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Cultivating More-Than-Animal Welfare Within the Animal Research Facility

by

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Thesis for the degree of Doctor of Philosophy

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Abstract

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Scientific research involving animals is a popular means of cultivating knowledge within the modern day and is increasingly being recognised as a fertile space for exploring the complexities of human – animal interactions. In this thesis, emphasis is placed on exploring experiences of wellbeing which exist within animal technician – laboratory animal relations, as found within UK research facilities. In order to explore these relations, this thesis starts by emphasising the value in cultivating a multidisciplinary approach within the laboratory, by drawing on both the animal studies and welfare science literature in turn. These literary explorations conclude that insights should be drawn from the animal studies literature in order to explore human – animal relations, however considerable value is also recognised in the frameworks of the welfare science discipline, particularly the Five Freedoms framework. Ethnographic and Interview data collected in three UK research facilities, was analysed by drawing on two of the freedoms (Discomfort, Fear and Distress) from the Five Freedoms Framework, using it as a novel multidisciplinary tool for exploring human – animal wellbeing. Emphasis is placed in particular on practices of animal research, including enrichment provision and euthanasia. This thesis also applies 'Freedom from Discomfort' and 'Freedom from Fear and Distress' to my own experiences during data collection, recognising the need for an ethic of care to be extended to researchers who collect data in animal production spaces. Ultimately, the use of the Freedoms framework within this thesis provides an important steppingstone towards a more relational and multidisciplinary understanding of both human and animal within the laboratory, as well as recognising the implicit harms which can be found within the research landscape.

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Research Thesis: Declaration of Authorship

Print name: Rebecca Thomas

Title of thesis: Cultivating a More-Than-Animal Welfare Within the Animal Research Facility

I declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before submission.

Signature: ..... Date:

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Abbreviations

ASPA .....Animals in Scientific Procedures Act 1986

WATOK .....Welfare at Time of Killing Legislation, 2015

FAWC……. Farm Animal Welfare Council

NACWO .....Named Animal Care and Welfare Officer

NTCO .....Named Training and Competency Officer

NVS .....Named Veterinary Surgeon

AWERB.....Animal Welfare and Ethics Review Board

1 An Introduction to Animal Research

> 'I often seemed to stand outside myself, calmly assessing my progress. It was easy to flick back over the years – right back to the time that I had decided to become a veterinary surgeon. I could remember the very moment […] I felt a surging conviction that this was for me.'
>
> **(Herriot 1976, p273)**

1.1 Introduction

The use of animal bodies in the creation of scientific knowledge has occurred since the 'dawn of medicine' (Franco 2013. p239) and this practice remains and thrives in the modern day. Figures released in 2022 revealed that 3.06 million procedures were completed on UK research animals in 2021 (Home Office, 2022) and such figures affirm that our society retains a strong reliance on live research animals as a scientific tool. Indeed, they remain the most popular disease model and behavioural blueprint for several scientific disciplines. This cultural phenomenon of animal usage for scientific gain permeates human and animal health and the acquisition of scientific knowledge, yet many of us remain unaware of the specific humans and animals which populate this process. This has been demonstrated in papers which seek to explore current public understanding, with Ormandy & Schuppli (2014) ultimately concluding that there remains a lack of knowledge in how animal research occurs. It is this disconnect, between the prevalence of animal research and the realities of these practices which first piqued my interest in this area, notably the invisible yet fascinating lives of laboratory animals and their animal caretakers.

In recent years, human – animal relations within the laboratory have also become a popular subject for both the welfare science and animal studies disciplines. The lives of laboratory animals are becoming increasingly relevant within welfare science, as the literature seeks to understand and ultimately protect animal wellbeing in the laboratory landscape. This can be noted in the recent special issue of 'The Welfare of Laboratory Animal' which was published in 2021 by the journal 'Animals'. Laboratory animal culture has also become a popular theme within the animal studies literature, which seeks to

hear the animals 'cry' (Buller 2014, p312), in a production setting where the animal is harmed (Roe & Greenhough 2021), manipulated (Davies 2013 a) and ultimately killed (Mazhary 2021). A growing body of welfare science literature is also recognising the importance of those who care for laboratory animals (LaFollette 2020, Chang & Hart 2002), an insight which is echoed within the animal studies discipline (Friese & Latimer 2019, Davies 2013 a, Greenhough & Roe 2018). Thus, this thesis sees considerable value in adding my own unique knowledges about this world to the literatures of the animal studies and animal welfare sciences.

This chapter begins with an overview of the inspiration for this thesis, charting my own personal journey in the world of human – animal relations. This summary looks to emphasise my unique positionality to the reader, an identity which includes trained animal welfare scientist, animal lover, animal studies scholar and animal welfare policy advisor, each of which has had a crucial role in shaping this thesis. The chapter then outlines some key details about the laboratory world for the unacquainted reader, including the legislative framework, current statistics and the animals and individuals involved in the performance of animal research. Emphasis then turns to the thesis aims, before a brief summary of the subsequent chapters is provided in order to orientate the reader in the wider thesis structure.

1.2 All Creatures Great and Small

Despite the focus of this thesis, my fascination with human – animal relations did not begin within an animal research context. Like most animal lovers, this identity was forged during my childhood, where a considerable amount of time was spent in more traditional spaces of human – animal interaction including zoos, petting farms and the home. These experiences were incredibly formative for me, as they enabled me to practically navigate my own relations with animals, recognising the importance of interaction, attunement and empathy when trying to develop relationships across the species divide.

As I spent more time with animals, I became increasingly interested in the novels of James Herriot. For those unfamiliar with his work, these autobiographical books chronicle the working life of a veterinary surgeon during the 1940's, on the windswept Yorkshire dales. These books provided me with my first initiation into the vivid world of human –

animal narratives, with their engaging portrayals of the lives of veterinarians, farmers, agricultural animals and pets as well as finding the stories immensely readable, I was fascinated by the ways in which Herriot sought to give the animals emphasis. In one excerpt, Herriot describes a young calf as 'scraggy and long-haired […] utterly unimportant, infinitely vulnerable and dependant' (Herriot 1979, p301). Such a description cultivates an ethic of concern for the animal in question, whilst simultaneously recognising its fragile and overlooked position within the agricultural community of 1940's. For me, these novels were hugely influential, and readers will note the use of James Herriot quotes at the start of each chapter in recognition of this influence.

I began collecting my own animal narratives at the age of 14, whilst attempting to secure my place at veterinary school. The rigorous entry process demanded that over 16 weeks of work experience were collected, which involved spending time at a number of animal institutions including kennels, stables, farms, veterinary practices, pathology laboratories and a zoo. In order that I could provide interesting insights at interview, I spent considerable amounts of time documenting what I saw within these settings, writing in particularly vivid detail about the welfare of animals in each of these landscapes. Time spent on a Welsh sheep farm during a particularly chilly winter encouraged me to document my own emotion whilst working alongside these animals, as I came face to face with continual animal death. Time spent within veterinary practice enabled me to witness the importance of human – human relations within animal spaces, as there were often communicative disconnects between veterinary surgeons and their nurses which had potential impacts on animal welfare. Time spent within the pathology laboratory enabled me to recognise the ways in which animals could be simplified down into separate parts, cells and samples. Without even being aware of it, these experiences were my first attempt at ethnographic writing.

My training as an animal welfare scientist began during my Animal Behaviour and Welfare degree at Bristol University. The welfare discipline has a rigorous and unflinching emphasis on the animal as the sole unit of analysis, with various animal behaviours and chemical measurements used to validate animal knowledges. Welfare science recognises that in order to determine animal emotions we require an 'insight into 'other minds'' (Yeates 2010, p237) and thus, these forays into animal thinking must be rigorously proven

by the scientific method. By searching for quantitative truth, the lived experience of the animal can be understood, as well as enabling husbandry alterations to be made which ensure animals experience a 'life worth living' (Mellor 2016 a, p3). According to my schooling within this discipline, logical conceptualisations of the animal were the best way to understand the animals experience, rather than my detailed animal ethnographies.

With this in mind, I entered my first laboratory unit and diligently attempted to categorise the welfare experiences of the laboratory animals I encountered. Welfare was a common buzzword within the facility and staff members were constantly paying attention to any perceived changes, unexpected pain or abnormal behaviours shown by the animals in their care. However, I couldn't help but notice that so much of what I saw and experienced could not be captured in quantitative and numerical terms. Many facets of welfare provision were entangled within the personal knowledges and experiences of animal caretakers. Whilst increasing emphasis has been placed on the role of the animal caretaker in transforming the fates of captive animals within the laboratory (Waitt et al 2002), the animal welfare literature retains its need for statistical linkages between caretaker behaviour and welfare outcomes. As personal narratives and the emotion associated with the laboratory space cannot be easily standardised, these knowledges are deemed to be of little use to the discipline. Yet it seemed to me in attempting to focus solely on scientific conceptualisations of the animal, half the picture was missing. The rich contradictions and ethical uncertainties played out within the laboratory day to day were not fully represented, nor were the experiences of laboratory animals and their caretakers.

It became increasingly clear that a disciplinary shift was needed to bolster my understandings of the laboratory, supplementing my animal welfare knowledges with complex and relational forms of enquiry as can be found in the animal studies literature. This allowed me to create new understandings of laboratory animals, within which they could start to be seen as 'living, breathing creatures who continue to express themselves and to intrude on our consciousness', as Smith (2002, p52) has encouraged within the abattoir. By exploring the literatures of the social sciences during my PhD thesis, I increasingly became interested in the ways in which animals could be seen to exist 'in relation' to their animal caretakers. This relational approach is a key trope of the Animal Studies literature, as summarised in the seminal review of Buller (2014) and encourages

us to recognise that both caretaker and laboratory animal impact on one another, rather than seeing animals as stagnant and quantifiable forms. This discipline appeared to hold the answer to the limitations of the animal welfare world, a shift which has also been recognised by other researchers, as the animal studies discipline has had a 'significant resurgence of interest' in recent years (Guillo & Hamilton 2015, p135).

Despite the intrigue of a more relational and embodied world, this move from the biological towards a more complex conceptualisation of the animal was a difficult transition to make as an animal welfare scientist. Rather than a definable entity, a multiple hybrid animal is fostered within the wider animal studies imagination, an animal shaped by culture, capitalism and other anthropocentric notions. Gone are the simpler understandings of the animal in which certain production environments are deemed to provide good or bad welfare. Instead, the very nature of animal production, animal spaces and human-animal relations are questioned. This animal studies schooling meant that I increasingly began to question the very practice of animal research as I completed my data collection for my PhD. Whilst witnessing the overt and often painful manipulation of the animal form, my reading increasingly turned to authors who sought to comprehend the inherent violence of animal production within a capitalist society (Gillespie 2020, Collard 2018). Thrust into the laboratory world I became increasingly uneasy about the practices I was witnessing, as well as taking issue with the acceptability of animal death, pain and distress within the welfare discipline. When viewed from this perspective, it did not seem surprising that animal research remained 'A deeply controversial topic' within the public sphere (Hobson-West 2010, p46).

Despite movements towards the animal studies literature, it was also clear that the knowledges of animal welfare could not be entirely dismissed from my literary toolkit. I was acutely aware that the further I moved from an animal welfare perspective the more crucial it seemed to return to it, to foster new conversations with the welfare science world from an animal studies perspective. Furthermore, despite some of the flaws in the welfare science discipline, it cannot be denied that welfare knowledges remain dominant within modern society, particularly in relation to policy creation (van Dijk et al 2017). This understanding became increasingly apparent during my new role as a policy advisor in welfare at slaughter at Defra, a post I took up towards the end of my PhD. It became increasingly obvious that welfare science literature was the dominant source of

knowledge for all policy officials, in contrast to the more conceptual insights of the social sciences. It therefore seemed foolish to fully remove the welfare science discipline from the conversation on human – animal relations.

The use of welfare frameworks within the discipline also provides an unrivalled and simplistic approach to understandings of animal need, yet they have yet to be explored from the perspective of the animal studies literature. When completing my PhD data analysis, I felt that there was considerable value in welfare frameworks such as the Five Freedoms (1969) and 'The Five Domains' (Mellor & Reid 1994), upon which I had been schooled. It therefore seemed appropriate to use these as a way of exploring human-animal relations further, drawing heavily on insights from the animal studies literature. Such an approach aims to bridge the inner rift I have felt personally as a result of my own disciplinary conflicts, as well as repairing the wider disconnect which is recognised to exist between the animal studies and welfare science literatures (Buller 2015).

1.3 Understanding Animal Research

Now that my own positionality within this thesis has been outlined, attention can turn to providing the reader with a broader understanding of animal research practices. Despite the lack of clarity available to members of the public on the realities of animal research, the creation of scientific knowledge is tightly regulated within the current UK legislation, with many describing the Animals in Scientific Procedures Act (1986) as one of the most stringent legislative protections in the world. To provide some contextual detail to this claim, this section begins by providing a brief summary of the development of this legislation, before attention turns to current Home Office figures published in 2021. These statistics provide a brief introduction to the procedures and animals involved in animal research, as well as providing the reader with a sense of the scale of current practices. The section concludes by providing a brief introduction to the humans involved in the creation of scientific knowledge, including animal technicians, researchers and Named Veterinary Surgeons.

1.3.1 Legislative Overview

Historically, the use of animals to cultivate scientific insight has been a popular method of knowledge creation, with animal models first used in Greek and Roman times (Franco

2013, Hajar 2011). Despite this lengthy history, animal research as it is known and recognised today, only began to grow into prominence during the 17th and 18th century, when considerable scientific progress was made. During this time there was often little to no regard for animal welfare, with 'animal vivisection […] especially prominent' (Guerrini 1989, p391). These practices led to the introduction of the Animals Cruelty Act in 1876, which led to the regulation of vivisection and the introduction of species licensing for animal research in order to secure improved laboratory animal welfare.

A century later in 1986, the Animals in Scientific Procedures Act (ASPA) replaced the 1876 legislation, as it was recognised that further protections were necessary to safeguard animal welfare. For the first time, scientific procedures became regulated, meaning that any action deemed to cause 'pain, suffering, distress and lasting harm' to 'protected animals' (all vertebrates) had to be carefully managed, alongside the introduction of a system of licences. In 2012 by way of further update, the EU passed Directive 2010/63 which enabled the high standards of ASPA to be exported across the EU as well as adding some further legislative amendments. These included the addition of the 3R's into the legislation to support experimental best practice, as well as extending protections to cephalopods when used in research. These additions sought to ensure animal welfare continued to be protected within the modern day under the continual scrutiny of members of the public.

By charting this legislative timeline, we can begin to notice the ever-increasing concern for animal research which has developed over the last few hundred years, as an interest in laboratory animal welfare is not new. It also allows us to recognise the importance of legislation in protecting animal welfare, as it provides a regulatory backbone to societal concern. Emphasis now turns to sketching in some of the finer details of animal research within the modern day, by drawing on the recently published figures for 2021.

1.3.2 Exploring the 2021 Statistics

Under current Home Office monitoring, UK research procedures are split into two discrete categorisations, which include 'experimental procedures' and the 'creation and breeding of genetically altered animals.' In 2021, the performance of experimental procedures within UK research laboratories involved 1.73 million animals, which included

the performance of procedures for Basic, Regulatory and Applied Research purposes. These categorisations can be defined as follows.

- Basic research - *The use of animals in behavioural or physiological studies, in order to aid understandings of disease, healthy animal physiology or the development of specific treatments.*'
- Regulatory Research – *The use of animals to satisfy legal requirements around the safety and efficacy of particular materials and products'.*
- Applied Research - *The treatment and prevention of specific diseases, including cancer and neurological diseases.*'

Alongside these different types of experimental procedure, the 'creation and breeding of genetically altered animals' was also common in 2021, with 1.33 million animals bred for this purpose. Whilst the animals are merely being bred in this categorisation and are not subject to any active procedures, it is listed as a regulated procedure on account of the potentially aversive side effects than can be experienced by the animal. In this research, animal genomes are actively manipulated to encourage the development of genetic disorders such as Huntington's or Parkinson's which come with their own aversive side effects.

Home office figures also provide us with a useful overview of the types of animals which were involved in animal research in 2021. Animals within research facilities are often referred to as 'laboratory animals' which makes it difficult for the public to comprehend the diversity of species and animals involved in the creation of scientific knowledge. However, as the 2021 figures helpfully show, there were a considerable and dominant number of mice (54%) involved in animal research during 2021. In decreasing order, mice were followed by fish (15%), birds (14%) and rats (11%), which emphasises the large proportion of small animals involved in animal research. Specially protected species such as primates, cats and dogs were involved in 2021 research work, however they made up just once 1%. Whilst the 'other' categorisation, which includes a range of different species such as sheep, pigs, cows and horses, made up just 5%. Such figures allow us to recognise why there is a current emphasis on exploring the experiences of rodents within the welfare science and animal studies literature, as they are used in a significant proportion of animal research. The annual Home Office statistics can therefore be recognised as a

valuable resource for gaining a greater insight into the realities of the animal research world.

1.3.3 Caretakers within the Laboratory

Now that there is a clearer sense of the animals involved within research practices, it seems timely to provide some clarity on the different humans who exist in relation to these individuals. Often when the term 'human' is used within the laboratory literature, there is an assumption that reference is being made to Animal Technicians, a role which has been extensively explored in the welfare science (Chang & Hart 2002) and animal studies disciplines (Greenhough & Roe 2018, 2019). However, it became increasingly clear during my field work that there were a range of other individuals within the animal research facility which did not fit neatly into this 'animal technician' categorisation, a diagram of which can be found below.

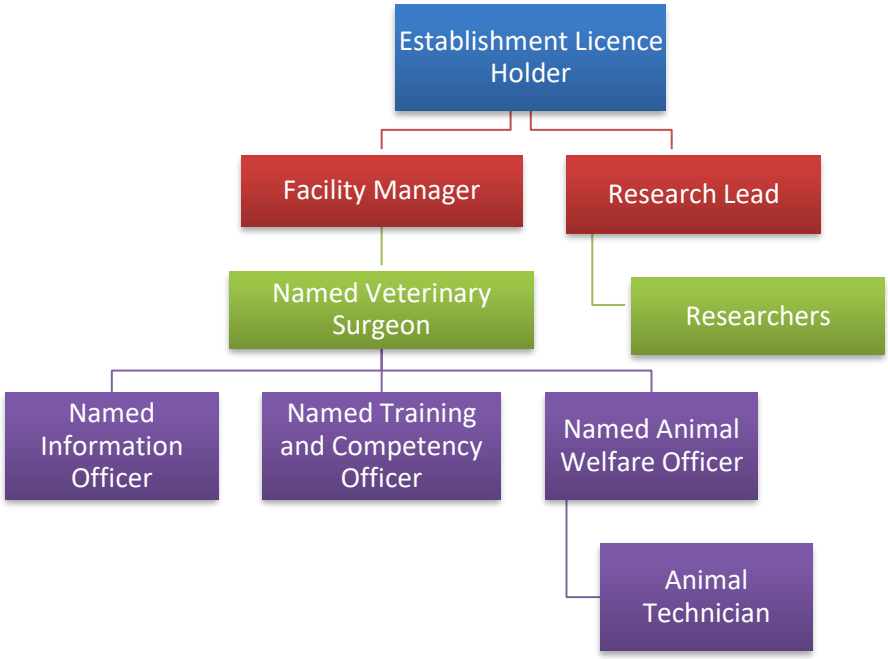

Figure 1 – A guide to the staffing structure of the animal research facility.

1.3.3.1 Animal Technicians

Animal technicians are responsible for providing animal care within the research facility, a job which includes cage cleaning, maintaining biosecurity requirements, site and facility management, assisting with data collection and the management of breeding colonies. Furthermore, many animal technicians also complete their own procedures, reflecting the

increasing professionalisation of the animal caretaker role. These procedures can range from the more simplistic day to day genotyping of mice, through to the performance of a full-scale blood sampling procedures on larger animals. The care provision of animal technicians has also increased in recent years, with initiatives such as a 'culture of care' as discussed by Klein & Bayne (2007), encouraging individuals to attune to and provide for animal needs. A development of the technician role which has been explored by Stephens (1999, p74) who describes how historically 'no special attention was paid to… [the animals] care, maintenance, and disease' within the facility. Consequently, we can recognise the animal technician of the modern day as a professional, scientific, and caring individual, as was witnessed during my own data collection.

1.3.3.2 Named Officers

A proportion of animal technicians within facilities also held a number of named officer roles which are specified within the ASPA (1986) legislation. These individuals could be responsible for Animal Care and Welfare (NACWO), Information (NIT) and Training and Competency (NTCO) (LASA 2016). During my data collection I spent the most time with NACWO's, a role which required the individual to be 'responsible for overseeing the welfare and care of the animals in the establishment.' Whilst these individuals completed many of the same tasks as other animal technicians, their role came with a higher level of responsibility for ensuring animal welfare as they were explicitly named on the establishment licence. These individuals could be responsible for Animal Care and Welfare (NACWO) as well as having a natural affinity for leadership.

1.3.3.3 Named Veterinary Surgeons

Within every research facility there was at least one Named Veterinary Surgeon, a role which is also specified within the ASPA regulations and requires individuals to be named on the establishment licence. These individuals were responsible for ensuring the health and welfare of facility animals by inspecting and advising on the research that was taking place and during data collection it was clear that technicians frequently queried their NVS's on a range of subjects. Many NVS's also held the role of the Named Training and Competency officer within the facility, so they were also responsible for facilitating and overseeing the training of animal technicians on a variety of different procedures such as genotyping and euthanasia.

1.3.3.4 Facility Managers

Each facility also had a manager, which was an individual responsible for coordinating the managerial, legislative and financial side of research facility operations, as well as ensuring that animal welfare remained a key priority. In each of the three facilities I visited, this individual's role varied, with some managers hailing from an animal technician background, whilst others had been or continued to act as Named Veterinary Surgeon within the facility. These managers had a crucial role in the success of my data collection within the facility, as will be discussed in the subsequent methodology chapter.

1.3.3.5 Researchers

Researchers were responsible for designing and enacting scientific research on the animal themselves. Whilst the literature frequently describes a delegation of care, which sees 'one group of individuals conduct(s)the research or teaching procedures and a different group of individuals provide(s) daily care' (Chang & Hart 2002, p10), this split is of labour is not so clear cut within the research facility. In some scenarios animal technicians will have sole responsibility for the performance of procedures on the animals they care for, whilst in others this will be down to the researcher themselves. The variable nature of researcher – animal interaction was one of the main reasons why I chose not to focus on animal researchers within this thesis, however they have been mentioned as they still hold an important role in the network of animal research.

In this section, attention has been placed on the procedures, species and staff members involved in the performance of animal research. What has hopefully emerged from this exploration is the sheer number of individuals involved in the production of scientific knowledge and it is hoped that this sense of scale is now palpable for the reader, where it may have previously been unknown. By framing my work within the real-world context, it becomes clear that this work seeks to have impact on a large number of humans and animals who are currently involved in animal research.

1.4 The Aims of the Study

Now that the relevant contextual information surrounding this thesis has been outlined, attention can turn to the overarching aims of this research project. This thesis sees value

in exploring human – animal relations within the laboratory world, drawing on insights from both the animal welfare and animal studies literatures. In particular, the Five Freedoms framework as conceptualised by Brambell (1965) is used as a tool to explore understandings of human and animal relations, with particular focus on 'Freedom from Discomfort' and 'Freedom from Fear and Distress'.

- **To evaluate the effectiveness of the animal welfare science and animal studies literatures in exploring human – animal relations.**

- **To explore the relevance of using two of the five freedoms within the laboratory setting as a lens for exploring human – animal relations.**

- **To explore the value of using two of the five freedoms as a tool to conceptualise my own experiences of data collection.**

- **To outline a new manifesto for the animal welfare science which seeks to address some of challenges which have been recognised throughout this thesis.**

These areas of interest also provide an important grounding for the theoretical contribution of this thesis, which attempts to offer a new perspective of the human – animal relationship within the laboratory. By using a framework traditionally applied to the animal, new emphasis can be placed on the relationality, embodiment and affect which exists between human and animal, as well as cultivating dialogue between the animal welfare science and animal studies disciplines. This thesis is therefore of relevance to work which seeks to engage across this disciplinary divide. Furthermore, a conceptual approach to human – animal relations has yet to gain traction within the animal welfare discipline, something this thesis seeks to cultivate through its usage of Five Freedoms.

1.5 Thesis Outline

Chapter 1 has sought to provide some much-needed contextual information to the world of animal research. Emphasis has been placed on my own personal journey within animal worlds, which I have navigated as an animal lover, welfare scientist, animal studies

scholar and policy advisor. Explorations of the legislative background to animal research have also been undertaken, sketching out a broad overview of research practices within the UK.

In the next chapter, human – animal relations are discussed in further detail, with **Chapter 2** situating the reader within the literature of human – animal relations. The strengths and limitations of both the welfare science discipline and animal studies literature are explored in turn, before the chapter concludes that a multidisciplinary approach is needed in order to conceptualise these relations effectively.

In **Chapter 3**, attention turns to the literature of wellbeing which surrounds discussions of human – animal relations, drawing on both the animal welfare and animal studies disciplines. After recognising the strengths of animal welfare frameworks, this thesis evaluates the Five Freedoms and suggests its potential as a template for understanding human – animal relations. The chapter concludes by outlining the research questions of this thesis.

Chapter 4 outlines the thesis methodology, which uses two freedoms as a lens to explore human – animal relations. The chapter also critically engages with the methodological approaches of the animal welfare science and animal studies disciplines, a discussion which concludes with the decision to use Ethnographies and Interviews within my study. These methodological choices also align with the theoretical basis of this thesis, which is a feminist and post-humanist viewpoint.

