognitions about the Cairngorms reindeer (i.e., *Reindeer Cognitions*), and 3) perception of the identity of the Cairngorms reindeer. The third section describes the process of reducing the raw data in order to make the dataset manageable for subsequent testing. Data reduction was accomplished by analyzing the scales using: 1) reliability tests for the standardized WVO scale and 2) both exploratory factor analysis and reliability tests for the novel *Reindeer Cognitions* scale.

The final section of this chapter presents the results of differential and associational tests performed to test the hypotheses established in §3.2.4. Those seven *ad hoc* hypotheses arose directly from the qualitative elicitation study described in Chapter 2. The hypotheses were used to construct the conceptual model (cf. Fig. 4, §3.2.4) which guided Phase 2 data analysis. That model is

revisited in the discussion at the end of this chapter (cf. Fig. 16) in order to better illustrate the findings of the quantitative study.

3.4.1 Characteristics of the sample

The questionnaire was completed by 428 respondents in total, comprising the sample size of this research (N = 428). In some cases, respondents failed to fully complete the survey or left some items blank, whether intentional or accidental. Therefore, unique sample sizes (N) are presented along with each figure and table throughout this chapter. Three personal characteristics of the sample are examined. The first two comprise the demographic profile, including 1) place of residence and 2) nationality. A third and non-demographic personal characteristic to be described is *reindeer experiences*.

Demographic profile

Place of residence

As seen here in Fig. 8, the vast majority of survey respondents (69%) were visitors to the Glenmore area of the Cairngorms National Park. Local residents of the region Badenoch & Strathspey comprised 31% of total respondents. Given that the sampling effort was primarily concentrated on the Glenmore Forest Park, one of the most popular and highly visited areas of the Cairngorms National Park, this finding was not surprising.

N = 414
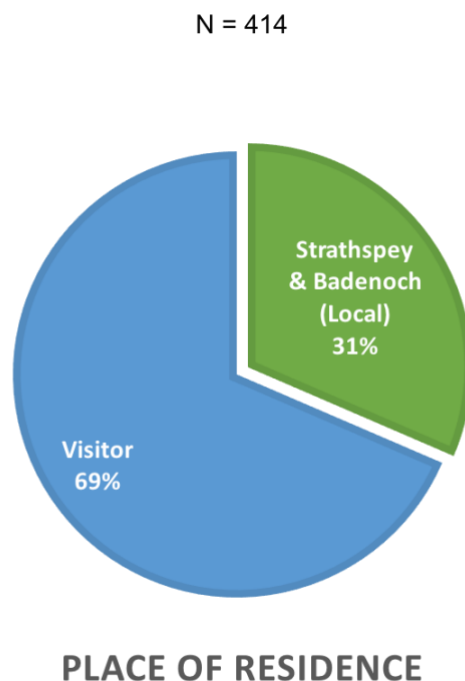
PLACE OF RESIDENCE

Figure 8. Place of residence by % of total sample

Nationality
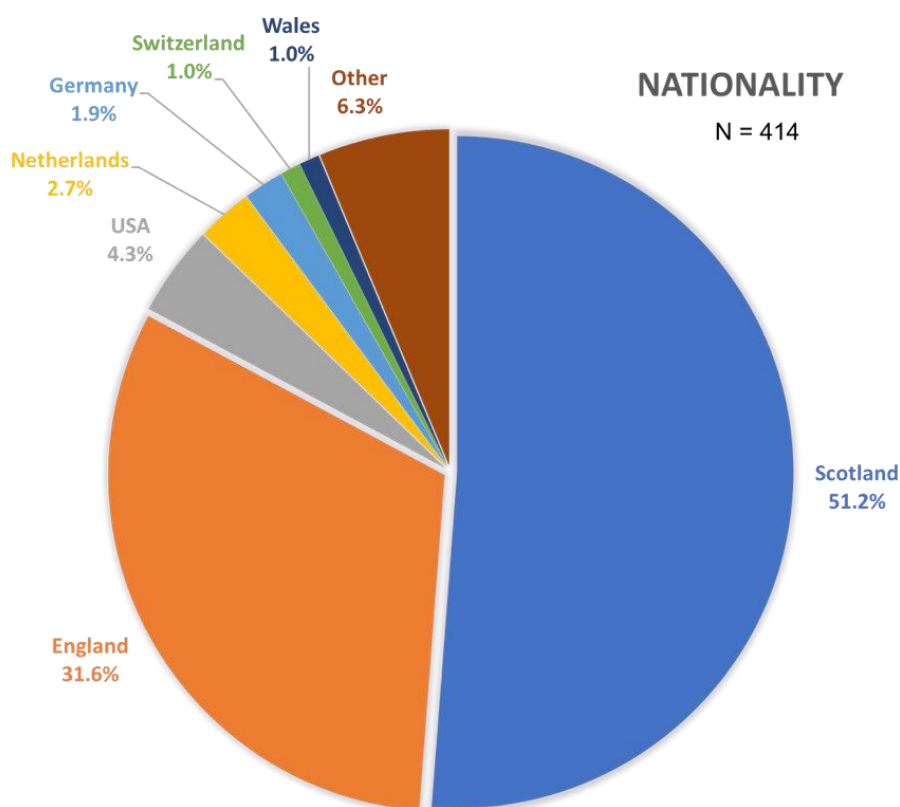
Figure 9. Nationality of respondents by % of total sample

As displayed by Fig. 9, most respondents (51.2%) identified as being of Scottish nationality, whether they were a visitor or local. Respondents from England comprised 31.6% of the sample, the next largest segment of the population. Finally, in descending order of number of respondents, other nationalities reported were American (4.3%), Dutch (2.7%), German (1.9%), Swiss (1%) and Welsh (1.0%). Those nationalities which individually represented less than 1% of the total sample are not reported here and subsumed into the Other category (6.3%). In total, 22 countries were represented in this sample.

Experiences with reindeer

Respondents were asked to report all the ways in which they had ever encountered the Cairngorms reindeer herd. Overall, 46% of those sampled reported seeing the reindeer at the Reindeer Centre paddock in Glenmore, the largest positive response. Next, 39% of respondents had seen (or shortly would see) the reindeer in the Hill Enclosure on the official Hill Trip led by a reindeer herder. Another large group (33%) was comprised of people who had seen the reindeer while 'in the wild' (i.e., while out hillwalking, skiing or otherwise recreating within the undeveloped areas of the national park). A further 22% of the sample had seen the reindeer at the upper carparks of the Cairngorm Mountain ski resort. Reindeer were reported to approach people at these carparks looking for food, especially in wintertime. Another 20% of all respondents had seen the Cairngorms reindeer while pulling Santa Claus's sleigh at a Christmas parade, a well-known activity of the Reindeer Centre for decades. The reindeer appear at many local Highlands parades, but they have

also toured all over the United Kingdom in past years and continue to do so. Finally, 18% of respondents in this sample had never seen the Cairngorms reindeer nor made any plans to do so on their visit to the national park. Fig. 10 visually displays these results by percentage and frequency.

I have seen (or will see) the Cairngorms reindeer at…

% of Total Respondents
(Frequencies in white)
N = 414

| Reinder Centre Paddock | Hill Trip | Hillwalking/Skiing | Cairngorm Mtn carparks | Christmas Parade | Never seen |
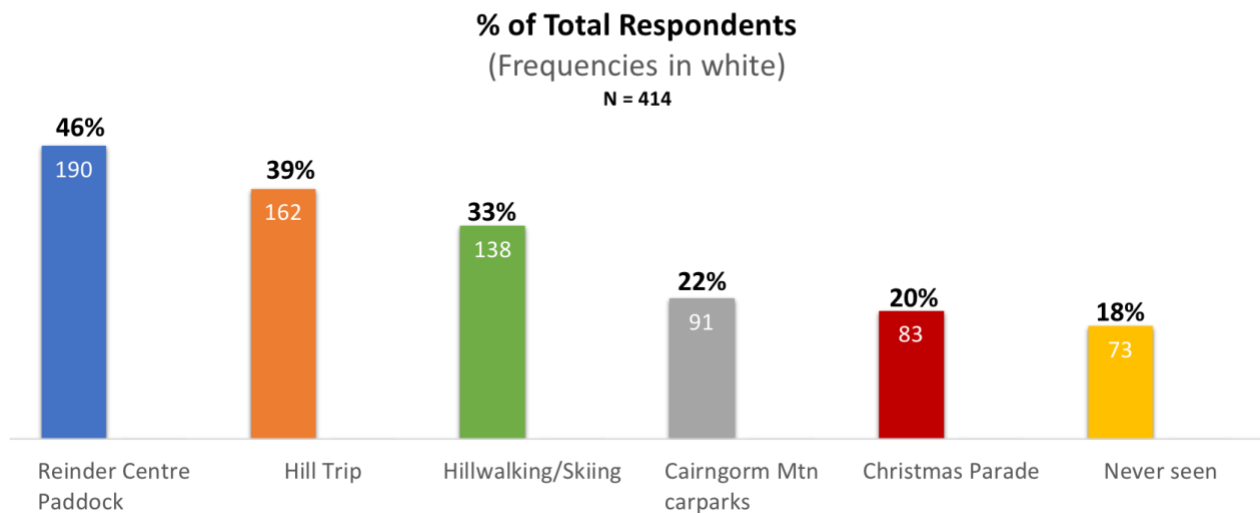
Figure 10. The experiences that respondents had (or were expected to have) with the reindeer by % of total sample[4]

Of these three personal characteristics, place of residence and *reindeer experiences* were chosen for further testing to see what, if any, relationship they might have had to wildlife value orientations or *Reindeer Cognitions*. Those relationships are reported later in this chapter.

3.4.2   Descriptive overview of the variables

This section presents the raw data resulting from the investigation into three variables that formed the basis for the conceptual framework and hypothesis testing. The first is *perception of reindeer identity*. The second is the *wildlife value orientations* (WVO) scale. The third is the *Reindeer Cognitions* scale.

Descriptive results for Perception of reindeer identity

As seen in Fig. 11, below, the majority (51%) of respondents thought of the Cairngorms reindeer as wildlife. Following this category in importance, 39% of respondents perceived of the reindeer as semi-domesticated animals. The other categories received few responses. Only 5% of the total sample viewed the reindeer as livestock, their actual classification according to Scottish Natural Heritage (personal communication, anonymous, 8 October 2018). Just 2% of respondents saw the reindeer as being pets. Finally, 3% of respondents chose to check more than one box in response to

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[4] Please note: because respondents could tick all boxes that applied, percentages don't add up to 100%. Instead, percentages reflect the number of respondents that ticked a box "Yes" out of the total sample size N=414.

this item despite clear instructions to select only one category. In the figure, this response is labeled 'Hybrid', and it perhaps reflects the ambiguous space which the reindeer inhabit in the minds of the general public. In summary, most respondents perceive of the reindeer as either wildlife or semi-domesticated animals.
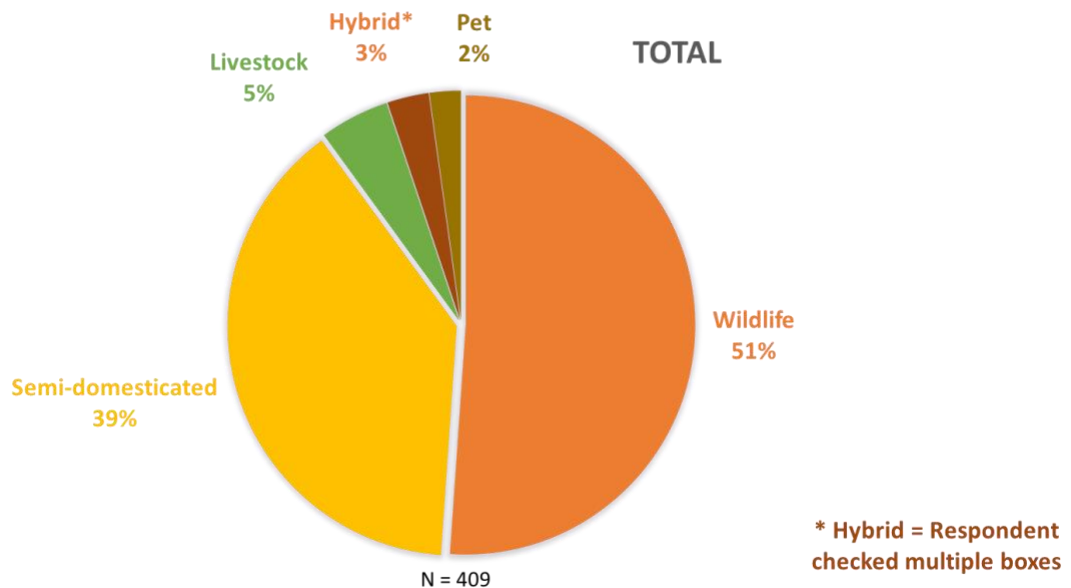
Figure 11. Perception of reindeer identity by % of total responses

Descriptive results for wildlife value orientations scale by basic beliefs

The raw data resulting from responses to the wildlife value orientations scale are displayed in Table 6 on the following page. This table contains the overall mean (average) scores for the entire sample per each item, as well as standard deviations for each score. The WVO and *Reindeer Cognitions* scale were both assessed on a 7-point Likert scale with anchors at 1 and 7, making 4 the midpoint of this range indicating a neutral or "I don't know" response. On this questionnaire, 4 was labeled "Neither Agree nor Disagree." On a 7-point scale, a low mean score (between 1 and 4) indicates a negative or disagreeable reaction to the survey item ranging from Strongly Disagree (1) to Somewhat Disagree (3). A high score (between 4 and 7) indicates a positive or agreeable response to the survey item ranging from Somewhat Agree (5) to Strongly Agree (7).

The standard deviation demonstrates the variance within the responses for each score. Generally speaking, any standard deviation > 1.0 is considered large by convention (Field, 2013). This does not mean the data is 'bad' or 'good' *per se*, but rather that there is simply a wide range of responses for the given survey question, reflecting a diversity of views within the sample. All standard deviations for the WVO scale responses are greater than 1.0 (cf. Table 6), indicating a large amount of variance in the sample.

The results for the WVO scale are organized first on the basis of the two basic beliefs which comprise the two value orientations. Mutualism wildlife value orientation is comprised of Social Affiliation and Caring beliefs. Domination is comprised of the Appropriate Use and Hunting beliefs. An overall mean score for each WVO will be provided at the end of this subsection.

Table 6. Descriptive results for WVO scale, grouped by basic belief

Wildlife Value Orientations	Survey Items N = 425	Mean	Standard Deviation
Social Affiliation	We should strive for a world where humans and wildlife can live side by side without fear.	6.36	1.06
	I view all living things as part of one big family.	5.88	1.24
	Animals should have rights similar to the rights of humans.	5.35	1.51
	Wildlife are like my family and I want to protect them.	5.67	1.24
Caring	I care about animals as much as I do other people.	5.27	1.64
	It would be more rewarding to me to help animals rather than people.	3.93	1.73
	I take great comfort in the relationships I have with animals.	5.68	1.28
	I value the sense of companionship I receive from animals.	5.85	1.20
Appropriate Use	Humans should manage wildlife populations so that humans benefit.	4.33	1.79
	The needs of humans should take priority over wildlife protection.	3.45	1.61
	It is acceptable for people to kill wildlife if they think it poses a threat to their life.	4.46	1.60
	It is acceptable for people to kill wildlife if they think it poses a threat to their property.	3.18	1.57
	It is acceptable to use wildlife in research even if it may harm or kill some animals.	2.82	1.59
	Wildlife are on earth primarily for people to use.	1.89	1.16
Hunting	We should strive for a world where there's an abundance of wildlife for hunting and fishing.	3.01	1.65
	Hunting is cruel and inhumane to the animals.	4.45	1.90
	Hunting does not respect the lives of animals.	4.57	1.86
	People who want to hunt should be provided the opportunity to do so.	3.32	1.63

1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree nor Disagree5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree

Social Affiliation

For the basic wildlife belief Social Affiliation, all mean values were high ($M > 4.0$) indicating a positive response to these questions ranging between Somewhat Agree and Agree. In particular, the first item of the questionnaire elicited the highest level of agreement ($M = 6.63$) and the lowest standard deviation ($SD = 1.06$) of the entire WVO scale. Across respondents, whether local or visitor, British, American or European, there was a strong agreement with the statement *We should strive for a world where humans and wildlife can live side-by-side without fear.*

Caring

The second component of Mutualism, Caring, had similarly positive mean scores for the items measuring it, mostly in the Agree range ($M > 5.0$). However, one item stands out here. The statement *It would be more rewarding to me to help animals rather than people* had a mean score of 3.93, indicating that respondents overall were nearly neutral (4.0) on this idea but verging slightly into disagreement.

Appropriate Use

The next group of six statements was used to assess the basic belief Appropriate Use, the first component of the Domination orientation. This group showed the widest range of responses, ranging from the lowest mean in the whole scale ($M = 1.89$, Disagree) for *Wildlife are on Earth primarily for people to use* up to $M = 4.46$ (Somewhat Agree) for the item *It is acceptable to kill wildlife if it poses a threat to their life*. Most means for the Appropriate Use statement were negative ($M < 4.0$). This indicates that respondents overall tended to disagree with statements implying that wildlife is to be dominated and exist only to be used by humans for our benefit.

Hunting

Hunting, *the* second component of Domination, was the last basic belief to be measured on this scale. The means here again ranged widely, from 3.01 to 4.57. However, the first (*We should strive for a world where there's an abundance of wildlife for hunting and fishing*) and last (*People who want to hunt should be provided the opportunity to do so*) items are actually worded so as to elicit an opposite reaction to the middle two items. As such, these scores were reverse coded before testing statistically for relationships with other variables. In fact, all the scores are relatively uniform when accounting for this. Taken together these means demonstrate a very negative response to hunting and general disapproval of it as an activity even for others besides themselves. Although, it should also be noted that the standard deviations in this group of 4 items are the highest in the whole survey ($SD = 1.86, 1.90$). Therefore, a very large amount of variance existed in these responses to Hunting items, indicating a wide range of perspectives amongst respondents.

WVO Summary

To make the most general comparison possible the mean values of the basic beliefs were used to calculate an overall average score for the two WVO's. Mutualism had an overall mean score of $M = 5.5$, indicating that the average respondent fell between Somewhat Agree and Agree with regard to that WVO. In contrast, Domination had an overall mean score of $M = 3.55$, indicating that the average respondent fell between Neutral (Neither Agree nor Disagree) and Somewhat disagree with regard to that WVO. This finding is discussed later.

Descriptive results for Reindeer Cognitions scale

See Table 7 on the next page for results drawn from testing from the exploratory scale, initially designed by the author to measure *Attitudes regarding the Cairngorms* reindeer. During analysis, the name for this construct was changed to *Reindeer Cognitions*. These 15 items were measured using a 7-point Likert scale (anchor 1 and 7), the same as the WVO scale. Positive scores (Agree) were $4.0 < M < 7.0$ and negative scores (Disagree) were $1.0 < M < 4.0$. A score of $M = 4.0$ indicated Neither Agree nor Disagree (Neutral).

Tourism

The first three items on the scale were designed to measure cognitions about reindeer tourism. All three had positive mean scores ($M > 4.0$). In particular, the average score for the first item *The Reindeer Centre is an important attraction of the Glenmore area* was $M = 5.99$, indicating Agree, which was the highest average score overall in the dataset of this *Reindeer Cognitions* scale.

Landscape and Place Meanings

The next three items and the very last item of the scale were designed to measure agreement with place meanings and ideas about the place of the reindeer in the Cairngorm's sociocultural landscape. The overall mean scores were also positive here ($M > 4.0$). These scores indicate that on average respondents range from Somewhat Agree to Agree with statements that evaluate the deep psychological and social meanings that people ascribe to the reindeer and the Cairngorms landscape. The statement *The presence of the reindeer makes the Cairngorms a more unique place* elicited the most positive response ($M = 5.83$).

Free-roaming Norms

Two statements were designed to measure injunctive norms regarding the free-roaming behavior of the Cairngorms reindeer herd. The first was pro-free-roaming (*Reindeer should be allowed to roam freely all throughout the Cairngorms*) with $M = 5.64$ (Agree). The second was about limiting the ability of the reindeer to range freely across the national park. This item (*Reindeer should be kept out of sensitive areas in the Cairngorms*) scored much lower ($M = 4.72$) indicating a Somewhat Agree position.

Ecological Impacts

The next three items in the scale were designed to measure respondents' cognitive evaluations of the negative impacts that the reindeer may be having on the Cairngorms environment. These three elicited the first negative responses on this *Reindeer Cognitions* scale ($M < 4.0$). The first two statements simply implied that the reindeer have a negative impact on the vegetation of the Cairngorms. Respondents delivered Somewhat Disagree scores here ($M = 3.41$ & $M = 3.65$ respectively). Notably, the final item in this trio and the only one to directly suggest altering the current management strategy (*The number of reindeer should be controlled to minimise environmental impact)* was met with the lowest score ($M = 1.02$) in the entire body of data pertaining to *Reindeer Cognitions*. This mean indicates that the respondents on average Strongly Disagreed with the notion that the number of the current herd should be reduced.