Chapter 5 is the first of the empirical chapters and seeks to explore how effective the provision of enrichment is in ensuring 'Freedom from Discomfort' is experienced by both caretaker and animal within the research landscape. Emphasis is placed on three different types of environmental enrichment and their role in alleviating animal discomfort, as well as exploring the external factors which impact the provision of enrichment within the research facility.

Chapter 6 explores the performance of euthanasia within the laboratory and seeks to explore the extent to which 'Freedom from Fear and Distress' is experienced by both caretaker and animal. The chapter outlines a typology of animal deaths which enables discussion of the emotional and ethical consequences of each. Distress is also explored

further during an analysis of two different methodologies of death, within which caretaker and animal distress exist in opposition to one another.

Chapter 7 is the third and final empirical chapter and this provides the reader with an insight into my own experience of data collection within the research facility. It draws on both freedoms to explore the extent to which I experienced 'Freedom from Discomfort' and 'Freedom from Fear and Distress' within the facilities.

The thesis concludes with **Chapter 8**, which seeks to bring together the analysis from all three empirical chapters in order to address the original research questions. This thesis focuses on the harms which have been recognised for animals, caretakers, and researchers, outlining a more-than-animal welfare manifesto which seeks to actively overcome these experiences of distress and discomfort within the discipline.

2 Human – Animal Relations

> 'I looked in surprise at the farmer who continued to gaze fixedly at the cow. There was a pathetic dignity about the old animal as she stood there against the mouldering timber of the partition, her eyes patient and undemanding. It was a dignity which triumphed over the unsightliness of the long-upturned hooves, the fleshless rib, the broken-down udder.'
>
> **(Herriot 1979, p9)**

2.1 Introduction

In this chapter, the literary basis of this thesis is explored, to provide some contextual detail about human – animal relations within animal research facilities. To achieve this, the literature review focuses on two key areas of literatures; Animal Studies and Animal Welfare Science disciplines, both of which come with their own unique ontological frameworks for conceptualising human and animal experiences. Indeed, animal welfare science draws on positivist ontologies and often views human, animal and their relations to one another in an objective and mechanistic way, as has been recognised by Millman (2009). In contrast, the animal studies discipline relies on a relational, embodied and theoretically grounded approach to exploring understandings of the animal and the caretaker, as recognised by a number of prominent scholars such as Buller (2015) and Haraway (2003, 2007). These disciplines provide the bedrock of current animal understanding within society, which is why they have been explored within this review. Drawing on these literatures also reflects my own multidisciplinary approach to animal understanding, as I began my undergraduate degree as an animal welfare scientist, before embarking on my postgraduate career in animal studies. It therefore makes sense to reflect this disciplinary development within this review.

Exploring both these literatures in tandem also cultivates opportunities for a multidisciplinary approach to human and animal relations, as it has been well emphasised in both disciplines that there is considerable scope for multidisciplinary insights. Animal welfare science has increasingly recognised the value in using methodological approaches from the animal studies discipline as practically utilised by Horseman et al (2014), Bard et

al (2017) and van Dijk et al (2017). Notions of Multidisciplinarity have also been emphasised by Fraser (1993, p48) a well-known welfare scientist who states that 'scientific knowledge… is only part of what we need to resolve animal welfare problems'. Notably, Carenzi & Vergi (2009, p22) in their recent review of animal welfare even state that the discipline must 'include collaboration between the natural and social sciences'. Meanwhile, the animal studies literature has also emphasised the potential strengths of multidisciplinary insights with the welfare science discipline, as strongly emphasised by Buller (2008), a prominent academic within the animal studies literature. There is a clear recognition within both literatures that there is value in working collaboratively across these disciplines, again confirming their relevance to this review.

Despite this promise of Multidisciplinarity, several ontological clashes exist between these disciplines which can make multidisciplinary collaboration challenging. The relational and positivist standpoints of the literature often mean that true Multidisciplinarity is partial and ineffective. Whilst methodological approaches such as interviews and questionnaires have been borrowed from the animal studies literature by the animal welfare sciences (Horseman et al 2014), they are often used in line with animal welfare values. For example, the theoretical approaches of post-humanism and feminism which underpin these social science research methods is often not acknowledged. Furthermore, the detailed thematic analysis of the animal studies literature is replaced with an objective and arguably perfunctory approach in Horseman's paper. An analysis which focuses on the specifics of what has been said, rather than how knowledge has been created, why this knowledge is being shared and who is speaking.. Furthermore, despite repeated calls for Multidisciplinarity within the animal studies discipline (Buller 2016), the literature rarely engages with or cites knowledges from the animal welfare world. These weaknesses are something which this thesis seeks to rectify.

As well as drawing on both disciplines, this literature review also takes an inclusive approach to the types of relations which are explored within the literature. Despite the animal research focus of this thesis, the scope of this review is not restricted to relations found solely in the laboratory world, as have been explored by Hobson-West (2009), Greenhough & Roe (2018) and Davies et al (2016). Instead, this literature review explores human – animal relations in domestic, agricultural and less well-known spaces, as there is considerable value in applying these knowledges to the laboratory setting. As a variety of

human – animal relations are explored throughout this thesis, the terminology used to refer to the human throughout these chapters is similarly diverse. Several descriptors including 'animal caretaker' and 'human' are used, as well as specialized terminology dependant on the production setting within which these individuals are found. Notably, 'stockperson' and 'farmer' are used in relation to the caretaker found within an agricultural setting, whilst 'animal technician' or 'caretaker' is used to indicate individuals who work within the laboratory. This reflects terminology used in both the welfare science and animal studies literatures.

The reviews wide ranging approach to human – animal relations also enable insights to be drawn from a number of different animal species. This is particularly useful as the specificities of certain species in the laboratory space have yet to be explored within the literature. For example, the use of agricultural animals in animal research, a topic of interest in this work has only been explored in the work of Miele (2016) so far. In order to counteract this, this thesis has been supplemented with explorations of human – animal relations from the agricultural literature, drawing on the work of Gillespie (2021, 2013) from the animal studies discipline and Hemsworth (2007) from animal welfare science. By drawing on knowledges from a range of human – animal worlds, a complete and more interesting picture of these interrelations can be formed. Again, the terminology for 'animal' is used interchangeably within both, as a broad-brush reference to a variety of different species, as well as being used to reference an individual. 'Non-human animal' is also used, a term which has become increasingly popular within the animal studies literature as a means to disrupt the hierarchies of popular human and animal interactions.

The review starts by exploring what it means to be an animal and a caretaker from a welfare science and animal studies perspective, before animal and caretaker are conceptualised in relation to one another. In the subsequent chapter, explorations of wellbeing within the human – animal relation are explored in considerable detail before a new approach to caretaker and animal wellbeing is championed. Throughout the literature review, emphasis is placed on the strengths and weaknesses of both disciplinary approaches, providing the reader with a clear idea of the knowledge gaps and methodological shortcomings of current human-animal interactions, which this thesis ultimately seeks to fill.

2.2 The Animal Welfare Science Discipline

The formation of a recognisable animal welfare science discipline is often traced back to the publication of the Brambell report back in 1965 (Carenzi & Verga, 2009). However, prior to the reports publication, a number of 'ethical concerns' (Fraser et al 1997, p187) held by different cultures, societies and religious faiths can be credited with laying the groundwork for the recognition of the discipline in 1965. Szucs et al (2012, p1506) recognise a 'harmony' in understandings of animal welfare, which can be traced through ancient Greek writing, Islamic teaching and other cultures and religions, concluding that from 'prehistoric time until the modern era human-animal relationships have been a focus of interest of society and an ethical issue'. A historical interest in animal welfare, which provided fertile conditions for the publication of the Brambell report.

Over the last 60 years, animal welfare has continued to be a priority for members of the public. Marchant-Forde (2015, p3) is keen to emphasise how the welfare science discipline is one of the 'branches of specialized science that is most accessible and inherently interesting' to members of the public' as well as being an integral source of 'guidance' in turn (Fraser et al 1997, p187). As a result of this interest, animal welfare knowledges continue to impact on society in regulatory (Mench 2018, p111, Lundmark et al 2014), economic (Blokhuis et al 2008) and cultural (Alonso et al 2020) ways. So commonplace are welfare science knowledges, that many struggle to recognise animal welfare science as holding a discrete, invariably positivist ontological approach. Consequently, many believe welfare science to be the dominant and only means of understanding the animal within society.

Welfare science as a disciplinary approach can be recognised to contain three distinct types of knowledge. Firstly, scientific studies which collect physiological measurements of the animal in strict experimental conditions, the value of which has been recognised by Barnett & Hemsworth (1990). This approach seeks to categorise physiological features of the animal to comprehend 'its attempts to cope with its environment' (Broom 1986. p524). Secondly, the behavioural turn, which has seen a burgeoning interest in the behaviour expressed by animals as a means to comprehend their experience within animal production spaces. These studies conceptualise behaviour as 'an organ, which is integrated within the biology of the whole animal' (Garner 2005, p106) as championed by

Dawkins (2003). Fraser et al (1997, p1) also acknowledge the importance of animals leading 'natural lives' and expressing normal behaviours, an approach which is included in this behavioural turn. Thirdly, there have been several studies which have sought to ask more imaginative questions of animals, exploring the ways in which animals can express their preferences (Duncan 2005) or even their emotion (Boissy et al 2007, Mendl & Paul 2004) through the medium of scientific welfare research. Despite these categorisations, these physiological, behavioural and emotional approaches to exploring the animal have since been blended and adapted in a finite number of ways which ultimately makes these categorisations overly simplistic and, in some instances, reductive. However, these categorisations go some way to define a discipline which Carenzi & Verga (2009, p22) describe as a 'broad multifaceted approach' to animal understanding.

2.2.1 The Welfare Science Animal

Now that we have an understanding of the different categories of animal welfare science study, attention can turn to the ways in which the discipline has conceptualised the animal within the literature. Carenzi & Verga (2009, p27) recognise the welfare science discipline as a 'tool to improve knowledge regarding animals', thus it is crucial to gain an understanding of the ways in which this tool perceives the animal and the caretaker within animal production spaces. Drawing on my own literary insights, I explore three typologies of animals which I have recognised within the discipline, including the 'scientific animal' which encompasses 'measurable' and 'representative' animal identities within its scope. The 'utility animal 'and finally the 'participatory animal.' These categories provide a crucial starting point for understanding the welfare science 'animal' as well as recognising weaknesses in the welfare science approach. These criticisms offer opportunities for interdisciplinary collaboration across the disciplines, allowing insights to be drawn from the animal studies discipline.

2.2.1.1 A Scientific Animal

The linkages between animal welfare and scientific thought have long been emphasised within the literature, indeed Fraser (1993, p27) summarises the disciplinary perspective of welfare science as a mixture of 'common sense and cutting-edge science'. It should therefore come as no surprise that the animal is viewed from a scientific perspective within the discipline. In this section, the ways in which the animal appears as a 'scientific'

individual are explored. However, before explorations of the 'scientific animal' can begin, it is important to note that the welfare science discipline is grounded in notions of positivism. Positivism as defined by Turner (2001, p11827) is 'the scientific study of the social world', whereby 'laws are to be tested against collected data'. The linkages between positivism and animal welfare are well recognised within the literature and Fraser (1999) and Millman (2009) have explicitly explored the influence of positivism within the discipline. A positivist approach to the animal requires knowledge about the animal to be constructed via the use of the scientific method and insights about the animal can only form when they have been trialled, tested and statistically proven. Positivism believes that one 'should not postulate unobservable processes to explain observable ones' (Fraser 1999, p12). The discipline has also been credited with producing 'A growing body of objectively verifiable data', as recognised by Lawlis & Allen (2014, p108) in their review of preslaughter handling, which begins with an exploration of the discipline. Furthermore, animal welfare is known to be 'consistent with the scientific method' (Millman 2009, p88) due to the use of 'deductive reasoning, formation of hypotheses and predictions, and collection and analysis of empirical data' (ibid 2009) within the literature.

2.2.1.1.1 A Measurable Animal

As a result of this positivist ontology, the animal is often characterised as a measurable entity within the welfare science literature and is represented via key indicators, which include both behavioural and physiological measurements. Common physiological indicators include the measurement of cortisol molecules which feature 'prominently in animal welfare research' (Mason & Mendl 1993, p302), alongside other objective measures such as 'plasma serotonin, heart rate variation, infra-red thermography, cytokines, salivary alpha amylase, and acute phase proteins' (Barrell 2019, p1). Meanwhile, behavioural measurements include the observation of fear responses (Rushen 1999), feed and foraging behaviour (Nielsen et al 2016), stereotypies (Garner 2005) and more recently an interest in positive displays of behaviour (McCormick 2012). These measurements are deemed to be representative of the animal form and are thus, by extension used to formulate understanding of the animal's identity. The use of these measurements is what Marchant-Forde (2015, p1) would describe as 'discrete measurable parameters... [which] draw an overall picture of the animal'. These

representations of the animal have been cultivated for a diverse array of species, including pigs, sheep, cows, chickens, rodents, fish and rabbits; all of whom are also used in the laboratory world.

Viewing the animal from this scientific perspective comes with several benefits. Firstly, the timescales for cultivating knowledges about the animal are often relatively short. Notably, it is easy for behavioural and physiological measurements to be collected, tested and proven in a short time frame. Secondly, the welfare science animal is often easy to understand due to the discipline's objective focus and usage of indicators. An animal split into measurable categories does not require society to engage in complex intellectual thought in order to understand the animal, as in the animal studies discipline. Indeed, Philo & Wilbert (2000, p4) describe the 'complex entangling's of human-animal relations with space, place, location, environment and landscape' within the animal studies literature, which can be difficult to comprehend and even more challenging to practically action within society. Thirdly, there is a sense of stability in the identity of the animal, as once a particular knowledge has been proven about a certain group of individuals this remains true and can be rectified or encouraged, unless it is statistically disproven by another study. This sits in direct contrast to the animal studies literature where animals are viewed as relational beings, in a constant state of transformation and relational flux. This stability in animal identity is likely to be the reason why the welfare science animal holds such dominance within society.

However, this understanding of the animal as a measurable form also comes with a number of downsides. In order to measure a specific aspect of the animal, individual animals are frequently stripped down into a sum of their parts. For example, an animal's stress response can be symbolised through a specific measurement of cortisol molecules in the blood or by measuring the display of a particular behaviour such as fear. This is what Fraser (1995, p103) would describe as the measurement of a 'Type 1 attribute', a 'single measurable attribute' which can be used to represent the animal. However, this approach creates a slightly obscured understanding of the animal if one measurement is prioritised over the others, or if objective measures are solely reliant upon. Indeed, it has been recognised that the use of these measures is 'not wholly reliable at the individual animal level' (Barrell 2019, p1).

Furthermore, splitting down the animal into component parts can also force us to lose sight of the animal itself. Indeed, this is a frequent critique from the animal studies discipline, as explored by Despret (2016) in her chapter on 'Separations' which looks at understandings of the scientific animal and the ways in which many of these knowledges have been formed by splitting the animal down via mutilation, or by separating the animal from key conspecifics. Despret (2016) has taken a strong view against this approach to animal understanding, critiquing studies which remove animals from their conspecifics, as well as separating them into body parts. In a memorable summary, Despret (2016, p149) critiques animal welfare science methodologies for their role in 'separating, mutilating, removing and depriving' animals in their investigations. Despret is keen to emphasise the violence implicit within these methodologies, something other critics have also recognised. Indeed Todd & Hynes (2017, p729) state that 'the violence of our relationship to animals draws attention to the question of how the animal is encountered at the level of ontology', conjoining violent experiences with the ontological approach chosen within a discipline.

The types of measurements used to understand the animal have also come under scrutiny. Notably, Mason & Mendl (1993, p301) describe how 'different types of measure may suggest quite different things about an animal's welfare' a statement which has the potential to undermine faith in the discipline's rigorous positivist approach. Some measurements are deemed to be a more accurate representation of the animal than others. Webster (2005, p45) emphasises how physiological measurements of the animal are frequently viewed as ''objective' and therefore more 'scientific' than the subjective observation of behaviour'. This attitude ultimately undermines the validity of measurements which do not conform with the strong positivist slant of the discipline, cultivating a skewed and potentially unrepresentative understanding of the animal within the discipline.

Yet even though emphasis is placed on 'single objective measures' (Fraser 1993, p103) of the animal within the welfare science discipline, it is important to recognise that these measurements remain heavily impacted by human judgment and bias. Indeed, the majority of knowledges which have been collected in the welfare science discipline have been shaped by human-centric notions of what an 'animal' is, despite the disciplines attempt to be 'purely objective' as is required by positivism. How studies chose to

'interpret wellbeing and even the [variables] we choose to study' (Fraser 1993, p38) corresponds directly to human-centric understandings of animal, undermining the promise of objectivity that the discipline offers. Millman (2009, p91) is keen to emphasise this in her review of the animal welfare literature, stating how there can be differing interpretations of data due to the 'importance placed on the parameters quantified, the relative importance placed on individuals or populations, and concerns about scientific uncertainty'.

This has been explored within the welfare science discipline where it is recognised that measurements of the animal are never 'purely objective and value-free' (Fraser 1995, p15). The considerable number of review papers (Hampton et al 2019, Hawkins et al 2013) which seek to outline statistical templates for data analysis within the discipline, point to some of these difficulties in cultivating objective data. Notably, Hawkins et al (2013) describe an 'apparent lack of sufficient information' within the discipline. Such insights reveal the conflicted nature of objective methodologies within the animal welfare discipline. In contrast, the social study of animals has increasingly recognised the need for a 'new way of conceiving objectivity' (Despret 2016, p144). The discipline critiques the very nature of objective knowledge production, describing it as 'gross error and false knowledge' (Despret 2016, p144) due to the objective understanding of the animal and the overwhelming concern with minimising 'reaction' and 'reactivity' to the caretaker (Despret 2016, p140).

Alongside these objective critiques, attention is increasingly turning to the nature of the research questions asked within welfare studies. Whilst Millman (2009, p88) emphasises the need for research 'questions… open to deductive reasoning', Despret (2016, p91) queries the logic behind these questions. She emphasises how the ontological positions of welfare science do not ask the correct questions, stating how 'the question [of] 'what could they [the animal] possibly be interested in?' is never seriously asked. This cultivates ontologies where the animal responds in a mechanistic way to the research problem formulated, as well as performing behaviours or solving challenges in 'terms that interest the researchers' (Despret, p93). Whilst these questions form objective answers which can be easily analysed, they do not cultivate the types of response which we are interested in exploring within this thesis. As a result of these critiques, this thesis believes that the ontological assumptions of animal welfare methodologies, negatively implicate the

knowledge produced about animals within the discipline. Whilst some methodological approaches attempt to overcome these difficulties, it is increasingly clear that the current ontologies of animal welfare science limit explorations of human – animal relations. As mentioned in the literature review, attention must therefore turn to the implementation of multidisciplinary methodologies within the disciplines.

2.2.1.1.2 A Representative Animal

Within a positivist ontology, the scientific animal is also representative, which means that the knowledge created in one study, is used to extend understanding to the experiences of another comparable animal. This approach is a standard principle of the scientific method and is recognised in the transfer of knowledges between the welfare science literature. For example, when a study such as Dalmau et al (2010) explores the behavioural responses of pigs (lameness, fear and slipping) within a slaughterhouse, it concludes that these measurements are effective indicators of animal distress, and that they can be used in other settings. This knowledge transfer enables the experiences of pigs in other slaughterhouses to be improved, even though they will be completely different individuals in a completely new slaughterhouse.

As a result of the scope and influence that the scientific animals can have within the discipline, the literature has a rigorous system of statistical testing, experimental design and peer review which ensures that the conclusions drawn are representative. This is reflected in attention to things such as sample sizes, repeat experiments and the use of control groups to ensure that the conclusions drawn are representative of the wider population. In a recent publication Hampton et al (2019, p1) sought to explore ‘how many animals should be sampled?’ within welfare science studies in order to ensure that findings are representative, a question which acknowledges the shortcomings of this approach to knowledge creation. This focus on populations rather than individuals is not unique to the veterinary literature. It is also prevalent within the medical sphere, where representative patient samples are used as a means to understand particular conditions such as diabetes (Forouhi & Wareham 2014) or comprehend a populations experience of mental health care (Jager & Rossler 2012). This interest in ‘how often diseases occur in different groups’ (Coggon et al 2009, p1) is known as Epidemiology, a thriving area and distinct are of interest in both the veterinary and medical disciplines.

In recent years, 'the reliability of data has become a major concern [....] especially when studying animal behaviour' (Rudeck et al 2020, p1). De Rosa et al (2003, p625) demonstrates this in her study, where she seeks to explore 'inter-observer reliability' for a range of welfare measures used on dairy cattle and buffalo. Similarly, the study by Dalmau et al (2010) which created pig welfare scores (lameness, fear and slipping) in slaughterhouses, places emphasis on the repeatability of these measures in order to ensure that pig welfare is being effectively recorded. Whilst these studies implicitly explore the repeatability of certain welfare measures within the discipline, for the majority of papers, repeatability is much more subtle. Welfare scientists will ensure that repeatability is built into the structure of animal welfare studies, as encouraged by Rudeck et al (2020). Researchers are concerned with ensuring that the samples used within their methodologies are representative, as has been emphasised by Hampton et al (2019) who outlines statistical guidelines to ensure that sampling approaches are as reliable as possible. Similarly in qualitative studies, the emphasis is often on ensuring a representative and scientifically validated sample size, as shown by Cameron et al (2021) in their survey of horse welfare, which drew over 500 respondents. It is therefore clear that in both quantitative and qualitative animal welfare studies, representative samples are crucial.

However, this understanding of the animal as a representative form could be seen as one of the weaknesses of the discipline. If the knowledge created about the scientific animal is inaccurate, as a result of the 'constraints that frequently emerge in the study of animal behaviour' (Garamszegi 2016, p223), it may be used in other scenarios, which perpetuates false knowledges about the animal. This is arguably one of the means by which restrictive and reductive notions of the animal have been championed and popularised within society by welfare science. The requirement for the animal to be a representative, also exposes welfare science knowledges to scrutiny. Measurements collected from animals are subject to strict and statistically validated forms of data analysis, thus anomalies in behaviour and physiology which may be facets of the animal's individuality, will be removed from the study and dismissed as inaccurate in order to improve the 'reliability of behavioural data' (Rudeck et al 2020, p1). There is an understanding in the discipline that these measurements 'differ between species […] between individuals and [...] in a single individual over time' (Mason & Mendl 1993,

p301). This censorship removes any of the variability or individuality which may be expressed by animals, cultivating a homogenised depiction of the animal as collective and exchangeable, rather than a unique entity. Such a critique is a function of positivism more broadly and follows in the footsteps of philosophers such as Rollin (1990) who have started to recognise the 'positivist constraints' in welfare science as noted by Fraser (1999, p12). Whilst the scientific animal fulfils the values of positivism by being measurable and representative, it is increasingly clear that it lends itself to critique when viewed from other perspectives. Despite the ease of keeping animals within this objective and neatly defined criteria, it is not always the most effective means of conceptualising or knowing a specific animal.

This has been noted within the literature, as Marchant-Forde (2015, p1) highlights the need for 'gaining in-depth knowledge of the welfare of individual animals'. She recognises that 'populations are not homogenous and that individuals within the same system may be experiencing quite different welfare states' (Marchant-Forde 2015, p1). Furthermore, whilst collective understandings of animals are frequently seen as a means to create a representative sample within the discipline, this approach has been critiqued by the literature. Philosopher Despret (2016, p140) argues that whilst animals are often chosen 'indiscriminately to constitute a random' and representative sample, the sample itself can never achieve this aim. Welfare studies are only ever able to collect knowledge from a small proportion of the overall animal population and thus Despret (2016, p142) champions the idea of seeing them not 'as statistically representative' but as 'representatives or delegates', which can be seen to be reliable so long as 'the scientists have selected them correctly' (ibid p143).

2.2.1.2 A Utility Animal

Animals also appear as a unit of utility within the welfare science discipline, where they are valued for the utilitarian use they provide for society rather than their individuality. Indeed, animals within the literature are often described in terms of their milk-yield (Seabrook 1972, Bertenshaw & Rollinson 2009) or lameness score (Horseman et al 2014). Similarly, in the work of Jansen et al (2010, p1296), scientists refer to cows as a product of their 'udder health' or prevalence of a particular disease, such as mastitis, on farm. Rather than a scientific animal, the animal appears as a notion of utility which is measured

through the incidence of disease or product yield. Often this approach to conceptualising the animal is an attempt to incentivise farmers, who pay greater attention to welfare messages if they are presented through the lens of productivity. One can recognise that 'animal husbandry in all its various forms exists to yield marketable products' (Buller & Roe 2018, p25). Increasingly the discipline is recognising the need for research to be impactful for farmers, as there is often 'strong resistance to [animal welfare] change despite extensive research' (Peden et al 2018, p2). Furthermore, van Dijk et al's (2018, p22) exploration of welfare outcomes, recognises that 'unless individuals caring for the livestock on farm can see a value […] they are unlikely to result in any enduring change'. Therefore, describing the animal as a unit of utility is an effective strategy for incentivising farmers to make better choices in terms of animal husbandry and handling.

In a similar way to the 'scientific animal', this 'utility identity' fails to allow any individuality in understandings of the animal. Animals are viewed as a collection of separate but productive parts which makes it difficult to gain a sense of the whole individual. Narratives are not cultivated about the animal's individual experience of a particular disease, instead they are understood in utilitarian and economic terms. Unlike the work of Gillespie (2020) and Collard (2018) within the animal studies discipline, which critiques the capitalist linkages which exist between animals and those who care for them, the welfare science discipline choses to encourage the language of utility obscuring the animal's identity. Such an approach is unsurprising, as it is rare for a welfare paper to outwardly denounce or critique industry standards. Evidence is instead presented in a rational and objective manner to allow industry experts and policy makers to come to their own conclusions about what is right or wrong for the animal. In other scenarios, farmers are even encouraged to participate in the development of policy, as facilitated by van Dijk et al (2016) which further complicates this hierarchy between caretaker, animal and the development of legislation. From an animal studies perspective, this approach arguably creates an animal which is stagnant and obscured within utility terminologies and there is a limited sense of individuality within the discipline.

2.2.1.3 A Participatory Animal

Despite the positivist ontology which sits at the centre of the discipline, more interpretative ways of knowing animals do exist within the animal welfare science

discipline. Whilst the welfare discipline has a tendency to view the animal from an objective viewpoint, the literature also provides moments of genuine animal participation. The participatory animal can be found in studies which use preference testing, a methodology which places the animal and its decision-making abilities at the very heart of knowledge production. The animals within these methodologies are given the choice to indicate their preferences for certain items (Ago et al 2002), such as experiences or food sources, and these choices are recognised by observing animal behaviour. The animal appears as a research participant within these studies, one who has the ability to communicate with and express their preferences for particular circumstances. Duncan (2005, p483) emphasises the ways in which these tests facilitate the opportunity for the animal to be ‘'asked' what they feel about the conditions under which they are kept’. Whilst this methodological approach remains constrained by the positivist ontology of the discipline, as noticeable in the use of control groups and statistically validated data points, these studies are a step in the right direction towards an animal whose preferences and experiences are valued. This conceptualisation of the animal has been furthered by explorations of emotion within the welfare science discipline, as championed in the work of Boissy et al (2007) and recognised by Togerson-White (2021), which encourages society to see the animal as a complex individual, rather than simply a unit of measurement.

In recent years there has also been ‘an associated revival of interest in the subjective experience of animals’ (Fraser 1999, p184). This can be seen in the uptake of qualitative understandings of the animal, via methodologies such as qualitative behavioural assessment (QBA). This approach creates qualitative descriptions of animals using a pre-set and statistically validated list of adjectives, creating ‘personal terminologies’ which can then be used to translate an animals perceived experience into discrete knowledges (ibid 1999). Such an approach has been used to analyse the qualitative experiences of a variety of species including pigs (Wemelsfelder et al 2000) and sheep (Wemelsfelder & Farish 2004). The animal cultivated by these qualitative knowledges appears as an individual, as emphasis is placed on its feelings and experiences within the production setting. Rather than being separated into discrete and statistically validated chunks, the animal is assessed as a whole. Yet even when using this qualitative approach, critics have recognised the ‘objectification pressure’ (Tomlinson 2019, p85) that this assessment

criteria remains under from the welfare discipline. The current usage of QBA within the discipline still exposes the animal to statistical analysis and quantitative scrutiny. This reluctance to move completely away from quantitative methodologies, mirrors many within the welfare science discipline, including Fraser (1993, p111), an animal welfare science scholar, who is not ready to move towards 'purely subjective' modes of enquiry within the discipline. Ultimately then, these attempts at cultivating a participatory animal are not fully possible due to the quantitative linkages which remain.

By exploring these different identities of the animal within the discipline, including 'scientific', 'productive' and 'participatory', we can begin to recognise the animal individuals which make up the human – animal relation. There can be no doubt that the discipline provides us with a logical and effective way of conceptualising the animal. However, whilst the discipline prides itself on championing the animals experience, it is notable that in a number of scenarios the animal is ultimately obscured by positivist requirements and these moments provide a fertile space for interaction with the animal studies discipline . Despite these shortcomings, the welfare science animal has had a considerable influence on our understandings of the animal in the modern day, so it is crucial that this animal identity is considered in this thesis.

2.2.2 The Welfare Science Caretaker

Traditionally, the welfare science discipline has cultivated knowledges exclusively about the animal. This has meant that the animal caretaker is often absent or obscured and in much of the literature, the animal caretaker does not appear in the study at all. The complete removal of the caretaker is unsurprising in a discipline which aligns itself with a positivist ontology, as welfare science is constantly seeking to create 'universal, accurate statements about the way the world really is' (Smith 1983, p7). Experimental design often requires partial or complete removal of the caretaker from the frame of enquiry in order to minimise variation in data collection. For example, in a study into pig enrichment (Beattie et al 2000), the caretaker is not visible, even though caretakers and their attitudes towards enrichment are likely to influence the ways in which enrichment is provided within the laboratory, something which is recognised and discussed in considerable detail in the first of the empirical chapters.

Even studies which seek to explore the fear response created between human and animal look to minimise the impact of the caretaker through the replacement of the human body with video footage or even dummy forms (Waiblinger el al 2006). Considerable attention is placed on removing the researcher from the frame of enquiry, with researchers 'spending enormous amounts of time and energy' habituating the test subject to their presence or concealing themselves from the animal form (Despret 2016, p139). The researcher is very much seen as an extraneous variable to be concealed in order to ensure the quality of the data produced. This leads to the cultivation of objective, non-biased results, data that Despret (2016, p144) describes as 'claim[ing] to be a view from nowhere' (Despret 2016, p144). In contrast, within the animal studies literature, the quality of the relationship between researcher and participant defines the value of the data collected. This thesis argues that the complete removal of caretakers in the name of standardisation is a flaw, as it ignores the specificity of the bonds between human and animal. In short, the caretaker is methodologically neutralised within certain welfare studies cultivating an incomplete understanding of the caretaker.

This missing caretaker reflects a trend more widely within the discipline to ignore the contributions of caretakers who work within animal production spaces. Whilst in some sections of the literature 'ratings by human observers' (Meagher 2009, p1) (e.g., body fat, pain responsiveness) are used as a knowledge source about the animal, their usage is often met with suspicion. Meagher (2009, p1) describes concerns about these observations 'reflect[ing] reality in an unbiased manner'. This aversion to caretaker knowledge probably stems from the belief that caretakers may hold inaccurate or anthropomorphic understandings of the animal. Anthropomorphising is when the animal is viewed in a human centric way and human characteristics are wrongly assigned to the animal. Furthermore, 'the near official consensus about anthropomorphising' is made clear by Horowitz & Bekoff (2007, p23), when they state, 'it is to be avoided' Yet the removal of these knowledges is one of the disciplines biggest shortcomings, as it cultivates deficient understandings of human-animal relations. This has been attempted to be rectified in the encouragement of 'Critical Anthropomorphism' within the welfare science discipline, an approach which has been hailed as a 'serious and thoughtful attempt to bridge the gap between the understanding of human and animal life' (Morton et al 1990, p13). Critical Anthropomorphism can be recognised in welfare assessments

such as Qualitative Behavioural Assessment (Wemelsfelder 2007) which allows observers to use their own intuition, experience and powers of observation to assign specific, pre-verified, behavioural states to animals under observation.

Despite attempts to encourage a new form of anthropomorphism, the animal studies discipline still critiques the welfare science approach within the literature., Emphasis is particularly placed on the ways in which the caretaker remains invisible within the published scientific report. This is summarised by Birke (2012, p15) when she states that the 'individuals experience, their relationships with others, the places they live (or work, if human)' will often be removed, as none of these knowledges are deemed to be 'relevant to published experimental finding[s]' (p14), even though the animal studies literature recognises this to be otherwise.

In recent years, the animal caretaker has begun to be included within the literature, however the disciplines reliance on statistical evidence means that understandings of the caretaker are only validated or considered interesting when there is a clear and objective benefit or impact on the animal. This is noticeable in studies exploring farmer attitudes which utilise both qualitative and quantitative methodologies (Kauppinen et al 2013). Results sections seek to quantify the caretakers experience by grouping attitudes into statistical groups (Campler et al 2018), as well as plotting figures and graphs to summarise caretaker opinion, as seen in LaFollette et al (2020). Even notions of caretaker wellbeing are still understood in objective ways, conceptualised via psychometric scales and body scoring (King et al 2020) or questionnaires and welfare indicators (Hansen & Osteras 2019). Whilst these approaches provide valuable information for the industry, they do not reflect the types of insights into the caretaker which this thesis seeks to cultivate. Caretakers even succumb to this objectification pressure themselves, as it has been recognised that they frequently self-censor by avoiding qualitative terminologies of animal welfare 'for fear of appearing unscientific' (Wemelsfelder 2007, p8). Whilst these results are valuable, they ultimately remove much of the nuances of the human – animal relationship through this standardised approach. Despite a methodological divergence within the discipline, the animal welfare literature is ultimately unable to escape its rigid ontological beliefs.

There is also a hierarchy of knowledge within the discipline which views the beliefs and knowledges held by researchers to be 'better' or more valuable than the beliefs held by

caretakers. In studies which seek to explore the attitudes of farmers, there was a clear understanding in what researchers were attempting to achieve. This is highlighted in the lameness study completed by Horseman et al (2014, p157) where considerable emphasis was placed on paying 'greater attention' to the points of view of farmers. However, it is clear that the correct treatment has already been decided upon by the study researchers, rather than exploring the knowledges offered by agricultural caretakers. Horseman et al (2014) appear to already have their own understandings of the most effective method of reducing lameness on farm, which reveals a lack of openness towards new forms of knowledge, even whilst attitudes are being collected. Implicit within many of the studies is the understanding that caretaker knowledges are only validated or taken into consideration when these attitudes are seen to benefit animal welfare in a meaningful and quantifiable way. Like the welfare science animal, which was explored in the previous section, it is clear that the identity of the caretaker is partial and incomplete. Consideration of the caretaker is only cultivated when there is a clear quantifiable impact on the animal, meaning that glimpses of the caretaker are fragmented in many studies.

2.2.3 Human – Animal Relations in Animal Welfare Science

Despite the partial identity of the caretaker within the discipline, in recent years there has been a definite shift within the welfare science literature to explore human and animal in relation. Indeed, 'recognition of the role of stock-people in the welfare and productivity of livestock' (Hemsworth 2007, p199) has accelerated over the last 20 years, as can be recognised in the publication of studies such as Velde et al (2002) and Lund et al (2004). Early explorations of human – animal relations were mainly found within the agricultural discipline, kickstarted by an increasing interest in the importance of animal handling on farm. Whilst these literatures recognise the importance of the human – animal relationship, they often chose to explore these relations in a quantifiable way. For example, Rushen et al (1999) explored the impact of aversive handling on milk yield in cattle, whilst Grandin et al (1998) explored the impact of aversive handling and restraint on cattle.

Stockpeople have also been brought into the frame of enquiry in the context of eliciting fear in animals, which has been strongly correlated with noticeable impacts on productivity in dairy cows (Bruer et al 2000) and chickens (Cransberg et al 2000). A recent

and notable review was also published by Mota-Rojas (2020) which explored the human – animal relationship in the context of welfare and productivity. Here the caretaker has a clear impact on the animal's experience within the production setting. In recent years, a noticeable shift towards more positive explorations of human – animal relations have also occurred moving away from fearful interactions. Higher milk yields have been noticeably associated with farms that cultivate more positive human – animal relationships (Waiblinger et al 2006, Bertenshaw & Rollinson 2009), a trend which has also been explored by Rault et al (2020). Such studies helped solidify the links between caretaker action and animal experience, as well as bringing the caretaker into the frame of analysis.

The increasing acceptance of the caretaker as an agent of welfare change within the agricultural sphere, has led to a shift in interest in investigating the attitudes and opinions of stockpeople towards their stock. It has been well recognised that the 'decisions and behaviour of humans […] have the potential to both compromise and enhance animal welfare' (Mellor 2016 a, p13). Farmer perceptions and attitudes have been explored in review studies by Velde et al (2002), Waiblinger et al (2006) and Seabrook (2001). These studies seek to discuss the impact of caretaker attitudes on the animal by drawing on previous quantitative studies. For example, Boivin et al (2003, p479) is keen to emphasise the need for 'positive human contacts for both animals and stockpeople', whilst Waiblinger et al (2006) emphasises the importance of 'behavioural attitudes' and their role in influencing the care for the animals. Whilst these studies mainly focused on human – animal relationships from an animal perspective, both animal and stockholder appear as important considerations, marking a distinct change from previous animal welfare approaches which sought to focus exclusively on the animal's experience. Despite this interest, it is increasingly noticeable that animal stockperson voices are still missing from the frame of analysis. Whilst aversive handling is seen to have a quantifiable impact on animal wellbeing, the reason that poor handling occurs within production spaces is still missing from the analysis. Kauppinen et al (2013) argues that farmers' voices and their representations of animal welfare are rarely heard, even though farmers are the ones directly able to improve animal welfare.

These methodological weaknesses have led to the uptake of qualitative methodologies within animal welfare. Qualitative approaches hail from the social sciences' discipline, thus their uptake within animal welfare literature is indicative of an interdisciplinary shift.

The most popular methodological approach used within the animal welfare discipline is interviews. These have been used in a variety of papers (Velde et al 2002, Kauppinen et al 2013) allowing researchers to capture human attitudes towards animal welfare and recognising that animals are strongly influenced by the behaviours and attitudes of those who care for them. Questionnaires have also allowed caretaker opinions to be collected and have been used in a variety of studies such as those by Lund et al (2004) and Hansen & Osteras (2019). More recently, focus groups have also become a popular tool of enquiry, as demonstrated in the studies of Devitt et al (2013), Butler (2019) and van Dijk et al (2016). These studies seek to explore the impact of animal caretakers on animal experience by recording caretaker attitudes via qualitative methodologies. Links between animal caretaker action and animal wellbeing have been forged for a number of species, including cows (Bertenshaw & Rollinson 2009, Kielland et al 2010, Horseman et al 2014, van Dijk et al 2016), sheep (Best et al 2021, Kane et al 2017), pigs (Peden et al 2018) and chickens (Ayim-Akonor et al 2020, Cransberg et al 2000). In recent years there has been a steadily developing association between benevolent farmer behaviour and positive welfare experiences for the animal. This use of qualitative methodologies within the discipline highlights the ever-growing importance of the animal caretaker within the literature. Rather than simply excluding stockpeople from analysis as in the traditional welfare literature, the caretaker is now seen as an important factor in the provision of animal welfare.

There is also an increasing awareness within the welfare literature that there is considerable diversity in the attitudes held by individuals, echoing Hewsons (2003. p496) assertion that ‘the term [welfare] can mean different things to different people’. Indeed, it has been well documented that farmers hold differing views about a range of different welfare areas, including pig aggression (Peden et al 2018), swine euthanasia (Campler et al 2018), cow docility (Bertenshaw & Rollinson 2009) and animal empathy (Kielland et al 2010). Studies are keen to group caretaker attitudes into generalised categories, which suggests some ‘uni-dimensionality’ to farmer perceptions, as found in Hansson & Lagerkvist (2015, p579). These categories enable the literature to highlight the ‘variability in caretaker experience as well as their attitudes.’ This is shown by Campler et al (2018, p254) in their recognition of three discrete clusters of animal caretaker attitude, which arose from swine euthanasia. Campler et al (2018, p254) describes ‘confident and

empathetic' individuals, 'confident, knowledgeable and detached' caretakers and those who were 'unconfident and lacking knowledge'. A similar grouping of attitudes was also shown in a study by Jansen et al (2010, p1296), where 'hard to reach farmers' were asked their views on mastitis issues and split into four groups depending on their attitudes to treatment. Meanwhile Lund et al (2004) created a similar partitioning of opinion in their categorisation of Swedish dairy farmers.

These qualitative explorations of human – animal relations are not just limited to agricultural spaces. They have since expanded into other fields, such as explorations of horse welfare (Butler 2019) and Chang & Hart (2002) exploration of the human – animal bond within the laboratory using qualitative survey techniques. However, aside from these relatively few studies, there has been minimal exploration of the actions and attitudes of laboratory animal caretakers within the welfare literature. It is important that studies begin to focus on the specificity of individual caretaker involved in animal research, as whilst agricultural insights have some relevance, the human – research animal relationship comes with its own set of nuances.

These approaches by Hansson & Lagerkvist (2015) and Chang & Hart (2002) are the first attempts within the literature to recognise the caretaker as more than just a homogenous stockperson and highlight the impact that stockperson behaviour can have on the lived experiences of agricultural animals. It is therefore crucial that these attempts are encouraged within the current welfare science literature. However, it is arguable that these explorations still do not go far enough to recognise the nuances of an individual caretaker's opinion and attitude. Categorisations create stock understandings of caretakers such as 'confident and empathetic' (Campler et al 2018, p254) which are arguably misleading when viewed from an animal studies perspective. The animal studies literature seeks to highlight the conflicts which exist in caring for animals, emphasising how care and violence often exist side by side within society (Roe & Greenhough 2021, Gillespie 2020), which undermines the notion that caretakers can be branded as wholly empathetic towards the animals in their care.

In this section, we have explored the ways in which the welfare science discipline identifies both the animal and the caretaker, as well as recognising the moments where they exist in relation to one another. Despite the strengths of these conceptualisations, it is clear that there are weaknesses in this disciplinary approach. The whole animal is often

missing from the frame of analysis, whilst the caretaker is either exiled completely or included as a quantifiable and partial form, preventing any opportunity for exploring the nuances of human – animal relations. It is therefore clear that there is a need to turn towards a new understanding of both human and animal, one informed by knowledges from the animal studies discipline in order to address these disciplinary limitations.

2.3 The Animal Studies Discipline

Attention now turns to the animal studies literature in order to explore the unique ways in which the discipline has sought to solve the thorny problem of human and animal relations. Until the early 1960s, the social sciences discipline focused exclusively on the experience of the human within society and paid little, to no attention, on the animal. However, a growing recognition of this gap led to the development of the animal studies discipline in the early 1960s (Wolch & Emel 1998). Interest in the animal was galvanised by ongoing work within cultural ecology, which placed considerable emphasis on animal domestication and the landscapes within which this had occurred. From these insights, the social science discipline begun to recognise the value in focusing on animal individuals, rather than humans, an approach which was supported by the development of conceptual theories such as post-humanism (Castree & Nash 2006) in the mid-1990s which created a new perspective with which to explore human – animal interactions. This shift has been labelled the 'animal turn' (Salzani 2017) and has led to several authors exploring human – animal relations from a posthumanism perspective, including Lindgren & Ohman (2018), Colombino & Giaccaria (2002), Barcz (2015) and Wolfe (2008).

Post-humanism recognises that humans are not completely autonomous and agential, instead 'agency is distributed through dynamic forces of which the human participates but does not completely control' (Keeling & Lehman 2018, p1). Put simply, post-humanism seeks to understand the animals, objects and alternate individuals which are not human and the ways in which they experience and interact within wider society. There is increasing awareness within the discipline that humans 'are not the only possible subjects or objects of study' (Ulmer 2017, p1). Post-humanism critiques the current anthropocentric approaches to the creation and exploration of knowledge within current society, 'radically shift[ing] what is possible in research methodology' (Ulmer 2017, p1). This theoretical framework invites emphasis on non-human others in order to create

meaning within the world, a shift in theoretical focus which has enabled the development of the animal studies discipline.

Post-humanism emphasises the disciplinary limitations of current animal welfare and animal studies methodologies. The theory moves away from 'empirical models of science,' as used in animal welfare, with their 'causality, reliability and validity' (Ulmer 2017, p1), whilst simultaneously recognising the empirical shortcomings of animal studies, what (Buller 2015, p375) emphasises as the 'anthropocentric and humanist social sciences'. In recent years, more radical approaches, such as post-human animal studies have led to methodologies where the animal is included as an active research participant, as in multispecies ethnographies. These methods are explored in detail in a book edited by Bastian et al (2018) where they champion more-than human participatory research. In this collection and in other literary explorations, we can begin to recognise the ways in which methodologies are strongly influenced by the theoretical underpinnings of the discipline.

In this thesis, the term 'Animal Studies' is used to unite a range of subdisciplines including the animal geographies, animal philosophies and emotional geographies literatures, cultivating a new geographical perspective which includes the animal in explorations of space, place and landscape. This sub discipline gained considerable traction in the 1990's and has been extensively explored by a range of authors including Buller (2013), Philo & Wilbert (2000) and Wolch & Emel (1998). Animal philosophy is another subdiscipline of animal studies which seeks to ask new questions about human – animal relations and important work has been done in this area by the likes of Despret (2016) and Haraway (2003, 2007), who ask new questions of the animal and its ethical place within society. Lastly, there is the subdiscipline of emotional geographies where concepts such as emotion and affect are explored in the context of the animal, as championed by Lorimer (2019) and Lorimer et al (2019). These disciplines form the basis for the animal studies discipline as it is conceptualised in the modern day. Despite the broad range of literature included within this discipline, animal studies are united in a disciplinary approach which seeks to explore human- animal relations from a theoretical perspective as well as drawing on interpretive and relational ontologies. In this section, exploration of the animal, the caretaker and their relations to one another are explored in considerable

detail, in order to gain a comprehensive understanding of the strengths and weaknesses of this disciplinary approach.

2.3.1 The Animal Studies Animal

Attention now turns to the ways in which the animal studies literature conceptualises the animal within the discipline. The animal studies animal can be recognised as having agency, individuality and impact as recognised by Buller (2016), in a way which has not been cultivated within the welfare science discipline. Facets of emotion and relationality are also brought into the mix, marking a departure from the logical and objective approach of welfare science. The animal studies 'animal' is therefore an entirely different being to the animal of the welfare sciences. In this section, the identity of the animal studies animal is outlined and explored using three broad categories, including 'the individual animal', 'the embodied animal' and lastly the 'missing animal'.

2.3.1.1 An Individual Animal

Within the animal studies discipline, the literature often recognises the animal as an individual, rather than a collective or unknown form. This sense of individuality has been encouraged in certain studies, where characters such as Angela the Octopus (Bear 2011), Hester the dog (Hodgetts & Hester 2016) and Haraway's dogs Cayenne Pepper and Roland (Haraway 2003) appear within the literature. By placing considerable emphasis on one individual, researchers are able to explore the complexities of this particular human – animal interaction, as well as being able to draw on their own personal experiences and narratives in order to cultivate animal understanding. These studies have also arisen in recognition of the fact that the animal studies literature has a tendency to 'speak of collectives while speaking less of individual creatures' (Bear 2011, p297). This approach sits in sharp contrast to the welfare science discipline, where the animal can be identified as a specific data point but is frequently viewed as part of a broader cohort of collected data.

Animal individuality is also cultivated for individuals who have not been assigned a name. For example, Gillespie's (2013, p1) exploration of 'Holstein Cow with ear tag #1389' or Miele's (2016) exploration of a group of sheep undergoing behavioural research. Emphasis on a nameless individual has also been demonstrated in the work of Collard

(2018) who narrates the story of 'one female sea otter' in order to orientate the reader within the context of a particular disaster, which in this instance was an oil spill in Alaska. Whilst these animals are not named, a sense of individuality is still cultivated. This individualistic approach is something which is currently missing from the welfare science discipline; however, this is able to be created within animal studies because the animal is not subject to the same rigorous demands of repeatability and representation as fostered in the welfare sciences. The animal does not have to be statistically validated in order for knowledges to be transferred between individuals, as animal science does not ground its knowledges in a positivist approach. However, the discipline does cultivate highly personal stories which do not always have noticeable applicability in other settings. In order to counter this, the discipline tries try to create linkages between these narratives. Even in the instance of unique animals, such as Angela the Octopus (Bear 2011), Angela is explored in relation to wider understandings of animal and is deemed to be representative of other octopuses and other animals more generally.

The fact that individual animals are recognised and explored within the animal studies discipline, occurs as a direct result of the post-humanist turn within the wider social sciences. Post-humanism is a critical body of work which seeks to shift the focus from the human to a more open and inclusive approach which encompass the animal. It recognises that previous knowledge cultivated within the social sciences placed 'the singular figure of the human front and centre' (Lorimer 2009, p344). In contrast to this, the discipline has sought to give animals considerable agency, placing them at the centre of the analysis. This has been championed in much of the animal studies literature, indeed Greenhough & Roe (2018, p367) explicitly address posthumanism at the start of their paper into human – animal relations within the laboratory, describing how it strives 'to take account of more-than-human agencies and perspectives'. Such an approach differs in comparison to the animal welfare science discipline, as whilst both disciplines place considerable emphasis on the animal form, the animal studies discipline seeks to comprehend things from an animal's perspective. In contrast, the welfare science discipline uses human centric knowledges in order to understand the animal form, applying objectivity and the scientific method to understandings of the animal.

Animal rights theories have also had considerable influence on the creation of animal individuality. Singer (1975) and Reagan (1983) have offered a new way of viewing

animals, emphasising the collective cruelty that animals experience within our society, as well outlining the ways in which their rights were not being met. Both texts call for greater consideration of an animal's agency and their rights, encouraging each and every animal to be considered as an individual. Whilst this animal rights approach now exists at the far reaches of the animal studies remit, these values still exert a considerable influence in the literature. Particularly in the work of Gillespie (2013), alongside calls to re-evaluate the status of animals within society, as emphasised by Donaldson & Kymlicka (2011). That said, the work of Singer and Regan has been strongly criticised from a feminist perspective by Deborah Slicer (2008, p112) when she describes how they 'do not acknowledge, much less separate, differences between humans and other animals', a critique which emphasises the lack of individuality assigned to the animal within rights discourses. Ultimately then, we can recognise the ways in which the animal studies literature is the appropriate discipline of choice for exploring the individual animals experience within the laboratory.