Table 7. Descriptive results for the Reindeer Cognitions scale

N=410	Reindeer Cognitions *Survey Items*	Mean	Standard Deviation
Tourism	The Reindeer Centre is an important attraction of the Glenmore area.	5.99	1.05
	Seeing the reindeer is a highlight of visiting the Cairngorms.	5.62	1.28
	Reindeer tourism is important to the local economy.	5.66	1.08
Landscape & Place Meanings	The reindeer are an essential part of the Cairngorms landscape.	5.61	1.27
	The presence of the reindeer makes the Cairngorms feel wilder.	5.47	1.36
	The presence of the reindeer makes the Cairngorms a more unique place.	5.83	1.20
Free-roaming	Reindeer should be allowed to roam freely all throughout the Cairngorms.	5.64	1.38
	Reindeer should be kept out of sensitive areas in the Cairngorms.	4.72	1.41
Environmental Impacts	The reindeer have a negative impact on the vegetation of the Cairngorms.	3.41	1.26
	The presence of the reindeer impedes habitat restoration and reforestation.	3.65	1.24
	The number of reindeer should be controlled to minimise environmental impact.	1.02	1.47
Management	The reindeer should be managed more like other species of livestock, e.g. sheep	3.52	1.40
	The reindeer should be managed more like other species of wildlife, e.g. red deer	4.31	1.38
	The reindeer are being managed properly just the way they are now.	4.73	1.18
Landscape & Place Meanings	Reindeer belong in the Cairngorms.	5.35	1.43

1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree nor Disagree, 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree

Management

The next three statements were meant to measure evaluations and norms regarding how the CRH is currently being managed. Respondent somewhat disagreed that the reindeer should be managed as livestock (M = 3.52) and only somewhat agreed that they should be managed as wildlife (M = 4.31). Both of these means were relatively close to neutral. However, the statement *The reindeer are being managed properly just the way they are now* had a mean value of 4.73, suggesting a tendency to agree with this idea.

The following page presents a bar chart version (cf. Fig. 12) of the results present in Table 7 in order to make the information more legible. Additionally, error bars based on the standard deviation for each mean value have been added to illustrate the variance of responses within the sample. While these descriptive results can be useful in of themselves, the next step in the analysis was to refine and condense these components through scale analysis and data reduction. The results of those procedures are detailed in the following section.
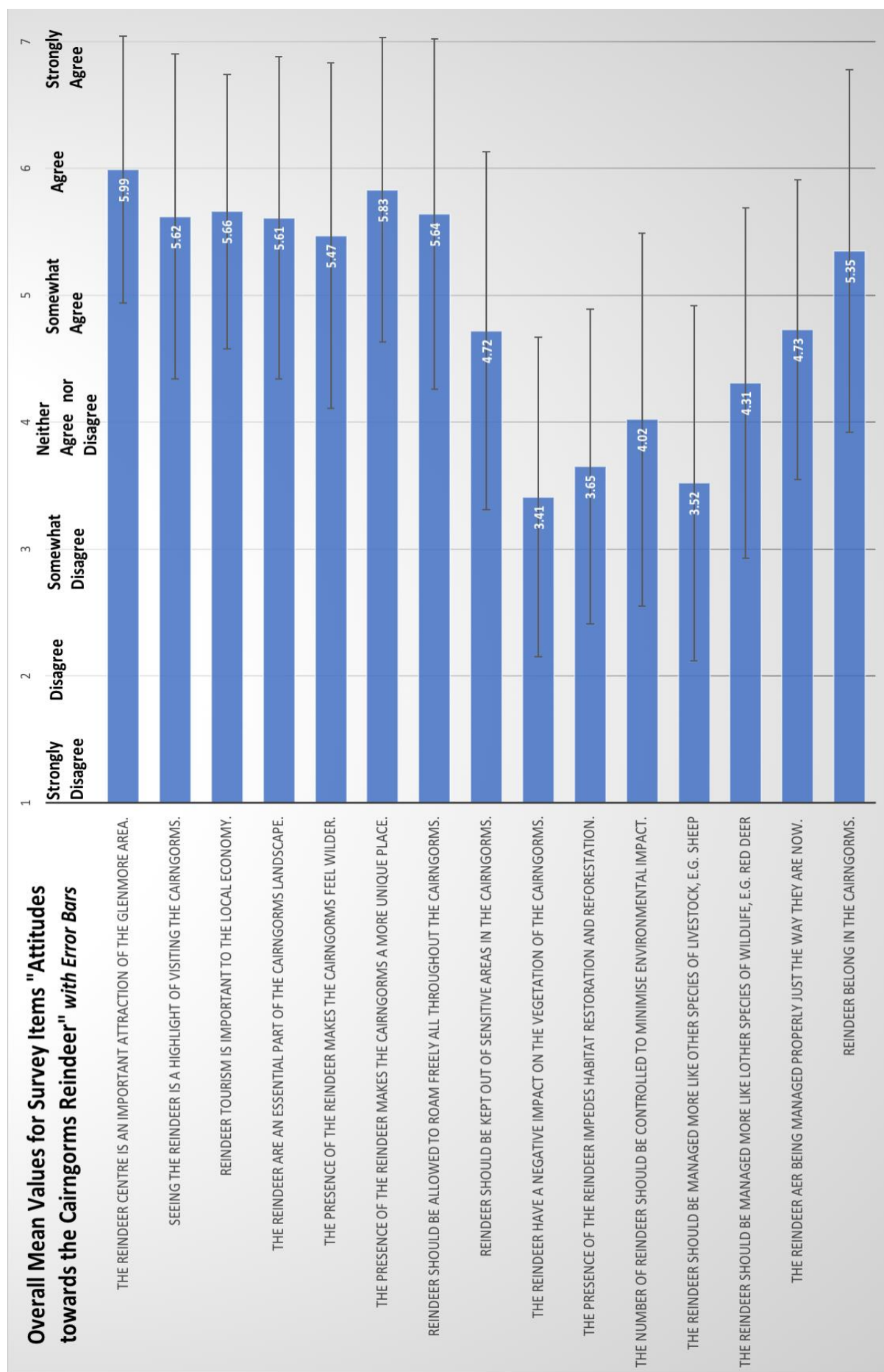
Figure 12. A graphical representation of results for the Reindeer Cognitions scale with standard deviation

3.4.3   Analyses of scales

Reliability test of wildlife value orientations scale

As the WVO scale is a well-supported theoretical model and standardized scale validated by many case studies (Fulton et al., 1996; Jacobs et al., 2014; Jacobs et al., 2012; Vaske et al., 2011), the theory-driven decision was made to use reliability analysis. Reliability analysis measures the internal consistency of the factors (Vaske, 2008). In other words, reliability tests can indicate if the survey items indeed measure the cognitive constructs that the underlying theory says they do (Field, 2013).

Criteria for inclusion

The most common measure for reliability is known as Cronbach's α. Field (2013) argues that a wide range of alpha values are acceptable, from 0.5 to 0.8, dependent upon the field of inquiry, psychological construct measured, and stage of research, among other things. Furthermore, the author states that a 'good' alpha is between 0.7 and 0.8. Specifically for research in the realm of parks, recreation, and human dimensions, Vaske (2008) asserts that a Cronbach's α score greater than or equal to 0.65 is a conventionally agreed upon cut-off for an adequate scale in. Therefore, **Cronbach's α ≥.65** was chosen as the criterion for the inclusion of an overall composite index in subsequent testing.

Additional metrics were used to determine if each individual survey item (statement) within the composite index was reliable and worth retaining in the scale for further analysis. First, the author examined the 'corrected item-total correlation' values, one possible output of reliability tests in SPSS. Vaske (2008) states that if the **Item-total Correlation ≥ .4**, then the item is reliable and should be kept in the scale. For this reason, all individual Item-total Correlations are displayed in Table 8 on the following page. Finally, 'Alpha if deleted' was another output of the reliability tests used to determine inclusion. If Cronbach's α doesn't increase when the item is deleted (compared to the total α value for the composite index) then the item was kept in the scale. These values are all displayed in Table 8 below, which will now be discussed.

The results of reliability tests on the WVO scales (cf. Table 8) revealed that all four factors [Affiliation (α = .81), Caring (α = .82), Appropriate Use (α = .75), and Hunting (α = .78)] satisfied the 'adequate' cut-off for inclusion (α ≥ .65) and even reached the level of 'good' (α ≈ .8). Therefore, all composite indices of basic wildlife beliefs (4) were found to be very reliable and suitable for subsequent testing of relationships. Furthermore, all original items (18) of the standardized WVO scale were found to be reliable and fit for inclusion. This was demonstrated by 1) all Item-Total Correlations per item were greater than the limit of .4, and 2) Cronbach's α did not increase when deleting any of the 18 items. All dimensions of the wildlife value orientations were kept for subsequent testing.

Table 8. Results of reliability test for the wildlife value orientations scale

Wildlife Value Orientations	Survey Items	Item-Total Correlation	Alpha (α) if deleted	Cronbach's α
Social Affiliation	We should strive for a world where humans and wildlife can live side by side without fear.	.56	.79	Reliable .81
	I view all living things as part of one big family.	.66	.75	
	Animals should have rights similar to the rights of humans.	.64	.77	
	Wildlife are like my family and I want to protect them.	.68	.74	
Caring	I care about animals as much as I do other people.	.67	.75	Reliable .82
	It would be more rewarding to me to help animals rather than people.	.61	.79	
	I take great comfort in the relationships I have with animals.	.69	.75	
	I value the sense of companionship I receive from animals.	.62	.78	
Appropriate Use	Humans should manage wildlife populations so that humans benefit.	.35	.75	Reliable .75
	The needs of humans should take priority over wildlife protection.	.56	.69	
	It is acceptable for people to kill wildlife if they think it poses a threat to their life.	.56	.69	
	It is acceptable for people to kill wildlife if they think it poses a threat to their property.	.64	.66	
	It is acceptable to use wildlife in research even if it may harm or kill some animals.	.43	.73	
	Wildlife are on earth primarily for people to use.	.41	.73	
Hunting	We should strive for a world where there's an abundance of wildlife for hunting and fishing.	.41	.81	Reliable .78
	Hunting is cruel and inhumane to the animals.	.69	.67	
	Hunting does not respect the lives of animals.	.72	.65	
	People who want to hunt should be provided the opportunity to do so.	.55	.74	

Exploratory factor analysis of Reindeer Cognitions scale

For reasons detailed in the Methods section of this chapter (cf. §3.3.2), exploratory factor analysis (EFA) was used to analyze the exploratory scale developed specifically for this case study to test which components contributed to the public's cognitions about the Cairngorms reindeer. The data reduction of the *Reindeer Cognitions* scale was achieved in three stages. 1) A first round of EFA was performed and factors were extracted. 2) The factors which were extracted were then analyzed by either correlation or reliability tests. These tests allowed the author to evaluate how well the survey items comprising each factor measured the theoretical construct of *Reindeer Cognitions* (Field, 2013). 3) Finally, another round of EFA was performed. The multi-stage process enabled the author to construct a working model driven by the actual data and then combine survey items into composite indices afterward to form the exploratory *Reindeer Cognitions* scale.

Stage 1. First round of EFA

Exploratory factor analysis was conducted on the 15 *Reindeer Cognitions* items using Varimax rotation with Kaiser normalization suppressing coefficients below .4 (Jacobs, 2018b). The type of EFA known as Principal Component Analysis (PCA) was selected because it is the scale analysis procedure conventionally used in the social sciences (Vaske, 2008). Before performing the PCA, the *Reindeer Cognitions* scale was tested to determine if the PCA was an appropriate measure of this scale. The Kaiser-Meyer-Olkin measure verified that the sampling was more than adequate for further analysis, KMO = .88 ["meritorious" according to Hutcheson and Sofroniou (1999) as cited in Field (2013)]. Furthermore, Bartlett's' Test of Sphericity showed high levels of significance ($p < .001$) for the association between items. These measures verified that the condition of the dataset was sufficient to proceed with the EFA.

An initial PCA was run in SPSS to get eigenvalues for the three factors being extracted from the data set (cf. Table 9, below). In consultation with supervisor M. Jacobs, the principal factors of *Reindeer Cognitions* were named: 1) *Psychosocial meanings of reindeer*, 2) *Norms regarding free-roaming*, and 3) *Environmental consequences of reindeer*. These were later shortened for efficiency. See Table 9 on the next page for the rotated factor loadings per each item under these principal factors. One item (*The reindeer are being managed properly just the way they are now*) had a very low factor loading coefficients (-.53) and was immediately dropped from further analysis.

Two test statistics that demonstrate the strength of a principal factor are its *eigenvalue* and *Percent of variance explained*. The three extracted factors had eigenvalues great than Kaiser's cut-off criterion of 1.0 (Field, 2013). Taken all together, these factors explained 59.11% of the variance in responses to the *Reindeer Cognitions* scale. However, a resulting scree plot was slightly ambiguous, indicating either 2 or 3 principal factors before the inflection. Because of this and the dual membership of item *Reindeer should be allowed to roam freely all throughout the Cairngorms* in two separate factors (cf. Table 9), reliability tests were performed on these three factors.

Table 9. Results from Principal Component Analysis of the Reindeer Cognitions scale with Rotated Factor Loadings (N=414)

	Principal Factors *with Cronbach's alpha (α)*		
Original Items from Survey	**Psychosocial meaning of the reindeer herd** *(α =0.89)*	**Norms regarding free-roaming**	**Cognitions about environmental consequence of the reindeer herd** *(α =0.73)*
The Reindeer Centre is an important attraction of the Glenmore Area.	.762		
Seeing the reindeer is a highlight of visiting the Cairngorms.	.774		
Reindeer tourism is important to the local economy.	.798		
The reindeer are an essential part of the Cairngorms landscape.	.829		
The presence of the reindeer makes the Cairngorms feel wilder.	.764		
The presence of the reindeer makes the Cairngorms a more unique place.	.841		
Reindeer belong in the Cairngorms.	.698		
Reindeer should be allowed to roam freely all throughout the Cairngorms.	.449	.562	
Reindeer should be kept out of sensitive areas in the Cairngorms.		.719	
The reindeer have a negative impact on the vegetation of the Cairngorms.			.699
The presence of the reindeer impedes habitat restoration and reforestation.			.734
The number of reindeer should be controlled to minimise environmental impact.			.688
The reindeer should be managed more like other species of livestock, e.g., sheep			.654
The reindeer should be managed more like other species of wildlife, e.g., red deer			.603

Stage 2. Reliability and correlation tests

Next, reliability and correlation tests were run on the three factors extracted in Stage 1 of EFA. Reliability tests could be conducted for the components of the factors *Psychosocial meanings of reindeer* and *Environmental consequences of reindeer.* All 8 items comprising the *Psychosocial meanings of reindeer* factor met the criteria for inclusion, including the cut-off for Item-Total Correlations (≥ 4) and the alpha not increasing when items deleted. Overall, this factor had an excellent Cronbach's α (= .89) and was kept for inferential statistical testing.

The factor *Environmental consequences of reindeer* had a very good Cronbach's α (= .73) when initially tested for reliability. However, its final item (*Reindeer should be managed more like other species of wildlife, e.g., red deer)* had a low Item-total Correlations of .33 which is below the conventional cut-off of .4. Moreover, when this item was deleted the alpha increased to .75. The author decided to exclude this item from further analysis. All four other items had acceptable Item-Total Correlations and alpha did not increase when deleted, so they were kept for the next round of EFA.

As a separate factor, *Norms regarding reindeer free-roaming behavior* was analyzed by correlation testing because it did not have the minimum of three items necessary to perform a reliability test. The test showed that the two constituent items had a highly significant correlation ($p < .001$) but a weak relationship (small effect size since Pearson's r = .26); Therefore, the item *Reindeer should be kept out of sensitive areas of the Cairngorms* was dropped from further analysis. The other item was retained with the *Reindeer should be allowed to roam freely all throughout the Cairngorms* was retained with Factor 1, *Psychosocial meanings of reindeer*.

To summarize, stages 1 and 2 of data reduction resulted in the principal factor *Free-roaming Norms* and three survey items being dropped from further analysis since they did not meet the criteria for inclusion.

Stage 3. Second round of EFA and correlation testing

After verifying two factors, a second round of EFA using PCA with varimax rotation was conducted to confirm results. The results of this second PCA for two factors are displayed in Table 10, below, along with Cronbach's alpha from Stage 2 reliability tests. Together these two factors explain 51% of the variance in the *Reindeer Cognitions* data. Both factors far exceed the acceptable eigenvalue of 1.0. Finally, after this round of factor analysis, the scree plot definitively showed 2 factors before the inflection point converging with the results of other tests.

Factor 1 was named '*Psychosocial meanings of reindeer'* (also referred to herein as '*social cognitions'* for brevity*).* The items that clustered on this factor suggest that the factor represents an appreciation for the importance of the psychological and social meanings attached to the reindeer, the importance of reindeer tourism for the local economy, and a desire to see the reindeer continue to range free in the Scottish Highlands. Factor 2 was named '*Cognitions about environmental consequences of the reindeer'* (also referred to herein as '*environmental cognitions'* in brief). The items clustered here represent cognitive evaluations about the reindeer having a detrimental impact on the other flora and fauna of the Cairngorms ecosystems, the need for a reduction in the size of the herd or other change in management regime.

Since these two composite indices were proposed to form the theoretical construct dubbed *Reindeer Cognitions*, a final correlation test was conducted to assess their relationship to one another (cf. Table 10). The test revealed that these two factors have a highly significant correlation ($p < .001$) with a medium effect size ($r = -.32$), indicating a typical, but inverse, relationship. Among respondents in this sample, as positive evaluations, or social cognitions, of the reindeer increase, then accordingly, negative evaluations, or environmental cognitions, of reindeer decrease. Put another way, the more likely that a person is to agree with the social and economic value of the reindeer, the less likely they are to agree that the herd has negative impacts on the environment. This finding is discussed in the next section. Data reduction complete, analysis shifted to assessing the associational and differential relationships between the variables (Vaske, 2008).

Table 10. Final results of EFA and reliability tests for the 2 factors extracted from Reindeer Cognitions scale data (N=414)

	Overall Factor Metrics	Psychosocial meaning of the reindeer	Cognitions about environmental consequence of the reindeer
	Eigenvalues	5.29	2.39
	% of variance	35.23	15.92
Survey Items	Cronbach's alpha (α)	.89	.75
The Reindeer Centre is an important attraction of the Glenmore Area.		.765	
Seeing the reindeer is a highlight of visiting the Cairngorms.		.775	
Reindeer tourism is important to the local economy.		.799	
The reindeer are an essential part of the Cairngorms landscape.		.832	
The presence of the reindeer makes the Cairngorms feel wilder.		.763	
The presence of the reindeer makes the Cairngorms a more unique place.		.839	
Reindeer belong in the Cairngorms.		.702	
Reindeer should be allowed to roam freely all throughout the Cairngorms.		.449	
The reindeer have a negative impact on the vegetation of the Cairngorms.			.700
The presence of the reindeer impedes habitat restoration and reforestation.			.717
The number of reindeer should be controlled to minimise environmental impact.			.722
The reindeer should be managed more like other species of livestock, e.g., sheep			.636

3.4.4 Testing relationships between variables

This section presents the results of testing the hypotheses of the conceptual model (cf. Fig. 4, §3.2.4).

H1 - Wildlife value orientations are related to Reindeer Cognitions

H1a - The two WVO's, Domination and Mutualism, are related to Reindeer Cognitions

The first hypothesis sought to reveal if the wildlife value orientations (WVO) model was able to predict the components of *Reindeer Cognitions*. It was tested by means of a form of multiple regression analysis known as ANOVA, or Analysis of Variance. This test was selected following Tables 4 and 5 in the previous section because it assessed the model's fitness overall. The results are presented in Table 11, below.

Table 11. Effect of WVO's and basic beliefs on Reindeer Cognitions

N = 413	Psychosocial meanings of reindeer				Environmental consequences of reindeer			
	Overall Model Fit		Model Parameters		Overall Model Fit		Model Parameters	
Wildlife Value Orientations	R^2	Sig. $(p)*$	Beta (β)	Sig. $(p)*$	R^2	Sig. $(p)*$	Beta (β)	Sig. $(p)*$
Mutualism	.05	$p<.001$	.25	$p<.001$	.09	$p<.001$	-.14	.01
Domination			.11	.04			.22	$p<.001$
Social Affiliation	.06	$p<.001$	.04	.50	.10	$p<.001$	.05	.39
Caring			.23	$p<.001$			-.19	.001
Appropriate Use			.13	.01			.15	.004
Hunting			-.02	.71			.14	.007

* Relationship is significant when $p < .05$

The results of ANOVA testing indicated that there was a good fit with a highly significant relationship ($p <.001$) between these variables. However, the effect size (as measured by the R^2 score) was .05 for the factor *Psychosocial meanings of the reindeer*. That value means that the WVO scale accounted for just 5% of the variance in the social cognitions (Field, 2013). Similarly, the effect size (as measured by R^2) was .09 for the factor *Environmental consequences of the reindeer*. That value means that only 9% of the variance in this construct was accounted for by WVO's (Field, 2013). According to Vaske (2008) and Jacobs (2018a), these were both low effect sizes, which indicated weak relationships and low predictive potential for these variables.