2.3.1.2 An Embodied Animal

The animal studies literature also cultivates an embodied individual. The concept of embodiment was first explored in the context of the human body and can be described as an interest in the 'human body – whose matters, where, when and how much' (Kellmeyer et al 2021, p1). The notion of embodiment seeks to 'centre the body as a geography unto itself.' (Kellmeyer et al, 2021, p4) by placing considerable emphasis on how the body moves, what the body does and the impact the body can have on the surrounding world. In recent years, this notion of embodiment has been explored in the context of the animal, as whilst we 'may not share language with non-humans […] we do share embodied life and movement' (Buller 2015, p378). An embodied animal appears in a number of scenarios within the discipline, but mainly through methodological approaches such as ethnography where narratives of the animal's movement and body can best be recorded.

Within the literature, particular emphasis has been placed on the bodily knowledges of domestic dogs (Haraway 2003, Fletcher & Platt 2018) and the ways in which they can use their bodies to cultivate a relationship with their owners. Bodies are also an integral form of communication in the agricultural sphere, where bodies can communicate to an

observant researcher that the animal is not coping with the pressures of the production system, as explored by Gillespie (2013) or in contrast, that the animal is thriving in spaces of sanctuary (Gillespie 2019). Whilst in the laboratory, emphasis has been placed on the ways in which animal bodies can be edited and manipulated via gene editing in order to cultivate bodies with 'monstrous potential' (Davies 2013 a). Bodies then, are a crucial element of an animal understanding within the animal studies discipline.

This notion of embodiment cultivates a highly complex animal, which cannot be explored via reductive logic of the welfare science discipline. Rather than reducing the animal into a number of logical parts, complexity is something which the discipline seeks to cultivate. Greenhough (2009, p204) links this complexity with the theoretical basis of Posthumanism and argues that 'our relations in and with the world […] define us, including the myriad of complex ways we are linked to our biological and material environment.' These insights create an understanding of the animal as a complex and embodied entity, which this thesis sees considerable value in. However, from a critical point of view, this need for complexity can make it challenging for knowledges and conclusions within the discipline to travel across into other areas, as there is often a large amount of contextual information which is needed to interpret the meaning of study results. This complexity is one of the reasons why knowledges created within animal studies are not frequently used within the welfare discipline or utilised within the development of animal welfare policy. This heavily contrasts with the welfare science approach, wherein knowledge is frequently transferred and utilised between disparate individuals.

2.3.1.3 A Missing Animal

Despite the strengths of the animal studies approach, it is important to note that the literature does have ontological gaps. In recent years, critiques have been levelled at the discipline on account of the types of animals which are often missing from the frame of analysis. This is what Acari et al (2021, p1) describe as a 'selective remit of care and concern' for particular species. Such critiques recognise that even though the animal studies discipline seeks to challenge human centric knowledges, animals exist in a hierarchy of their own, which means that particular species are often missing from the animal studies literature on account of their distance from humans. Bear & Eden (2011,

p336) further this point in their explorations of the relationship between fish and recreational anglers, emphasising that fish are often viewed as 'alien' to humans on account of the 'non airy spaces in which they dwell'. These insights highlight the human-centric notions that remain at the heart of the animal studies literature, despite its attempts to make space for the non-human animal.

Furthermore, it has been increasingly noted that animal caretakers are often a centralised figure within the literature. Caretaker narratives are often drawn on to describe the animals experience within a particular production space, as used by a number of authors including Greenhough & Roe (2018), Friese & Latimer (2019). However, these explorations present an animal which is viewed from a human centric perspective, an approach which is subject to critique as it is thought to cultivate notions such as anthropomorphism. Numerous studies also explore humans and animals in relation to one another rather than simply focusing on the experiences of the animal. This emphasis on both can ultimately obscure the animal from the frame of analysis. This is recognised by Buller (2013, p308) in his review paper of animal geographies where he describes the 'challenge that the "animal" brings to the exclusivity of geography's adjectival humanism'. Explorations from this disciplinary perspective have been described as mainly 'produc[ing] modestly promising enactments of nonhuman animals' (Miele 2016, p12) despite attempts to focus on the animal.

As a result of this, the discipline is actively attempting to recentralise the animal within the literature. There has been a call to 'shift the anthropocentric gaze' and 'understand the animal's "side" of animal-human relations' (Gibbs, 2020, p775). This is similar to Buller's (2014, p312) assertion, that we should seek to hear the 'cry' of the animal which comes from the 'other side'. There has been a call to allow animals to 'speak back in ethically and epistemological significant ways' (Giraud & Hollin 2016, p43) within the discipline, particularly within the space of the laboratory. This has mainly been achieved through the development of new research methodologies including Participatory Action Research (Merskin 2011, p144), with its ability to 'consider the conditions of animals marginalized voices' and trans-species psychology (Bradshaw & Watkins 2017) with its belief in shared emotions and cognition. These approaches sit alongside the recent 'emergence' of multi-species ethnographies, as discussed by Kirksey & Helmreich (2010). It is therefore hoped that by incorporating elements from these methodological

approaches, the discipline can start to move to 'something more profound… and altogether different, less one-sided ontology' of both human and animal forms (Buller 2014, p310). Currently though, it would be fair to say that this vision for the animal studies literature is mainly aspirational. Switching to these methodologies requires a considerable 'cognitive and discursive shift', as recognised by Hodgetts & Hester (2016, p88) and it is notable that these methodological approaches have yet to be fully incorporated into the mainstream animal studies literature.

Ultimately then, the animal studies literature does not create an ideal animal identity, despite its ability to rectify many of the shortcomings of the welfare science discipline. Whilst animal studies cultivate an animal which is individual, embodied and complex, these attempts at understanding the animal from a new perspective, can ultimately lead to the animal being obscured when viewed in relation to their caretakers. Thus, the unflinching focus on the animal, as cultivated by the welfare science discipline, begins to have some relevance in this scenario. It is therefore increasingly clear that the weaknesses of the animal studies literature can be countered by knowledges and approaches from animal welfare science.

2.3.2 The Animal Studies Caretaker

Despite the considerable emphasis that animals have been assigned within the Animal Studies discipline, the animal does not dominate the literature as in the welfare sciences literature. The literature spends considerable time exploring the experiences and identities of caretakers who exist in relation to these animals. In this section, emphasis is placed on the identities of animal caretakers which are formed within the discipline, including the 'individual caretaker,' 'knowledgeable caretaker', 'active caretaker', 'emotional caretaker' and 'suffering caretaker'. Despite the discipline being called 'animal studies', the literature provides a fascinating insight into the caretakers who exist in relation to these animals, marking it in stark contrast to the welfare science discipline which affords them very little emphasis.

2.3.2.1 Individual Caretaker

Animal caretakers are perceived as individuals within the animal studies literature. This exists in direct contrast to the caretaker of the animal welfare science discipline who, as

previously discussed, is frequently viewed as a collective entity. One of the main means by which individuality is achieved in the animal studies literature is through the use of caretaker narratives, which are collected via ethnographies and interviews with caretaker staff. A prime example of this narrative approach is cultivated in Greenhough & Roe's (2018) exploration of laboratory animals via the stories which are told about them by technicians. By using direct quotes from narratives as a primary form of data analysis, we can recognise the individuality of the caretaker, as the reader is given a direct insight into the ways in which a particular caretaker or individual feels about a specific practice (Fletcher & Platt 2018) or species (Gillespie 2019, Friese 2019). Authors also cultivate a sense of individuality by showing sympathy towards dialect when quoting animal caretakers, as demonstrated extensively by Greenhough & Roe (2018). The use of pseudonyms throughout these literatures also allows the caretaker to be endowed with a sense of personality, whilst protecting their identity within the laboratory.

Caretakers also appear as individuals when emphasis is given to the range of different attitudes they hold about the animals within their care. Different characteristics are often seen to be associated with a particular identity of caretaker, as demonstrated in the work of Birke et al (2007) and their categorisations of caretakers as objective or emotional in the research laboratory. However, the animal studies literature has been criticised for presenting caretakers and other individuals with a lack of heterogeneity, as was critiqued in the welfare science literature. This is emphasised by Bear & Eden (2011, p339) in their explorations of angler-fish relations, when they recognise the ways in which anglers are often 'categorised and differentiated' alongside the animal, rather than being recognised as individuals. Often within the animal studies literature, individuals are mainly referred to as members of homogenous groups, having an identity such as an animal technician (Greenhough & Roe 2019, 2018), a gardener (Ginn 2013)or a pet owner (Fletcher & Platt 2018) who is recognised to hold similar views to their peers. In these categorisations, individuals are assumed to speak with one cohesive voice. This is emphasised further by a common methodological practice, whereby commonalities and themes between different caretakers are drawn out and used to represent caretakers more widely. This collective vision of the human removes the nuances of individual caretakers.

2.3.2.2 A Knowledgeable Caretaker

Significant emphasis is also placed on the views of animal caretakers within the animal studies discipline, as these individuals are recognised as having an important insight into the experiences and understandings of the animal. Caretaker knowledges have been used to inform understandings in the laboratory space, (Greenhough & Roe 2018, 2019) and on the farm (Bertenshaw & Rollinson 2009) and caretakers provide a crucial source of knowledge for formulating understandings of the animal. Interestingly, the opinions and attitudes of caretakers are not statistically validated in any way in these studies. These knowledges are simply validated as a direct result of the confidence, which is placed in these caretakers, which sits in direct contrast to the welfare sciences with their need for representative and accurate sample sizes.

This interest in and emphasis of the animal caretaker has groundings in feminist theory, as it enables marginalised caretaker voices to come to the fore and be taken seriously. The linkages between feminism and animal studies have already been extensively explored within the literature through the work of Birke (2002) and Adams (2000). Birke (2002) has focused mainly on the benefits that a feminist approach can bring for the animal, rather than comprehending the value that a feminist ontology could have on the animal caretaker. However, the animal studies literature is also placing emphasis on the lack of legitimacy afforded to these caretaker voices within wider society. Anthony (2003, p505) recognises that there is a need to provide 'farmers and stockpersons an ethical voice', assigning them agency in wider discussions of animal welfare. This is in agreement with Greenhough & Roe (2006, p417) who call for the 'indigenous and more generally non-expert, microscale knowing's of biotechnology', which are cultivated by animal technicians, to gain more emphasis within the laboratory. Haraway (2007, p39) describes a need for a 'larger oral culture of animal knowledges' which are required in order to truly understand animals, rather than simply relying on understandings from the welfare science discipline. All of these studies recognise the importance of caretaker knowledges in order to gain a more accurate depiction of both animal and non-human animals within the discipline.

2.3.2.3 An Active Caretaker

Caretakers within the animal studies literature also recognise the impact that the animal caretaker can have on the animal form. Unlike the obscured caretaker found within the welfare science discipline, the caretaker is recognised to have a considerable influence on the animal form through embodied interactions with the animal. As previously explored, embodiment concerns the body and the ways in which it is utilised to create knowledges within society. Particular emphasis has been placed on the ways in which caretakers can use their bodies in order to cultivate care for the animal, as explored by Friese (2019) in her description of Martine, an animal technician, who uses her hands to feel for the warmth of the mice within the cage. Similarly, Greenhough & Roe (2011, p49) recognise this in their own explorations of the laboratory when they place emphasis on the 'bodily practices and sensations' which enable staff members to attune to the needs of the animal. Throughout the animal studies literature, it is clear that the human body must 'attune to the bodies of animal others' (Greenhough & Roe 2019, p368) in order to enact animal care within the laboratory.

Embodied alterations are also made to animals via embryos or selective breeding, with researchers continually working to 'rewrite understandings of genetics through the production of mutant mice' (Davies 2013 a, p4). This bodily shaping is also emphasised by Birke (2012, p6), when she describes the 'breeding programmes and, later, direct genetic manipulation' which alter the animal form. Whilst genetic alterations are a regulated procedure within the facility, some researchers view these manipulations as inherently sinister. Giraud & Hollin (2016, p36) state that research animals are frequently 'moulded into model objects' via genetic means, through the selection of amenable characteristics to ensure the production of individuals who do not 'threaten experimental goals'. These insights force us to recognise that the human – animal relationships do not always create moments of animal flourishing within the laboratory, as well as emphasising the sense of control that technicians have over animal lives.

2.3.2.4 An Emotional Caretaker

The animal caretaker is also recognised as an emotional being within the animal studies literature, which is missing from the welfare science approach. Such an emphasis on emotion can be traced back to the considerable work which has been done on emotions

in broader spaces than the animal studies discipline, including the work of Katz (1999) and the development of the emotional geographies discipline over the last 20 years as documented in the work of Berlant (2004), MacKian (2004) and Anderson & Smith (2001). This burgeoning interest in emotions within the human geography discipline has been credited with development under a feminist influence, as in the work of Widdowfield (2000). As a result of these explorations, animal emotion has become a more prevalent theme in the animal studies discipline, as recognised in the work of Bekoff (2008).

Experiences of animal death have been a particularly strong feature of these emotional explorations. This has been explored by Mazhary (2021), Convery et al (2005), Gibbs (2021), Lorimer (2019) and The Animal Studies Group (2006). A range of species have also been explored in these emotional explorations of animal death, including work by Atchinson (2019) on carp, alongside work on slugs by Ginn (2013). Numerous examples of the emotional challenges of dealing with animal death appear within the literature exploring the research laboratory, as represented in the work of Friese & Latimer (2019), Greenhough & Roe (2018, 2021), Giraud & Hollin (2016) and Birke et al (2007). Indeed Greenhough & Roe (2017, p699) frequently describe the 'emotional labour' of animal research in their work. In a more recent paper, Greenhough & Roe (2021, p21) recognise how these complex and contradictory practices of care cannot be resolved' all of the time, which results in strong emotion or distress for the animal technicians. Greenhough & Roe (2021) go on to emphasise the impossibility of killing animals when the emotions of the animal technician are too potent, proving the value in conceptualising caretaker emotion within animal production spaces.

Emotion is also cultivated in particular spaces and is not just linked to the animal caretakers themselves. Indeed, this notion has been explored in the work of Lorimer (2019) in his work on a pet burial site on the coast of Scotland. This idea can be explored further through the notion of emotional atmospheres (Lorimer et al 2019), as a rapidly developing body of work seeks to view emotional states as an atmosphere which is experienced by individuals, rather than being cultivated within and by a specific individual. This notion was first explored within the emotional geographies' literature (Bille et al 2015) but has since extended into the animal studies discipline. Consequently, we can recognise the ways in which animal caretakers can be exposed to particular spaces within the animal production landscape which are likely to cultivate a particular

emotional response. Within the laboratory setting, one could view the hidden settings of animal research as cultivating a particular affective atmosphere for caretakers to manage. Greenhough & Roe (2021, p11) emphasise the 'complex and contradictory atmospheres' which caretakers are expected to navigate which are likely to create an emotional response. Therefore, the potent value of spaces in the cultivation of emotion is another insight which the animal studies literature can bring to our understandings of human – animal relations.

2.3.2.5 A Suffering Caretaker

The animal studies literature has also explored the suffering experienced by caretakers within animal production settings, including visceral experiences of physical suffering. The physical discomfort of staff members has been noted by Smith (2002, p50) in his analysis of the abattoir where he describes the unpredictability of the animal and the need for staff to 'avoid kicking hoofs, sharp knives or fall[ing] into bone-crunching machinery' when working within these environments. Injuries are common within animal production spaces due to the physically demanding nature of 'recurrent tasks' which farmers are forced to complete (Ibid p51). The animal studies literature is unique in this conceptualisation of the caretaker's role, as these insights are currently missing from animal welfare literature exploring the human – animal relationship.

Animal caretakers can also suffer as a direct result of their societal ranking. Animal workers are deemed to suffer 'physically, mentally, as well as morally' as a result of their associations with animals (Porcher 2011, p6). Porcher (2011) discusses the suffering experienced by workers in the pig industry in terms of smell and how its societal association with uncleanliness and poor hygiene impacts their social relations. These themes are also discussed in the work of McDowell (2009, p6) who emphasises how in the world of human care 'servicing the bodily needs of others' has been regarded as low-status work'. Individuals whose role is to service the bodily needs of animals are likely to be viewed with even more social disdain. When we consider the wider backdrop to animal research within society, it is likely that the actions of animal caretakers, particularly those which involve animal euthanasia or procedural pain, are likely to be even exacerbated by ethical concerns. Smith (2002, p52) recognises that abattoir workers seem 'morally tainted by their noisome associations' with the animals that they kill,

process and package into meat. It is therefore clear that the animal studies literature has a keen interest in exploring the societal and physical ways in which caretakers suffer within society.

By separating caretakers into these discrete categories, we can begin to recognise the keen interest that the animal studies literature has in both human and animal experiences within production settings. The animal studies literature provides us with a far more intentional exploration of the caretaker's experience, which is a useful tool for gaining a greater understanding of the human within human – animal relationships. That said, there are still limitations in these caretaker understandings, which have yet to be fully resolved within the discipline.

2.3.3 Human and Animal Relations in Animal Studies

As previously explored, human – animal relations within the welfare science discipline are objective and reductive in their explorations of interrelations. Rather than exploring the complexity of interactions, emphasis is often placed on conceptualising human – animal relations in a logical way, wherein particular types of interaction were clearly defined as either bonds, relations, or interactions (Hosey & Melfi 2014) and then statistically validated via the scientific method. In contrast to this, the animal studies discipline seeks to cultivate relational understandings, wherein the complexities of human – animal relations are embraced and explored in considerable detail. Such an approach is championed in Haraway's (2016) constant call to 'stay with the trouble' of human – animal relations and is one of the strengths of the animal studies discipline.

Relations have been explored in a number of traditional spaces of human – animal interaction, including homes (Power 2012, Brown & Dilley 2011) farms (Convery et al 2005) and Zoos (Anderson 1995). The literature which has been created in these spaces is numerous, as these settings conform to traditional understandings of where humans and animals interact. However, in recent years, new spaces of human – animal interaction have also been explored, including explorations of agricultural markets (Gillespie 2013), aquariums (Bear 2011), laboratories (Davies et al 2016, 2020, Greenhough & Roe 2018, 2019, 2021), therapeutic care farms (Gorman 2019), cityscapes (Acari et al 2021) and even prisons (Moran 2015). The diversity of locations collected within the discipline

reflects the ever- growing interest in human and animal interaction in a variety of different spaces.

As well as exploring the spatial differences in human – animal relations, considerable emphasis has also been placed on the types of relations which exist within these settings. Emphasis has been placed on the cultivation of affective relations within the animal studies discipline as they have been recognised to have a 'long history' (Charles 20, p715) within the context of both human and animal. Affective relations recognise that both human and animal impact and influence one another through their interactions, via the cultivation of particular affective states. Affective relations between human and animal were first associated with explorations of pet keeping, as in the work of Thomas (1991), however in recent years, affective relations or 'environments' have been recognised in other spheres such as the laboratory (Greenhough & Roe 2018, p713). In the work of Miele (2016, p11) affective relations are recognised to be experienced by sheep in relation to their caretakers. Affective relations allow us to recognise 'moments of fleshy interspecies interaction' (Buller 2015, p379) between human and animal in certain spaces of animal production.

2.3.3.1 Collaborative relations

Human – animal relations are recognised as a means to achieve a common goal. Collaborative relations appear in daily rituals, such as a dog walking, as explored by Fletcher and Pratt (2018, p221). In this study they describe the 'negotiation' between dogs and their owners whilst on a walk, showing the relational quality to this simple interaction. Miele (2016) also describes the collaborative relations which must be cultivated in order to successfully complete a behavioural study on sheep in the laboratory. In order for data collection to be successful, the PhD student, animal carer and sheep must all collaborate alongside one another, through a network of complex relations. Miele even broadens the scope of her inter-relational enquiry to include 'heterogeneous materials' (Miele 2016, p10) such as cameras, buckets and other such devices, as key features of this collaborative act. The animal studies discipline frequently includes other objects in the analysis of animal production spaces, reflecting animal network theory, a linkage recognised by Buller (2014). Within the laboratory, data collection can only be achieved if 'the choreography of all [...] relations work' (Miele 2016,

p10) and in Miele's analysis it is clear that there is a practical sense of collaboration between animals and their human caretakers. A less tangible form of collaboration has also been noted within the laboratory by Levina (2018, p233), in her analysis of Lab Animal advertising, when she describes how animals are treated 'as active collaborators in research and participants in their own sacrifice'. Collaboration can also be recognised in other spaces, notably between anglers and their fish. During interviews with anglers by Bear & Eden (2011, p336) it was noted that fish are seen to 'influence the anglers and are affected by the anglers' in turn. Thus, the animal studies literature has a crucial role in creating knowledges about both caretaker and animal in relation to one another, rather than simply cultivating knowledge about the animal form as in animal welfare science.

There is a considerable focus within the literature on exploring the ways in which care is enacted within human and animal relations. The provision of care is the epitome of wellbeing for both human and animal. Traditionally care has been viewed as a one-way transfer from one individual to another, however in recent years care has been conceptualised as an affective relation between individuals as explored in the works of Puig de la Bellacasa (2012) and Mol (2008). Drawing on these explorations, both human and animal have begun to be recognised as actively collaborating in the provision of care. Emphasis has been placed on the enactment of care within the animal research facility. For example, narratives have highlighted the ways in which care is cultivated between caretakers and beagles (Giruand & Hollin 2016), rodents (Greenhough & Roe 2018, 2021, Freise & Latimer 2019) and aquatic animals (Message & Greenhough 2019) within the laboratory. This analysis and exploration of care is an integral feature of my own explorations of the laboratory, once again emphasising the importance of drawing on animal studies literature, throughout the subsequent empirical chapters.

2.3.3.2 Harmful Relations

The animal studies literature also emphasises that not all relations between human and animal are beneficial, particularly in spaces of animal production where they are being reared for economic or scientific gain. Human-animal interactions have been described as 'non-consensual, forced, and violent' (Kopnina 2017, p34) in the animal studies discipline and many authors have argued that harmful relations are endemic within animal production industries. Gillespie (2018, p78) places considerable emphasis on the physical

suffering experienced by animals within human – animal relations in the agricultural world, describing the 'visceral suffering' she witnessed within these spaces. Laboratory animal science in particular has been recognised to cultivate challenging human – animal relations, as a result of the 'deliberate and inadvertent harming and killing of animals' (Roe & Greenhough 2021, p1) which occurs within this space. Harm is also inflicted as a result of the demands of the scientific method. There is an increasing recognition within the research laboratory that the animal, or 'standardized technical object' (Davies 2013 b, p134) as it frequently recognised, experiences pain, injury and disease in order to create knowledges which are deemed to be of scientific value. The animal studies literature also recognises the ways in which animal agency is frequently obscured within wider society by capitalism, power relations and a human centric society. Notably Anderson (1995, p257) charts the historical development of Adelaide Zoo and the ways in which the space, despite its more natural appearance, remains underpinned by the 'power and possession known as domestication'.

Unlike animal welfare science, the animal studies discipline seeks to actively critique this harm. It achieves this by unbalancing normal hierarchies and placing the animals as key protagonists within the discipline. This serves to empower our contemporary understandings of the animal, but also provides a more animal focused perspective on historical events, as in the instance of 1989 Exxon Valdez oil spill (Collard 2018) which was explored from the perspective of a young otter called Homer. The animal studies literature offers a bold critique of animal production, in a way that the welfare discipline could never fully achieve. The discipline's critical voice, with its leanings in the animal rights literature, enable animal practices to be viewed as cruel without needing statistically validated proof allowing a new recognition of suffering within human – animal relations. The caretakers themselves are also recognised to have a proactive role in attempting to counter these experiences of harm for the animal. Greenhough & Roe (2021) describe the ways in which practices of harm can be countered by the actions of caretakers within specific relationships.

The literature has also conceptualised the notion of 'shared suffering' (Haraway 2007, p71), as experienced by both human and animal stakeholders within animal production spaces. Haraway uses this to emphasise the reality of animal production spaces and the ways in which they incur harm to both human and animal bodies. Such a concept

recognises that the reality of animal production spaces exists in sharp contrast to the cultivation of wellbeing. The notion of shared suffering in animal production spaces has been explored in a paper by Porcher (2011, p3) exploring the 'shared suffering' which exists between pig farmers and their animals. Shared suffering ultimately recognises the importance of including the caretaker experiences within animal production settings, recognising the suffering, which is implicit in the caretakers' role, which is often obscured as a result of the focus on the animal. It also goes a step further and explores the relational qualities of this suffering and the ways in which it is cultivated and mediated by the human – animal relation. Suffering is not just experienced by the animal as a direct result of cruel caretakers. Instead, both human and animal are recognised to experience oppression within animal production spaces which is arguably why much of this cruelty occurs.

2.3.3.3 Critiques of a relational approach

Whilst a relational notion of suffering has become popular within the animal studies literature, it is important to recognise the hierarchy which exists between human and animal bodies when using this term. Haraway (2007, p71) emphasises this in her theorisation of 'shared suffering', as pain is not 'borne symmetrically' (p74) between human and animal bodies. Instead, the suffering is mainly experienced by the animals. Haraway theorises that the pain and visceral suffering experienced by the animal far outweighs the suffering experienced by caretakers as a result of ethically uneasy relationships to animals. Yet in some explorations of human and animal experience, this hierarchy is not recognised which ignores this disparity in experience. For example, Porcher (2011) fails to recognise this in her description of the 'shared suffering' of workers in the pig industry when she describes the long working hours, emotional hardships, physical exertion and social stigma, which is deemed to equate to the suffering of the pigs in the caretaker's care. It is easy to recognise the ways in which the caretaker's suffering cannot be comparable to the experiences of the pigs within their care, who may be subject to mutilations, difficult living conditions and death.

This is discussed further by Shildrick (2015), whose work is found in the social sciences literature, when she argues that the hierarchy between disabled and non-disabled individuals is often flattened within debility studies, which view individuals relationally.

She argues for the need to 'counter the centrality of relatively privileged white bodies in disability discourse' by emphasising the uneven power relations within these spaces (p11). In a similar way, relational studies can obscure the uneven power relation in human and animal studies. If studies view human and animal in relation to one another it becomes difficult to recognise which individuals are oppressing the other as both are suffering. It becomes a challenge to see the harm implicit in these relations. It is therefore important that the hierarchies between human and animal bodies are not flattened or ignored, simply because they are explored in relation to one another, however this can be difficult to achieve in animal studies. The notion of hierarchy is a crucial feature of feminist writing which looks to destabilise privileged knowledges.

Despite the critical role that the animal studies literature plays in raising awareness of animal harm, it is important to note that the animal studies literature does not always recognise the implicit harm within human – animal relations. For example, Bear & Eden (2011, p336) explore the ways in which anglers 'make sense of, and engage, with' their fish during recreational fishing. Considerable emphasis is placed on the ways in which both human and fishy forms are altered by these encounters, and yet despite these transformative interactions, this relationship ultimately creates harm for the fish involved as it enables them to be caught, killed and consumed. However, there is limited exploration and recognition of this harm within the study. This is also recognised by Gillespie (2016, p574) when she describes the distribution of 'common-sense narratives that erase the violence of routine industry practice' in agriculture, ensuring the violence of the US cattle markets is obscured and animal 'lives […] are rendered ungrievable' (p572). Collard & Contrucci (1988, p68) paint a similar picture within the research laboratory describing how 'violent acts are neutralised' through their routine nature, as well as being validated through the praise individuals receive. Researchers are 'admired (published and replicated) and the actors honoured (tenured and funded)' showing how fully integrated these acts of violence are into the scientific culture (Ibid 1988). Whilst the animal studies discipline recognises the inherent harm of human – animal relations, it is interesting to note that some studies fail to recognise these harms within their own analysis.

Understanding human and animal wellbeing from a relational approach also sits in direct contrast to the logical, easy to conceptualise approach of the animal welfare frameworks.

Wellbeing is deemed to be a relational state which varies depending on the interactions and individuals which the animal is exposed to. Whilst this added complexity reflects the reality in the real world, it is more challenging to conceptualise, indeed it is arguably more helpful to have a logical outline or framework in order to understand welfare. However, limited attempts have been made to engage with welfare science frameworks from an animal studies perspective. Whilst the animal studies discipline has engaged with existing animal welfare frameworks, these explorations have mainly been from a historical perspective, for example Hobson-West's exploration of the 3R's (2009) within which they were envisaged an 'animal' and Davies et al's (2018) historical excavations of the same framework. More work could be done to engage with these welfare tools in order to revitalise the animal studies discipline's point of view.

By exploring these relations, one can begin to recognise the benefits of exploring human and animal relations from an animal studies perspective. The animal studies literature places considerable attention on the care which is provided by the animal caretaker for the animal form, as well as recognising the inherent harm which exists within human – animal relations. Explorations within the welfare science literature do not recognise the nuances of these relations, nor do they seek to critique or recognise the implicit cruelty and suffering of animal production in the same way as the animal studies literature. . It is therefore crucial that an animal studies perspective is included within the thesis.

2.4 Conclusion

Throughout this chapter, a number of key gaps have been identified within each of the disciplinary approaches. Limitations of the welfare science discipline include its positivist approach, which ultimately obscured the caretaker from the frame of enquiry and prevented the animal from being fully visible. In contrast, the animal studies literature does pay considerable attention to the experiences of the caretaker within animal production settings, as well as cultivating a more individualistic and active identity of the animal. However, despite the value in cultivating a relational approach, the animal can also be obscured from the frame of analysis very easily. This thesis seeks to cultivate an understanding of the animal which has the clarity and focus of the welfare science discipline, as well as recognising the value of the caretaker within animal production spaces, as championed by the animal studies literature. It is therefore abundantly clear

that there is a real benefit to drawing on both the animal welfare science discipline and the animal studies literatures within this thesis.

3 Welfare and Wellbeing in the Human – Animal Relation

> 'For a moment he stood silent, shoulders hunched, hands deep in the pockets of his coat, then he spoke quietly as if to himself. "They [the horses] were two slaves when I was a slave" He turned and looked at me and for a revealing moment I read in the pale blue eyes something of the agony and struggle he had shared with the animals.'
>
> **(Herriot 1976, p356)**

3.1 Introduction

In the previous chapter, considerable emphasis has been placed on the relations which exist between animals and their caretakers, as explored from the perspective of the animal studies and animal welfare disciplines. Whilst the value of these interactions from both literary perspectives has been noted, little attention has been placed on the wellbeing cultivated within these human – animal relations, despite the fact that wellbeing is a crucial feature of both human and animal experience. So important is the provision of good animal welfare that it is often seen as a crucial and ethical requirement for caretakers and wider society to provide (Fraser et al 1997). Thus, the provision of welfare within human – animal relations is something which this chapter seeks to explore, outlining the current understandings which exist within the animal welfare science and animal studies literatures in turn.

Both disciplines have had ontologically distinct contributions towards welfare understandings for both human and animal. Insights from the welfare science discipline have had an incredibly valuable role in formulating understandings of welfare within the modern day, as the literature has spent considerable time attempting to define, categorise and measure animal welfare in a number of studies. The animal studies discipline has also had an important, less appreciated, role in assisting in conceptualisations of wellbeing, creating relational understandings of welfare for both human and animal, as well as recognising the inherent suffering which can arise as a result of these interactions. Despite the disciplines diverse and at times contradictory ontological perspectives, this thesis sees the value in exploring both knowledge sources within this review, to ensure that the weaknesses of both disciplines can be counteracted

This chapter starts by discussing the strengths and weaknesses of these disciplinary understandings of wellbeing, before attention turns to an interdisciplinary solution through an amended form of the Five Freedoms framework. The framework's present and historical usage in explorations of welfare is outlined before it is reconceptualised to incorporate both human and animal wellbeing into the frame of enquiry. This modified framework provides a new approach to exploring human and animal relations within the laboratory setting, which will be drawn on in the subsequent empirical chapters.

3.2 Animal Welfare Science

The animal welfare science discipline is a crucial starting point for exploring understandings of wellbeing within the current literature. As suggested in its title, the purpose of the discipline is to explore the ways in which an animal's welfare can be impacted by a number of factors, which include their experiences within production settings, the spaces within which the animals are kept and the individuals who care for them. Within the welfare science discipline, there have been numerous disagreements about what the term 'animal welfare' actually means, as there is no unified or universal welfare definition. Mellor (2016 a, p14) has recognised that in the last 30 years, 'since animal welfare emerged as a legitimate area of scientific study, no universally endorsed definition has emerged' within the literature. This lack of clarity is unsurprising, as the term animal welfare encompasses a diverse range of species, states, experiences, and moments which would be difficult to summarise into one discrete term.

3.2.1 Defining Welfare

In order to create some clarity in understandings of animal welfare, three orientations of welfare have been suggested by Mellor (2016 a, p14) which include 'biological function, affective state and natural living'. Biological functioning as a means to understand animal welfare, is when scientists seek to 'define animal welfare as if it were a purely empirical concept' (Fraser et al 1997, p189), relying on physiological measurements in order to prove that animals are either experiencing good or bad welfare. Welfare has also been conceptualised as an affective or behavioural state wherein the expression of certain behaviours such as feather pecking (Dixon 2008) or the lack of certain behaviours, such as dustbathing (Shields et al 2004) can be indicative of a particular positive or negative

welfare experience. Finally, welfare can be understood from a natural perspective, where the animal's welfare is correlated with their opportunities to engage in natural living (Lund & Olsson 2006) or what is deemed to be normal behaviour for that species. Despite these discrete categorisations, the discipline often champions an understanding of welfare wherein behavioural, physiological and natural living indicators are used cohesively to represent animal welfare. Although they are discrete approaches, what can be seen to unite these understandings from an animal welfare science perspective is the notion that wellbeing is a measurable and quantifiable entity, something which can be independently measured and categorised via a range of methodological approaches.

3.2.2 Frameworks of Wellbeing

The welfare science discipline also relies on several frameworks, which enable the animal's wellbeing to be evaluated. These frameworks provide a simple and clear means of conceptualising animal welfare and are an important method of understanding within the welfare science discipline. Natural, biological and affective measurements of welfare can all be used within these frameworks, and they provide an effective means of ordering welfare knowledges. Multiple frameworks already exist within the discipline including the Five Freedoms framework, the five domains model (Mellor & Reid 1994), the 'Quality of life' model (Green & Mellor 2011) and the notion of a 'life worth living' (Mellor 2016 a), as developed by the Farm Animal Welfare Council (2009).

The five freedoms are outlined in a 2009 FAWC report on Animal Welfare in Great Britain: Past. Present and Future.

- Freedom from hunger and thirst, by ready access to water and a diet to maintain health and vigour.
- Freedom from discomfort, by providing an appropriate environment.
- Freedom from pain, injury and disease, by prevention or rapid diagnosis and treatment.
- Freedom to express normal behaviour, by providing sufficient space, proper facilities and appropriate company of the animal's own kind.
- Freedom from fear and distress, by ensuring conditions and treatment, which avoid mental suffering

This framework is a valuable means of conceptualising animal welfare, grouping welfare measurements into key categories such as ‘distress’ and ‘discomfort’ in order to evaluate the animal’s wellbeing within production settings. The framework is a popular and ‘memorable’ (Webster 2016, p2) framework, which creates a structured approach to understandings of animal welfare within domestic and production settings. The animal’s experience can be evaluated against key criteria, enabling their overall welfare to be assessed. Since the development of the initial five freedoms, this has been extended further to create the Five Domains. The Five domains model seeks to provide a ‘more thorough, systematic and comprehensive means to assess negative welfare impacts’ (Mellor 2016) as developed by Mellor & Reid (1994), by focusing ‘attention on specific factors or conditions that may impact on an animal’s welfare’ (Kells 2021). This model has proven its applicability to numerous different species, ranging from working farm dogs (Littlewood & Mellor 2016) through to pest species (Beausoleil & Mellor 2014).

The concept of Quality of Life seeks to ‘emphasise(d) the importance of positive experiences’ (Green & Mellor 2011, p263) for animals, recognising that whilst positive and negative will be experienced, the positive should prevail in order to ensure that animals experience good welfare. It has also been recognised to enable a ‘more comprehensive, multifactorial understanding´ within production spaces (Green & Mellor 2011, p263). This emphasis on cultivating positive experiences for the animal has become popular within the literature. More recently the ‘Vienna framework’ (Rault et al 2020) has been added to the list of frameworks which provides a means to structure positive welfare research. Whilst these frameworks champion different approaches to exploring and ordering animal welfare science, they are united in a number of key themes. They provide a logical, aspirational, individualised and clear means for evaluating animal welfare. There is a clear understanding of what welfare means in each of these distinct frameworks, whether it be ‘freedom from’ an experience or a life which is ‘worth living’. Furthermore, in each of these frameworks the animal welfare science discipline provides a clear statement about what animal welfare means and how it can be recognised, what Yeates (2011, p397) describes as ‘intuitively understandable’ concepts, something which this thesis sees incredible value in. Frameworks can also champion an individualised approach to animal understanding as they encourage the exploration of a specific

individuals ‘quality of life’ or ‘life worth living’, as well as being representative of a wider concern for a species experience within a particular production space.

Despite the power of welfare frameworks in ordering understandings of animal wellbeing, there are some limitations in their usage. Notably, they have been critiqued for encouraging a human centric understanding of animal welfare, rather than facilitating the animal’s perspective. This has been specifically discussed in relation to the notion of a ‘life worth living’, as explored by Mellor (2016 a, p5), where he describes having ‘doubts about the concept of “a life worth living” because it is a value judgement made by us (humans), rather than the animal in question’. The difficulties of interpreting animal welfare using a framework approach have also been flagged by Beausoleil & Mellor (2013, p37) in their analysis of the Five Domains model, ultimately concluding that ‘caution must be used in interpreting and applying the outputs of the model’. Whilst Green & Mellor (2011, p263) emphasise that ‘their value in the practical management of animals is limited’. Despite animal wellbeing taking centre stage in both of these frameworks, it is questionable how much influence animals really have in shaping understandings of welfare in this discipline. Further critiques will be levelled at frameworks later in this chapter, but for now it is important to simply note the limitations of current categorisations of welfare.

3.2.3 Caretaker Wellbeing

Consideration has also been extended to exploring caretaker wellbeing in animal production spaces. This is in response to the increasing recognition that caretaker behaviour and ultimately their wellbeing can impact upon animal welfare. In recent years there has been a rise in the number of papers which explore the links between human wellbeing and animal welfare, via the lens of mental health. These papers are beginning to recognise the difficulties of a stockperson’s role, a job which involves economic hardship, extreme physical labour, as well as exposure to animal euthanasia, as outlined by Campler et al (2018). A focus on caretaker welfare has become apparent, particularly in papers which have directly brought farmers mental health into the frame of analysis. Hansen & Osteras (2019) have found statistical linkages between a farmer’s wellbeing and the provision of good animal welfare, with similar findings shown by the paper of King et al (2020), where associations between farmer wellbeing and cow lameness have been recognised. Some papers have even sought to document experiences of poor animal

welfare (i.e., animal neglect on farm) and the ways in which this can have a basis in poor human wellbeing, as explored by Kelly et al (2011), Andrade & Annebergand (2014) and Devitt et al (2013). Therefore, there is a clear linkage between caretaker wellbeing and animal welfare, as is recognised in the welfare science discipline.

In all of these papers there is a clear recognition of the challenging mental health conditions experienced by farmers and the impact this can have on providing appropriate animal care. Devitt & Hanlon (2018) describe the ways in which poor mental health can impact the human – animal bond and it has also been assigned significance in the medical discipline by Sanne et al (2004) and Nuvey et al (2020), with traumatic events such as the Foot and Mouth outbreak gaining particular attention (Peck 2005). These studies emphasise the importance of caring for and about the animal caretaker, rather than simply seeing them as another barrier to the facilitation of animal welfare. Moving from the agricultural setting, LaFollette et al (2020, p1) have explored the wellbeing of laboratory animal professionals, linking 'professional quality of life' with experiences of animal pain, enrichment provision and euthanasia methods. Unsurprisingly, the study found that a poor quality of life for caretakers, as typified by long working hours and a lack of control over euthanasia preferences, frequently led to worse experiences for the animals themselves. One can begin to recognise the ways in which the welfare science discipline is starting to cultivate and recognise the benefits of a relational approach to wellbeing within these studies.

Despite the benefits of the welfare science approach, which include the use of clear and logical frameworks in order to evaluate animal welfare and the considerable focus on animal wellbeing, there are some weaknesses in current understandings of welfare within animal welfare science. Whilst attempts at relational understandings of wellbeing do exist within the literature, they are often few and far between and the main focus of these studies is often to highlight the impacts of these relations on animal welfare, rather than cultivating any concern for the animal caretaker. The human – animal relation is still viewed as more of a one-way interaction, stemming from the caretaker and impacting on the animal, rather than a constant relation which moves and shifts depending on the nature of the interaction, as championed by the animal studies literature. Critiques can also be levelled at the objective and logical approach to understandings of welfare, which

contrast with the relational and embodied experiences explored by the animal studies literature.

Furthermore, despite the benefits that welfare science frameworks bring to ordering understandings of the animal, they have yet to be extended to exploring the experiences of caretakers within the same setting. No caretaker has yet to be included in an animal welfare framework despite the value of exploring what constitutes a 'life worth living' for an animal caretaker or recognising how a 'good quality of working life' could be created. Whilst a recent iteration of the Five Domains model (Mellor et al 2020, p1) sought to 'evaluate the negative and/or positive impacts of human behaviour on animal welfare', the humans own experiences within these interactions was again, notably lacking. Mellor et al's (2020) branding of human – animal relations as objectively positive or negative feels rather simplistic, when viewed alongside the contradictory performance of care which has been explored by Greenhough & Roe (2021) in the laboratory setting. It is therefore clear that the use of a purely animal welfare science approach to exploring human and animal wellbeing would be a mistake, and attention now turns to the animal studies discipline and its attempts at exploring animal and caretaker wellbeing within the literature.

3.3 A Multidisciplinary Need

This literature review has emphasised the need to cultivate an multidisciplinary approach to exploring wellbeing by recognising the strengths and weaknesses of the animal studies and animal welfare literature. As has been noted, the animal welfare science discipline brings an objective and focused approach to understandings of the animal, as well as creating valuable frameworks which provide a useful means to conceptualise wellbeing. However, it's positivist understanding of the animal and its limited explorations of animal caretaker wellbeing are not deemed to go far enough, when viewed from an animal studies perspective. In contrast, the animal studies discipline cultivates a relational approach to the animal which views both human and animal in constant interaction with one another, as well as drawing on theoretical perspectives such as feminism to reimagine these relations. However, this relational approach can be critiqued from an animal welfare science perspective, as it is deemed to obscure the animals experience and prevent practical improvements to welfare from being suggested. There is therefore

value in drawing on both disciplines concurrently in order to create knowledges which mitigate the weaknesses of both literatures.

New approaches to exchanging knowledge between disciplines are starting to be recognised and defined within the literature, particularly in the health research sphere, although they have application in a welfare science and animal studies setting. Multidisciplinary 'draws on knowledges from different disciplines' but does not seek to transgress or break down the boundaries which exist between different literatures (Choi & Pak 2006, p251). Interdisciplinarity 'analyses, synthesises and harmonizes links between disciplines' with the ultimate aim of creating 'A coherent whole' of understanding (ibid 2006). Transdisciplinarity actively 'transcends… traditional boundaries' (ibid 2006) and develops new knowledges by encouraging 'mutual learning between science and society' by integrating knowledge from non-academic stakeholders (Seidl et al 2013, p5). Whilst this thesis attempts to create a multidisciplinary approach, it recognises the considerable value in all three cross disciplinary approaches.

Despite the value in drawing on different disciplines, any attempt at crossing the disciplinary boundaries of animal welfare and animal studies is not without it'schallenges. The animal welfare science and animal studies disciplines come from conflicting ontological viewpoints, which means that appetite for the exchange of knowledge between these literatures is often low. Davies et al (2016, p9) summarise the welfare science attitude towards animal studies, when they describe how cross-disciplinary engagement is frequently seen as an attempt to 'undermine the value of scientific knowledge' and are deemed more as a threat by the welfare sciences, rather than an opportunity to foster more developed understandings.

Discrepancies between these two disciplines, also relate to the usage of the scientific method. Animal studies researcher, Merskin (2011) argues that the welfare science disciplines reliance on the scientific method creates unimaginative and badly designed studies. Merskin (2011, p158) also emphasises how animals are forced to 'think like humans' within these experiments, as they are designed and run from a human perspective, creating difficulties for true animal participation. This has also been argued by Despret (2016) in her aptly named book 'What would animals say if we asked the right questions?', which highlights the weaknesses of the welfare science discipline in creating meaningful and non-human centric understandings of the animal. Welfare science is not

seen to allow animals to participate in knowledge creation, which sits in stark contrast to the animal studies, wherein the animal is encouraged to "become with" a curious scientist' (Haraway 2007, p34). It is therefore clear that attempts at cross-disciplinary engagement can be incredibly challenging, as the disciplines are operating from completely different ontological and methodological approaches.

Cross disciplinary communication also suffers, with Davies et al (2016, p2) noting how 'communication across these disciplinary perspectives is currently limited', most likely due to the 'specialised languages' (p8) of each discipline. Fusing objective, scientific language from the animal welfare discipline with more conceptual and theoretical insights from the social sciences is challenging. In recognition of this, Buller (2008, p397) emphasises the need for disciplinary knowledges to be 'appropriately translated' in order to have wider traction within other literatures. Overcoming these communication challenges is important, as it is to 'the social sciences [….] to animal geographies and their multiple, troubling, conflicting and discordant human-animal relations', that Buller (2014, p315) believes we must increasingly turn. Despite the value that could be gained from such an approach, it currently remains a hope rather than a reality. These interdisciplinary difficulties of polarised ontologies and specialised languages, emphasise the need for a new approach in order to cultivate true improved interdisciplinarity.

3.3.1 The Five Freedoms: An interdisciplinary thought experiment

A solution to this interdisciplinary challenge is therefore urgently needed. Attention now turns back to the animal welfare frameworks which were first encountered at the start of the chapter, particularly the Five Freedoms framework which has had important legislative contributions (Brambell 1965). In order to address the current shortcomings in animal welfare and animal studies interaction, this thesis sees the value in amending the Five Freedoms framework, in order to cultivate interdisciplinary understandings of the animal research world. Such an approach provides the perfect opportunity to develop the scope of the Five Freedoms, allowing it to be used in novel spaces and to be interpreted in new ways. This section starts by charting the development of the framework back in 1965, following its progression and usage within the modern day.

3.3.1.1 Framework Development

The historical development of the Five Freedoms has been well charted over the last 60 years and much has been written in the literature on this topic (Kirchhelle 2021, Buller & Roe 2018, Webster 2005, 2016). To understand the framework's role within society, attention must turn to Ruth Harrison and her seminal work 'Animal Machines' (1964) as it is widely regarded as the tipping point which instigated a cultural change in animal welfare enquiry as supported by Webster (1995), Buller & Roe (2018) and Kirchhelle (2021). Animal Machines was a book, published in 1965 which set out to explore the agricultural conditions of British farm animals in the 1960s. It detailed the lived experience of a broad number of species (chickens, cows, pigs) and alerted its readership of a severe need for animal welfare improvements within the industry.

Harrison's work was introduced to the British public at a fertile and 'timely' (Sayer 2013) moment of animal welfare concern, as the increasing popularity of a British identity as a 'nation of animal lovers' (Kirchhelle 2020, p66) sat in increasingly strained conflict with post-war 'consumer hunger for meat' (p68). Harrison recognised the clear 'gap between public understanding of what a farm was' and the reality of factory farming in the 1960s (Sayer 2013, p474) and in order to rectify this, Harrison provided vivid descriptions of animal conditions, alongside a pictorial summary of factory farming, collating images which emphasised the poor conditions of British animals. These images would go on to have widespread impact in the Observer articles she wrote before Animal Machines was published in March 1964 (Kirchhelle 2021, p90). Intensive animal production was already an increasing area of concern for the British public before Harrison published her work in 1964, however Harrison was able to do something that previous protests had yet to achieve, which was to galvanise public and governmental action, indeed she is credited with 'set[ting] in motion a series of political, institutional and scientific responses' (Buller & Roe 2018, p29), cultivating a new societal concern for animal welfare.

The public responses to the 'easy-to-read, compelling moral narrative' crafted by Harrison were instantaneous (Kirchhelle 2021, p79). Sayer (2013, p486) in her analysis of the impact of animal machines describes the widespread media response to the publication, as well as highlighting the rapid activism that Harrison inspired, which included petitions and a mass rally. Public outcry, alongside the damming evidence in Harrison's book,

directly triggered a governmental enquiry into British agricultural practices, which was led by the Brambell committee. This committee set out to review and reform agriculture practices, as a direct result of Harrisons enquiries into animal welfare. A year after its formation, the committee published the 'Report of the Technical Committee to Enquire into the Welfare of Animals kept under Intensive Livestock Husbandry Systems' (Brambell, 1965). Within this, the Five Freedoms 'are found in their embryonic form' (McCulloch 2012, p2), sparked by the belief that all farm animals should be given the freedom to 'stand up, lie down, turn round, groom themselves and stretch their limbs' (Brambell 1965, p13). Rather than valuing the animal for its productivity, there was a sudden societal shift which saw the importance of ensuring a good life for animals within farming settings, recognising the need to provide them with ample space to facilitate animal welfare improvements. From these embryonic beginnings, an emphasis on comfort was then expanded into a set of 'animal welfare codes' by the Farm Animal Welfare Council in 1979 which showed concern for hunger, comfort, prevention of injury, normal behaviour and fear (FAWC 2009). After some clarifications in wording in the new Brambell report (1965), these codes became the Freedoms' framework which we know and utilise today. One can therefore see the direct linkage which exists between the book Animal Machines and the development of the Five Freedoms.

Whilst the framework was first suggested in the 1960s, it remains a 'memorable' (Webster 2016 p2) and 'highly influential' (Nicol & Davies 2012) form of reference for animal welfare scientists and animal caretakers in the modern day. Due to the development of animal welfare interest alongside the Five Freedoms, the framework has been credited as holding the key to modern day animal welfare. Consequently Nicol & Davies (2012, p1) have gone as far as to state that the early iterations of the Five Freedoms framework can be considered 'the original components of animal welfare'. Thus, this thesis believes that the Five Freedoms is an important and historical tool for conceptualising animal wellbeing, due to the clear power that this framework has had within the discipline.

The framework was also created at a pivotal time in the development of the welfare science discipline, which means that much of the disciplines output can be aligned with the five freedoms. For example, even though the need to ensure 'Freedom from pain, injury and disease' is not explicitly referenced in all animal welfare papers, considerable

emphasis has been placed on improving welfare in production settings, by reducing the *pain* experienced by animals in production settings (Weary & Robbins 2019), as well as preventing *disease* in species such as poultry (Butterworth & Weeks 2010) and pigs (Wisener et al 2021). Emphasis has also been placed on minimising *distress* for animals by encouraging positive interactions within production spaces (Zulkifi 2013), as well as reducing the stress (Etim et al 2013), experienced by these animals. It is therefore clear, that many of the freedoms have relevance to the wider animal welfare science discipline and whilst the examples provided are by no means conclusive, they emphasise the importance of this framework on the creation of animal welfare knowledges in the modern day.