Both independent variables, Mutualism ($p < .001$) and Domination ($p = .04$), made significant contributions to predicting the values of the social components of *Reindeer Cognitions,* according to those *p*-values. The standardized beta (β) value of Mutualism ($\beta = .25$) was bigger than that of Domination ($\beta = .11$). Therefore, the Mutualism wildlife orientation was the more important

predictor of the social cognitions in this model (Field, 2013). For the environmental cognitions of the reindeer, both independent variables, Mutualism (p =.01) and Domination (p <.001), were again significant in their effect. By contrast, the β of Domination (β = .22) was much bigger than the β of Mutualism (β = -.14). Hence, the Domination orientation was the more important of these two predictors for the environmental cognitions about reindeer.

In summation, the WVO scale predicted both components of *Reindeer Cognitions*, social and environmental, but it only accounts for a small amount of variance. Thus, it has low predictive potential. Mutualism was the best predictor for the social cognitions component, and Dominations was the best predictor for the environmental cognitions component.

Result: Hypothesis 1a was confirmed.

H1b - The four basic wildlife beliefs are related to Reindeer Cognitions

In order to take a closer look at the inner workings of the *Reindeer Cognitions* model, the relationship between it and the constituent elements of the WVO's, the four basic beliefs, were also tested by multiple regressions. A significant association was found (p <.001) between the 4 basic beliefs and both the social and environmental components of *Reindeer Cognitions*. The basic wildlife beliefs explained 6% of the variance for the social cognitions of reindeer. The basic wildlife beliefs explained 10% of the variance for the environmental cognitions. Again, these values indicated a low predictive potential for *Reindeer Cognitions*, just as with the two orientations, Domination and Mutualism. This was expected since the four beliefs are the components that make up the value orientations.

By looking closer at the model's parameters, the basic belief of Social Affiliation (p =.5 and p =.05, respectively) was not significantly related to either factor, *Psychosocial meanings of reindeer* or *Environmental consequences of reindeer*. In both cases, this component of Mutualism had very low β values (.04 and .05, respectively) which reinforced how unimportant Social Affiliation was in predicting overall *Reindeer Cognitions*. The Hunting basic belief, a component of Domination, was not significantly related to (p = .71) to the social cognitions with a low β of -.02. For social cognitions, only the beliefs Caring (p <.001) and Appropriate Use (p = .01) had significant associations. Of these two, Caring was the more important predictor with the larger β of .23, compared to the β of Appropriate Use (.13). For the relationships between the basic beliefs and the environmental cognitions, three factors demonstrated significance: Caring (p = .001), Appropriate Use (p =.004), and Hunting (p = .007). Of these three, Appropriate Use and Hunting were approximately equal in their importance as predictors of the environmental cognitions (β =.15 and β =.14, respectively). Caring was of much less importance.

In conclusion, the model of basic wildlife beliefs predicted both components of *Reindeer Cognitions*, social and environmental. However, it only accounted for small amounts of variance and thus had low predictive potential, similar to the results for the WVO scale. By analyzing the basic wildlife beliefs, it was found that Social Affiliation beliefs and Hunting beliefs impaired the predictive potential of the *Reindeer Cognitions* model.

Result: Hypothesis 1b was confirmed.

Although wildlife value orientations were not found to have the strongest predictive potential for the *Reindeer Cognitions*, the scale could be tested in other ways. One method was to segment the sample into groups (or clusters) whose membership was based on sharing similar attributes of the wildlife values and basic beliefs (Field, 2013). These clusters allowed the story within the data to emerge more clearly by revealing the traits associated with each group. One trait, contrasting cognitions of the Cairngorms reindeer, is discussed here. Another, differing *perceptions of reindeer identity*, is discussed later. The statistical test called K-means cluster analysis was used to create groups of respondents (Field, 2013). The results of the process are displayed below in Table 12.

Table 12. Results of K-means cluster analysis for WVO's

N = 427			Final Cluster Scores***		
Basic Wildlife Beliefs	**Sign. (*p*)***	***F* (424)****	**Mutualism - oriented**	**Centrist**	**Domination - oriented**
Social Affiliation	*Highly Significant p < .001*	349.4	.80	-.16	-1.66
Caring	*Highly Significant p < .001*	222.7	.81	-.26	-1.32
Appropriate Use	*Highly Significant p < .001*	109.6	-.70	.27	.95
Hunting	*Highly Significant p < .001*	70.2	-.52	.11	1.04

* Difference is significant when *p* < .05
** *F* value considered large when *F* > 2.58
***Final Cluster Center scores on standardized scale of -2 to 2

In order to accurately weigh these four factors against each other, the values of each belief were first converted by SPSS using their Z-scores into new values on a standardized scale of -2 to +2 (Field, 2013). K-means cluster analysis was then performed on these standardized scores. The analysis detected three factors that were named by the author for the orientations which they represented: 1) Mutualism-oriented, 2) Centrist, and 3) Domination-oriented.

Table 12 shows that all four beliefs were highly significant in differentiating the clusters (*p* <.001). The *F* values for each variable are also displayed in Table 12 in order to demonstrate the relative importance for each variable in this process (Field, 2013). Social Affiliation had the highest *F* value (*F* = 349.4) which meant that it had the greatest value in differentiating the cluster. Hunting had the lowest value (*F* = 70.2) meaning it had the least value in determining cluster membership. It must be noted that overall all four basic beliefs had very large *F* values since *F* > 2.58 is conventionally acceptable (Field, 2013), and these values were much higher than that. The final cluster scores displayed in Table 12 represent the standardized scores on a ±2 scale discussed earlier (Field, 2013). These cluster scores are also displayed graphically below (cf. Fig. 13) in order to make the membership traits of each cluster visually legible.
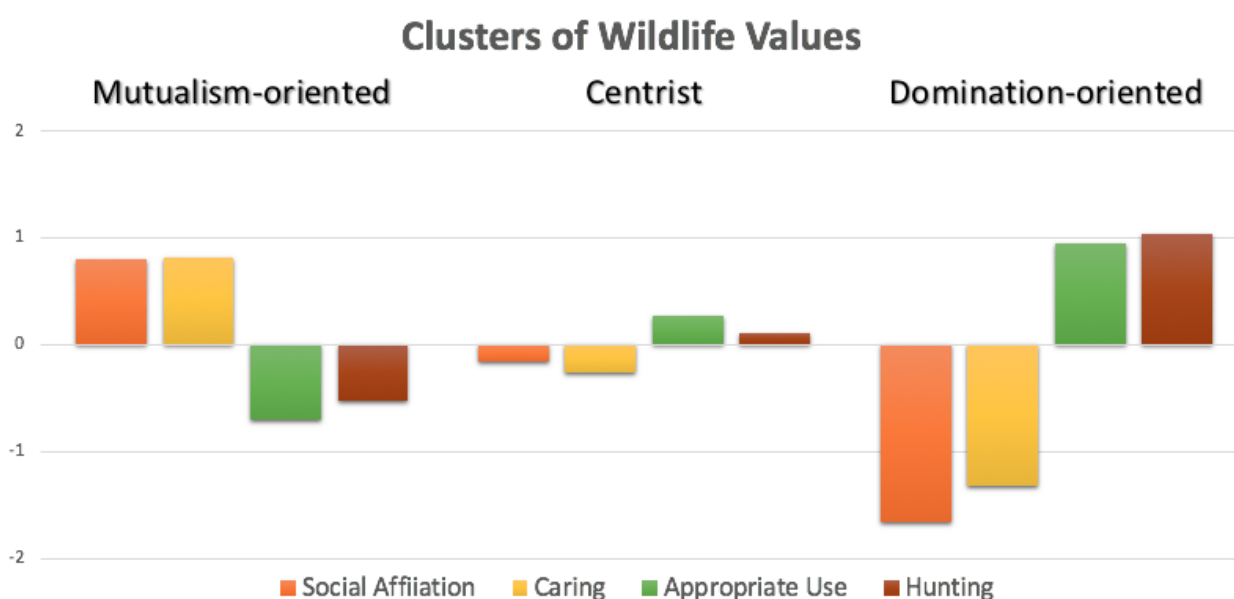
Figure 13. Visual representation of WVO cluster membership

According to the results shown in this figure, the majority of respondents in this study were Centrists (N = 211) who comprised 48.4% of the total sample of 427 respondents. Centrists held very moderate, almost neutral, wildlife beliefs and values. This cluster had the narrowest range of values (-.26 to .27). Members tended to respond to WVO survey items with 'Somewhat Agree', 'Somewhat Disagree' or 'Neither Agree nor Disagree.' Overall, they scored slightly higher on domination-oriented statements (i.e., agreed more) and slightly lower on mutualism-oriented statements (i.e., disagreed more).

Mutualists (N = 159) were the next largest segment comprising 37.2% of the total respondents. The members of this cluster tended to agree with survey items measuring Social Affiliation and Caring beliefs and disagree with items measuring Appropriate Use and Hunting beliefs. The range of cluster scores was wider for Mutualists then for the Centrist group. Clusters ranged from a minimum of -.87 to a maximum of .81. Overall, this cluster scored high on Mutualism items and low on Domination items.

The Domination-oriented cluster was the smallest group by membership (N = 57), representing only 13% of the total sample. The members of this group exhibited the widest range of views on average (-1.66 to 1.40) by a substantial margin over the other two clusters, meaning they were very diverse in their perspectives. Cluster membership traits included moderately high responses (i.e., Agree) to items measuring Appropriate Use and Hunting beliefs and very low responses (i.e Disagree and Strongly Disagree) to items measuring Social Affiliation and Caring beliefs. Overall, members of the Domination-oriented cluster scored very high on Domination items and very low on Mutualism items. A summary cluster membership by WVO's is depicted in Table 13, below.

Table 13. Description of membership in WVO clusters

N = 427 Sample Segment	Members	% of Total Sample	Traits	
			Mutualism	Domination
Mutualism - oriented	159	37.2%	High	Low
Centrist	211	49.4%	Slightly Low	Slightly High
Domination - oriented	57	13.3%	Very Low	High

After these three clusters and their membership traits were defined, the hypothesis (H1a) that WVO cluster membership was related to the *Reindeer Cognitions* was tested by One-way ANOVA, after consulting Tables 4 and 5 (Jacobs, 2018a). The results are displayed below in Table 14.

Table 14. Results of ANOVA test for WVO clusters and Reindeer Cognitions

N = 413 Test: ANOVA	$F_{(2)}$	Significance (p)*	Effect Size (r)
Psychosocial meanings of reindeer	2.67	.07	.11
Environmental consequences of reindeer	3.52	*Highly Significant* $p < .001$	*Small - Medium* .24

* Relationship is significant when $p < .05$

The results demonstrated that WVO cluster membership had a significant relationship with the environmental cognitions but not the social cognitions. With regard to social cognitions being affected by cluster membership, no significant association was detected ($p = .07$) and the effect size was small ($r = .11$). However, in testing the relationship between WVO clusters and overall construct of *Reindeer Cognitions*, a highly significant relationship ($p < .001$) was detected with a small to medium effect size, together indicating a typical statistical relationship between these two variables ($r = .24$) (Jacobs, 2018a). In order to understand what these differences in *Reindeer Cognitions* by cluster actually entailed, a table of descriptive results was produced (cf. Table 15, below). The mean scores and standard deviations revealed a profile of a typical cluster member.

Table 15. Descriptive results for the relationship between WVO cluster membership and Reindeer Cognitions components

N = 413 Cluster	Psychosocial meanings of reindeer		Environmental consequences of reindeer	
	Mean	Std. Dev.	Mean	Std. Dev.
Mutualism - oriented	5.78	1.04	1.16	.09
Centrist	5.55	.89	3.83	.89
Domination- oriented	5.58	.86	3.84	.90

Looking closely at the social cognitions (*Psychosocial meanings of reindeer*) scores in the first two columns of results, the means for the three clusters were nearly the same (*M* = 5.78, 5.55, 5.58 respectively) and any differences were not significant. Therefore, regardless of membership in any given WVO cluster, all respondents varied between 'Somewhat Agree' and 'Agree' in their evaluations of the social cognitions of the reindeer. Looking at the standard deviation values, the Mutualism-oriented respondents varied more widely in their social cognitions scores (*SD* = 1.04), then the Centrists (*SD* = .89), and Dominationists (*SD* = .86). These two clusters were nearly identical in both their means and standard deviations for this factor, social cognitions, as well as the next factor, environmental cognitions.

Focusing on the differences in environmental cognitions (*Environmental consequences of reindeer*) by WVO cluster membership, Centrists (*M* = 3.83 , *SD* = .89) and Domination-oriented people (*M* = 3.84 , *SD* = .90) scored essentially the same. These twin scores meant that members of these two clusters may have differed in their basic beliefs about wildlife, but they were both neutral (or perhaps undecided) about the reindeer having negative environmental impacts. However, a marked difference was seen when comparing these responses to those of the Mutualists. On average, Mutualists strongly disagreed (*M* = 1.16) with the environmental cognitions items. Further, the standard deviation (*SD* = .09) was notably low, which indicates that the Mutualism-oriented respondents had little variance in their responses. In other words, Mutualists were unified in disagreeing strongly with the environmental cognitions scale.

In summary, members of all three WVO clusters agreed that the reindeer have important sociocultural meanings and economic value and should continue to roam freely. However, they differed significantly in regard to their evaluations of the environmental impacts and management of the herd. While Centrists and Dominationists stayed mostly neutral on environmental cognitions, the Mutualists strongly disagreed with those items which implied the reindeer have negative consequences for the Cairngorms ecology and, if so, their population size should be reduced or their management altered. The implications of these findings for future decision-making will be discussed in greater detail in the Discussion chapter.

Result: Hypothesis 1c was partially confirmed.

H2 - Personal characteristics are related to Reindeer Cognitions

As previously described, the two personal characteristics of the sample used in testing were 1) place of residence and 2) *reindeer experiences*. These sample characteristics were hypothesized to have an effect on the two components of the *Reindeer Cognitions*, social and environmental cognitions, and therefore tested separately. The testing results are discussed below.

H2a - Place of residence is related to Reindeer Cognitions

This hypothesis asked the question, "Are there significant differences between the *Reindeer Cognitions* of visitors to the Cairngorms National Park and local residents of Badenoch & Strathspey?" Table 16 displays the results from the independent samples *t*-test used to test this relationship.

Table 16. Results of t-test for relationship bet. Reindeer Cognitions and residency

	Visitors N= 283		Locals N = 130		Independent sample t-test N = 413		
	Mean	Standard Deviation	Mean	Standard Deviation	t(411)	Significance (*p*)*	Effect Size (Cohen's *d*)
Psychosocial meaning of reindeer	5.56	.90	5.82	1.03	-2.55	*Significant* .01	*Small* .27
Environmental consequences of reindeer	3.63	.06	3.67	1.22	-.37	.71	.04

* Difference is significant when *p* < .05

The results in Table 16 revealed that significant differences (*p* = .01) existed between locals and visitors in their thoughts about the social cognitions (i.e., *psychosocial meanings of the reindeer*). The effect size was small (*d* = .27) indicating a weak relationship. Local residents scored slightly higher (*M* = 5.82) than visitors (*M* = 5.56) on this scale. In other words, locals agreed slightly more than visitors that the reindeer enhance the social and economic landscape of the region and the herd should be able to roam freely. On average both groups scored between 'Somewhat agree' and 'Agree' on survey items measuring this construct.

For environmental cognitions (i.e., *environmental consequences of the reindeer*), no significant differences were found between these groups (*p* = .71). This meant that locals (*M* = 3.67) and visitors (*M* = 3.63) thought alike about the ecological impacts and management of the reindeer. On average respondents responded between neutral and 'Somewhat disagree' to statements about the environmental cognitions. However, according to the standard deviations, there was only a little variance in the answers of visitors (*SD* = .06), while local residents had a rather wide range of views on this topic (*SD* = 1.22).

Result: Hypothesis 2a was partially confirmed.

H2b - Experiences with reindeer are related to components of Reindeer Cognitions

The next aspect of hypothesis 2 tested the association between *reindeer experiences* and the two components of *Reindeer Cognitions*, social and environmental. See Table 17 for the results of the independent sample t-test performed in SPSS. Three major findings are reported for this testing.

Table 17. Results of t-test for relationship bet. Reindeer Cognitions and reindeer experiences

N = 412	Psychosocial meanings of reindeer					Environmental consequences of reindeer				
Independent sample t-test	Mean	Std. Dev.	t(410)	Sign. (p)*	Effect Size (d)	Mean	Std. Dev.	t(410)	Sign. (p)*	Effect Size (d)
Paddock	5.76	.82	-2.23	.03	Small .21	3.60	1.10	.80	.43	.08
Hill Trip	5.88	.84	-4.10	p<.001	Med .41	3.46	1.03	2.86	.004	Small .029
Hillwalking or Skiing	5.79	.94	-2.08	.04	Small .22	3.67	1.12	-.43	.67	.04
Carparks	5.81	.95	-1.77	.08	.21	3.72	1.16	-.76	.45	.09
Christmas Parade	5.92	.91	-3.03	.003	Small .37	3.59	1.16	.50	.62	.06
Never Seen	5.03	.90	6.41	p<.001	Large .83	3.87	.82	-2.46	.02	Small .30

* Difference is significant when $p < .05$

First, results demonstrated that a highly significant relationship existed between seeing reindeer on a Hill Trip and both components of *Reindeer Cognitions*. The Hill Trip experience had a typical relationship with social cognitions ($p < .001$, $d = .41$) and a weak relationship with environmental cognitions ($p = .004$, $d = .029$). A Hill Trip experience was associated with higher agreement with social cognitions ($M = 5.79$) but also less disagreement with the negative environmental cognitions ($M = 3.46$). Therefore, a respondent who went on a Hill Trip was more likely to see more social value for the reindeer but also more likely to believe that the reindeer have negative ecological impacts as well.

Second, an experience with the reindeer at either the Reindeer Centre paddock ($p = .03$, $d = .21$), a Christmas parade ($p = .003$, $d = .37$), or while recreating in the park ($p = .04$, $d = .22$) had a significant minimal relationship with the social cognitions scale due to small effect sizes. In contrast, there was not a significant effect on the environmental cognitions. Practically, speaking, this meant that respondents with those types of reindeer encounters had more positive social cognitions for the reindeer than those who did not report having had these encounters.

Finally, the experience of having never seen the reindeer at all also had a significant relationship with both social and environmental cognitions scales. In particular, there was a highly significant, or substantial, relationship ($p < .001$) with a large effect size ($d = .83$) between never encountering

reindeer and the psychosocial meanings (social cognitions) scale. Compared to those respondents who had seen reindeer in any way, people that had no experiences with reindeer tended to both agree significantly less with the social meanings ($M = 5.83$) and disagree significantly less that the herd has negative environmental consequences ($M = 3.87$) In other words, no personal experience was correlated to somewhat agreeing with the social cognitions and remaining neutral with the environmental cognitions.

Result: Hypothesis 2b was confirmed.

H3 - Perception of reindeer identity is related to the components of Reindeer Cognitions

A one-way analysis of variance test (ANOVA) was used to assess the association between *perception of reindeer identity* (wildlife, livestock, etc.) and the *Reindeer Cognitions*. The results of that test are presented in Table 18. Psychosocial meanings of the reindeer had a highly significant association ($p < .001$) with *perception of reindeer identity* and medium effect size ($r = .31$), indicating a typical relationship. Similarly, the environmental consequences of reindeer had a highly significant association ($p = .002$) with *perception of reindeer identity* and a small to medium effect size ($r = .22$), indicating a typical relationship.

Table 18. Results of ANOVA for relationship between Reindeer Cognitions and perception of reindeer identity

N = 409 Test: ANOVA	*F* (6)	Significance (*p*)*	Effect Size (*r*)
Psychosocial meanings of reindeer	7.13	*Highly Significant p<.001*	*Medium .31*
Environmental consequences of reindeer	3.52	*Significant .002*	*Small - Medium .22*

* Relationship is significant when *p* < .05

After it was shown that highly significant relationships existed with both components of *Reindeer Cognitions*, descriptive statistics were produced to better understand the implications of these findings. These are shown in Table 19 on the next page. Respondents that perceived of the reindeer as wildlife scored higher (agreed more) on the social cognitions scale (*M* = 5.90) and lower (disagreed more) on the environmental cognitions scale (*M* = 3.48) than all other categories of reindeer identity. In comparison, respondents that view reindeer as semi-domesticated scored lower (agreed less) on the social cognitions (*M* = 5.38) and higher (disagreed less) on the environmental cognitions (*M* = 3.79). Only the finding from the categories of wildlife and semi-domesticated are discussed in the text because these were the two primary ways that people perceived of the reindeer by a vast majority. Consult Table 19 for full results.

Result: Hypothesis 3 was confirmed.