The Five Freedoms have also gone on to have considerable impact in the realm of animal welfare legislation. McCulloch (2012, p4) credits the Five Freedoms as having an 'enormous impact on animal welfare' due to their efficacy in various Defra codes of practice for livestock including chickens (DEFRA 2018, p1). Equally the Farm Animal Welfare Council highlight the role of the freedoms in guiding government policy, describing them as the 'cornerstone of Government and Industry policy' (FAWC 2009, p12). As well as having a large impact on agricultural legislation, facets of the five freedoms can also be found in other pieces of legislation, such as the Welfare of Animals at Time of Killing Legislation (2015). This highlights the need for 'avoidable pain, distress or suffering' to be minimised for animals experiencing slaughter in the UK, as well as specifying that food and water should be provided for animals retained in the slaughterhouse for a considerable length of time. Whilst the Five Freedoms are not explicitly referenced within this legislations, crucial themes of the framework are notable throughout the legislative instrument.

One can also recognise the influence of the five freedoms in Section 9 of the Animal Welfare Act (2006), which requires specific animal needs to be met, including;

- need for a suitable environment.
- need for a suitable diet.
- need to be able to exhibit normal behaviour patterns.
- any need it has to be housed with, or apart from, other animals.
- its need to be protected from pain, suffering, injury and disease.

Whilst this legislation does not mirror the Five Freedoms exactly, there are similarities between the legislation and the original framework, although it is notable that there is no requirement for animals to avoid experiences of fear and distress, as specified in the Five Freedoms. This legislation applies to all domestic animals within the UK, including animals found in zoos, on farm and in the domestic space of the home, emphasising the applicability of the Five Freedoms to a variety of different human – animal relations.

Recognising the influence of the Five Freedoms within the welfare legislation, changes our perception of the human – animal relations which exist at the centre of this framework. Whilst the human – animal relationship has not been a key area of concern for the five freedoms, it's translation into legislation effectively locks the caretaker into the framework, as they are assigned legal responsibility for delivering these freedoms for their animals. Thus, the centrality of the human – animal relationship starts to become more visible in the Five Freedoms framework.

These legislative shifts have also meant that in recent years, the concept of the Five Freedoms has been directly drawn on within other areas of animal production, alongside the agricultural. The framework has been particularly popular within studies of equine welfare, as seen in the work of Bell & Rodgers (2021), Hockenhull & Whay (2014), Mills & Clarke (2007) and Campbell (2016). Campbell (2016, p540) is keen to emphasise that the framework is a 'useful tool for identifying and addressing management practices that could be improved' for horses, although the study ultimately concludes that it is 'insufficient' (p541) for analysing the welfare of equine athletes on account of its negative focus. The welfare of other species, such as dogs (Houpt et al 2007, Pereira et al 2017) and even fish (Huntingford et al 2006, Sanchez-Suarez et al 2020) has also been explored through the lens of or in reference to the Five Freedoms framework. This usage of the Five Freedoms in other animal spaces, emphasises the relevance of this framework to new spaces beyond the farm. There is therefore considerable support for the adaption of the Five Freedoms framework to the laboratory space as there is considerable species overlap between the two spaces, as well as there being value in extending the framework to new animal settings.

3.3.1.2 Critiques of the Five Freedoms

Despite the ease of understanding the framework, there have been a number of critiques levelled at the Five Freedoms. A common critique of the Five Freedoms is its inability to offer positive conceptualisations of animal welfare, as was emphasised by Campbell (2016). Historical understandings of welfare, such as the five freedoms, often attempt to minimise the negative experiences of animals within domestic animal settings, rather than seeking to facilitate positive experiences. This negative approach echoes McGlones (1993) definition of animal welfare, wherein welfare is only deemed to be a concern 'physiological systems are disturbed to the point that survival or reproduction are impaired', with little to no encouragement of positive welfare experiences within the discipline. This observation has also been emphasised by Webster (2016), McCulloch (2012), Lewejohann et al (2020) and these critiques can be credited with kickstarting the development of other welfare measures such as a 'life worth living' and 'Quality of life' in recent years. The Five Freedoms have even been reconfigured to facilitate more positive experiences for animals. For example, Greggor et al (2018) provides a reworded version of the Five Freedoms to reflect more positive welfare aims, recognising the value in counteracting this negative focus within the current framework.

The Five Freedoms also cultivate an aspirational approach to welfare, rather than a definition of welfare which can ever be fully achieved. Webster (2016, p2) states that 'It should be obvious that […] the […] Five Freedoms, are aspirations' rather than ideal states of being for the animal's, as it appears to be universally acknowledged that the Five Freedoms enable individuals to 'promote, if never achieve, this ideal welfare state' (Webster 2005, p12). This aspirational approach has been frequently criticised within the literature as it means that the welfare aims of each freedom are never fully achieved. Furthermore, the freedoms can be interpreted in a multitude of ways due to the broadness of terms such as 'fear', 'discomfort' and 'distress' which makes it challenging to create a cohesive understanding of welfare. Whilst there are difficulties in creating a cohesive understanding of the five freedoms, as a result of the terminology used within this framework, the lack of clarity in definitions can also be viewed as a strength. The freedoms enable a process of continual animal welfare improvement to be achieved, what Webster (2005, p12) encourages in his description of the freedoms as 'aspirational'. Viewed from this perspective, the Freedoms can be seen as bold targets to achieve within

animal production spaces, offering a radical understanding of animal wellbeing if they interpreted in the right way. The broad categorisations of the discipline can also provide the perfect opportunity for animal studies insights into wellbeing to be included in the framework, as there are no clearly defined criteria to understand what 'freedom from distress' really means.

Many within the welfare science discipline perceive the Five Freedoms to be outdated, as can be recognised in the constant redevelopment of this framework (Mellor 2016 b). This does force us to question the applicability of this framework in the modern day. Notions of animal welfare have advanced considerably since animal machines was published in 1965, not least in terms of scientific discovery, positive conceptualisations of welfare and new knowledge sources. However, this thesis sees the value in reclaiming this framework, indeed Greggor et al (2018) and Mellor (2016 b) both chose to rework rather than discard the five freedoms structure which shows the implicit value in maintaining links with the original. The value of the Five Freedoms has also been emphasised in a report by the Farm Animal Welfare Council (2009), where it is recognised that they still have considerable value when utilised in conjunction with other notions of welfare such as a 'good life'. The notion of a good life is outlined by FAWC in their 2009 report, where they outline a scale for assessing an animals experience, ranging from 'A life not worth living' through to 'A life worth living and a good life'. In order to be classified as living a 'good life' the animals standards of welfare are likely to be 'substantially higher than any legal minimum' (FAWC 2009, p16) and FAWC describe an existence for the animal wherein all five of the freedoms appear satisfied. There is therefore a value in continuing to explore animal wellbeing via the lens of the five freedoms, as FAWC have seen fit to do so in order to explain their classifications of animal experiences. However, FAWC do recognise the challenges of providing a life aligned to the five freedoms when animals are found within modern day production systems, as they question 'how certain systems of husbandry could ever satisfy the requirements of a good life' (ibid 2009).

FAWC (2009, p10) also emphasise the popularity of the Freedoms within the modern day, describing how the page which outlines the 'Five Freedoms' on the FAWC website is the most popular and is accessed at least '89 times daily'. Indeed Webster (2016, p5) in his evaluation of modern-day frameworks clearly states that the Five Freedoms are 'likely to have more impact on, and be of more use to, everybody else—and that includes the

animals'. There is therefore no reason why the framework is not fit for purpose in the modern day. Rather than simply dismissing the five freedoms, the framework can instead be interpreted in new ways, allowing us to reconfigure the freedoms through any lens that we choose.

Critiques of the Five Freedoms can also be levelled at the ways in which the animal, caretaker and laboratory itself are currently conceptualised by this framework. It is important to note that these limitations are not critiquing the current framework, but rather its current usage within the discipline. It is increasingly clear that the framework has a considerable amount of untapped potential and in order to counter these deficiencies, understandings of the animal from an animal studies perspective are needed within the five freedoms framework. In this next section each will be explored in turn, to highlight the limitations of this Five Freedoms within the modern day.

3.3.1.2.1 A Missing Animal

The Five Freedoms, as used within the welfare science literature still rely on objective animal welfare knowledges, which means that an animal can only be recognised to experience 'distress' or 'discomfort' when there is objective and statistically validated proof that this is occurring. Whilst the notion of 'freedom from discomfort' could provide an insightful means of exploring the animal's experience within production settings, the frameworks current reliance on welfare science considerably limits the potential of the freedoms. Additionally, the animal is rarely recognised from an individual perspective within the current Five Freedoms framework, as in order to collect a representative sample of animal experience, numerous species are assessed via the Five Freedoms framework and results are presented collectively, rather than on a case-by-case basis. This collective approach to animal welfare obscures the individual and creates homogenous understandings of the animal's experience in production settings, as explored previously in the wider context of the welfare science discipline. That said, encouragement can be taken from modern day researchers who often use the framework as a set of guidelines for structuring thinking, rather than interpreting them literally. This has been shown by Bell & Rogers (2021) in their usage of the five freedoms to guide the development of their survey on end-of-life care for horses and by Campbell (2016) in their analysis of equine sport.

3.3.1.2.2 A Missing Caretaker

In current interpretations of the Five Freedoms, the animal caretaker does not appear in any animal welfare framework. From a historical perspective this is not surprising, as one only needs to turn to the development of the Five Freedoms to understand why. In Animal Machines (1965), it is notable that Harrison places little attention on the experiences of farmers in her analysis. She does not choose to discuss the poor conditions experienced by both human and animal within 1960's agricultural spaces. Instead, Harrison chose to condemn farmers, whom she believed to be complicit in the production of animal violence, stating that 'farmers were astonishingly unaware that their methods were questionable' (Kirchhelle 2021, p80). In this quote, Harrison felt that farmers, as well as the poor legislation surrounding agricultural animals at the time, did not do enough to ensure animal wellbeing. This was emphasised in the 1964 Observer articles, where Harrison stated 'the factory farmer and the agri-industrial world behind him [sic]" only acknowledged 'cruelty […] where profitability ceases.' (Kirchhelle 2021, p90 quoting Harrison). This conceptualisation of farmers as cruel, mindless, animal torturers suited Harrison's agenda, as her book sought to expose controversial factory farming practices rather than extend any care to the agricultural industry. Harrison sought to shock the public, as highlighted through her usage of photographic imagery and the memorable front cover (Kirchhelle 2021, p81) and she therefore had little interest in cultivating an ethic of care for farmers working within these spaces. Harrisons work ultimately blamed the agricultural community for the current animal conditions, even whilst many farmers welcomed Harrison's critiques, as Sayer (2013, p489) proves through her discussion of 1960's agricultural opinion polls. Harrison's work, whilst conceptually and historically powerful in its cultivation of concern for agricultural animals, created an incomplete understanding of human – animal relations within the agricultural space.

The original five freedoms framework could also be critiqued for its lack of emphasis on the animal caretaker, as it seeks to evaluate animal welfare. However, . in their 2009 report exploring Farm Animal Welfare, FAWC actively seek to emphasise the importance of those 'who are responsible for the supervision and care of farm animals' in ensuring the Five Freedoms are met (FAWC 2009, p2), providing a reference for the evaluation of human actions. . The Five Freedoms also include a specific statement of human action within their very definition, for example, 'Freedom from hunger and thirst' can only be

facilitated ‘by ready access to water and a diet to maintain health and vigour’, which the caretaker is required to provide. It is therefore clear that the animal caretaker has a key role in facilitating the provision of the Five Freedoms framework. The report also emphasises the importance of ‘good husbandry, considerate handling and transport, humane slaughter and above all else, skilled and conscientious stockmen’ (FAWC 2009, p3) in ensuring that the Five Freedoms can be facilitated within animal production spaces.

Other authors have also updated the Five Freedoms (Edgar et al 2013) to emphasise the importance of the caretaker , most memorably Mellor (2016 b) in his update of the ‘Five Provisions’. Mellor (2016 b, p1) is keen to emphasise how welfare provisions are not a new concept, having been incorporated into understandings of animal welfare for many years ‘without naming them as provisions’. After recognising them in the literature, Mellor (2016 b, p1) sought to create a workable ‘Five Provisions/welfare aims paradigm’ which clearly outlined what the five freedoms meant in practice for caretakers. These provisions have been widely used by a range of individuals within the literature as a replacement for the original framework, having been practically applied to a range of different species including horses (Mellor & Burns 2020) and pest species (Beausoleil & Mellor 2015). The model has also been credited with undergoing extensive updates since it was first developed in 1994 (Kells 2021), showing an ability to rejuvenate and update in a way which other frameworks have been unable to achieve. Although Webster (2016), in his analysis of the Five Domains and Five Freedoms model, is unprepared to dismiss the five freedoms entirely on this basis, describing it as ‘timeless’ in contrast to the Five Domains which he feels is subject to constant change and regeneration. As well as giving a clearer definition for each freedom, one could argue that in his reconceptualization of the five provisions, Mellor (2016 b) has recognised the need to include the caretaker in a more overt way within the framework, including not just what caretakers should aim to provide but also how it can be achieved, recognising the role of the caretaker in the provision of care.

Whilst the importance of the caretaker is clear in these updated versions of the five freedoms, there is little emphasis on the caretakers own wellbeing. Mellor’s (2016 b) framework has traditionally avoided mention of the caretakers own experiences of wellbeing in his exploration of the Five Provisions. An exception to this rule can be found in a recent paper (Mellor et al 2020) which sees the inclusion of human – animal

interactions within the Five Domains model, an addition which is deemed to 'enhance[s] the Model's utility' (p1). Whilst this inclusion is a step in the right direction, the human – animal relation exists as a one-way interaction, with caretakers facilitating positive or negative experiences for the animals, rather than their own personal experiences being taken into account in any meaningful way within the analysis. We can therefore see that there is a gap in the current usage of the five freedoms as it removes the animal caretakers experience from the frame of analysis.

3.3.1.2.3 The Missing Laboratory

The Five Freedoms has also been applied in a limited way within the laboratory world. Laboratory animal literature which mentions the Five Freedoms, tends to emphasise the limitations of the framework rather than exploring its relevance to the laboratory. There is a dismissive approach to the framework within the current literature. In a recent study by Lewejohann et al (2020, p151) the Five Freedoms was introduced as an 'early approach' to conceptualising animal welfare within the laboratory but was quickly dismissed from the discussion on account of its negative welfare focus. Similarly, Baumans (2005) mentions the Five Freedoms in her exploration of laboratory animal welfare, however the framework is deemed inadequate as it is seen to only offer a rudimentary approach to animal understanding. Baumans (2005, p505) appears to be more interested in the animal's ability 'to cope' with the laboratory environment as well as emphasising the need to 'focus on [the] specific needs of the animals' (p509), even though arguably, both of these aims could be facilitated by the five freedoms. Whilst Lee et al (2020, p2) highlights the 'guiding principles' of animal welfare that the freedoms provide, when discussing laboratory welfare. This reference to the framework like much of the laboratory animal literature is brief and in passing, highlighting a gap within the literature for discussion and usage of the Five Freedoms for laboratory animals.

Interestingly, Mellor & Reid (1994, p3) have utilised the five freedoms as a 'system for assessing the impact of a proposed animal experiment or usage', which brings the Five Freedoms into the laboratory world in a more intentional way to previous examples. This paper uses the Five Domains to create new measurements of animal welfare during experiments including 'Thirst/hunger/ malnutrition', 'Environmental challenge', and 'Anxiety/fear/pain/ distress' (p9) to name three. In this study, Mellor & Reid (1994, p9) are using these categorisations 'not as freedoms, but in terms which emphasise welfare

compromise', drawing attention to the instances within which these needs are compromised in order to facilitate experimental aims. Thus Mellor & Reid (1994) provide a crucial steppingstone, by highlighting the value of using the Five Freedoms to explore animal experiences within the laboratory. It is notable that the usage of this framework has yet to gain traction within the laboratory world over the last 28 years. An observation which is likely to stem from the complexity with which Mellor & Reid (1994) have used the framework. The freedoms have been simplified into discrete parts, as well as being used in conjunction with a grading scale and a cost benefit analysis, which obscures the clarity of Five Freedoms. The Five Freedoms has yet to become a popular means of exploring animal welfare within the research facility setting.

3.3.1.3 The Three Rs

This apparent disinterest in the five freedoms framework from a laboratory animal welfare perspective, highlights the popularity of another within the laboratory, a framework known as the 3R's, which has been applied to the laboratory setting for over 60 years, a timescale remarkably similar to that of the Five Freedoms. The three R's, as developed in 1959, aim to cultivate 'replacement' 'reduction' and 'refinement' and within the laboratory space and were devised by Russel & Burch (1959). The original definitions of the 3R's are as follows:

- Replacement: *The substitution for conscious living higher animals of insentient material.*
- Reduction: *Reduction in the number of animals used to obtain information of given amount and precision.*
- Refinement: *Any decrease in the severity of inhumane procedures applied to those animals, which still have to be used*.' (Russel & Burch 1959).

Whilst the development and design of this framework has been credited to Russel & Burch (1959), others have described how they emerged as a result of 'A uniquely collaborative approach between an academic animal welfare organisation and the scientific community' (Hubrecht & Carter (2019, p2). The Universities Federation for Animal Welfare or UFAW as it is commonly known, have been credited with encouraging their development, through their 'non-confrontational and academic approach to animal welfare issues' (Hubrecht & Carter 2019, p1).

Since their inception, the three R's have gone on to become a popular and important framework for conceptualising animal welfare in the laboratory, with a crucial role in 'minimizing harms to animals' (Roe & Greenhough 2021, p3). In 2012 the principles of the 3Rs were enshrined in UK law. Alongside this legislative prominence, in a recent special issue the framework was credited with cultivating a wide range of welfare improvements, which included alterations to cage heights for rodents (Mazhary & Hawkins 2019), improvements to humane experimental technique (Hubrecht & Carter 2019) and refinements to animal euthanasia (Steiner et al 2019) to name but a few. In the modern day, definitions of the three R's have shifted slightly, as although 'sixty years have passed since their publication […] the journey has not ended' (Hubrecht & Carter 2019, p9) and the Three Rs can now be defined as:

- Refine: *Experiments must be designed to protect animal welfare and cause as little pain and suffering to animals as possible.*
- Reduce: *Experiments must be carried out on as few animals as possible.*
- Replace: *Scientists must replace the use of animals in scientific experiments wherever possible.'* (Understanding Animal Research, 2022)

As well as creating more simplistic definitions of each category, it is also notable that the order in which these 'Rs' are presented has changed. In the original publication by Russel & Birch (1959), the three Rs were stipulated in a specific order, reflecting 'the order in which they should be addressed' by those within the scientific community (Hubrecht & Carter 2019, p2). In the modern day, the three Rs now appear in all manner of formations within the literature showing a flexibility in usage which was not apparent 60 years ago.

Whilst the 'refinements' (Russel & Burch 1959) the three R's have provided to laboratory animal welfare are substantial, they can be critiqued in turn. It is arguable that only one of the total three R's is interested in improving the lived experience of animals, with 'replacement' and 'reduction' having limited impact on the lived animal body (Russel & Burch 1959). 'Refinement', in a similar way to distress and discomfort, is also a broad categorisation which gives limited structure to the provision of animal wellbeing. This lack of 'clarity' has been discussed within the literature (Tannenbaum & Bennett 2015, p120) where it is clear that welfare science researchers are often confused as to how best to provide this for animals. Furthermore, it is also challenging to see the individual animal within the framework as the 3R's are often applied on the macro scale rather than the

micro individual animal. In this sense the five freedoms, when interpreted correctly are much more emotive in cultivating concern for the individual animal and their freedoms.

These criticisms emphasise the flaws apparent in this welfare framework, which have also been recognised within the wider literature. Smith & Hawkins (2016, p1) conceded that the 'Three Rs are still lacking in many areas of laboratory animal science'. Their solution is to encourage the uptake of the Three S's, as championed by Carol Newton which include 'Good science, Good sense and Good Sensibilities.' Whilst there is inherent value in the encouragement of all three, particularly 'good sensibilities' with its 'capacity to be respond to or be affected by emotions or events' (p3) within the laboratory, the framework retains a broad-brush approach to human and animal wellbeing. Furthermore, the notion of 'good sense' carries with it an implicit risk, particularly when it is implemented in a world where the day-to-day suffering of animals is likely to be seen as neutral and sensical, despite critiques from the animal studies discipline. As a result, this thesis prefers to use the five freedoms within the laboratory, as the framework has distinct advantages to the use of the Three Rs.

3.3.1.4 A Culture of Care

Another concept of interest, in relation to the laboratory setting is the provision of 'A culture of care'. This concept has gained increasing usage within the literature over the last few years and could be found in the EU Directive on Laboratory Animal Care and Welfare (Directive 2010/63/EU, 2013), as well as being endorsed in the post-Brexit UK laboratory culture. Its importance can be recognised in the numerous papers which discuss the need for it to be established in laboratory culture, including work by Klein & Bayne (2007), Robison et al (2019) and Boden & Hawkins (2016). It aims to create a better living and working culture within the laboratory and is notable for its inclusion of both human and animal within the remit of care. A Culture of Care can be recognised in the quality of hiring practices, the effectiveness of communication and has even been linked to the implementation of the 3Rs within research facilities by the National Centre for the Replacement, Refinement and Reduction of Animals in Research (Brown 2014). The 3Rs and a Culture of Care are often recognised to sit hand in hand, as by replacing, reducing and refining the experience of animals within research facilities a more caring culture can be cultivated.

Despite increasing understandings of what a culture of care means for human and animal welfare , it would be fair to state that the research community is still exploring the practicalities of a culture of care can be achieved within animal facilities. This is notable in the number of surveys and workshops which have attempted to define what a culture of care really means (Robinson et al 2020, Robinson & Kerton 2021). Bertelsen & Ovlisen (2021, p453) emphasise how the term can 'become a meaningless phrase if no agreed local definition of the term exists', whilst Williams (2021, p1) is keen to note how the concept is 'poorly defined' within current laboratory culture which creates challenges when attempting to use it as a means to explore human – animal wellbeing. Williams (2021, p1) goes on to emphasise, that despite the multispecies care ethic that a culture of care can be seen to offer, 'closer attention to human-human […] human-animal relations' is needed in order to be successful. This shows that despite the promise that a culture of care offers, it's usage within the modern day suffers from a similar fate to the Five Freedoms framework, in that the animals experience is prioritised and the caretaker is frequently obscured.

Shifting across the disciplinary divide, a culture of care has also been explored by researchers within the animal studies discipline, with important contributions from Gorman & Davies (2020) and Greenhough & Roe (2021). Both papers view a culture of care from a fresh animal studies perspective, creating an expanded and more nuanced understanding of this notion. Notably, Gorman & Davies (2020) recognise the power and hierarchy implicit in the provision of care, whilst Greenhough & Roe (2021) explore the importance of technicians cultivating affect towards their animals, as well as highlighting the co-existence of structural violence and care within the laboratory space. Despite the power of these papers, This thesis sees value in utilising the Five Freedoms to explore laboratory animal and caretaker welfare . The exploration of a Culture of Care from an animal studies perspective, as demonstrated by Greenhough & Roe (2021) and Gorman & Davies (2020), is something which this thesis seeks to echo, using the Five Freedoms framework rather than a culture of care.

3.3.1.5 A New Framework

Whilst recognising these framework critiques, this thesis still sees value in using the five freedoms to structure understandings of wellbeing, particularly 'freedom from fear and

distress' and 'freedom from discomfort'. A proactive decision has been made to use two freedoms rather than five, as the use of 'Freedom from pain, injury and disease', 'Freedom to express normal l behaviour' and 'Freedom from hunger and thirst' have their own challenges. Despite the basic provisions of the Five Freedoms within animal production settings, many laboratories would actually struggle to ensure compliance with 'Freedom from hunger and thirst'. Such an admission may be surprising, as it has been well recognised within the welfare literature that caretakers have 'complete control over food and water availability, quality and variety' (Mellor 2016 a, p13), thus instances of non-compliance may be deemed to be low within animal research facilities. However, there are frequent instances within the laboratory where food and water provision will be manipulated in order to meet study aims, which means that 'freedom from hunger and thirst' cannot be fully enabled within the research facility. This was also recognised by Mellor & Reid (1994, p12) in their explorations of the laboratory landscape using the Five Domains where they described experiments where 'fluid and food intake' could be impacted so to cause 'weight loss of 20%'. The FAWC (2009, p2) report also emphasises how 'the provision of food should be promoted as a pleasurable experience' for individuals and yet food is often used as a means to ensure that the animal participates with the research study. In some scenarios accessing food may be an inherently distressing or painful experience for the animal involved.

'Freedom from pain, injury and disease' would also struggle to be achieved within the laboratory landscape, due to the centrality of all three states to the production of scientific knowledge within animal research. Laboratory animals are subject to painful experiences within research facilities, as recognised by the development of a scale which classifies the severity of the procedures they undergo, into "non-recovery", "mild", "moderate" or "severe" (ASPA 1986). Animals may also be subject to particular diseases or injuries in order to further understandings from a scientific perspective. Increasing emphasis is placed on the ways in which caretakers manage an animal's experience of 'pain, suffering and distress' within the laboratory landscape, as explored in a survey by Hawkins (2002), however its occurrence was deemed to be so diffuse that it would be challenging to document in any meaningful way. It was therefore not deemed appropriate to explicitly explore these two freedoms in a production system which

frequently overrides these freedoms. However, the empirical chapters do draw on both of these freedoms in passing to conceptualise understandings of animal wellbeing.