Table 19. Descriptive results for relationship bet. reindeer experiences and the components of Reindeer Cognitions

N = 409 **Reindeer Identity**	Psychosocial meanings of reindeer		Environmental consequences of reindeer	
	Mean	Std. Dev.	Mean	Std. Dev.
Wildlife	5.90	.79	3.48	1.01
Semi-domesticated	5.38	1.00	3.79	1.02
Livestock	4.99	1.21	4.21	.94
Pet	5.73	.80	3.70	1.41

H4 - Place of residence is related to wildlife value orientations

Hypothesis 4 posed the question "Do significant differences exist in the wildlife value orientations of visitors to the Cairngorms National Park versus local residents of Badenoch & Strathspey?" This was test using independent samples t-tests and full results are displayed in Table 20, below. No significant differences were found in either the wildlife value orientations (Mutualism, Domination) or basic beliefs (Social Affiliation, Caring, Appropriate Use, Hunting) amongst visitors and locals. These two groups of respondents were essentially equal in their representation across the spectrum of wildlife values and beliefs.

Result: Hypothesis 4 was rejected.

Table 20. Results of testing the relationship between WVO and place of residence

Wildlife Value Orientations	Visitors N= 285		Locals N = 130		Independent sample t-test N = 415		
	Mean	Standard Deviation	Mean	Standard Deviation	t(413)	Significance (p)*	Effect Size (Cohen's d)
Mutualism	5.53	.94	5.44	1.07	.85	.40	.08
Social Affiliation	5.87	.94	5.72	1.15	1.29	.20	.14
Caring	5.19	1.16	5.16	1.24	.23	.82	.03
Domination	3.30	.91	3.39	1.03	-.86	.39	.09
Appropriate Use	3.33	1.00	3.37	1.13	-.41	.69	.04
Hunting	3.26	1.31	3.41	1.46	-1.00	.32	.11

* Difference is significant when *p* < .05

H5 - Place of residence is related to experiences with reindeer

Descriptive results are visually presented in Fig. 14, below, to help illustrate the relationship between *reindeer experiences* and place of residence. The figure was were used to aid the author in the practical interpretation of results. The result was that there were highly significant ($p < .001$) differences between how visitors and locals encountered the reindeer, except in regard to the Hill Trip. Place of residence had a substantial relationship (i.e., large effect size) with encountering the reindeer at the upper carparks ($\varphi = .47$) or a Christmas parade ($\varphi = .48$), a typical relationship (i.e., medium effect size) with seeing reindeer in the wild ($\varphi = .38$), and a minimal relationship (i.e., small effect size) with visiting the reindeer paddock ($\varphi = .18$).
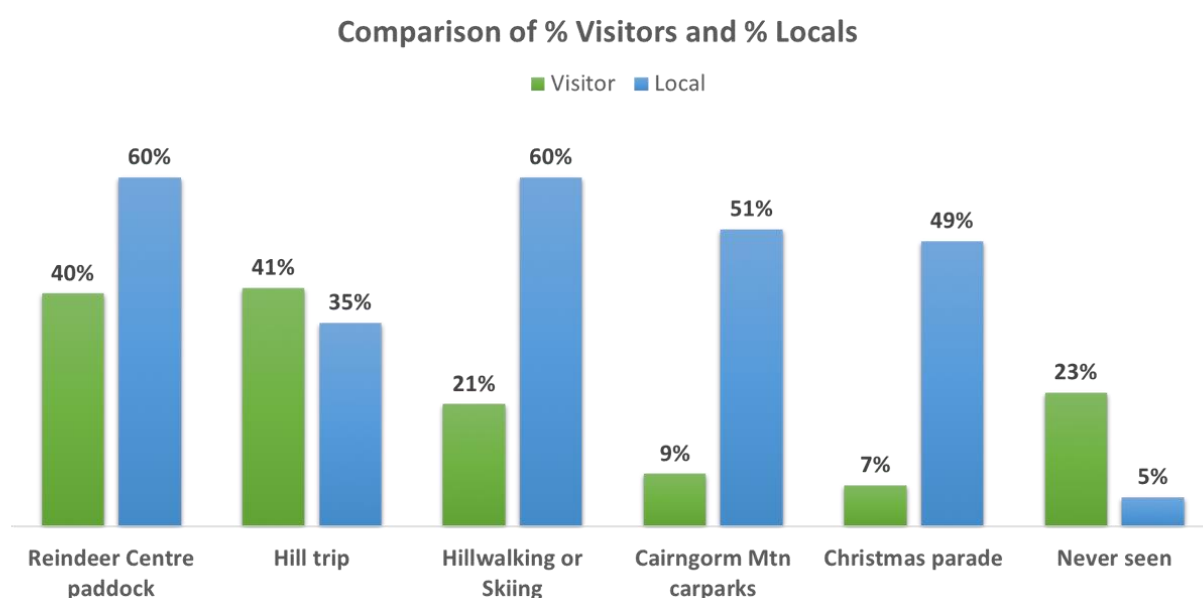

Figure 14. Descriptive comparison of visitors' versus locals' reindeer experiences (by % within residence group)

Descriptive results in Table 21, on the next page, indicated that locals were more likely to experience reindeer at the Reindeer Centre paddock, a Christmas parade, the Cairngorm Mountain carparks, or while out hillwalking or skiing in the national park. By contrast, visitors were more likely than locals to have never seen the reindeer at all. This was a highly significant ($p < .001$), but weak relationship due to very small effect size ($\varphi = -.23$). Finally, when it came to Hill Trip, no significant differences existed between these demographic groups ($p = .329$). Visitors and locals were equally likely to have encountered reindeer in this way.

Result: Hypothesis 5 was partially confirmed.

Table 21. Results of chi-square test for relationship bet. reindeer experiences and place of residence

Reindeer Experiences	χ2 (1)	Sign. (p)*	Effect size (φ)
Cairngorm Mtn carparks	91.19	*Highly significant* $p < .001$	*Large* .47
Christmas parade	95.05	*Highly significant* $p < .001$	*Large* .48
Hillwalking & skiing	60.27	*Highly significant* $p < .001$	*Medium* .38
Reindeer Centre paddock	13.36	*Highly significant* $p < .001$	*Small* .18
Never seen	21.66	*Highly significant* $p < .001$	-.23
Hill trip	1.17	.329	-.05

* Difference is significant when $p < .05$ N = 413

H6 - Personal Characteristics are related to perception of reindeer identity

This hypothesis, that personal characteristics of a respondent had an effect on their *perception of reindeer identity*, was also tested using a chi-square test. This hypothesis was split into two parts, first assessing the association with place of residence in H6a and then assessing the association with *reindeer experiences* in H6b.

H6a - Place of Residence is related to perception of reindeer identity

The table inset within Fig. 15, below, displays the results of chi-square testing for this hypothesis. There were highly significant differences ($p < .001$) between how visitors and locals perceived of the identity of the Cairngorms reindeer.

I think of the reindeer of the Cairngorms as being…

Comparison of % Visitors and % Locals

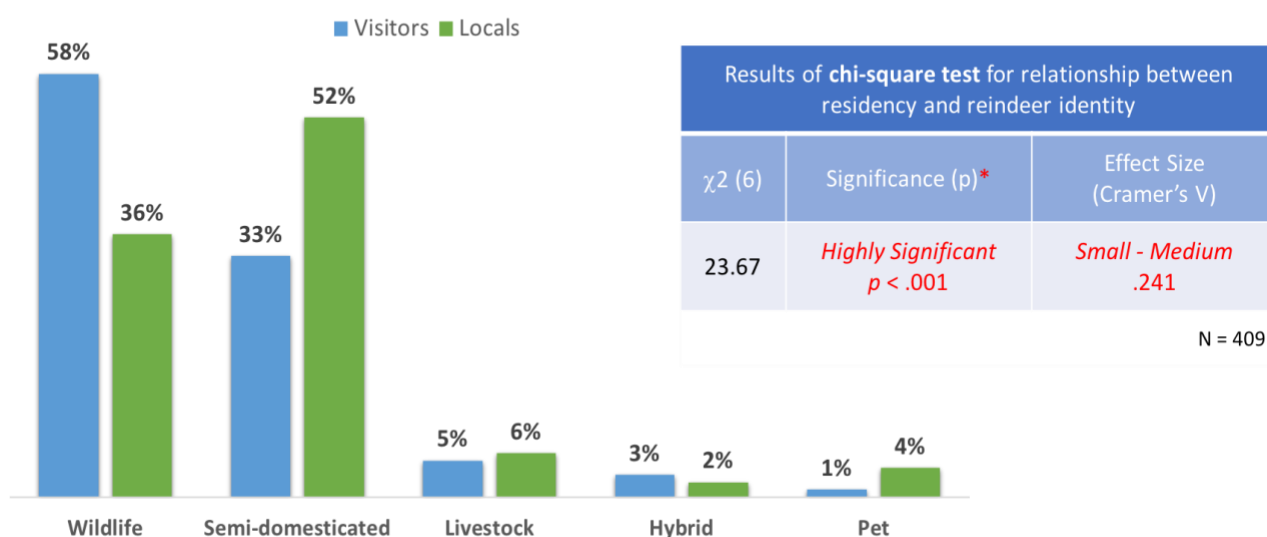| Results of **chi-square test** for relationship between residency and reindeer identity		
$\chi2$ (6)	Significance (p)*	Effect Size (Cramer's V)
23.67	*Highly Significant* *p < .001*	*Small - Medium* .241
		N = 409

Figure 15. Combined results: A descriptive comparison of perception of reindeer identity by place of residence, plus inset table showing chi-square test for relationship bet. place of residence and perception of reindeer identity

By examining the descriptive results shown in Table 22, below, we can see that visitors were more likely to consider the reindeer to be wildlife (58% of all visitors). On the other hand, locals were more likely to consider the reindeer to be semi-domesticated animals (52% of all local residents). Very small percentages of both of these demographic groups saw the reindeer as livestock, pet, or a hybrid of these categories. But overall, most respondents saw the reindeer as wildlife or semi-domesticated by a wide margin regardless of demographic factors.

Table 22. Descriptive results for survey item 'perception of reindeer identity'

I think of the reindeer as being:	Visitor N = 281		Local N=128		Total Sample N= 409	
	Freq.	%	Freq.	%	Freq.	% of total
Wildlife	163	58.0	46	35.9	209	51.1
Semi-domesticated	93	33.1	66	51.6	159	38.9
Livestock	13	4.6	7	5.5	20	4.9
Wildlife & Semi-domesticated	8	2.8	2	1.6	10	2.4
Pet	4	1.4	5	3.9	9	2.2
Semi-domesticated & livestock			1	.8	1	0.2
All four			1	.8	1	.02

Result: Hypothesis 6a was confirmed.

H6b - Experiences with reindeer are related to perception of reindeer identity

This hypothesis was tested by chi-square to see whether or not *perception of reindeer identity* was related to *reindeer experience*. Only three out of six categories of *reindeer experiences* had a significant association. The results of those three tests are shown in Table 23. The results for the other three experiences ('Hill Trip', 'Hillwalking/skiing', 'Never seen reindeer') were not significant and therefore, not displayed here. There was a significant relationship with a small to medium effect size with encountering reindeer at the upper carparks (p = .003, Cramer's V = .22), a Christmas parade (p = .006, Cramer's V = .21) or the reindeer paddock (p = .008, Cramer's V = .19).

Table 23. Significant results of chi-square test for relationship bet. reindeer experiences and perception of reindeer identity

Reindeer Experiences	$\chi2$ (6)	Sign. (p)*	Effect size (V)
Cairngorm Mtn carparks	19.46	.003	*Small - Medium* .22
Christmas parade	17.83	.006	*Small - Medium* .21
Reindeer Centre paddock	15.16	.008	*Small - Medium* .19

* Difference is significant when p < .05   N = 409

In combination with descriptive frequencies, some meaningful conclusions are discussed here. Respondents that experienced reindeer at the Reindeer Centre paddock were equally likely to view reindeer as wildlife (20% of total) or semi-domesticated (20% of total). On the contrary, if a respondent had **not** visited the paddock, then he or she was more likely to see reindeer as wildlife (31% of total) than semi-domesticated (18.5% of total). Respondents that did **not** see reindeer at either the Cairngorm Mountain carparks or a Christmas parade were more likely to view the reindeer as wildlife (43% and 43%, respectively) than semi-domesticated (29% and 31%, respectively).

Result: Hypothesis 6b was partially confirmed.

Table 24. Result of chi-square test for relationship bet. WVO clusters and perception of reindeer identity

N = 409	$\chi 2$ (12)	Sign. (p)*	Effect size (V)
WVO Clusters	20.12	.06	Small .16

* Difference is significant when *p* < .05

The seventh and final hypothesis asked the question, "Is membership in a WVO cluster related to a respondent's *perception of reindeer identity*?" This was also tested by chi-square. No significance differences (*p* =.06) were found to exist between WVO clusters in terms of *perception of reindeer identity* (cf. Table 24, above). While there are big differences in descriptive statistics between groups, e.g., more Dominationists (19.6%) saw the reindeer as wildlife than Mutualists (4.6%), these differences were not truly significant. In other words, membership in any particular WVO cluster did not have a statistically significant effect on how respondents in this sample perceived the reindeer. In order to make findings more accessible so that the reader can draw his or her own conclusions about the profile of respondents in this study, the full descriptive results (frequencies and percentages) are displayed in Table 25, below.

Table 25. Descriptive results of test for association of WVO clusters and perception of reindeer identity

	I think of the reindeer of the Cairngorms as being…							
N = 409	Wildlife		Semi-domesticated		Livestock		Pet	
WVO Cluster	Members	% of Total	Members	% of Total	Members	% of Total	Members	% of Total
Mutualism-oriented	19	4.6	26	6.4	7	1.7	0	0
Centrist	111	27.1	71	17.4	9	2.2	6	1.5
Domination-oriented	80	19.6	61	14.9	4	1.0	3	.7

One interesting finding is that 27% of all people in this sample were WVO Centrists who saw the reindeer as wild animals. This was the largest cluster overall with 111 members out of 409 total.

Result: Hypothesis H7 was rejected.

3.5   Discussion of quantitative study results

3.5.1   Reindeer Cognitions

Overall, respondents in this study held on average positive cognitions regarding the sociocultural value and meanings of reindeer, locals slightly more so than visitors. Respondents, regardless of the place of residence, were on average either neutral or somewhat disagreeing that the reindeer have negative environmental consequences. The two components of *Reindeer Cognitions* (*Psychosocial meanings of reindeer* and *Cognitions about environmental consequences of* reindeer) exhibited a highly significant relationship but were inversely correlated to one another.

Exploratory factor analysis

To arrive at the *Reindeer Cognitions* scale, data reduction had to first be performed. EFA was used to reduce the 15 original survey items of the *Reindeer Cognitions* scale to just two factors reliable enough to enable subsequent testing, *Psychosocial meanings of reindee*r and *Cognitions about environmental consequences of reindeer*. A highly significant, inverse correlation existed between these two components factors of *Reindeer Cognitions*. In other words, the more positive a respondent's social cognitions were, the more negative their environmental cognitions were likely to be and *vice versa*.

Social cognitions (*Psychosocial meanings of reindeer*)

Significant differences were found here between locals and visitors in their responses to the social cognitions component of the *Reindeer Cognitions* scale. Locals responded slightly (but significantly) more positively than visitors in endorsing the view that: 1) the reindeer, the Reindeer Centre and reindeer tourism enhance the social and economic landscape of the Cairngorms region; 2) the reindeer contribute deep sociocultural meanings to the landscape; 3) reindeer should be able to continue to roam freely. The average response of both residency groups for these social cognitions statements fell between 'Somewhat agree' and 'Agree.'

Environmental cognitions (*Cognitions about environmental consequences of reindeer*)

In contrast to the finding above, locals and visitors did not differ significantly in their responses to the environmental cognitions component of the *Reindeer Cognitions* scale. The average response of both residency groups fell between 'Neither agree nor disagree' or 'Somewhat disagree' for the environmental cognitions statements which suggested that: 1) the reindeer have adverse environmental consequences; 2) their numbers should be reduced; 3) the herd should be managed differently than it is currently.

3.5.2   Factors influencing *Reindeer Cognitions*

1. Personal characteristics of respondents

Demographics

The sample of respondents included visitors to the Cairngorms National Park (69%) and locals residents of Badenoch & Strathspey (31%) in the central Highlands of Scotland. The vast majority were from either Scotland (51%) or England (32%).

Reindeer experiences

Overall, respondents reported mostly encountering the reindeer at the Reindeer Centre's paddock (26%), on an official Hill Trip tour (22%), or in the wild (19%). However, 17% of all respondents had never seen a reindeer and/or did not plan to. As expected, visitors were more likely to have never seen the reindeer than locals. Locals were much more likely than visitors to have seen reindeer at a Christmas parade or the Cairngorm Mountain carparks and also more likely to see reindeer at the Reindeer Centre paddock or while recreating in the undeveloped areas of the national park. Visitors and locals were equally likely to have seen reindeer on a Hill Trip.

Experiences with reindeer were significantly related to *Reindeer Cognitions* in several ways. First, having any experience with reindeer whatsoever was associated with more positive social cognitions of the reindeer. Second, having experienced the reindeer on a Hill Trip was associated with a neutral attitude about the environmental consequences of the herd. Third, having never seen a reindeer was associated with a lower (but still positive) evaluation of the reindeer's social value, and a more neutral view on their environmental consequences. This finding is consistent with previous attitudinal research, such as Regan and Fazio (1977) who found that attitudes formed by direct experience with the object of the attitude were better predictors for behavior than attitudes formed without direct experience.

2. Perception of reindeer identity

Most respondents (51%) viewed reindeer as wildlife, agreeing that they have high social and economic importance and should roam free, while somewhat disagreeing that they have negative environmental impacts or that their management should be changed. More visitors tended to view reindeer as wildlife than locals, perhaps due to locals experiencing the reindeer more often in domesticated settings, such as the paddock, the car parks, and Christmas parades. Other respondents (39%) viewed reindeer as semi-domesticated, somewhat agreeing with their socio-economic importance and remaining more neutral as to their environmental consequences and management.

Overall, 51% of respondents thought of the reindeer as wildlife, and 39% of people thought of the reindeer are semi-domesticated. Visitors were more likely to see reindeer as wildlife, while locals were more likely to see them as semi-domesticated. *Reindeer experiences* were significantly related to *perception of reindeer identity*. For example, having seen reindeer at the paddock, a Christmas parade or in the upper carparks was more associated with thinking of them as semi-domesticated, which were the most common reindeer experiences and perception amongst local residents.

Finally, *perception of reindeer identity* was also significantly related to *Reindeer Cognitions*. Respondents that viewed reindeer as wildlife had more positive social cognitions but also a more negative view of their environmental impacts. In comparison, respondents that viewed reindeer as semi-domesticated had a lower (but still positive) social cognitions and a higher (but still negative) environmental cognitions about the reindeer.

In summary, the *perception of reindeer identity* was related to personal characteristics of the respondent (*reindeer experiences* & place of residence) but not their wildlife value orientations.

3. Wildlife value orientations and beliefs

The standardized WVO model was found to have a low effect size, and therefore weak predictive potential, for both components of *Reindeer Cognitions*, social and environmental. This renders the model less useful for future applications to research on reindeer in the CNP. The model did find a minimal relationship between WVO and *Reindeer Cognitions*, but it explained very little of the variance in these cognitions. In other words, the wildlife value orientations of the respondents only predicted 5% to 10% of their *Reindeer Cognitions*.

This finding is in contradiction to other studies that found the WVO model to have strong relationships and predictive potential with a variety of other constructs. For example, Jacobs et al. (2014) found that the WVO model had a large effect size for the acceptability of certain wildlife management interventions in a variety of situations. WVO's explained 35-42% of the variance in acceptability of severe interventions, in the of case hunting. This indicated a substantial relationship between the variables (Jacobs, et al., 2014). In another study, WVO's predicted the acceptability of lethal control of agricultural crop-damaging geese and deer. The effect size for geese was $R^2 = 37\%$, and for deer it was $R^2 = 35\%$, meaning that wildlife value orientations explained a significant amount of variance in both of the dependent variables (Sijtsma, Vaske, & Jacobs, 2012). Although other studies found a stronger predictive potential for the WVO scale and other constructs, it is possible that publication bias has led to only 'successful' demonstrations of the scale being published and disseminated. Perhaps more studies like this one found a weak predictive potential for the WVO scale but were never published.

By more finely testing the dimensions of WVO, basic beliefs, it was found that Social Affiliation beliefs and Hunting beliefs in particular impaired the potential of the model to predict cognitions about the Cairngorm reindeer. Further research is required to understand the reasons for this phenomenon. The author can only speculate that it may have been due to the ambiguous status of the reindeer (wild, semi-domesticated, livestock) as well as other factors, such as *perception of reindeer identity*, place of residence, or *reindeer experiences*. Additionally, other unknown factors such as political affiliation or level of education of the respondent might explain the remaining 90% to 95% of the variance in *Reindeer Cognitions*, but they were not tested in this study.

In contrast to the finding above, the measurement performance of the standardized WVO scale for the population was strong in general. Reliability tests confirmed the high reliability and internal validity of the wildlife value orientations scale and demonstrated its suitability for subsequent testing in this research. These scores suggest that the WVO tool is applicable and useful in the central Scottish Highlands, confirming Teel et al.'s (2007) claim that the model is generalizable

across cultural contexts. This particular point will be discussed more in §4.5.2, Scientific Contributions.

Another interesting result was that local residents and visitors were essentially equal in their representation across the spectrum of wildlife values and beliefs. At the outset of research, the author and others involved with the CRRP speculated that these two populations could differ drastically. For example, the author expected local residents to show higher Domination value orientations than CNP visitors because hunting (locally referred to as 'stalking') has been one of *the* prime shapers of landscapes, livelihoods, and traditions for centuries across the Scottish Highlands. Nevertheless, the finding that locals and visitors had similar wildlife values and beliefs confirms recent findings that large shifts in wildlife values are uniform across human cultures worldwide as they all transition to post-materialist societies (Manfredo et al., 2016; Teal et al.,2007). Despite potentially coming from very different cultural contexts (e.g., urban vs. rural, Anglo-Saxon vs. continental European), the vast majority of residents and visitors alike exhibited either Centrist or Mutualist value orientations. Furthermore, the descriptive statistics for each WVO suggested that the average respondent somewhat agreed to agreed with Mutualism (M=5.50) and either somewhat disagreed with or was neutral/undecided about Domination (M=3.55). This confirms the finding that the global value shift is towards more Mutualism (Manfredo et al., 2016). Additionally, the absence of significant differences in WVO's between Cairngorms locals and visitors was consistent with findings that the WVO scale may be generalizable *within* societies, as well as across (Teel et al., 2007). The vast majority of locals and visitors alike were Scottish and/or British, therefore from the same society, generally speaking.

WVO Clusters

Based on the WVO scale, three approximate types (i.e., clusters) of people were represented in the sample: Mutualists, Centrists, and Domiationists. Centrists (49%) and Dominationists (13%) were alike in remaining neutral/undecided on the environmental impacts of the reindeer. Mutualists (37%) strongly disagreed that the reindeer have had negative impacts on the ecology of the Cairngorms. All groups, regardless of differences in their basic wildlife beliefs, were alike in positive social cognitions regarding reindeer.

Membership within these WVO clusters had other implications as well. For one, it was related to *Reindeer Cognitions.* All groups agreed that reindeer have important sociocultural meanings, high economic value and should roam freely. However, the clusters differed significantly in their appraisal of the reindeer herd's environmental consequences. Pluralists and Dominationists were neutral/undecided regarding this topic. In contrast, Mutualists strongly disagreed that with these statements, meaning that they did not think that the reindeer herd has had a negative impact on the ecology of the Cairngorms, should be managed as livestock, or reduced in numbers. In contrast, WVO cluster membership was not related to *perception of reindeer identity* (e.g., semi-domesticated, wild). Understanding the different dispositions of cluster members could contribute to more informed decision-making in the CNP in the future.

Some of these discussions will continue in the concluding chapter via recommendations for future research or in comparison with the qualitative results.

3.5.3   Limitations of Quantitative Methodology

Some methodological limitations that could have affected results were found in both the method (survey instrument) and the sampling itself.

Sampling Limitations

Several weaknesses were found in the survey sampling protocol. One major flaw of this study was its nonprobability sample (Vaske, 20008), which limits the ability of the author to generalize the results to the population. All participants were chosen opportunistically, or by convenience, in order to optimize the number of participants in the sample in a short amount of time (Vaske, 2008). For example, the author spent more time and energy surveying people in the immediate vicinity of the Reindeer Centre than at any other sampling site. Probability sampling would have been preferred (Vaske 2008), but simple random or systematic random sampling were not possible given the circumstances and time constraints. The sampling period was constrained because the CNP reindeer tourism high season was drawing to a close with cold and inclement weather on the way. In addition, the seasonality of the timeframe certainly could have affected response rates simply because there are fewer tourists available to sample in the fall than in the summer in the Cairngorms.

Another sampling limitation was that the author was unable to calculate the response rate because he neglected to keep track of the nonresponse rate. Future studies could rectify this limitation by tracking survey effort so that the actual response rate can be calculated. Anecdotally, the nonresponse rate was much higher for local residents than it was for visitors. One possible reason for this was that a number of surveys and studies have recently been conducted in the area on a variety of topics, potentially contributing to survey fatigue, (i.e., limited patience for surveys associated with high nonresponse rate) amongst local residents (Porter, Whitcomb, & Weitzer, 2004). Another reason may simply be that the author simply approached more visitors than local residents. Preferably, approximately equal numbers of visitors and residents should have been included in order to enhance the representativeness of the sample and generalizability of these findings for the whole population of interest (Field, 2013; Vaske, 2008), reindeer stakeholders.

Coincident to this idea is another limitation: by surveying more visitors than locals, the results could have skewed in one direction because visitors to a national park are already a self-selected interest group. National park visitors could be presumed to have deeper interests in nature, conservation, wildlife, and so on, than the average citizen of the UK or a tourist that chooses Disney World as his destination. This might be especially true of reindeer tourists who go a step further and intentionally spend the time and money necessary to encounter the reindeer directly through the experiences offered by the Reindeer Company or on their own.

Method Limitations

Several mistakes were made in the design, content, and formatting of the survey instrument simply because of inexperience. This was the author's first time ever designing a quantitative study or a questionnaire. The resulting weaknesses in the survey instrument are likely to have contributed to a higher nonresponse rate. Perhaps the most consequential mistake was to measure the construct *reindeer identity* categorically, instead of continuously. That choice later limited which statistical tests could be performed on that construct's relationship with other variables. Another simple

mistake that led to a flaw in the content on the survey instrument was that one item related to the basic wildlife belief Caring in the standardized WVO scale was omitted from the final draft of the survey which was printed and distributed to respondents. Investigating why this happened, it seems that the item was somehow accidentally dropped between the fifth and sixth drafts of the questionnaires with no explanation. These limitations were due to unintentional mistakes.

Other questionnaire limitations resulted from the intentional choices of the author. One such limitation was a formatting flaw in font size. In order to fit more questions on each page and thereby limit the survey to just both sides of one sheet of A4 paper, a small font was chosen (size 10) for the survey instrument. The sample of both residents and visitors contained a large number of older respondents in the end. Many of them commented directly to the author that it was too difficult for them to see and thus contributed to their nonresponse. A similar mistake in designing the questionnaire was only making the survey available in English only. The vast majority of survey respondents the author approached spoke English either natively or fluently as a foreign language. However, a small number of foreign tourists (~10) chose not to take the survey because they were not proficient in English. Another few respondents (~5) began the survey but did not complete and cited their lack of English proficiency as the reason. However, in general, the nonresponse or incompletion rate was more often explained by the length of the survey, based on the author's anecdotal observations. This was especially true for visitors to the CNP, who left the survey incomplete when it began to rain, or their party was finished using the toilet, buying Hill trip tickets or reindeer souvenirs, etc. and became impatient for the respondent to go with them. All in all, these limitations did not seem to constrain the quantitative study too much.

3.5.4   Summary of hypothesis testing and a revised conceptual model

This chapter concludes with a concise summary of the results of statistical analysis testing for the hypotheses stated at the end of Chapter 1. Summary results will also be communicated graphically via a revised version of the conceptual model introduced in the Theoretical Framework section of this chapter (cf. §3.2.4)

Results of hypothesis testing

[Color codes: Black = confirmed, Blue = partially confirmed, Red = rejected]

H1a – Confirmed   Wildlife value orientations were related to *Reindeer Cognitions*.
H1b – Confirmed   The four basic wildlife beliefs were related to *Reindeer Cognitions*
H1c – Partially confirmed   WVO cluster membership was **only** related to *environmental consequences of reindeer*, **not** *psychosocial meanings*

H2a – Partially confirmed   Place of residence is **only** related to *psychosocial meanings of reindeer*, **not** *environmental consequences*
H2b – Confirmed   *Experiences with reindeer* were related to *Reindeer Cognitions*

H3 – Confirmed   *Perception of reindeer identity* was related to *Reindeer Cognitions*

H4 – Rejected   Place of residence was **not** related to wildlife value orientations

H5 –   Partially Confirmed: - Place of residence was **only** related to some *reindeer experiences*, including seeing reindeer at the paddock, a Christmas parade, a mountain carpark, and in the wild.
                                 - Place of residence was **not** related to seeing a reindeer on a Hill Trip or never having seen the reindeer.

H6a – Confirmed   Place of residence is related to *perception of reindeer identity*
H6b – Partially confirmed - **Only** three *reindeer experiences* were related to *perception of reindeer identity*: seeing reindeer at a Cairngorm mountain carpark, a Christmas parade or the Reindeer Centre paddock.
                                 - The other experiences were **not** related to perception of identity.

H7 – Rejected   WVO cluster membership was **not** related to *perception of reindeer identity*

Based on the results of the quantitative study and its limitations, (cf. §3.5.3), changes were made to the conceptual model of *Reindeer Cognitions* and the factors influencing it, introduced in §3.2.3. Fig. 16, below, presents a revised version of the model to visually summarize results of statistical testing. The relationships are color-coded the same as above. The thickness of the arrow indicates the strength of the relationship (i.e., thicker equals stronger). Hypotheses that were confirmed as significant with typical to substantial relationship strength remain coded black. Weak/minimal relationships, which were nonetheless significant, are coded blue and represented by directional arrows with the least line weight, e.g., H1: Wildlife value orientations were associated with *Reindeer Cognitions* but explained only a small amount of variance, or H5: Place of residence was only related to *some reindeer experiences*, not all. Hypothetical relationships that were tested and rejected because they were statistically insignificant are coded and red crossed out, and their arrows have been removed (H4 and H7).
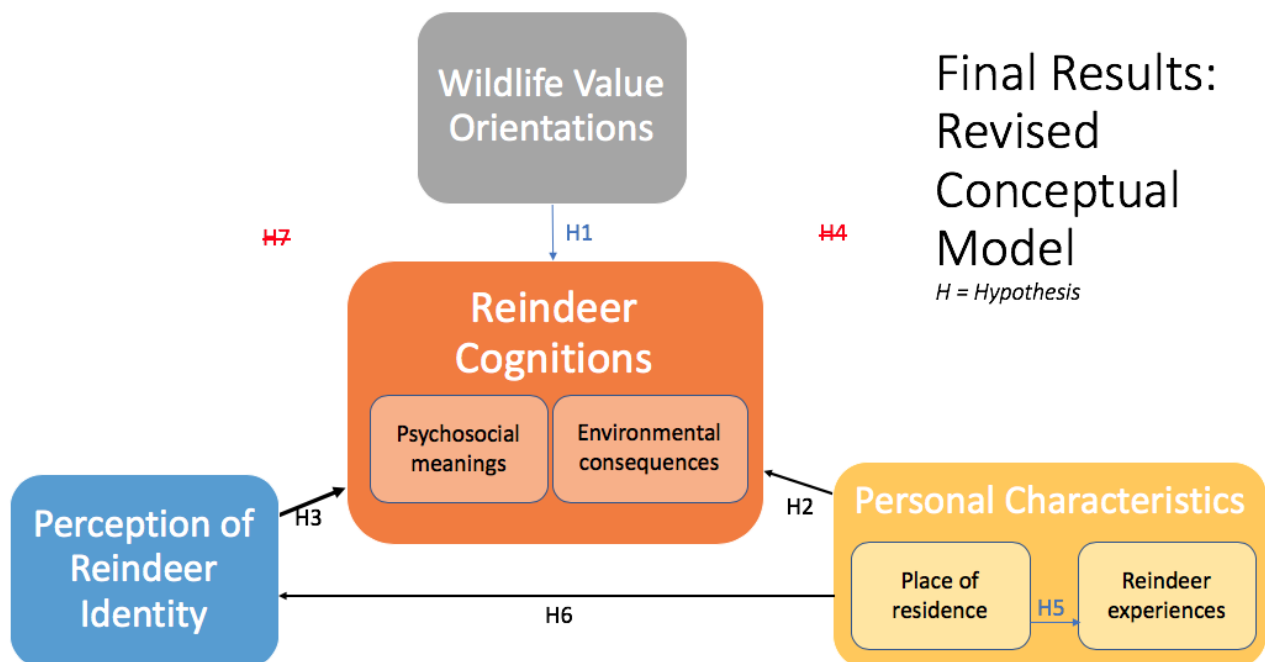
Figure 16. Revised conceptual framework based on results of testing hypotheses

3.6 Conclusion

In the previous two chapters, the sequential phases of this exploratory mixed-method case study were presented separately in chronological order. In Chapter 2 the qualitative theoretical framework, methods, and results were presented and discussed. The results of the RITA method, used to analyze the semi-structured interviews, were described. Supporting evidence for these themes was presented in the form of valence and transcribed quotations selected to best exemplify each theme. Those themes and other qualitative findings are discussed again in the next chapter, this time by broadly comparing them to quantitative findings. In one sense, the end product of Phase 1 was the survey instrument, discussed in §3.3.1 and found in Appendix D, since its design was based directly on the preliminary findings of the elicitation study.

In Chapter 3 the quantitative theoretical framework, methods, and results were presented and discussed. The results of statistical testing conducted in IBM SPSS used to analyze the dataset compiled through the collection of questionnaires, were displayed in tables and figures and explained. First, descriptive results were shown and described. Then, the results of reliability testing and data reduction were displayed. After that, the results of hypothesis testing using a variety of inferential statistical tests were presented next. Finally, the revised conceptual model (Fig. 16) was used to visually summarize the Phase 2 results. That refined model is used to frame the overall discussion and comparison of qualitative and quantitative results in the final chapter.

Chapter 4.   Comparative Discussions & Conclusions

4.1   Introduction

This chapter is composed of four sections. First, the conclusion to each research objective, stated at the outset (cf. §1.2.2), is summarized. When taken together these results answer the overall problem statement. Second, the qualitative results and quantitative results are compared and contrasted, because together they constitute the core findings of this research. While triangulation between different methodological approaches is notoriously difficult, the author was able to detect general trends observed across both phases of the study. These observations are discussed and related to previous research. Third, the methodology is discussed, including some of its overall strengths and limitations. Fourth, the scientific contribution and practical relevance of this research are described. Finally, the report is concluded with some suggestions for future research.

4.2   Objectives and Conclusions

This research project was designed and implemented to resolve the following knowledge problem: How do different stakeholders think about the reindeer in the local context of the Cairngorms National Park?

The gap in scientific knowledge that this problem addressed was chosen based on the express needs of the study's commissioners, the empirical context of the Cairngorms reindeer, and a review of literature relevant to the study of human dimensions of wildlife tourism and management. The knowledge gap was filled using an exploratory, mixed-methods methodology that holistically elicited and measured a wide range of meanings and cognitions about the Cairngorms reindeer. The methodology was based on the research questions of the elicitation study and the hypotheses of the quantitative study, articulated together via five research objectives stated at the outset (cf. §1.2.2). The research project successfully met those five scientific objectives. The following subsections will briefly summarize how each objective was fulfilled. Detailed discussions of each are found in prior chapters.

Objective 1

To explore what place meanings that stakeholders in the reindeer issue have with the Cairngorms landscape and the reindeer herd itself.

Through the qualitative study, four distinct place meanings for the Cairngorms landscape *as related to the reindeer herd* emerged from the interviews. This research did not exhaustively reveal *all*

place meanings for the Cairngorms landscape itself, nor did it set out to. The first place meaning was that the reindeer were an essential part of the Cairngorms landscape. The second place meanings was the reindeer contributed to the wilderness character of the Cairngorms. The third was that the reindeer enhance the uniqueness of the Cairngorms landscape. In the quantitative study, exploratory factor analysis found that these four place meanings hung together with other beliefs and attitudes, comprising a factor referred to herein as *Psychosocial meanings for the reindeer*.

Objective 2

To determine which cognitive constructs these stakeholders hold in relation to the reindeer issue, which includes their natural and cultural history, their management, and tourism based on the reindeer.

The qualitative study identified nine major cognitive constructs associated with the reindeer, coded as themes in the RITA analysis. In descending order of valence, those constructs were: 1) Attitudes towards reindeer tourism, 2) Attitudes and norms regarding reindeer management, 3) Landscape and place meanings related to reindeer, 4) Beliefs about environmental impacts of the reindeer, 5) Beliefs about the future of the reindeer herd or Reindeer Centre, 6) Beliefs about the identity or classification of the reindeer, 7) Attitudes to reindeer roaming freely, 8) Recollections of past experiences with the Cairngorms reindeer, and 9) Wildlife values and beliefs. These thematic constructs were later directly used to design the exploratory items of the survey instrument, specifically in Sections 2 and 3.

Objective 3

To verify the existence of these diverse cognitions about reindeer within the general public and to understand their relative strength in the minds of that population.

The quantitative study fulfilled this objective through the survey data collection and analysis. The findings revealed that the *Reindeer Cognitions* (place meanings, beliefs, values, attitudes, norms, and intentions) drawn from Phase 1 results were indeed present of the populations of interest: visitors to and local residents of the Cairngorms National Park, specifically the Badenoch & Strathspey region, also referred to as reindeer stakeholders. This conclusion was supported by two results. First, the pre-determined WVO scale was found to be highly reliable. Second, exploratory factor analysis of the novel *Reindeer Cognitions* scale found two primary factors to exist in the survey dataset: 1) *psychosocial meanings for the reindeer*, and 2) *evaluations of the environmental consequences of reindeer*. Additional testing demonstrated that these factors were reliable and inversely correlated with one another. The relative strength of these cognitions was established by measuring them on a continuous scale. These results were delivered via the presentation of descriptive statistics such as mean scores and standard deviations.

Objective 4

Assess the relationships within and between these cognitive constructs regarding reindeer and a variety of other possible factors influencing those cognitions, as suggested by the elicitation study.

This objective tapped the potential of explanatory statistical methods for quantitative analysis. It was accomplished using inferential statistical testing for two types of relationships, differences, and associations. Differences were tested using independent sample t-tests and ANOVA. Associations were tested using correlation and multiple regressions. The main finding was that *perception of reindeer identity*, *experiences with reindeer*, and wildlife value orientations were all significantly related to both components of *Reindeer Cognitions*, social and environmental. Additional findings were discovered regarding the personal characteristics of survey respondents. First, both personal characteristics, including place of residence and *reindeer experiences*, were associated with significant differences in *perception of reindeer identity.* Second, within the construct of personal characteristics, place of residence was associated with differences in *reindeer experiences*.

Objective 5

To deepen theoretical knowledge of the Wildlife Values Orientations scale by applying it in a novel context.

This objective, driven by personal curiosity, led the author to conduct additional testing beyond the initial research aim of understanding just cognitions about reindeer. A major finding here was that the WVO was reliable in the context of the central Scottish Highlands. Another key finding was that no significant differences were found between local residents' and visitors' wildlife value orientations or basic beliefs. A corollary finding was that WVO's were not related to *perception of reindeer identity.* Other findings included that three clusters of basic wildlife beliefs existed in the sample and that most people fell into the Centrist cluster, meaning that their wildlife value orientation was essentially neutral, as were their evaluations of the reindeer's environmental consequences.

4.3 Comparative Discussion of Findings

This section contains a brief reflection on the ways in which some of the main findings of the qualitative study and quantitative study converged and diverged in a final analysis.

Convergent findings

Reflecting on the findings of the two phases of the overall research, some general trends emerged. One way in which qualitative and quantitative results converged was that everyone, interview participant or survey respondent, resident or visitor, agreed that the reindeer are an important visitor attraction and reindeer tourism makes a positive contribution to the local economy. Estimates of the actual economic impact varied amongst stakeholders, but not views on the basic idea. This was a key finding because it was anticipated by some involved in the project that certain CNP stakeholders/landowners would deny the value of reindeer tourism due to the politicized nature of the issue at this time.

Another place where findings converged was on the identity, or categorization, of the Cairngorms reindeer. While a range of perceptions of reindeer identity where found amongst the stakeholder interviewees and the survey respondents, most people in this study tended to think of the reindeer as inhabiting a middle space between wildlife and livestock, herein referred to as 'semi-domesticated'. Almost all interviewed stakeholders were local residents and, therefore, well familiar with the reindeer, the Reindeer Company and their history in the area. As a result, almost all stakeholders described the reindeer as 'semi-domesticated', with just a few describing them as fully domestic or 'livestock'. In contrast, survey respondents were spread widely across the range of all perceived reindeer identities from fully 'wild' all the way to 'pet'. But, in general, most people in the survey indicated that they see the reindeer as semi-domesticated, tending towards the 'wild' end of the spectrum.

Reinforced by both phases of research, this ambiguous identity is interesting for two reasons. On one hand, the wild image of reindeer affirms reindeer tourism as a form of wildlife tourism and validates this study's application of the WVO metric. Additionally, it explains why there is widespread support amongst locals and visitors for the reindeer to continue free-roaming as other wildlife are permitted to do in the Cairngorms. On the other hand, the image of the reindeer as partially domesticated helps to explain resistance to the idea of treating reindeer the same as other species of wild deer, such as shooting the reindeer when they stray off of their leased ground. This is also in keeping with the global trend of human values for animals shifting towards mutualist value orientations that foster less human-centered attitudes and afford animals more rights than previously (Manfredo et al., 2016).