'Freedom to express normal behaviour' encourages animals to display 'positive behaviours, such as play and social grooming' (FAWC 2009, p16) with their conspecifics. Play is something which has been actively studied and recognised in animals, via the medium of animal research, for species such as Rats (Pellis & McKenna 1992) and pigs (Lidfors et al 2021). Social grooming has also been deemed an important indicator of stress in laboratory mice (Smolinsky et al 2009), whilst enrichment provision in the laboratory is seen as an important tool for promoting 'behavioural wellness' (Overall & Dyer 2005) in the research facility. It is therefore easy to see how observations of 'enjoyment and associated behaviours' are indicators that an animal is experiencing a 'good life' (FAWC 2009, p16) within the laboratory. The facilitation of these normal behaviours is reliant on caretakers providing the correct conspecifics, objects or environment. This may not be possible within the laboratory due to study aims, financial constraints of cultural boundaries. Normal behaviours can also be confounded by the sex of different species. Male mice are one such example of this, as they are often singly housed in order to minimise aggressive encounters, thus disrupting opportunities to engage in normal behaviour. However, 'both group housing and single housing as a consequence of aggression' have been 'deemed to be 'problematic and stressful for the animals' (Zidar et al 2019, p1010), complexifying our understandings of what is normal behaviour for male mice. There are therefore considerable challenges with ensuring 'freedom to express normal behaviour' within the context of the research facility.

Whilst the Five Freedoms explicitly states the importance of ensuring 'Freedom to express normal behaviour' within animal production spaces, this freedom has been interpreted in a different way in recent years. 'Freedom to express Natural Behaviour' has also been explored extensively within the discipline (Spinka 2006, Bracke & Hopster 2006) and seeks to encourage states where the animal is deemed to be 'unaffected by man' (Yeates 2018). This can be recognised in the disciplines insistence on reducing unnatural behaviours for poultry such as feather pecking (Rodenberg et al 2013) and encouraging more natural ones such as dust bathing (Widowski & Duncan 2000). P5). The encouragement of 'natural behaviour' can therefore be seen to go further than the expression of normal

behaviour as it encourages innate animal behaviour, rather than seeking to facilitate normal behaviours which can be expressed within the restrictions of the domestic setting.

When applied to the animal production context, one can begin to recognise the difficulties which surround the definition of 'naturalness' within the literature (Yeates 2018). Whilst the freedoms framework actively seeks to facilitate positive experiences and remove those which are aversive, literal interpretation of the use of the word natural could achieve the opposite effect. For example, the expression of behaviours such as aggression between male mice could be described as natural, despite the fact that they ultimately create distress, pain and injury for the animal in turn.

The term 'natural behaviour' also creates difficulties when used in conjunction with laboratory animals. Both the spaces and the animals themselves are often manipulated considerably to achieve research aims, as noted by Davies (2013 a, p268) when she describes the 'monstrous potential' of laboratory mice. In order to encourage natural behaviour, Yeates (2018, p1) recommends comparing domesticated animals to the 'closest population of unaffected animals', however many of the animals used within research do not have wild counterparts that remain untouched by human domestication efforts, meaning it is challenging to know what true naturalness would look like within this setting. Consequently, the notions of 'freedom to express normal behaviour' and 'freedom to express natural behaviour' were not explicitly explored in this thesis, although the empirical chapters do drawn on these freedoms in passing to conceptualise understandings of animal wellbeing.

Freedom from fear and distress has been defined as the provision of the 'conditions and treatment which avoid mental suffering' for the animal, as outlined in Mellor's (2016 b, p2) five provisions. The exploration of this freedom within the laboratory is appropriate as it allows us to recognise potential moments of fear and distress experienced by animals, as a result of spaces, experiences and interactions. Within the welfare science literature considerable emphasis has been placed on altering the handling techniques of technicians to ensure that animals do not experience fear and distress, as has been shown in studies into rodents (Gouveia & Hurst 2019) and dogs (Overall & Dyer 2005). However, one could take this exploration of 'fear and distress' one step further and explore laboratory animal experiences from an animal studies perspective, recognising the wider system of harm within which animals are found, as has been explored in the

work of Gillespie (2019) and Collard (2018). This thesis also sees the value in exploring 'fear and distress' from a caretaker perspective, as has already been explored in the animal studies literature. Distress can also be experienced by caretakers when they have to inflict harm upon their animals in order to create scientific knowledges, as recognised by Greenhough & Roe (2021). As such, there is considerable relevance in using this freedom to explore human – animal relations within the laboratory.

'Freedom from discomfort' seeks to ensure that animals have access to comfortable spaces and is defined as the provision of 'an appropriate environment including shelter and a comfortable resting area' (Mellor 2016, p2). Exploring this freedom within the laboratory is appropriate as it allows us to analyse the quality of the environment within which the animal can be found. Good welfare is already recognised to be directly correlated with the quality of the lived environment for animals, as shown through explorations of bedding substrate for laboratory rodents (Ago et al 2002) or by exploring the preferences of nesting material for mice (Kawakami 2007). Experiences of discomfort can also be viewed from an animal studies perspective, as the spatial features of landscapes have already been explored extensively by Philo and Wilbert (2000), as well as recognising the discomfort which may be experienced because of the societal, cultural and ethical attitudes held towards animals. Explorations of discomfort from a caretaker perspective are also valuable within the laboratory setting, enabling us to explore the discomfort that animal technicians may feel in certain spaces or interactions.

It is increasingly clear that there are real benefits in the application of two of the five freedoms to the laboratory space. Applying these freedoms creates new and exciting insights into the laboratory world and allows us to explore human – animal relations from a different perspective. Whilst the role of the caretaker in providing the five freedoms for animals has been recognised in the welfare science literature (FAWC 2009, Mellor 2016), this thesis draws on insights from the animal studies literature to focus specifically on the experiences of the caretaker, as well as attempting to apply two of the Five Freedoms to the caretaker's own existence within the research facility. . The memorability of the five freedoms and its central position within the animal welfare literature, makes it the best choice of framework for exploring animal experience within the research laboratory. It does require a number of alterations in order to make it fit for purpose in the modern day. The methodological weaknesses (McCulloch 2012, Webster 2005) inherent within

the framework highlight the need for a reconceptualised approach, something which this thesis seeks to cultivate in the subsequent empirical chapters.

3.4 Research Questions

Now that the value of the five freedoms has been recognised as a tool to structure explorations of human and animal experience within the laboratory, we can now turn to the research questions which will guide this thesis. Research questions provide a crucial ontological backbone to any study, guiding the types of knowledge which can be created, and their value has been recognised by Agee (2009, p431) when she describes the 'reflective and interrogative processes' required in order to create them. The research questions for this thesis are as follows:

1. **Is there any value in using 'freedom from discomfort' as a means to explore the provision of enrichment for caretakers and laboratory animals within the animal research facility, from an animal studies and animal welfare science perspective?**

2. **Is there any value in using 'freedom from distress' as a means to explore the performance of euthanasia for caretakers and laboratory animals within the animal research facility, from an animal studies and animal welfare science perspective?**

3. **What can be learnt when both freedoms (fear and distress, discomfort) are used to explore my own experiences as a researcher, within the laboratory space?**

4. **What can the animal welfare science discipline learn from the animal studies literature? How might it lead to a reconceptualization of the animal welfare science discipline?**

4 Thesis Methodology

> 'The quotation about not having time to stand and stare has never applied to me. I seem to have spent a good part of my life – probably too much – in just standing and staring'.
>
> **(Herriot 1979, p272)**

4.1 Introduction

Now that the literature surrounding human - animal relations has been explored in sufficient detail, focus can turn to exploring the methodological approach of this thesis. Methodological and conceptual choices are not to be taken lightly, as it has been well documented that the methodology of a research study has considerable significance in shaping the data which is produced. Buller (2015, p376) devotes an entire review paper to exploring animal studies methods, in his attempt to find a 'set of concepts and methodologies that address(es) what matters for both human and non-human animal', which emphasises their importance. A similar sense of care is shown towards methodological choices within this thesis. This chapter begins by exploring the methodological diversity which can be found within both the animal studies and animal welfare literatures, before the methodological choices of this thesis are outlined in full. Focus is then placed on the data collection and subsequent data analysis that was undertaken within three research facilities within the UK. Ultimately this thesis seeks to argue the value in my unique methodological approach, which draws on animal studies methods such as interviews and ethnographies whilst structuring the analysis in accordance with the five freedoms framework.

4.2 Animal Welfare Science

The animal welfare discipline has long been the favoured approach for creating knowledge about the animal, as emphasised by Buller (2015, p375) when he describes how 'long ago [the social sciences] gave up the animal to the natural sciences'. This means that within society, the animal is often conceptualised by welfare science methods, rather those found within other disciplines. Seijan et al (2011, p302) recognise the ever-evolving state of the discipline when they assert that the 'need for reliable

methods to assess […] animal welfare is growing'. Despite this popularity, it is important that the methodological approach of the discipline is analysed, before these methods are used in my own thesis. Whilst Buller (2014, p4) describes the welfare science discipline as having 'A curious epistemology and multiple methodologies', I argue that there are number of unifying features within animal welfare science methods which create a methodology which can be critiqued. In this section, the methodology and methods used within the animal welfare science discipline are outlined in full, before a number of limitations in their usage are highlighted. These critiques ultimately provide the justification as to why welfare science methodologies are not drawn on within this thesis, as my interests as a researcher were not suited to these approaches.

4.2.1 Methodology

Methodologies are defined as 'assumptions, postulates, rules, and methods—the blueprint or roadmap—that researchers employ to render their work open to analysis, critique, replication' (Given 2008, p517). It is therefore important to outline the specific set of rules which govern the welfare science methods, before these are applied to this thesis. One governing rule of the animal welfare science discipline is the theory of positivism, which the discipline adheres strongly to. Animal welfare science methods have been sculpted by notions of positivism, wherein knowledge is only deemed valid when it has been scientifically verified. Seijan et al (2011, p303) emphasise the value of a 'science-based assessment' in animal welfare methodologies throughout their paper, recognising its role in creating a 'more universal approach' (p302) to explorations of animal wellbeing. Such a linkage between animal welfare science and positivism is unsurprising as positivism has 'long been identified as the epistemology of quantitative research' (Yang et al 2008, p64). Positivism was also the 'dominant methodological orientation of the nineteenth century' (Swingewood 1984, p129), a trend which for many disciplines has remained in the modern day.

The welfare science methodology is also characterised by its strong ties with and usage of the scientific method. Science has been recognised to hold 'A prominent role […] underpinning decisions on animal use' (Hemsworth et al 2015, p29) within the discipline, which makes the uptake of traditional scientific methods within animal welfare unsurprising. The discipline asserts that one can "measure" animal welfare as if it were a

purely empirical concept' (Fraser 1999,p1) and it is likely that this association between the discipline and the scientific method stems from a need to prove itself as scientifically sound, as 'animal behaviour has perhaps been unfairly thought of as a "soft" science' over the years (Marchant-Forde 2015, p5). Millman (2009) is keen to emphasise three methodological features which show the implementation of the scientific method within the animal welfare discipline. These include the formation of research 'questions… open to deductive reasoning', the 'formation of [the] hypothesis… [and] collection and analysis of empirical data' (Millman 2009, p88). This thesis would argue, like Millman (2009), that all three criteria emphasise the connection between the animal welfare discipline and the traditional scientific method.

4.2.2 Methods

For ease of summarising welfare science methods, it makes sense to split them into two categorisations which include both quantitative and qualitative methods. Quantitative methods involve the collection of numerical data about the animal and rely on the measurement of certain indicators, which are deemed to provide accurate and scientifically verified knowledge about an animal's experience within production spaces. These indicators have been used extensively in the context of animal research facilities. They can either measure what an animal does behaviourally: by recording preferences, as explored by Ago et al (2002) in their explorations of different bedding material for laboratory mice, or they can explore the performance of indicator behaviours, such as a reduction in feeding behaviour when animals are stressed (Francois et al 2022). Other indicators will analyse an animal's physiological make up, which involves taking measurements of certain molecules or physiological states such as cortisol, glucose or blood pressure, which are deemed to indicate specific behavioural states. These physiological indicators are extensively drawn on in Balcombe et al's (2004) review of the parameters associated with handling, blood collection and gavage in the laboratory. Despite the different indicators which can be measured, all of these indicators ultimately rely on their ability to be scientifically verified, which can then be used as a means to prove or disprove a studies original hypothesis.

In recent years qualitative methods have also become popular in animal welfare literature, as has been recognised within the previous chapters. Qualitative methods

involve the collection of descriptive data about the animal in order to understand the truth about the animal's experience within production settings. In some instances, caretakers are also included within the analysis in order to recognise their impact on the animal. Unlike quantitative data collection, space is afforded for less measurable forms of data, such as attitudes, opinions, thoughts and beliefs qualitative methods include the use of interviews to explore farmer attitudes on lame dairy cows (Horseman et al 2014), questionnaires to investigate horse owner's experiences of restricted grazing (Cameron et al 2021) and focus groups (Croyle et al 2019) to explore farmer receptivity to welfare advice. Unsurprisingly this data is harder to analyse quantitatively which opens itself up to a more interpretive approach to data analysis, although facets of positivism are still recognisable in this method.

Despite the popularity of these methods, it is important to note the hierarchies of knowledge which exist within the welfare science discipline. In the quantitative studies of animal welfare, there is an assumption that the researcher is the most knowledgeable about the best indicators of an animal's experience. This is recognisable in the ways in which indicators are simply decided upon and applied by the researcher, without any prior discussion with the animal caretaker. In two studies into laboratory rodent bedding preference (Ago et al 2002, Blom et al 1996), caretakers were not involved in any stage of the research process, even though they would have a wealth of anecdotal knowledge about the preferences of their rodents. Such an approach links directly to a positivist approach to knowledge production, wherein objective data is deemed to be the most powerful knowledge source, as they rely on methods which follow 'logic, [show] deductive reasoning and [have] transparency' (Millman 2009, p91).

A sense of hierarchy is also visible when the hypothesis for a particular study is formulated prior to the research study taking place. Millman (2009, p91) even goes so far as to suggest that a 'key component [of animal welfare] is [the] development of a testable hypothesis', emphasising how this should be created in advance, rather than 'collecting a laundry list of measurements that remain to be interpreted afterward'. Here there is a clear recognition that the researcher has an understanding of the knowledges which may or may not be found within a particular study before it has even taken place. This gives the researcher a privileged position over what knowledge is deemed to be relevant to the study. However, this ultimately means that an openness to new knowledges, whether

they be anecdotal and observational are often ignored, unless they can be scientifically verified. This assumption of superiority over the animal caretaker is not one I wish to replicate within my own thesis, as I am not an expert in laboratory animals or the provision of their care. This encouraged me to seek a more inclusive and participatory methodological approach.

This critique can also be applied to qualitative forms of data. Whilst qualitative methods allow caretakers to tell their own narrative of events within production settings, Qu and Dumay (2011, p238) highlight how some animal welfare studies can be 'characterized by an asymmetry in power' (Qu & Dumay 2011, p239) between interviewer and interviewee. In some studies, the interview agenda is conceived, formed and shaped solely by the researcher and in these studies, there is 'A danger of simplifying and idealising the interview' method, which in turn impacts the usefulness of the data produced. In contrast, this thesis sees the value in championing an openness to the knowledge encountered in the laboratory space, showing a curiosity to what arises during the data collection process.

Qualitative welfare science methods can also be recognised to retain their connection to positivism. There is often a requirement for qualitative data to be representative of the wider population which is achieved by ensuring that large sample sizes are used (Hampton et al 2019), responses are statistically analysed (Cameron et al 2021) and qualitative findings are supplemented with quantitative data (Kauppinen et al 2013). Indeed, Vojtkovska et al (2020, p4) describes questionnaires as 'comprehensive tools, containing objective records', which highlights the objective focus of these methods within the welfare science discipline. This need for objectivity means that the attitudes and opinions raised by participants are only considered valid if a significant number of others in the sample have raised the same concerns. Again, this was not a methodological approach which I sought to replicate within my own thesis, due to the limitations it creates for the data which is being produced.

There are several limitations in the current methods of the welfare science discipline. These limitations are ultimately created by the fact that an animal welfare science methodology is set up to answer very different questions about animals and their caretakers, than the questions which are posed in this research. Welfare science methods seek to scientifically and deductively validate particular indicators, in order to prove or

disprove an animal's experience of welfare. Whilst these methods have become more relational in recent years, as a result of more qualitative methods being utilised within the discipline, these methods are still strongly influenced by positivism. If these methods were used to explore my own research aims, it is clear that these knowledges would create only a partial understanding of the human – animal relationship. In recognition of this, attention now turns to the animal studies discipline to find a more appropriate methodology for conceptualising laboratory life.

4.3 Animal Studies

The animal studies literature has been deemed to show 'empirical, methodological and conceptual diversity' (Gibbs 2020, p769) in its approach to exploring human – animal relations and despite the popularity of animal welfare science methods within society, there is increasing interest in using methodological tools from the animal studies discipline. This thesis has already explored the ways in which qualitative methods have migrated from the social sciences into the welfare science discipline, with varying levels of success, as shown in recent studies by Kauppinen et al (2013) and Bard et al (2016). In this section, the methodology and methods created within the animal studies discipline are outlined in full, enabling us to recognise the relative strengths of the animal studies discipline. As in welfare science, a number of critiques are also highlighted in association with this approach, however this section ultimately provides the justification as to why animal studies methodologies should be used within this thesis. As well as emphasising how animal studies methods align with my interests as a researcher.

4.3.1 Methodology

In a similar way to the animal welfare science discipline, it is important that the methodological approach of animal studies is outlined in full before the methods of this thesis are chosen. One of the governing rules of the discipline is the notion of interpretivism, which 'emphasizes the need to understand or interpret the beliefs, motives, and reasons of social actors in order to understand social reality' (Oxford Reference 2022). In contrast to the welfare science discipline which sees the value in collecting objective data about the animal, the animal studies discipline sees merit in understanding the relations which surround an animal, as these are deemed to shape the

reality which is experienced in animal production settings. Animal studies methodologies also champion an exploratory, inductive approach to knowledge creation. This is known as grounded theory and allows researchers to discover or construct theory from data rather than formulating it in advance (Chun Tie et al 2019). This gives researchers the flexibility to focus on the knowledges which appear to be the most important as the study is conducted, rather than 'setting out a test hypothesis' before the study has taken place (Reeves et al 2008, p512), an approach to data collection which has already been discussed in considerable detail in the context of animal welfare science. This is notable in the methodologies of the animal studies literature, wherein the research questions will be exploratory in nature, rather than prescriptive.

Interest in the experiences of the animal is also a crucial feature of the animal studies methodology, which occurs as a result of the post-humanist influence on the discipline. Post humanism encourages analysis of the 'beliefs, motives and reasons' of animals alongside their caretakers. This extension of interest to the animal form is a considerable strength of the animal studies methodology, as it has been well recognised that other 'methodologies have been the mechanism by which […] ontological and epistemological [human-animal] divisions have [...] been maintained' (Buller 2015, p375). Thus, the animal studies methodology actively seeks to move beyond this arbitrary division between human and animal towards something more inclusive. However, it is important to recognise that despite the methodological promise of the discipline, the discipline ultimately retains an 'entirely understandable emphasis on the human side of the human – animal relations' (Buller 2015, p376), as will be noted in the upcoming analysis of animal studies methods.

4.3.2 Methods

As a result of these methodological approaches to knowledge collection, a wide array of methods have been cultivated within the animal studies literature. Methodological techniques range from qualitative approaches, such as the use of interviews (Greenhough & Roe 2018, 2019. Fletcher & Pratt 2018) through to the use of ethnographies in order to capture the day-to-day interactions of caretakers with their animals, what Reeves et al (2008, p512) would describe as 'unstructured data' in their explorations of qualitative research methods. Studies also seek to analyse collected historical data (Howell & Kean

2018, Franco 2013), as used by Levina (2018), in her analysis of adverts in a Lab Animal magazine. In recent years more visual forms of data collection have become popular, as championed by Bear & Holloway (2019) in their analysis of robotic milking systems using photography and video clips. Such a diverse array of approaches provides a wealth of understanding about the human-animal relations enacted in society. These animal studies methods produce data which is open to interpretation from a range of theoretical, conceptual and cultural standpoints. In this chapter, attention is focused on two key methods which are commonly used within the animal studies discipline, which include interviews and ethnographies.

4.3.2.1 Interviews

Interviews are an important and well recognised methodological approach in the qualitative research methods toolkit. Indeed DiCicco-Bloom & Crabtree (2006, p314) highlight how interviews are some of 'the most familiar strategies for collecting qualitative data', highlighting their centrality as a methodological approach. Because of this, they have received widespread acclaim, as shown in the studies of Gill et al (2008), Thwaites (2017) and Kvale (2007), whilst Qu & Dumay (2011, p238) emphasise how interviews are 'one of the most important qualitative data collection methods'. This widespread admiration of the interview method has also been noted in studies which seek to explore human – animal relations, as shown in explorations of animal technicians (Greenhough & Roe 2018, 2019), dog walkers (Fletcher & Platt 2018) and therapy farm workers (Gorman 2019) with their animals.

Interviews have been credited with enabling participants to express themselves 'in their own ways and [at their own] pace' (Jamshed 2014, p87). By spending a devoted period of time with participants, or what DiCicco-Bloom & Crabtree (2006, p315) deems to be 'key informants', specific topics can be explored in greater detail from the perspective of one individual. This is particularly powerful for participants whose voices have yet to be heard in any meaningful way within the discipline. The practice of interviewing is recognised to be feminist when it works to recognise subjugated voices and attempts to counter those most dominant. This linkage has been well recognised within the literature, for example, O'Keeffe (2017, p2) emphasises how the interview 'no longer places the researcher in a position of authority' but instead allows both researcher and participant perspective to

be collected. There has been a considerable increase in the number of studies focused on the experiences of animal technicians, an emphasis which stems from the recognition that these groups have been previously subjugated, ignored and simultaneously victimised within society. By giving agency to these voices, a new perspective of animal knowledge is enabled within these spaces, offering insights into the 'specific skills, expertise and relationships' (p365) which exist between human – animal, as well as explicitly recognising the 'importance of studying AT's' themselves (Greenhough & Roe 2019, p369).

Interviews also enable individual participant voices to become prominent within the data, through the use of direct quotes. Within animal studies interviews, caretakers will be directly quoted throughout the paper, which gives considerable emphasis to the things they say and provides a forum for caretakers to tell their own stories. Data analysis within the animal studies discipline is also sensitive to a participant's mannerisms of speech, as has been demonstrated by Greenhough & Roe (2018). The inclusion of colloquial phrases such as '*he was just a real fatty'* in reference to a facility mouse (p376), or '*oh god, your bleeding cat'* (p377) in an anecdote about animal care, provide a real flavour of the types of participants which can be found within the research facility, as well as remaining true to the recorded interview. This sensitive approach to analysis, is one of the many means by which interviews can champion their study participants, rather than merely viewing them as a source of data collection.

Interviews also enable the cultivation of data which is co-produced by both researcher and participant. Interviews were traditionally seen as little more than 'casual everyday conversations' (Qu & Dumay 2011, p239). However, DiCicco & Bloom (2006, p314) have emphasised how interview strategies have altered in recent years to view the person as a 'participant in meaning making' rather than what they describe as a 'conduit from which interview is retrieved'. Increasingly participants are given the space and the power to shape the content of the research interview, through 'unstructured' and 'semi-structured formats', as discussed by DiCicco- Bloom & Crabtree (2006, p314). These enable both the interviewer and the participant to 'diverge, in order to pursue an idea or response' (Gill et al 2008), creating a more flexible form of knowledge production which remains open to more pertinent themes and ideas. These approaches enable interviewers to 'co-create

meaning with interviewees' (DiCicco-Bloom & Crabtree 2006, p315), cultivating more valuable knowledges about the relations under study.

Despite the methodological strengths of this method, there are a number of critiques which have been levelled at the use of interviews. Whilst interviews enable individuals to describe how certain practices are completed, it is not possible to observe the full complexities of human and animal relations using this method. Indeed Gorman (2019, p8) emphasises how 'interviewing only gives a viewpoint to certain elements', such as what the caretaker deems to be interesting or what they are prepared to share. This viewpoint is similarly skewed within animal care settings as caretakers may feel considerable pressure to say the right thing, rather than what they actually do day to day. It is all too easy to assume that participants within interviews are 'competent and moral truth tellers' (Qu & Dumay 2011, p238), when in reality there are all manner of reasons as to why the ultimate truth may be obscured. Gorman (2019, p8) emphasises how there is no value in 'jettisoning the interview' as a method as a result of this critique, instead a 'reimagining' is required, in order to enable the cultivation of a more embodied and ultimately more truthful interview method. Many researchers overcome this limitation by using both interviews and ethnographies within their methodological approach, a dual methodology which is well-suited to address the proposed research questions.

Interviews can also be challenging due to the complications that words can create for both researchers and participants. Misunderstandings are common, recognised by Qu & Dumay (2011, p239) who state that 'even when the interviewer and the interviewee seem to be speaking the same language, their words may have completely different cultural meanings'. This is likely to be the case within the animal research facility where conceptualisations of care are known to hold a myriad of meanings, as studied by Greenhough & Roe (2018). Furthermore, when asking interviewees to explain how they provide care for the animal day to day, many staff members may struggle to find the right words to explain these experiences, as they have yet to really think or talk about them. Often interviewers are interested in the daily, mundane and unanalysed processes which take place between human and animal, which can make it difficult for staff members to talk about. Greenhough & Roe (2019, p370) recognise this, when they state how the provision of care, is 'hard to capture in an interview conversation'. This limitation once

again highlights the benefits of using both ethnographic and interview methods in order to rebalance these methodological weaknesses.