Another finding that was confirmed by both qualitative and quantitative results was the importance of firsthand experiences with reindeer. The qualitative findings suggested that these experiences were uniformly enjoyable and led to generally positive attitudes towards the reindeer. In the interviews, stakeholders often described pleasant memories of experiencing the reindeer in a variety of ways and at different venues over the years. These categories of experience (e.g., at a Christmas parade, while skiing in the Cairngorms, etc.) were then elicited from the survey respondents as well. Statistical analysis of those responses and their relationship to the *Reindeer Cognitions* verified that **any** direct, firsthand experience of reindeer was linked to a higher score for the *psychosocial meanings of reindeer*. In other words, seeing a reindeer in person was associated with valuing the presence of reindeer in the Cairngorms overall. This result agrees with the findings of Ballantyne, Packer, and Falk (2011) who found that wildlife tourism experiences could enhance tourists' awareness, appreciation and actions of the environment in general and the specific animal encountered. While this research demonstrated the effect of *reindeer experiences* on the appreciation of the reindeer and the Cairngorms landscape itself, further research is needed to assess its predictive potential for intentions or behaviors that might be of interest to a manager.

Divergent findings

In other ways, the findings of the two phases of research diverged greatly. Broad patterns of contrast emerged from the comparative analysis in regard to three interrelated topics: free-roaming, environmental impacts, and management of the Cairngorms reindeer. These divergent findings and possible reasons for them will be discussed in this subsection. First, free-roaming was a particularly divisive topic amongst those stakeholders who were interviewed. Some were strongly supportive of the reindeer continuing to range and graze freely across the Cairngorms, while others

were strongly opposed to it. Contrastingly, nearly all those people surveyed were in support of the reindeer roaming free. Similarly, many stakeholders that were interviewed expressed a belief that the reindeer are having detrimental impacts on the native ecology of the Cairngorms, particularly those representing conservation or land management organizations. In contrast to this, the majority of survey respondents were undecided when it came to this issue or slightly leanings towards saying that their environmental consequences are minimal. Lastly, several interview stakeholders were pushing for either outright changes in reindeer management or at least for there to be a more rigorous assessment of how the reindeer are being managed in relation to long-term conservation goals for the Cairngorms National Park. Only a couple of stakeholders expressed beliefs that management was currently fine and there should be no alterations to existing arrangements. By way of counterpoint, the overwhelming majority of survey respondents were decidedly neutral on this issue of reindeer management or slightly disagreeing that management needs to be changed in some way.

These differences are likely to have occurred due to differences in the sample composition of the two studies. The qualitative study exclusively sampled people that were local residents of Badenoch & Strathspey or very nearby. In addition, all interview participants were also direct stakeholders in the issue of the Cairngorms reindeer in some fashion as each was a representative of an organization tied to land management, tourism, or both. Finally, four stakeholder interviewees were directly involved in the Cairngorms Reindeer Research Programme itself. These local inhabitants and stakeholders had much more in-depth knowledge and personal experiences of the reindeer, the Cairngorms landscape, the tourism economy of the central Highlands, current issues in Scottish conservation, and so on. This greater familiarity with the context and issues of the reindeer certainly colored their responses, as evinced by the qualitative data. Furthermore, all but three of these stakeholders were conservation professionals working to preserve the biodiversity and natural features of the Cairngorms which was linked to seeing the ecological role of the reindeer in that landscape (introduced, non-native, etc.) in a markedly different way than a member of the general public.

By contrast, the quantitative study was composed of a majority of visitors/tourists to the national park (69%). Of these visitors, most came from other areas within Scotland (51%) and around the United Kingdom (33%), which are likely to be more urbanized than the Cairngorms landscape, which is commonly described as 'wilderness'. The remainder of the visitors came from other countries and cities around Europe and the world entirely.   Although the quantitative sample was also composed of many local inhabitants of Badenoch & Strathspey (31%), who could be considered reindeer stakeholders, these people were not actively engaged with issues of reindeer and land management to the degree that interview participants were. As several stakeholder interviewees noted, the Cairngorms reindeer were "part of the wallpaper/furniture" (i.e., something so familiar and taken-for-granted as to passively blend into the background).

The marked difference between the expert stakeholders/interviewees and the wider populace/survey participants in their evaluations of the CRH's free-roaming, environmental impacts, and management, described In this section,, suggests that other factors were more important in predicting favorable cognitions (attitude, norms, intentions) towards reindeer than simple demographic characteristics such as nationality and place of residence. This finding confirms the cognitive hierarchy theory in two ways. *Reindeer Cognitions*, situated at the center of the inverted triangle (cf. Fig. 1), are more numerous, quick to change, and specific to the situation than

lower-order values and beliefs (Vaske & Donnelly, 199). The reindeer stakeholders sampled by the elicitation study were a varied group of people; however, most of them shared a much greater familiarity of knowledge about the current issues and challenges with the CRH at present. In fact, it was why they were chosen for inclusion in the study. It could be inferred that their norms, attitudes, and intentions for the reindeer were more specific and situational than the average survey respondents. Those respondents, who mostly lacked deep knowledge of the CRH's context and current situation, may have instead been drawing upon their basic beliefs and values about wildlife when asked to evaluate the reindeer and their importance, at least in part. Although the relationship between the WVO's and the *Reindeer Cognitions* was a weak one, it was nevertheless found to be a statistically significant one. These divergent findings lend support to the claim of the cognitive hierarchy that the more stable, foundational cognitions influence the ones above them in the hierarchy, and that the higher cognitions are more dynamic and specific to situations than the lower ones.

4.4 Mixed Methodological Discussion

This section reflects on both the strengths and challenges of the chosen methodologies.

4.4.1 Strengths

The decision to mix methods was driven by both the substance of the context of the study and the pragmatic stance of the author. Mindful of the ontological and epistemological incompatibilities that often result from mixing methodologies (Creswell, 2014), the author attempted to choose conceptual frameworks for the two phases of research which were compatible and would yield useful results for the commissioners of the study.

The added value of using mixed methods was multiple. First and foremost, this study did something fairly unique by crafting a truly bespoke survey instrument. This was accomplished by first thoroughly investigating the local empirical context of the Cairngorms reindeer via in-depth qualitative interviews. The qualitative study allowed the questionnaire to be embedded in that local context by eliciting the most recent and relevant issues and perspectives from a variety of stakeholders. This embeddedness guided the choice to combine a powerful and proven standardized instrument (i.e., the WVO scale) with a novel and exploratory approach (i.e., *Reindeer Cognitions*, identity, and experiences) in order to yield the richest dataset possible.

Furthermore, the use of multiple methods may help to legitimize these social science findings for a broader, lay audience. The qualitative study provided thick data in the form of in-depth and nuanced descriptions. The quantitative study added the extra dimensions of measuring the strength of some of the attitudes, norms, values, and beliefs that emerged from the analysis of those thick descriptions. Kitchenham (2010) describes the added dimensions best: ''The combination of qualitative and quantitative techniques enhances legitimation as the qualitative analyses involve descriptive precision and the quantitative analyses ensure numerical precision'' (p. 562). The numerical precision of the quantitative study might also have the benefit of making social science findings more legible to land managers and natural resource conservation professionals

who are predominantly trained in the natural sciences. Mixed methods findings can potentially make a greater impact because the inclusion of different kinds of data helps to build a more convincing case for skeptics (Onghena et al., 2019). Ultimately, the practical utility of these findings is contingent upon the reader accepting its knowledge claims as legitimate. Stating as convincing a case as possible certainly aids in that regard.

4.4.2   Challenges

Some methodological challenges that arose were limiting factors on the overall success of the research design. One of these was triangulation. The promise of triangulation is often optimistically touted in the literature (Creswell, 2014; Denzin & Lincoln, 2011; Onghena et al., 2019; Tashakkori & Teddlie, 2003). However, actually triangulating results proved to be difficult in practice. This was primarily because concrete, step-by-step explanations of how to systematically perform triangulation were conspicuously absent from the literature reviewed by this author. Lacking suitable guidance, the author judged the process illogical and confounding. For example, while the valence of thematic codes in qualitative analysis is interesting to the qualitative researcher, it cannot be said to have any statistical significance when analyzed by the quantitative researcher reliant upon p-values and large data sets. Ultimately, making direct comparisons between quantitative and qualitative results, the proverbial apples and pears, was reduced to the general terms of §4.2.

Possibly, much of the literature on mixing methods has been overly optimistic in some claims regarding its benefits without a solid foundation in actual evidence. As Fielding (2012) cautions, researchers must not confuse pragmatism for triangulation or triangulation for mixed methods. While agreeing with Denzin (2012) that mixed methods research should not be abandoned outright, more thorough meta-scientific research is still needed to validate such optimism and overcome the current superficiality of the literature. As triangulation was only a corollary goal of employing mixed methods, difficulties with it did not limit the success of the research overall. The choice of mixed methods was mainly driven by both the substantive needs of the reindeer context and the pragmatic stance of the author.

Another challenge particular to this research design was that, because it included both a fully developed qualitative study and a fully developed quantitative study, it became a bit cumbersome for the author. Either one of these studies alone would likely have been sufficient for a typical MSc thesis. This made the tasks of designing, implementing, analyzing, and writing doubly time-consuming and cognitively taxing for the author. Consequently, the overall project required more time than is generally considered normal for a thesis at Wageningen University.

Let this lesson serve as a warning to fellow student-researchers: Many guides to research design present mixed methods as a comparable choice alongside a qualitative or quantitative study alone, approximately equal in effort required. However, it has been the experiences of this author that, in order to do a good job at either type of study, a correspondingly double amount of time was required. In the context of this case study, the research design essentially demanded two full studies one after another (not actually mixing them) in order to hold to their epistemological claims. It may be that this challenge could be overcome given further training and experience in

using multiple methods to realize their advertised benefits. Despite these challenges the rich data that resulted contributed both scientific and practical applications in the end.

4.5   Contributions of the Results

4.5.1   Scientific contributions

Teel et al. (2007) issued a call to action to the scientific community test the WVO scale in cultural contexts outside of the United States, where it had been thoroughly studied. Since then, researchers across the globe took up the challenge (e.g., Rickenbach et al., 2017; Vaske et al., 2011; Zainal Abidin & Jacobs, 2016). Contributing to that effort was one driver for choosing the WVO scale for this research. By confirming the reliability of the WVO model, this case study demonstrated one more cultural context where the tool is valid, the Scottish Highlands. Furthermore, these findings confirmed the global trend of wildlife values shifting away from Domination and toward Mutualism (Manfredo et al., 2016). In some incremental way, this case study contributed to the work of the Wildlife Values Globally initiative (cf. §3.2.2).

Some new insights can be drawn from this study. The finding that wildlife value orientations did not predict perceptions regarding reindeer identity reveals a something genuinely new about wildlife value orientations, and about the cognitive hierarchy by association, at least based on the literature which the author familiarized himself with for this thesis (e.g., Jacobs et al., 2012; Manfredo, 2008; Sijtsma et al., 2012; Teel et al., 2010). In this case study, the now-standard basic wildlife beliefs and values did not predict perceptions of reindeer as whether the animals should be officially classified as wildlife, livestock, pets, or something else entirely. This seems to be a novel field of inquiry that the scientific community devoted to studying human-wildlife relationships have not focused on as of yet.

The author would argue that the cognitive construct called *perception of reindeer identity* throughout this report is, in fact, a belief because it is not evaluative enough either to be a norm or attitude. It is neither a positive/negative attitudinal judgment nor a widely acknowledged norm. In contrast, that cognitive construct is not general enough to be a cultural ideal, so it is not a value (Schwartz, 2006). Judging by Rokeach's typology, *perception of reindeer identity* is certainly neither a terminal value nor an instrumental one (Rokeach, 1973). What is clear is that the construct is a specific idea about a specific phenomenon, or cognitive object (i.e., the Cairngorms reindeer). It remains unknown if *perception of reindeer identity* part of a pattern of beliefs. So it is likely to be a belief, not a value orientation (Vaske, 2008). Extrapolating from Jacob et al.'s (2014) claim that beliefs reflect thoughts about general classes of issues and objects in a given domain, perhaps a belief about the identity of reindeer is influenced by a basic belief about the identity of 'wildlife' in general, situated lower on the cognitive hierarchy. This abstraction from the data may have more support from the next finding to be discussed.

Flowing from the idea above, we arrive at a closely related finding about *perception of reindeer identity,* which may be of interest to quantitative researchers who choose to collect data via survey instruments or study wildlife in any way. This study found that respondents held a range of

definitions not only for reindeer but for the term 'wildlife' as well. In this study, the local resident and visitor populations held contradictory definitions of wildlife simultaneously. For example, many of them had empirical knowledge and firsthand experience of the domesticity of the reindeer, such as seeing them fenced inside the Hill Enclosure or harnessed to Santa's sleigh, or personally feeding the reindeer by hand and stroking their fur on a Hill Trip. And yet, the majority of respondents (51%) identified the reindeer as 'wildlife.' Another large segment (39%) viewed them as 'semi-domesticated', so at least partially 'wild'. It seems that these respondents hold the mutually exclusive ideas that the reindeer is a wild (or semi-wild) animal despite clear and present evidence of their domesticity. Normally, survey studies on wildlife issues and tourism define wildlife as "non-domesticated animals" (Usher, 1986). But as these findings demonstrate, beliefs about what animals can be perceived as wildlife are not part of the wildlife value orientations scale. The scientific community might be advised to look more closely at how 'wildlife' is defined, specifically on questionnaires, or, more interestingly, begin to examine if the cognitive construct of 'wildlife identity' is indeed a basic belief. Then it could be tested to see the ways in which a 'wildlife identity belief' are related to, or even a part of, wildlife value orientations.

4.5.2   Practical relevance

This section highlights the most relevant applications of the research findings to current challenges in the Cairngorms. The practical objective of this study was to produce sound scientific insights and inform real-world praxis for the commissioners of this study, the Cairngorms Reindeer Research Programme. In order to do so, an empirical understanding of the Cairngorms reindeer was first needed to assess the overall psychological, social, and economic values of the herd. This research laid a foundation which should enable future research to focus on the economic contribution of the CRH to regional tourism, which can be difficult to measure directly without prior contextual knowledge. As such, some of the key findings and recommendations presented herein have already been shared with the CRRP in a November 2018 presentation by the author as well as in an official product report entitled "Report Phase 1 : April 2019", which synthesized these results with the parallel ecological study and was co-authored with supervisor Dr. J. de Koning and Dr. L. de Raad.

Another practical outcome is that findings may deepen CRRP members' awareness of the reindeer herd's current and potential roles in the economic and social landscapes of the Cairngorms. Deeper awareness could inform more responsive tourism management strategies for the future. A possible way to do this is to focus on using the reindeer more effectively as an educational tool for visitors to the CNP to focus on critical conservation issues as suggested in one stakeholder interview (P9). Reindeer are past-native animals that went extinct in Scotland during another period of dramatic climate change, the end of the last Ice Age (Clutton-Brock & MacGregor, 1988). Therefore, their unique natural history in Scotland could be used to illustrate long-term, ecological processes such as climate change and the accompanying extinction of species.

These findings may also contribute to a better understanding of reindeer tourism and its practices amongst the members of the CRRP, key stakeholders and decision-makers for the future of the CRH. For example, the interviews revealed that, in some cases, important actors in these issues knew very little about the actual management practices of the Reindeer Company, such as daily herding routines or their policy on preventing hefting. Better communication about these practices could potentially resolve some lingering tensions that are may exist solely because of a lack of

knowledge sharing. In turn, improved communication and mutual understanding within the CRRP and amongst other stakeholders can contribute to more productive collaboration as the research program progresses.

Coalitions of landowners and conservation agencies, such as Cairngroms Connect, are currently proceeding with plans for wildland restoration and forest expansion of the CNP. The results of this study may have practical implications for fostering more sustainable management of the reindeer herd in the changing Cairngorms landscape as well. Two key findings are most relevant here. First, results indicated that the reindeer are strongly linked to the Cairngorms via deeply help memories, place meanings and more. Second, the free-roaming image of the reindeer is romanticized by the public and is perhaps a key part of their enduring appeal to tourists. However, it is also the source of tension for certain landowners in the CNP. It, therefore, has the potential to become an intractable issue if not handled delicately by managers.

Understanding the implication of these findings and the relative importance of the reindeer to visitors and local residents should help the CRRP to tread lightly if and when it proposes any new management interventions in the future. *Reindeer Cognitions* were significantly linked to wildlife value orientations, however weak the relationship, and therefore, have some potential to predict acceptability of management interventions (Jacobs et al., 2014). For example, members of the public with favorable cognitions about reindeer, whether local to the CNP or otherwise, may be more likely to resist severe interventions in reindeer management, such as revoking their 'traditional' right to free-roam the Cairngorms in the wintertime or removing the herd from their 'traditional' grazing allotment, the highly visible Hill Enclosure and the Upper Glenmore area, as these interventions would likely threaten the meanings people attach to the reindeer herd.

In summary, the results of this study can help promote awareness, education, and collaboration and inform best management practices. In turn, those improved practices could ease potential bottlenecks in the implementation of innovative approaches to reindeer and wildlife tourism management by anticipating contentious issues and avoiding or mitigating resistance from the public eager to support 'their' Cairngorms reindeer.

4.6   Suggestions for Future Research

Initially, this research was designed to serve as a pilot study for a larger quantitative survey to be conducted online or by mail. Now, a follow-up study looks unlikely. However, it remains the author's recommendation that such a study be conducted someday. Many lessons were learned from this survey and its qualitative elicitation study which enable the design of an even better questionnaire and sampling procedure in future research. Several ways to achieve this will be explored. First, a follow-up study could aim to randomly sample equal amounts of visitors and locals in much larger numbers. This would increase the reliability and validity of the results and make them truly generalizable to the whole population of reindeer stakeholders. I conducted online or by mail, a future study could sample one key interest group that was missed in this study: the long-term financial supporters of the Reindeer Centre who adopt individual reindeer online, receive regular newsletters from the Reindeer Company, and make repeat visits to the reindeer over the years (personal communication, anonymous, 25 September 2018). These deeply-invested

stakeholders can be estimated to feel stronger attachments to the reindeer and more sensitivity to management interventions than the general public. Furthermore, the Reindeer Company has already volunteered access to their supporter database should the CRRP wish to survey them (personal communication, anonymous, 25 September 2018).

A follow-up study could employ a refined version of the *Reindeer Cognitions* scale, already customized to the Cairngorms' empirical context and issues. An updated survey instrument could correct flaws in the original one. First, the WVO scale could be removed. It only explained a small amount of variance in the *Reindeer Cognitions,* meaning it has less predictive potential than initially hoped for when chosen for inclusion in this case study. Additionally, the author anecdotally reports that many British respondents had strong negative reactions to the 'Hunting portion' of the WVO scale as evinced by exaggerated facial expressions and verbal comments to both fellow visitors and the author. This may be because hunting has a long and controversial history in Scotland and the UK, where it is viewed primarily as an old-fashioned and somewhat elitist activity of the wealthy and foreign trophy hunters.

Second, a follow-up study would be advised to look deeper into *perception of reindeer identity* and the topic of the reindeer free-roaming, which were found to be meaningful and divisive by both qualitative and quantitative results. In this survey, free-roaming was assessed by only two survey items, not the three that are necessary to run reliability tests during statistical analysis (Field, 2013). Furthermore, *perception of reindeer identity* was measured as a categorical variable in this survey. In a new instrument, it should be measured continuously and with multiple items to enable direct comparison with other variables and increase the reliability of this evidently important construct. A new survey could be easily amended to accommodate these changes.

Finally, because this study occurred very early in the establishment of the Cairngorms Reindeer Research Programme, future management interventions had not been discussed even hypothetically at the time of data collection. Nevertheless, a general fear of public outcry over any proposed changes to reindeer management was pointedly mentioned in several stakeholder interviews. Therefore, a new iteration of the survey instrument could include items measuring responses to plausible management interventions in order to directly measure stakeholder intentions to support or resist such interventions. Greater specificity and real-world stakes should strengthen the predictive potential of the *Reindeer Cognitions* scale in future research.

In an entirely different vein, future studies of the Cairngorms reindeer could pivot away from the cognitive approach to research, while remaining attentive to place meanings. Stakeholder interviews, observations of Hill Trips, casual conversations with local residents and reindeer tourists led the author to recognize cognitions as important in this context for their theoretical links to behavior. Consequently, a cognitive approach was chosen to conceptually frame the study. The cognitive approach certainly yielded insights, such as the role of *reindeer experiences* and *perception of reindeer identity* in shaping cognitions about the animals. However, the qualitative elicitation study also revealed that emotions played a role in people's past memories of the reindeer, their immediate reactions to the reindeer as part of tourism experiences, and were linked to evaluations of current reindeer issues. Therefore, future research could be based on an affective approach to studying the emotions elicited by reindeer and reindeer tourism. For example, a qualitative study could be designed to solely investigate the affective content of tourists' *reindeer experiences* by interviewing people both immediately before and after a Hill Trip and a Reindeer

Centre paddock visit. The results could then be compared in order to understand the expectations and motivations driving reindeer tourism versus the satisfaction and emotions felt during and after tourism experiences with reindeer.

Of course, countless other possibilities and suggestions for research into reindeer and wildlife tourism exist in the author's mind. These are just a selection of the most salient recommendations for future research suggested by the findings of this case study.

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Appendix A. Interview Guide

The Cairngorms Landscape
- How long have you been living in the Cairngorms region?
- Are you native to the region?
    - Probe: If not, what brought you here?
- How would you describe the Cairngorms to someone who has never been here?
- What does the Cairngorms landscape mean to you?
- How important do you regard the Cairngorms landscape for yourself?
    - Probe 1) How important is it in general?
    - Probe 2) What contributes to this importance?
- What activities do you perform in the Cairngorms?
    - Probe: How do you use the landscape?
- What are your favorite characteristics of the Cairngorms? Does it include Reindeer?
- Are you satisfied with the Cairngorms and the management and development of this landscape?
- Do you experience any problems with respect to the Cairngorms or their management and development?

The Cairngorms Reindeer Herd
1. Perceptions of the reindeer
- What can you tell me about the reindeer of the Cairngorms?
- Do you have any personal experience or memories of encountering the herd or individual reindeer, either at the Glenmore paddock or out on the hills?
- What is the importance of the reindeer for you personally?
    - Probe: How does this differ from their importance to your institution/organization?
- What do you think is the importance of the CRH to visitors and tourists?
- What do you think is the importance of the CRH to local residents?
- Are the reindeer an essential component of the Cairngorms landscape?
    - Probe: What does the presence of the reindeer add to the landscape?
    - Probe: Can you imagine a Cairngorms without the reindeer?

2. Attitudes towards management of the reindeer
- What do you know about the Reindeer Company that manages the herd?
- Are you satisfied with how the Reindeer Company manages the reindeer herd?
    - Probe: If yes, then what do you think they are doing well?
    - Probe: If no, what do you think could be improved?

3. Perceptions of reindeer-based tourism
- What can you tell me about the Reindeer Centre in Glenmore?
    - Probe: Have you visited the Centre and the reindeer paddocks yourself?
- Do you have any experience with the daily Hill Trips that go to visit and interact with the reindeer herd out on the hills?
    - Probe: If so, what was that experience like for you? What was most striking about it at the time, or memorable in retrospect?

- What do you see as the impacts of reindeer tourism on Glenmore and the Cairngorms as a whole, either positive or negative?
  - Probe: What impacts, if any, does this tourism have on nearby communities, such as Aviemore, and their economies?
- Is a visit to the Centre or a Hill Trip a "must-do" part of a trip to the Cairngorms and/or Glenmore?
- Why do you think tourists are attracted to visit the reindeer?

The Future
- What opportunities do you see for future management of the Cairngorms reindeer herd?
  - Probe into this to reveal the challenges
  - Probe on the feasibility, timeline, logistics, funding
- What opportunities do you see for reindeer tourism development in the future? -
  - Probe = same as above

Conclusion
- Is there anything else that you want to discuss further regarding the Cairngorms landscape or the reindeer herd that we didn't cover adequately?
- Do you have any more questions or comments about my research project or how this information will be used?
- Finally, is there anyone else relevant to these topics that you think I should interview? If so, what is their contact information? Is it okay to say that you referred me?

Appendix B. Interview participant key

Participant Code	Organization	Date Interviewed	Interview #
P1	Cairngorms Business Partnership	28/9/2018	1
P2	Royal Society for the Protection of Birds	1/10/2018	2
P3	Forests and Lands Scotland	2/10/2018	3
P4	Forests and Lands Scotland	2/10/2018	3
P5	Wildland Ltd	3/10/2018	4
P6	Cairngorms National Park Authority	5/10/2018	5
P7	Cairngorms National Park Authority	5/10/2018	5
P8	Reindeer Company Ltd.	5/10/2018	6
P9	Scottish Natural Heritage	8/10/2018	7
P10	Forests and Lands Scotland	9/10/2018	8
P11	Aviemore and Vicinity Community Council	10/10/2018	9
P12	National Trust for Scotland	10/10/2018	10
P13	Natural Retreats (Cairngorm Mountain Ski Resort)	12/10/2018	11

Appendix C. Example of completed RITA coding form

Transcribed 10.1.2019

Start: 15:30
17:10

Rapid Identification of Themes from Audio Recordings (RITA) Form

Interview ID#: __9__   Participants: __P11__   Coding Time: __100__ minutes

Listen to the interview audio in 3 minute segments. After each segment, indicate a positive (+), negative (-) and/or neutral (0) instance of each theme below.

Themes	00:00 - 02:59	03:00 - 05:59	06:00 - 08:59	09:00 - 11:59	12:00 - 14:59	15:00 - 17:59	18:00 - 20:59	21:00 - 23:59
1. Landscape/Place meanings	+	+						+
2. Attitudes towards reindeer tourism	+		+	+		+	+	+
3. Past experiences of reindeer	0 +		0 +				+	+ Christmas parades
4. Attitudes & norms re: reindeer management						|		
5. Beliefs about reindeer ecological impacts								
6. Beliefs about reindeer classification			+					
7. Attitudes to reindeer roaming behavior		+	+					
8. Future of the reindeer herd or centre								
Notes:			0 "public outcry" 7:38					

WP0

123

Appendix D. Survey Instrument

Reindeer in the Cairngorms National Park

This survey is administered by a MSc student conducting thesis research for Wageningen University in cooperation with the University of the Highlands and Islands at Inverness. None of your personal information will be recorded, so all of your answers will remain anonymous. Your completion of this form implies your consent to voluntarily participate in this study. A fully completed survey will be most useful to conducting a good study. However, you may stop filling it out at any time for any reason with no consequence. Please ask if you have any questions or need clarification. ***Thank you for your participation today.***

Section 1. General Beliefs about Humans and Wildlife

Please read and consider each statement carefully, then indicate to what extent you agree or disagree with it by checking one box only.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
We should strive for a world where humans and wildlife can live side by side without fear.	□	□	□	□	□	□	□
I view all living things as part of one big family.	□	□	□	□	□	□	□
Animals should have rights similar to the rights of humans.	□	□	□	□	□	□	□
Wildlife are like my family and I want to protect them.	□	□	□	□	□	□	□
I care about animals as much as I do other people.	□	□	□	□	□	□	□
It would be more rewarding to me to help animals rather than people.	□	□	□	□	□	□	□
I take great comfort in the relationships I have with animals.	□	□	□	□	□	□	□
I value the sense of companionship I receive from animals.	□	□	□	□	□	□	□
Humans should manage wildlife populations so that humans benefit.	□	□	□	□	□	□	□
The needs of humans should take priority over wildlife protection.	□	□	□	□	□	□	□
It is acceptable for people to kill wildlife if they think it poses a threat to their life.	□	□	□	□	□	□	□
It is acceptable for people to kill wildlife if they think it poses a threat to their property.	□	□	□	□	□	□	□
It is acceptable to use wildlife in research even if it may harm or kill some animals.	□	□	□	□	□	□	□
Wildlife are on earth primarily for people to use.	□	□	□	□	□	□	□
We should strive for a world where there's an abundance of wildlife for hunting and fishing.	□	□	□	□	□	□	□

Hunting is cruel and inhumane to the animals.	□	□	□	□	□	□	□
Hunting does not respect the lives of animals.	□	□	□	□	□	□	□
People who want to hunt should be provided the opportunity to do so.	□	□	□	□	□	□	□

Section 2. Attitudes towards the Cairngorms Reindeer

Please read and consider each statement carefully, then indicate to what extent you agree or disagree with it by checking one box only.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
The Reindeer Centre is an important attraction of the Glenmore area.	□	□	□	□	□	□	□
Seeing the reindeer is a highlight of visiting the Cairngorms.	□	□	□	□	□	□	□
Reindeer tourism is important to the local economy.	□	□	□	□	□	□	□
The reindeer are an essential part of the Cairngorms landscape.	□	□	□	□	□	□	□
The presence of the reindeer makes the Cairngorms feel wilder.	□	□	□	□	□	□	□
The presence of the reindeer makes the Cairngorms a more unique place.	□	□	□	□	□	□	□
The reindeer should be allowed to roam freely all throughout the Cairngorms.	□	□	□	□	□	□	□
The reindeer should be kept out of sensitive areas in the Cairngorms.	□	□	□	□	□	□	□
The reindeer have a negative impact on the vegetation of the Cairngorms.	□	□	□	□	□	□	□
The presence of the reindeer impedes habitat restoration and reforestation.	□	□	□	□	□	□	□
The number of reindeer should be controlled to minimise environmental impact.	□	□	□	□	□	□	□
The reindeer should be managed more like other species of livestock, e.g., sheep.	□	□	□	□	□	□	□
The reindeer should be managed more like other species of wildlife, e.g., red deer.	□	□	□	□	□	□	□
The reindeer are being managed properly just the way that they are now.	□	□	□	□	□	□	□
Reindeer belong in the Cairngorms.	□	□	□	□	□	□	□

section 3.

1. What is your country of origin? *Indicate your current nationality by checking one of the boxes provided, or by writing it on the line.*

□ Scotland   □ England   □ Other: _____

2. What is your residence status in the Cairngorms? *Check one box.*

□ I am a visitor   □ I reside within Badenoch & Strathspey   □ I reside elsewhere within Cairngorms National Park

3. I have seen (or will see) the Cairngorms reindeer... *Check all boxes that apply.*

□ at the Reindeer Centre paddock in Glenmore   □ on a Hill Trip organized by the Reindeer Centre
□ while hillwalking or skiing □ during a Christmas parade   □ at Cairngorm Mountain car park   □ I've never seen the reindeer.

4. I think of the reindeer of the Cairngorms as being... *Check one box only.*

□ wildlife □ semi-domesticated   □ livestock   □ pet

Appendix E. Additional qualitative data

Theme 1. Attitudes towards reindeer Tourism

The Reindeer Centre is an important tourism attraction of the Cairngorms.

[The Reindeer Company is] part of the wallpaper around here. (P8)

Fundamentally, I think a lot of people enjoy the reindeer thing, a lot of people enjoy Cairngorm Mountain, a lot of people enjoy RSPB, and a lot of people enjoy the Forestry Commission, and a lot of people will enjoy Cairngorms Connect. And I think Cairngorms Connect is probably richer with the reindeer experience for many. (P5)

So yeah, I think [reindeer tourism] does have an impact. I don't think we'd be so busy in the [Glenmore] visitor Centre in October until Christmas if it wasn't for the reindeer, definitely. (P3)

"[The Reindeer Centre] is a serious tourist draw in the area, the Aviemore area, Badenoch & Strathspey. It's a tourist area[...] And [the Reindeer Centre] is a major attraction out there [in Glenmore] and it's borne out by quite a lot of the traffic that heads out that way. You just have to go up there in the summer and see how many vehicles are parked outside the Reindeer Centre." (P11)

I: As [the reindeer] are here now, do you think, do you like the way they fit into the Cairngorms landscape?
P11: Oh yeah. Yeah, they do. They fit in well.
I: What do you think it adds?
P11: It adds the fact that they're there and you see them. And you know they're quite confined in the area that they're in. They're not all over Scotland. So, from my guiding point of view, a tourism points of view, we've got something that's special. People want to see them.

I: So do you think that in the time they have been here, either from a local or tourist perspective, that the reindeer have become an essential part of the landscape?
P1: As part of tourism? I can't say essential, but what I would say is it's a very important part of tourism, what they offer.
I: In what way? What do you mean specifically?
P1: Why because it's a unique thing that people can do. It's unusual."

Experiences with the reindeer are a highlight of visiting the Cairngorms

Someone goes up the [funicular mountain] railway and then they see some reindeer even from the train trip. Or they get on the [summit lodge's viewing] terrace and there's reindeer moving past them. You know, that's a huge plus for their visit. That's something that sticks in their memories, you know. (P13)

So, I came here with reindeer as my focus and I think I could say that of many of the visitors to the Reindeer Centre. They come because they want to see the reindeer. And I think most people know in advance coming up this road that they're going to visit the Reindeer Centre. So, they see Glenmore and the Cairngorms as where the reindeer live. So, for me it's a bit like social geography when I look at the hills, I look at them as a reindeer grazing range. So, whereas, walkers will come and look at them as, " which Munros have I got to bag?" or " which rocks have I got to climb?" or " what's the skiing like today?". I mean, yeah! People come here for lots of reasons. (P8)

Interestingly enough they called themselves the Cairngorms reindeer herd rather than the Glenmore reindeer herd. I guess that's because the image of them is grazing on the high plateau is kind of a selling point. I think it does have an effect on Glenmore of making more of a destination. I think the forest and just the landscape and being in a national park is the key destination and the Reindeer Centre is part of that. I don't think it's a stand-alone part of that. (P3)

I've walked a lot of the hills of Scotland now and in the past few years. And you see nothing at all, nothing. The red deer are all tucked away in the coires. It's just barren countryside and you think, "Crikey!" You come to the Cairngorms and to stumble across a little herd of reindeer must be an absolute delight for people. (P8)

I would say that a high percentage of [...] visitors to the Reindeer [Centre] are coming to see the reindeer, not because they have driven along the road and seen the sign. I think they already know in advance what they're going to be doing that day." (P8)

Reindeer tourism makes a significant contribution to the local economy

[The Reindeer Centre is] a massive ambassador for the area. Somebody said this to me years ago: "[The Reindeer Centre] going out at Christmas time with [...] reindeer is one big advert for the area." You know, "We've come from the Cairngorm mountains. Oh, where are they? The Highlands of Scotland. Oh right!"... There's not a journal, national, daily, magazine, that [the reindeer] have not been in, and that includes the Financial Times... So yeah, [the reindeer] are a big flag flyer for the area. [They] go all over the country. (P8)

Similarly, with the social aspect, the assumption is that reindeer have got to be good for the economy for locally because you know brings in businesses and all the rest of it, and I hope that is the case. But it may highlight some of these trickier issues that we've just been talking about, which is potentially uncomfortable. (P2)

I mean, obviously we're tourism orientated, we get a lot of visitors... The landscape and being outdoors is brilliant, but if you see a dotterel on the summits, or you see an eagle or a red deer or something, mountain hare. It's in the same bracket as seeing the reindeer. It makes the trip so much more special for people visiting us. And it doesn't cost. That's something that's added value for us, and it doesn't cost us anything basically, apart from the rights to let [the herd] wander over the estate. (P13)

Well, they're another attraction for people to come here and do, especially during the quieter months, that we're just about to go into. I think if the reindeer weren't here there wouldn't be as many people coming up to visit. So, they've got a positive impact on the economy, I think. (P3)

I: Do you think that the reindeer are as important to local residents as they are to the visitors?
P13: Probably not...there is two thoughts there: I'm sure to businesses and that, they do bring people here. Anything that's like us is an added bonus. I'm pretty sure that probably there is people that just come specially to see the reindeer. But that's an added bonus when you come here, you know, that's probably driving more people to come here compared to other areas. So there's that point of view: livelihoods and income. But I guess for local people, they're not as...probably the fluffy side of things don't doesn't add up as much as for the visitors, you know."

Theme 2. Attitudes and norms regarding reindeer management

Management is fine currently

I: What do you think of the job the Reindeer Company are doing in managing [the reindeer]? Are they doing a good job?
P11: Well, they obviously are because the numbers are, to my mind, I may be completely wrong, but I see a lot more reindeer here than there was when I came here at first. And the animals always look good.

I think they appreciate us, and we appreciate them and what they can bring to the table. if we see something, we are pretty much on the phone and they are up whenever they can, and where we can help out if there is something up and the Reindeer if we need to move them on or something then we just go on and do it. (P14)

Management needs to be improved

I don't think I've got an issue with them ranging over a bigger area of ground. I mean ultimately that is up to Forestry Commission and HIE. But I do think for sure that there needs to be better control or some sort of more formal agreement if they're going to be further afield than that. (P12)

People don't shoot [reindeer]. Occasionally they do, but they're not supposed to. But basically, you don't shoot reindeer. You know, if we've got deer on our land causing an impact on our habitat, basically we manage them. We shoot them. You can't do that with reindeer. So, our only recourse at the moment is basically phoning up the Reindeer Company saying, "Look, can you actually shift these animals off the land?" So that's how it works. [...] And so if they need to be managed, leave it for the owners to manage. You don't have to go and shoot them. Just tell the owners. So basically, that's just another element of "Well, actually these are not wild deer." Wild deer don't belong to anybody. Wild, you only belong to somebody when they're dead when they're shot. And so, it is the lead manager's role in Scotland to manage the land, the habitats in appropriate condition. But in terms of sheep, if the sheep are roaming on to a neighboring ground, or cattle, or horses, you wouldn't shoot them because they are domesticated. (P9)

Reindeer should be managed like other domestic livestock

I mean it was quite interesting when I spoke to some of the old keepers here, they were saying that in the past they had shot them. but I don't know if that's right or not. That if they come onto our ground, they were sort of fair game to have a pot shot at. But I don't know if that's reality or not. That was vaguely turned over here whether in fact... There's no permission whatever for those animals to be on our land. If we've got a farmer with sheep is coming onto our land, were quite quickly wanting them to get rid of them. But despite the fact people complain about them and say to them about the Reindeer, there doesn't seem to be much effort on the Reindeer Centre's part to keep them in closer about. (P12)

So [the reindeer] don't look out of place, and in small numbers, they may have very little overall impact on the condition of the habitat. But it does provide challenges both basic and in managing that. And if the neighbouring landowner doesn't want that, whatever the reason is, then it's difficult to manage without fencing. You could manage it through shepherding, but that's hard. That's very kind of labour intensive, very expensive. It could be managed in that way. (P9)

Reindeer should be managed like other wild deer

For a long time, we've been working with SNH with HIE and with Forest Enterprise Scotland to try and get [the Reindeer Company] involved. I think SNH empathize, but I think for them there's a bit of a question mark over whether damage is actually occurring. Which is a bit tricky because if we know that deer are causing damage, and we know that reindeer do similar things in terms of thrashing, browsing, trampling, and grazing, then I'd have thought that reindeer ought to be considered as seriously as the wild deer population. (P2)

But the difficulty I think they've got is, we've got things like different guidance to do with deer, a natural approach, the Wayne act, and stuff to do with deer management. And wild deer are actually governed under the Natura legislation. So, if a wild animal is negatively impacting a habitat then something needs to be done about it. That's the law of the land. SNH is responsible to do something about it. And I think that might be one of the interesting things to look at with regards to the reindeer. If they were classified differently then they will be taken like a wild animal. We need to work out ways... People need to work out ways in which you can mitigate the damage by moving them somewhere else. But from a social-economic point, I would suggest there could be more benefits to having... I don't know how many reindeer they've got. It is at 150? So, there may be more economic value for the area from the 150 reindeer then there are for [thousands of wild deer] basically kept there for rich people's pleasure, the sport shooting. (P5)

What I do feel and think generally is being overlooked in terms of the potential impact they are having on the habitat, the montane habitat, is that whilst from the Scottish Natural Heritage point of view, [they] are felling red deer left, right and center because of impacts on habitats, we're blindly turning a blind eye to the potential impact that reindeer could be having on some of the quite sensitive montane habitats. (P12)

If they were classified differently then they will be taken like a wild animal. We need to work out ways... People need to work out ways in which you can mitigate the damage by moving them somewhere else. (P5)

Also, in light of all the difficulties with deer management and red deer in Scotland, the thought of adding another herbivore to the group just doesn't sit well with me probably. (P12)

So, I suspect that if these reindeer were in an area that has got very high deer numbers, which we haven't, because we put so much effort into controlling them, as do our neighbours around about us in most cases. Then you would say, "Well what's a hundred and twenty reindeer in the presence of 5,000 [wild deer] or whatever? But we haven't got that. We've worked over decades to drive down the deer numbers to achieve our conservation objectives. So suddenly a hundred twenty reindeer are actually quite a significant impact. So, it's a fragile habitat. Objectives are to restore it, and, in the context of a very small deer population, these reindeer are quite significant. And they're feeding on habitats that most red deer wouldn't even go to or they certainly wouldn't hang around in. The red deer would pass through that area and going into much more productive ground. These things are on really fragile montane habitats which are exceptionally rare in Britain. (P2)

Theme 3. Landscape and place meanings related to reindeer

Reindeer as essential feature of the Cairngorms landscape

You know if it is, I don't know how close [the Cairngorms Plateau] is to a genuine tundra system, but reindeer are part of a genuine part of a tundra system but then so are lots of other components, like wolves – anyway, it's all got too complex now. (P6)

P3: Knowing local people, no one ever talks to me about the reindeer. They are never really on anyone's high agenda.
P4: They're just there!
P3: They just exist!
P4: I think because they've been here for so long, they are just part of the...

Reindeer as part of a wild landscape

For another respondent, the wilderness association of reindeer was less pointed, as that person simply listed their favourite things about the Cairngorms, with reindeer simply placed alongside of fresh air and scenery as amenities of the wild landscape: "Well, it's still beautiful woodland scenes of the mountains, or it's in the mountains and lochs, rivers, fresh air, and the area itself is home to 25% of the UK's endangered species of wildlife species. It's great for red squirrels. Yeah, you can see reindeer." P1

Reindeer as unique feature of the landscape

So again, yeah, I think winter's another thing in that you know that the skiing industry, but just the fact that you get a winter here and you don't really get winters in the UK, not like you get in the Cairngorms. So, I think, yeah, there's the whole skiing thing wrapped up with that. But again Rudolph [the Red-nosed Reindeer] fits into that whole thing doesn't it? It's just different, there really is nowhere like it. (P6)

I don't think people would see [the reindeer] in the sense of they are a core part of the biodiversity of the Cairngorms. I think they see them probably as an add-on, an interesting add-on. And they

are free-ranging, I think they recognise that as well. So, they're not just fenced in. So, I think they see them as a species from the past. (P9)

[To be a reindeer herder] is completely unique. This [Reindeer Centre] is unique. We are unique. We're not part of a corporate, bigger, amorphous thing that you can't identify with. We are identifiable as we are. We are what we say we are. So, I think for many people that have passed through here [as herders], they hold that with pride and passion really. (P8)

Reindeer belong in the Cairngorms landscape

I: So, you acknowledge that the public has some value for the reindeer, but what do you think that that value is?
P2: I suppose to me it's...well they're quirky animals. They're quite interesting animals and in terms of their survival strategies in northern latitudes, they're quite remarkable in that respect. There's also this history of herding and management. Scotland is now a reindeer herding nation thanks to this, this... As I understand it anyway, we've been adopted into the world of reindeer herding nations. So, there is a kind of global cultural meaning to reindeer in that sense. And it's ecologically interesting in that they can survive in such extraordinary and harsh environments and eat things of very low nutritional value.

I guess the Cairngorms, one of its unique features is that it's more like the arctic that it's not like the rest of the UK. It constantly treads this... on the arctic-alpine plateau and the fact the vegetation is more like the arctic tundra species compositions, arctic species compositions, etc., etc. And reindeer very much fit with that image of it being otherworldly, of it being more like Scandinavia than anywhere else in the UK and reindeer would be part of that arctic ecology. It's part of that aspect of it being a strong sense of place, it's being a tundra environment and reindeer would normally be part of the tundra. (P6)

I think they genuinely believe that the reindeer should be there; that they're entitled to be there. Maybe they think that we're making a fuss about nothing. I don't know. I suppose perhaps the difference is that they're very much embedded in the Cairngorms community. They have been there a very long time. So, they have a locus within the community. They are valued within the community. Perhaps to them, it's just a kind of natural extension of what they're already doing. (P2)

P6: And I guess the other part of it for me is the fact that there are very strong Norwegian associations in Glenmore because of the training for the second world war and the Norwegian military connections etc and langlauf skiing and all of that kind of cultural associations, the Norwegian flags still flies in Glenmore, Utsi's hut is part of the history and culture of the place, to have a reindeer herder's hut, you know, the names of these places are very much embedded in our cultural identity as part of the Cairngorms. And also, the fact that it's the only reindeer herd in the UK, but it's the only reindeer place in the UK because it's the only tundra in the UK. So that's all connected for me.
P7: I totally agree with all of that.

That's not to say that [reindeer] shouldn't be here because we have a perfect habitat for them in the Cairngorms. We ticked all the boxes. With climate and habitat and everything else. If it wasn't, the reindeer wouldn't be thriving. We wouldn't still be here. That's what it boils down to. (P8)

[The reindeer are] very meaningful. They've been here since what?... the early to mid-50s. So, they're well-established, and they're associated with the Cairngorms. The animals originally came from somewhere in Fennoscandia. They've kind of derived from those generations to the generations that we have now. So, in that sense, I suppose, looking back over 70 years, there's a cultural association with the Cairngorms. (P2)

Yeah, I mean [the Cairngorms plateau] basically feels like an island, an arctic island in Britain. So, it's very special to us to sustain what we do here. It's very hostile at times with the weather, like today. But it's why people come here. Its specialized habitat in the European context and that's why it's protected. But worldwide, it is renowned as a place to come and see something different. And because of that arctic link and that Arctic alpine habitat link to it, reindeer do seem to fit here. (P13)

I suppose what I'm not sure about is how reindeer are considered in terms of as a species. I mean they clearly were at one point in time native to Scotland...but it would be interesting to know how they are classed or regarded in that respect from Scottish Natural Heritage or the [National] Park Authority or whatever. (P12)

Theme 4. Beliefs about reindeer ecological Impacts

Before it was just seen as a good thing. They were there. They were a tourist attraction. They were contributing to the economy because they were bringing tourists in. But now we're looking at them with the more critical eye, thinking "Oh, you know, should that be more natural habitat, and are the reindeer preventing it from becoming a natural habitat. Or could the reindeer positively contribute to it becoming a natural habitat? (P10)

I suppose the thing with any study, like this, is you look at the ecology and you find, we might actually find some positive things, but we're all sort of expecting the ecology to clarify whether or not they're having an impact. (P7)

Reindeer have impacts on vegetation

It kind of feels like... if these animals did naturalize, that would be for some people acceptable. But it wouldn't be acceptable for us, because it's such a fragile landscape. There are no wolves, there are no lynx, there are no bears. There's no natural predator to keep the animals in check. (P2)

I think if our reindeer were in an area where there were already a lot of shrub, probably 80% of their diet would be shrub. But they're not, they are in an area where Heather dominates. Deer sedges dominate. Lichens in the wintertime. And so, they predominate on the heathers and the deer sedges. (P8)

But mostly they come in contact with some of the things we're doing. So, things like reseeding areas. They're often grazing in the grass and pulling things out, which isn't a big problem, you know, if it's thinned out, they're natural plants come in anyway. (P13)

It would be quite useful to know whether or not there is an impact. Because if somebody can say with certainty that they are not having an impact on interest features and by that, I don't just mean

the plant communities but also the breeding birds that are there, where they might be it might be feeding on eggs and they might be trampling nests. Then maybe there is a case for saying "Well, is there really a problem here?" But at the moment, we are taking a precautionary principle. I'm pretty certain that there is an impact. I can't believe that you can have 40 animals in a place like Coire Domhain for days on end without there being an impact on the natural heritage. (P2)

Reindeer are interfering with reforestation

They do eat trees. They do eat willows. I have seen them with my own eyes on Cairngorm Mountain. (P5)

I think our concerns grew that we were seeing animals in the wrong place in big numbers certainly doing damage in the Woodland Expansion Zone, potentially doing damage. (P2)

Our environmental guy always answers, he looks across, and you look at that bit there [the reindeer hill enclosure], and it's bare. There's no trees in it. Whereas they're getting regeneration of trees everywhere else. (P4)

P2: One concern, another that Forest Enterprise has had, is the failure of adequate regeneration in the fenced enclosure.
I: The reindeer hill enclosure?
P2: Yeah, which is above the forest. So that is I think part of the Glenmore SAC, I need to check that, and therefore... one of the attributes for pinewood SAC is that there should be adequate regeneration. And at the moment it's not happening in that part of the designation because the reindeer are in there.

If you look at the [reindeer] enclosure they've got that's on our ground on the hill. If you look at it from any distance the enclosure is bright green and obviously well fertilized because of the reindeer in it and there is no regen of the trees or the scrub in there. If you look outside the fence it's regenerating. So, there is a grazing pressure obviously. It's because they're in an enclosure. So as soon as you put any livestock in an enclosure it's a big impact on that. (P3)

So, the reason why that's relevant to reindeer is that the first sense we got that there was a problem was that, for a start, we were seeing more and more reindeer appearing on [our estate] and we've got data for that[...] So, what we were seeing was varying numbers of reindeer from one or two, to in some locations 30 or 40 animals. So, we saw them thrashing pine trees. So, you're probably aware both male and female reindeer have antlers. So, when they're in velvet, that's double the trouble, you know. So, we saw them doing that and we also witnessed them browsing the young planted trees and broadleafs. Yes, ones that we planted but also in one location on the reserve, we've got really good rowan [mountain ash] regeneration and that's happened principally because thrushes have brought in the fruits and we're now seeing this massive expansion in this area of Rowan. It's going to be an extraordinary piece of Rowan dominated woodland, but the reindeer we got video of the reindeer thrashing and damaging, just grazing and just breaking them down, really. So, we weren't very comfortable with that. As you can imagine, a huge amount of effort going into the deer control work, a huge amount of effort going into planting trees. We weren't getting a grant for the planting of trees. So, we were raising that money. Some of the

planting was being done by school groups and volunteers. So, for lots of reasons we have concerns about that. (P2)

Due to impacts, number of reindeer should be reduced

So [the reindeer] don't look out of place, and in small numbers, they may have very little overall impact on the condition of the habitat. (P9)

We have got a couple of coires outwith that which is heavily protected. But at higher levels, we haven't got as much ground as they do. And we're doing a lot of mountain woodland planting, and I know they're doing big scale stuff. So, yeah, if they are seeing reindeer thrashing about and eating things then it would cause them some concern, I guess, on the numbers side of things, yeah. From this report, I imagine, they will come up with some sort of recommendations on what sort of numbers we can sustain here without too much damage. (P13)

I: I would be curious to know if people expressed positivity about those experiences or negativity or indifference. What did you think? Didn't you say you saw [the reindeer] one time? And what were you thinking when you saw them at that time?
P12: For me, negativity. But then I'm thinking more about... Not just thinking, "Aw, that's a nice reindeer." I've gone past that. It's just like red deer. I mean they're beautiful animals, but I see them, and I think, "Oh God there's far too many of them! Where's the gun?"

Theme 5. Future of the reindeer herd or Centre

I think a pretty major issue that you might need to be addressing in this study is what might happen in the future. At the moment [she] is overseeing and she's got a good team of people and it's a good business and it's working for them, if down the line it starts to not work out and things change and it becomes too expensive for them to manage the deer the way they are, quite so, putting in quite the effort that they do... They are using some sort of birth control – how is it that they're preventing the herd from becoming too big? – but they're definitely managing the numbers of deer, so they don't get too big. If down the line they can't do that sort of management that they're doing at the moment and there's pressure to say look, these reindeer, they're not having that big an impact, let's just let them run wild like a red deer herd. Then that, if that came up and almost happened through the back door because they took their foot off the pedal and we were getting reports of 50 reindeer here and 100 over here and then the horse is bolted, and you've got this big herd building up. Then we're in a situation that would be very hard to reverse, and culling would have to come into place in the way that we cull red deer and it would be a very different landscape in terms of the ecology and socio-economic and everything, because we could end up with God-knows-what. (P7)

Reindeer provide the link to the plateau, which is our equivalent of the Arctic, arctic environments. And so, they provide a link to the remnant extent that we have left, and can we hold onto it... Reindeer could still be the hook to actually inform people about the condition of the habitats are faring under these climate-changing circumstances. And they are changing up on the plateau, and there are species that are being impacted on because of climate change. (P9)

Theme 6. Beliefs about reindeer identity

Ambiguous identity of the Cairngorms reindeer

[The reindeer] is domesticated so you can't shoot it if it strays onto your bit. But it's wild so I can't be held responsible for any actions it does or damage to your property. If it's a wild animal and it comes onto my land and damages my property, I can kill it. But if it's a domestic animal and it comes onto my property, I can sue the landowner, for the cost of that damage, or I can demand that the landowner keeps that animal under control. You can't have it both ways. (P6)

I: Do you personally see them as wild or domesticated or something in between?
P13: Definitely in between, because they're so tame. You can get really quite close to them. So, the picture when you see them out, it does look like that part of the landscape, but we know that they're tame. Mostly it is like being farmed animals, but they're just free-ranging on a wider area.

The [reindeer] that are on the hill are feeding naturally, but then they're still not afraid of humans. Try to approach anything else up on that mountain, like the roe deer and the red deer, the hares, you'll get nowhere near them. I think that's part of their attraction really... that they're not afraid of humans. They're quite happy in general to come to you. (P11)

I think from our point of view, it would be good for this project if there was like a definitive... Tilly, who owns the reindeer, she's very knowledgeable on where these reindeer, have we lost these reindeer in the past. There's various papers that I've seen that there might have been reindeer and within a few hundred years, hundreds of years ago people might have had that in their memory that there was still reindeer, I think it was forest reindeer, that we may have had in Scotland in the past but we've lost and they are the coming back. I think if there was a way of bringing some of this research to the table that our guides and people here might know a bit more about, obviously they are getting that on the tour of the Reindeer Centre, which is good. But you know, I think there's a lot of people dismiss that there probably wasn't reindeer all the way through so, and they have been hunted to extinction here. So, if there was a clear message there that was understood and maybe something in that report you bring out. (P13)

To be honest I just think perhaps I was just too new to the area. And I didn't really realize... I mean people think of deer, but there's a difference between deer and reindeer. Maybe I didn't even really acknowledge that before I got here. But what I knew was that it was a very different type of animal stood in front of me, then I had in my head, which was maybe a picture of a deer for instance. Hope a lot of people think like that [...] (P1)

Semi-domesticated

P7: My understanding, rightly or wrongly, is that reindeer are semi-domestic and need to be tagged I think, with ear tags and stuff so they're not wild deer in effect and they need to be managed, so they're a semi-domestic herd which puts them in another league to other wild deer which can freely be managed by the landowner on the land, within season, etc. So that puts them in a different category.
I: And my understanding from SNH is they're classed as a past-native and fully domestic.

P7: I don't know how you define fully and semi actually; I think fully is fenced in, but semi is running wild, living, but domestic in the sense that they're managed.

P6: Like sheep on the hill.

P7: Yeah.

P6: But they're gathered, aren't they? Isn't gathering part of the definition?

P7: Possibly.

P6: If the animals can be gathered...then they're semi-domesticated. So, if you can physically go out a whistle them in and they come to you then they're semi-domesticated, no matter how free-ranging they are.

Livestock

The only point I get on them from the wildlife point of view is that [the reindeer] are captive animals. It would be nice to see them in the wild. (P11)

Because obviously [the reindeer] are farmed and their model is based on, you know, Lapland and all the native peoples using them, every part of them, as a commodity basically to sustain their way of living. So, it's nice to have that cuddly side of things. But they have got a value as well. So, it would be nice to have that probably. (P12)

I: Do you think people are going there to see something familiar or something wild?

P3: Wild, I think. I think they go there for a wild experience.

I: How do you think about the reindeer? Do you think of them as wild animals?

P3: No, no. I think of them as... Well, I guess maybe my view of them has changed since I've worked here but I just see them as... they're just like another farm animal really. I used to work at Rothiemurchus, so we used to take people out on the deer farm tours. So, I just see them is the same as that really, just as a farmed animal. I don't see them as a wild animal because they're not. They've not been kept in wild conditions. Especially when Christmas comes, it really doesn't feel anything to do with wild animals. So, no I don't see them as wild animals.

Theme 7. Attitudes to reindeer roaming behavior

Positive attitude

P8: I don't want them to be thought of as captive reindeer. I don't want them to be... I want them to be envisaged as an animal that's living in its natural habitat. That's the exact reason. Yes, you get reindeer in zoos. Yes, you get reindeer in the Highlands Wildlife Park. Not so much now, but you get reindeer in little garden centres down south. But we are different to them, and they didn't come here so then we could use them for Christmas, they came here because Mr. Utsi identified a site that was suitable for reindeer. We are the product of that. So, we always talk about free-ranging reindeer, free-roaming reindeer. And if there was not an element of free-ranging and free-roaming all through the year of different cohorts of reindeer, they would not be thriving. Bottom line. If they said, "Right, you can only have reindeer if they're in the enclosure," well that would be the end of it.

I: That would be the end of...?

P8: Reindeer in the Cairngorms.

I: In terms of their health?

P8: Yes. Health and future... Because the reindeer need to roam. They need space. They need little different bits of vegetation to eat. They need to be able to get up to the higher ground.

Neutral perspective

I see them roaming where the landowners are comfortable for them to be in the numbers that are sustainable. And in a way that the business is successful. So those three key things. All the landowners have to be happy; the business have to be successful, and the habitats have to be non-severely impacted. Collectively, that presence is more than just a business. They are here to provide a tool or means to actually talk about bigger issues. So, they're not just... It's not a park, it's not a zoo, it's not one of these country parks where you've got a few animals roaming about. It's a place without fences. It's a place where you've got arguably an exotic species in one sense. They may not have initially came here for that reason but they're currently here and are supported by everybody because they provide a means to an end. (P9)

Negative attitude

The other thing that slightly concerns me is that there's been various bits of publicity that I've seen on the website, on there was an article in BBC Wildlife magazine, there was a programme about wildlife in the Cairngorms where reindeer are presented as part of the natural history of the Cairngorms. So, they're there by right, they're a free-roaming wild herd. And it feels a bit to me that these animals might effectively be reintroduced with no adherence to IUCN codes or anything like that. So that's been a bit of a concern when really then they shouldn't be considered a free-roaming herd that can go anywhere. They might be a free-roaming heard within the lease areas. That's fine. But the impression that starting to be given I think is that they are part of the Cairngorms natural history. (P2)

They do need a certain number of animals in relation to providing for the need for the business at two centres. And do they need animals roaming free? I mean it's a good question. Do they need to roam free here in the Cairngorms? Can they not roam free somewhere else? Like the Cromdales. (P9)

Theme 8. Past experiences of reindeer

Hill Trip

I've never been on a reindeer walk. All the messages I've seen have been on television, and [the reindeer] are often on television. (P9)

While recreating in the wild

A friend was telling me that he was out walking in the Cromdale Hills and he says he came on this what do you call a reindeer stag. But it could have been a female you know with the antlers. And he saw it and it was quite... So, he thought he'd get a photograph and he crept in along a ditch, typical kind of thing you would do for the red deer. And he'd gotten quite close and when he clicked the camera this head froze, looked around, and came wandering over to him. So that's what happens with the Reindeer. They don't run away when people are about. So even out on the

hill if you come on a reindeer on the Hill it's quite likely to come to you and let you approach it. (P11)

We can do see them frequently in some strange places in the middle of the forest every now and then. I mean I've never had any issues with any of them. They've always been friendly. (P10)

And people love seeing the reindeer. Like we get people going up Meall Buchal. That's one of the most popular routes. People come down really excited if they bump into a reindeer. It's quite nice if people come back saying "oh yeah, the reindeer are up there!" you know people love seeing them. I don't hear of any of them causing problems like on roads or visitors being scared by them or anything because they're quite docile and they're quite easy going. We don't take complaints about the reindeer from visitors. (P3)

Upper carparks

I can remember when I was a youngster, and I'd seen reindeer. And it's obviously quite a big thing getting up close to the reindeer for visitors. And you know, it's a holiday area, so a lot of people do come up to see reindeer or generally see wildlife. So some of them don't know they're here when I actually see a reindeer close-up or a herd of reindeers, it's exhilarating for people, you know, often you can see them around the car parks and the bottom of the ski hill here and then if you are getting further out you can kind of see them in groups and wondering about the plateau etcetera. So yeah, it's a big it's, a big bonus for tourism, I think. (P13)

Christmas parade

I: Speaking of reindeer in the Christmas parades, do you think the community would miss them if they were gone?
P4: I think so. I think that makes Christmas in these communities right around here kinda unique, quite unique. That pulls in a lot of tourists. All the kids look forward to it and the adults, it's not just for the kids, but it brings a lot of visitors in. So, I think that's quite unique for this area. I think the locals would miss that if it wasn't here. Yeah, I think so. It's kind of a tradition.

I would think that the only time that [local] people think about the reindeer is at Christmas when the reindeer appear in the Boyne and stuff. So, they're probably viewed as a favourable thing. (P12)

[Regarding reindeer in the Christmas parades] you can imagine the attraction it is for the kids and what not and Aviemore. Thousands come out for that... [the reindeer] are one of the attractions to it. I think if it was just a parade going down it wouldn't be the same. They make the Christmas parade. (P11)

Theme 9. Wildlife values and beliefs

Domination

P3: They do have a lot of people that do criticize [the Reindeer Company] quite heavily. And we're getting into that time of year that, because of the way they take the animals around on the Christmas circus circuit, they do get a lot of criticism for that.
P4: I have noticed that certainly in the last few years that's begun to appear.
P3: Animal rights, animal welfare groups.

On this estate, for example, we've certainly got less deer, then we used to have, but we've got enough deer. And perhaps we're trying to educate clients that come to shoot that if you're taking the life of something, don't you think you should at least work for it? It shouldn't be a given right that you come here, on the web page and buy the life of a stag and it's almost guaranteed. So, I think there's a lot of people who will appreciate the challenge of it. You may have to come 5 or 6 times to Scotland to try and shoot your stag. How it used to be, it was basically like going and shooting sheep in a field. (P5)

And actually, on [this estate] here, we do traditional sport shooting. It's quite a unique place. In the acquisition of the estate, it was a legacy that was used to by the estate. And the lady that left the money basically agreed two conditions on the management of the estate with [our organization]. It was a set of 12 principles, but the first three were... The primary aim is conservation. The second is open public access. But the third was that it should continue to run as a Highland sporting estate whilst in harmony with the first two objectives. (P12)

P2: If [the reindeer] are a nuisance, then there should be means to... I don't know that it's the case for every introduction, he says. What I'm trying to say is, if they were causing unacceptable damage, then I think that there ought to be the option to control them. We're not doing that.
I: In terms of culling?
P2: Yeah, we're not doing that. We've got no intent to do that, not least because we know it would, publicly, be a very unacceptable thing to do. So, we have no intention of doing that.

Mutualism

One comment I did hear, somebody was saying, that the thing about the reindeer they like is that, she's got a huge herd and it's not commercial. So, they're not killing them for food or anything like that... And I quite agree with it. Just the fact that you've got something like that and it's not as you and they don't sell the animals. And it's just run as a... Well, it's two things. It's an attraction but it's also kinda getting back to what was here. (P11)