Another limitation of interviews revolves around capturing the animal's perspective, which is often difficult to do. Whilst participants will often talk about animals within their interviews, there is limited agency assigned to the animals through this methodological approach. Fletcher and Platt (2018, p218) make an attempt to counter this limitation in their interviews with dog walkers. By choosing dog friendly spaces as the setting for their interviews, participants frequently brought their dogs along with them which worked as a 'catalyst for storytelling' (Fletcher & Platt 2018, p218) as well as facilitating the relations between interviewer and interviewee. However, the dogs remained noticeably silent and static throughout these interactions, even whilst the study sought to comprehend the movements of dog walking. A silent animal is common in the majority of human – animal studies which have used interview methodologies. Whilst the animal is frequently referred to by the caretakers themselves, it is often unable to move beyond this representation. Once again, ethnographies can be used to fill this methodological gap, due to their capacity to account for the animal.

Interviews are also reliant on the quality of the relationship which can be formulated between interviewer and interviewee, something which can be difficult to achieve in the short time frame of the interview. As Thwaites (2017, p1) emphasises, 'rapport is […] key to any interview situation' and therefore considerable attention is placed on achieving this within the constraints of the interview. DiCicco- Bloom & Crabtree (2006, p316) also recognise this need, stating how it is important to establish a 'safe and comfortable environment' within which personal experiences can be explored. However, this can be challenging when working within spaces that the researcher is unfamiliar with such as animal production settings or public spaces. Attempts to cultivate good relationships with participants can also lead to interactions which ultimately feel false for the researcher. Thwaites (2017, p1) describes how maximising rapport relies on 'minimising strongly held viewpoints, working hard on one's emotions… or suggesting an attitude of trust and mutual understanding that may feel disingenuous'. Such necessity sits in direct contrast with the 'open and honest' (p1) approach which researchers should simultaneously seek to cultivate with their participants. This is certainly the case for studies which explore controversial practices such as animal research, as the practices researchers witness may

sit in direct contrast with their own personal ethics. This conflict is something which would need to be actively managed by the individual researcher on a study-by-study basis. Despite the critiques levelled at the animal studies interview, it is still felt that there are sufficient strengths in this method, as well as an ability to mediate the outlined weaknesses, through the use of a supplementary methodologies such as ethnography.

4.3.2.2 Ethnographies

Attention now turns to the ethnographic method, which is unique to the social sciences discipline and involves the study of 'social interactions, behaviours and perceptions that occur within groups, teams, organisations and communities' (Reeves et al 2008, p542). Ethnography is an important methodological tool, wherein individuals are watched and observed by researchers in their day-to-day interactions as a way of giving meaning to these processes and 'generate[ing] rich understanding[s] of the social action that occurs' (Ibid p541). Ethnography is also a popular method for exploring interrelations within qualitative research. Davies & Dwyer (2007, p257) describe how ethnography, along with a 'suite of methods, remains the backbone of qualitative research' within the discipline of human geography. This method has also had considerable importance in the animal studies literature, with prominent ethnographic studies in the animal research setting including Freise & Latimer (2019), Friese (2019), Greenhough & Roe (2011, 2017, 2018), Davies (2013), Birke et al, (2007), Holmberg, (2011) and Svendsen and Koch (2013).

The importance of movement, action and interaction is a crucial feature of this methodological approach. Davies and Dwyer (2007, p258) comment on how ethnographers must make a 'commitment to understanding all research as performative' when they use this methodological approach, rather than viewing knowledge as something which can simply be collected. The ethnographic process acknowledges that not all information can be gathered via verbal communication, as individuals may not be 'consistent in what they say across all contexts' (Crang & Cook, 2007, p45). Ethnography negates this weakness, as by spending time in the spaces of interaction, in order to ensure that inconsistencies in thought and action become more noticeable. Collecting ethnographic knowledge is 'A different kind of knowing evidenced thorough embodiment or emotionality' (Davies & Dwyer 2007, p258).

The ethnographic method also recognises the importance of what Giraud and Hollin (2016, p172) describe as 'experimental context', recognising that encounters between human and animal are 'contingent on an assemblage of environmental, contextual and historical factors' (p174). Knowledges are 'situated and constructed' (Gobo & Molle 2016, p3) in particular settings and therefore require the complete immersion of the researcher within these landscapes in order to capture these subtleties. Ethnographers achieve this by 'frequent[ing] places of human-animal relations' (Buller 2015, p377). This has led to researchers visiting auction yards (Gillespie 2013), research laboratories (Greenhough & Roe 2018, 2019). Ethnographic methods have been credited for their role in cultivating more lively and informed knowledges about their research participants, whether they be human or animals. The ethnographic method does not seek to 'generate clarity, precision and reduce uncertainty and ambiguity in the world (Davies & Dwyer 2007, p258), rather it seeks to complexify human – animal relations, an approach which sits in stark contrast to the methods of the animal welfare science discipline.

Ethnography also focuses on the experiences of both human and animal within society. Ethnography enables the exploration of the experiences of subjugated groups, such as animal caretakers, as has been shown in studies by Freise (2019) and Greenhough & Roe (2011) within the laboratory space, and more recently by Chen et al (2021) who explored dairy cattle farming in China. These studies pay attention to the actions of these caretakers and their often-ignored roles within society. Such an approach is unsurprising in a discipline which has a strong feminist positionality for critique. Ethnography is a method which 'feminist scholars have identified […] as ideally suited to feminist research' (Stacey 1988, p21). From an animal perspective, there has been an increasing recognition of the need to move away from 'collective and abstract categorisations of the non-human' as has been emphasised in the literature (Buller 2015, p376), towards more individual and accurate depictions of the animal. Ethnography is able to facilitate this as the individual animal can be observed, heard and even touched, cultivating new knowledges about the experiences of these individuals, rather than relying on the observations and narratives of their caretakers.

Despite the benefits of using ethnographies as a methodological tool within the animal studies discipline, there are associated weaknesses with this approach. Indeed, the use of ethnography comes with an assortment of criticisms, which take issue with the

assumptions and practicalities of completing this method. This has led to the increasing recognition that ethnographic research 'can be problematic' (Reeves et al 2008, p514). In this next section, ethnographic weaknesses are discussed, allowing us to explore the realities of completing this 'difficult task' within the discipline, as well as emphasising the value in 'triangulat[ing] interview and observation methods' (Reeves et al 2008, p514) when exploring relations from a qualitative perspective.

The ethnographic literature prides itself on its ability to move beyond 'problematically anthropomorphised accounts of human and animal relations' (Buller 2015, p377), yet the animal is often still explored from a human perspective. This has been critiqued extensively within the literature, with animal studies seen to focus mainly on 'human relations' (Buller 2015, p375), whilst animals appear either as 'objects or representations within and defined by human social practice'. Animals have often held a liminal role within traditional ethnographic description, taking the form of a collective or passing reference. For example, Freise (2019, p287) in her ethnographies of 'caring for and about mice', does not describe the individual animals she encounters. She describes the trappings of care; the cage, the warmth of the mice and the cage labels but at no point does the ethnographic description centre on the individuality of the animals themselves. All of the ethnographic attention is focused on the caretakers, even whilst the study attempts to argue for a sense of 'shared vulnerability' (Freise 2019, p293) between human and animal. This methodological loss of the animal is unsurprising, for example, Davies (2013 b, p132) describes how the research animal is often 'enmeshed in the scientific apparatus of diagnostic tests and therapeutic drugs' within the laboratory. Whilst in his ethnographic encounters with production salmon, Law's (2012, p8) describes them as 'slippery' and fluid forms creating a 'non-coherent assemblage'. In short, animals can be hard to see within these spaces of encounter, despite considerable effort from the researchers.

To counter this limitation, there has been increasing emphasis within the animal geographies literature to push methodological boundaries, recognising the need for methods 'that do not rely upon wholly human representative accounts' (Buller 2015, p376). A call which the discipline has risen to over the last few years in its introduction of new methodological approaches such as Multispecies Ethnography, as shown in the literature of Law (2012), Despret (2016), Hodgetts & Hester (2016) and Roe &

Greenhough (2014). Researchers have begun to cultivate methodologies wherein 'creatures previously appearing on the margins […] have been pressed into the foreground' (Kirksey & Helmreich 2010). This move recognises the potential of 'affect' in cultivating a 'fertile ground of trans-species communication' (Giraud & Hollin 2017, p174), through the format of multispecies ethnographies. Whilst some studies offer a more radical form of knowledge co-production as shown by the collaboration with Hodgetts & dog Hester (2016), others simply seek to ground the animal more centrally within the ethnography, a methodological tweak which could easily be incorporated into new literatures.

It has been well documented that in order to create a 'thick description' (Geertz 1973: p5) of the research space, it is important to assign a considerable length of time to data collection. Researchers are expected to grasp the day-to-day texture of the laboratory by assigning emphasis to the 'characters, roles, patterns, regularities and rhythms' (Crang & Cook 2007, p55) which they are witnessing. Capturing these subtleties in order to build an effective multispecies ethnography often takes a considerable length of time, which researchers may not always have available to them. Reeves (2018, p514) highlights the temporal challenges which researchers face in collecting ethnographic data of a specific depth and quality.

Furthermore, the need to forge a partnership and understanding of an animal, as required within multispecies ethnography, can further complicate the data collection process. Whilst some ethnographies are based on a strong relationship between two key individuals, as in the instance of Haraway and her dog Cayenne Pepper (2003) and Hodgetts & dog Hester (2016) exploration of human – dog relations, this is often not possible within the farm animal production space. The rapid movement of animals through farm animal production spaces means it is often difficult to be attentive and gain a truly detailed insight into animal experience. Gillespie (2017, p166) describes how the ethnographic experiences which take place within human and animal spaces will always be 'contingent, partial and incomplete' due to the ways in which production settings operate. However, this does not mean that the data collected in these spaces does not remain powerful. Gillespie describes the data collected in these spaces as 'short vignettes, which act as a 'lens through which to understand their [animal] suffering' (Gillespie 2017,

p166), emphasising the value of this approach in furthering understandings of the animal's experience.

In some of the animal studies literature, ethnographies have been used as a way of documenting the experiences of the caretaker alongside the animal. This approach recognises the difficulty of cultivating accurate animal ethnographies, when time spent with the animal is partial and fleeting, and instead chooses to explore the intricacies of how caretakers interact with their animals. This has been championed in the work of Friese (2019) and Greenhough & Roe (2018, 2019), who explore the enactment of care within the laboratory, alongside explorations in agricultural (Chen et al 2021) and conservation (Van Doreen et al 2014) worlds. This methodological approach recognises, that 'those responsible for the day-to-day care, welfare and husbandry […], may also have something to teach animal geographers' (Greenhough & Roe 2019, p368) and provides a forum for this knowledge transfer to take place. By drawing on this expertise, expert knowledges about the animal can also be utilised within the research study, rather than relying on partial understandings of the animal, as created in other forms of data collection.

Another critique of ethnography centres on the lack of power that this methodological approach can have within the animal studies discipline. Critics believe that there is 'temptation to become so involved with the minutia of interactions and relations that other influencing factors…. are ignored' (Jeffrey & Troman 2004, p545). Whilst documenting the minutia of human – animal relations give us detailed and nuanced knowledges about the realities of animal care, the wider discipline often struggles to know how to use these knowledges effectively in order to cultivate real change. Furthermore, there is a very real risk of presenting human and animal relations as effectively benign using this methodological approach. Giraud & Hollin (2017, p173) comment on how there is a 'distinct violence in affective encounters that are [often] portrayed as mutually beneficial' through the usage of certain methodological approaches. This seems to be a very real issue within the ethnographies of animal research, which up until now have focused mainly on the cultivation of care between individuals, as shown by Freise (2019), rather than focusing on moments of discomfort or suffering. This avoidance of controversial or ethically challenging ethnographic moments is likely to be intentional. The inclusion of specific types of human – animal relation within

ethnographies, are also due in part to power relations. Hodgetts & Lorimer (2015, p289) discuss how ethnographic method is 'dependent on, and privileging of, particular human knowledges and power relations', a power which is often forgotten when selecting a particular methodological approach.

In order to counter this, attention should be paid to ensuring a critical perspective is applied to the findings, rather than just documenting actions and experiences which will only be relevant on an institutional basis. Gillespie (2019, p18) calls for the creation of a 'political multispecies ethnography' which 'attends to the webs of power relations that shape […] the research'. Creating ethnographies which work to overcome and change 'conditions of inequality, violence and value hierarchies in human-animal relations, by documenting the suffering of animal lives within these systems (ibid. 2019). Ethnographies of political power are also encouraged within the feminist literature; Haraway (1989, p255) describes how 'Feminism is a story-telling practice'. By capturing one individual's experience through the ethnographic technique, Donovan (2006, p309) describes how 'the injunction to care can be universalised even if the particular details of an individual case cannot be so extrapolated'. As such ethnographies can be utilised as a wider force for change outside of the laboratory walls and enable an extension of empathy and concern to both human and animal bodies, rather than just documenting the 'minutia of interactions' (Jeffrey & Troman 2004, p545).

As expected, the quality of ethnographic data produced is also reliant on the integration of the animal researcher into the community of study. This relationship between researcher and researched is known as 'reflexivity' and has been described as the 'central element of ethnographic work' within the assorted literature (Reeves et al 2008, p514). In more secretive communities, as in the animal research facility, it can often be challenging to cultivate trust between researcher and researched. Taylor (2011, p3) highlights the importance of friendships within ethnographic data collection, describing the 'significant advantages' that such relationships can have. However, such relations are not always possible within more secretive communities or in spaces where there are considerable time constraints. This need for effective relationships between the researcher and the participant places considerable pressure on the researcher and can threaten the validity of the data produced. As Taylor (2011, p6) emphasises, insider knowledge does not necessarily 'offer an absolute or correct way of seeing and/or reading the culture under

investigation', even if relationships can be categorised as a form of friendship. Furthermore, these relationships can often cultivate uneven power relationships between the individuals, as researchers may feel indebted to a particular research community as a result of being granted access, which could impact the data analysis. Reeves et al (2008) are keen to emphasise how researchers need to be 'flexible, patient and persistent in their work', recognising how ethnographers will often find themselves at the mercy of the community of study, rather than being able to dictate their data collection schedule. These relational difficulties could have a considerable impact on the ethnographic material which is produced and must therefore be recognised as another weakness of this method.

Despite the methodological weaknesses of both the interview and ethnographic method, there is considerable merit in using these approaches to collect understandings of human and animal relations. When combined with interviews, ethnographic approaches create an impressive methodological toolkit which enable us to witness the complexities of human – animal interactions, as well as allowing us to listen to narratives about these relations. This dual methodological approach has been used in a number of human – animal relation studies, including Gorman (2019) and Greenhough & Roe (2018) and is also the approach which has been chosen within this thesis.

4.4 The Five Freedoms: A Methodology

Whilst there is a heavy reliance on animal studies methods within this thesis, it is hoped that facets of animal welfare can also be cultivated within the methodology. Such an attempt is challenging, as truly interdisciplinary methods remain rare, despite attempts by both disciplines. Millman (2009) and Marchant-Forde (2015, p1) discuss the need 'to move beyond the bubble of animal welfare science and…. expand our horizons outside a relatively narrow scientific discipline', however definitions of a 'truly multi and inter-disciplinary science' often only encompass scientific approaches, 'such as behaviour, physiology, pathology, health, immunology, endocrinology, and neuroscience '(p3). Conversely, the animal studies discipline frequently emphasises the value of the animal welfare discipline in supplementing understandings of the animal, as recommended by Buller (2015, p380), when he suggests 'greater engagement between human-animal scholars and the biological'. However, it is still very rare for this literature to quote

directly from or draw on animal welfare knowledges in any practical way. This lack of cross disciplinary communication is unsurprising, as both disciplines cultivate 'different ideas, approaches and vocabulary' (Fraser 1999, p2). This has meant that methodological approaches of both animal welfare and animal studies remain siloed for both disciplines.

In order to overcome these disciplinary challenges, this thesis seeks to ensure that there are methodological features of both the animal welfare and animal studies literature within this thesis. Whilst the welfare science world has yet to depict the five freedoms as a methodology in its own right, it's usage within the current literature is indicative of this, as it already provides a framework for understanding and ordering knowledges of animal wellbeing. In this thesis, two of these freedoms have been transplanted into the animal studies discipline, in order to provide a set of orientations about new ways of knowing human and animal wellbeing. This thesis is interested in what new insights can be gained if 'Freedom from discomfort' and 'Freedom from fear and distress' are used as a guiding methodology, enabling insights from both an animal studies and animal welfare perspective.

4.5 The Data Collection Process

Attention now turns to the practical collection of data within this thesis, a process which took place during the second year of my project. In order to complete ethnographies and interviews within research facilities, ethical approval for the study had to be secured. This involved a written application to the University of Southampton ethics committee detailing what the study was seeking to explore, how data would be collected and how data protection would be ensured throughout the study. A number of required documents were also submitted alongside this application including a copy of the interview questionnaire, ethnographic and interview consent forms, a recruitment poster and a risk assessment. Due to the importance of protecting participant identity, particularly within the animal research facility, methods of data protection were emphasised throughout the application. This included assigning a pseudonym to each participant which only the researcher (myself) would know, as well as removing any identifiable features from the transcript and ethnographic notes that were created. This application was then reviewed by the ethics committee at the University of Southampton

and after some minor tweaks to the questionnaire and some clarifications around data protection, the study was approved (ERGO number 49258).

Research facilities were chosen as the site of data collection, as these were recognised to be the main spaces within which human and laboratory animal interactions took place. The majority of the laboratory animal studies literature explores the experiences of animals and their caretakers within the facility walls, as shown by Giruand & Hollin (2016), Greenhough & Roe (2018), Friese & Latimer (2019). One could challenge this methodological approach by drawing on Crang & Cook's (2007, p12) argument, that cultures are not always 'ring fenced' and can be encountered within a myriad of spaces. Some studies have explored human – animal interactions which move beyond the laboratory into the space of the home, through the lens of rehoming (Skidmore & Roe 2020). However, this thesis was interested in the day-to-day interactions of laboratory animals and their caretakers which meant that there was value in basing observations solely within research facilities. The laboratory world is often physically obscured from public view due to the highly sensitive nature of animal research. This is noted by Davies (2010, p4), when attempting to encounter experimental sites in the British landscape and ultimately 'encountering absences'. It was therefore necessary to gain access to these facilities in order to explore and witness the complexities of human – animal interactions. This thesis follows in a 'long tradition of studying nonhuman animals in spaces of animal use and exploitation' (Gillespie 2019, p19), by completing data collection within the research facility. A choice which arguably made me complicit in the continuation of this animal violence.

It is important to note that sites of animal research vary considerably depending on the sector within which animal research occurs. In light of this, I completed data collection in three different types of research facility. This included government facilities, as well as academic institutions. These differing facilities came with their own structural differences and approaches to animal research and whilst three research facilities cannot be seen to be representative of all UK facilities, the diversity in their approach made for some curious contrasts and comparison. Further information about each facility relating to the species, staff members and spaces has been outlined below. However, in order to protect staff members identities, the facilities A, B and C are not referred to or denoted in the subsequent empirical chapters of this thesis.

4.5.1 Facility A

Facility A was an academic institution which mainly housed rodents and fish, as these were favoured for the physiological and psychological studies completed by Facility A's researchers. The facility did house some large animals, guinea pigs, rabbits and aquatic species, however these tended to be in much smaller quantities and on more of an ad hoc basis. The workforce consisted of Animal Technicians who were supported by numerous NACWOs, alongside a single NVS who was responsible for ensuring the provision of appropriate animal care and caretaker training. AT's spent considerable amounts of time interacting with researchers and this appeared to be one of the main tensions which impacted on the provision of animal care, as some researchers held differing views to what AT'S believed was a 'good life' for their research animals (FAWC 2009, p16). Researchers would also spend a considerable amount of time within the facility, personally performing procedures on their animals which meant that animal technician were solely responsible for husbandry tasks, such as the provision of food, water, comfortable bedding and enrichment, rather than the actual research itself.

The facility was also spread over a number of locations with considerable geographical distance between the sites, which in turn cultivated differing approaches to the provision of animal care. Sites which were geographically challenging to access often showed a more relaxed and creative approach to the provision of animal enrichment and were often afforded more agency in the types of animal euthanasia which were chosen by staff members. Whilst the facility had stringent security practices in place, it was also notable for its ability to hide in plain sight, housing research animals in unassuming buildings which members of the public would frequently pass on a daily basis. Researchers would also come and go, depending on the length of their research contract which encouraged new ideas and approaches to animal husbandry to take seed within the facility landscape.

4.5.2 Facility B

Facility B was a government institution which housed large animals including sheep, cows, pigs, chickens and horses, as these were required for the animal health-based experiments which took place on site. In addition to this, there were also a number of rodents housed at this facility who were required for additional pathological work which had been commissioned by researchers. The workforce consisted of Animal Technicians,

supported by NACWOs who also tended to manage a particular area of the facility. Due to the scale of the site, there were numerous NVS working within facility and these individuals simultaneously held a line management role, which saw them closely involved in matters relating to HR and staff development, alongside animal welfare. As the facility was government run, there was a considerable lack of interaction with researchers on a day to day basis, tensions were instead experienced between NVS's and AT's who held differing interpretations of a 'good life' entailed for research animals (FAWC 2009, p16).

Facility B was found on large site and encompassed a range of different buildings, barns and fields. Due to the considerable number of large animals based at this facility the research landscape in some scenarios actively mirrored that of a working farm, whilst in others it appeared to be a more conventional representation of the laboratory landscape, which saw animals housed indoors in strictly biosecure buildings. In the outdoor landscape, care tasks mirrored those performed by farmers, which involved feeding, mucking out and general site maintenance. However, there was also the additional task of providing enrichment, which showed the ways in which the landscape was influenced by the laboratory. Enrichment provision also varied according to the species and spaces within which animals were housed. Animals housed outdoors were not deemed to require enrichment to the same extent as their internally housed conspecifics, whilst biosecure spaces tended to have a more rigid interpretation of the enrichment which could be provided. With regards to euthanasia, smaller species such as rodents and chickens were expected to be dispatched by animal technicians themselves in line with the research aims. However, larger species were transported to a specialist processing facility similar to an abattoir, where a distinct group of individuals worked. AT's were not expected to euthanise larger animals, which helped cultivate a less ethically challenging role for staff within the facility. Site security at Facility B was the most stringent of all the sites with only known individuals and various contractors allowed on site, this created a clear sense of facility identity which was rarely subject to external influences.

4.5.3 Facility C

Facility C was another government institution, however it differed from Facility B in that it housed only mice. These animals were involved in a diverse array of research projects which were seeking to gain behavioural, pathological and genetic insights into human

health. The workforce consisted of mainly AT's, supported by a number of NACWO's who were responsible for specific rooms on site and the resulting staff management. As in Facility A, there was one NVS available on site who held responsibility for staff training and animal welfare incidents as they appeared. Communication with researchers did occur, however this would often take place outside of the facility environment due to the considerable biosecurity which was in place on site. This meant that AT's had a considerable amount of responsibility for the animals in their care, as well as being expected to perform all of the scientific procedures which the research aims required. As a result, the levels of training held by staff members within this facility, was considerably higher than those found in Facility A and B.

Facility C was based in one location and encompassed one or two buildings, which made communication transfer and the facilitation of a unified culture much easier to create than in Facility A. As a result of this, enrichment provision within the facility was extremely regimented and there were procedures in place to ensure that standards were maintained across the laboratory. Furthermore, there were expectations surrounding the performance of animal euthanasia, which required staff members to cervically dislocate rodents, rather than using other methods. There were some expectations to this rule, but these individuals were few and far between, having been granted an exception on a case-by-case basis. Site security was similar to Facility B and visitors to the unit were tightly controlled, although the unit was actively engaging in public engagement which saw members of the public admitted to the research facility in order to see what went on inside.

It is therefore clear that there was considerable diversity in the species, spaces and staff members found within each research facility. Observing and interviewing in three facilities was also manageable in line with the limited time I had available to complete the data collection and the subsequent data analysis. It is also important to note that the location of research facilities and the availability of local transport links had some bearing on the sites which were chosen. The willingness of facility managers to allow me into their laboratories was also a determining factor, all of which created a slightly skewed sampling approach when recruiting facilities.

4.5.4 Recruitment

In order to secure access to all three facilities spaces, communication had to be established through a gatekeeper, individuals which Latchem-Hastings (2019, p1) describes as having 'control or influence over a researcher's access to participants'. Animal research facilities have a rigorous security presence in place in order to protect the employees who work there, so it was necessary to approach them formally in order to receive access. It was often challenging to find the contact details of individuals working at research facilities, so I decided to recruit individuals through my own professional network, as well as using conferences to secure contacts within the industry. This meant that the professional identity of each gatekeeper varied significantly between the research facilities, emphasising the variability of this role in the animal research setting. Once contact had been established, face to face meetings took place with all three facility gatekeepers in order to discuss the objectives of the study and gain approval for the project. In all three instances the meetings were successful and after the meeting ended, I was invited to tour the research facility by the gatekeeper. This tour provided my first entry point into the research facility, allowing me to speak directly to staff members in order to facilitate some initial recruitment conversations, as well as implicitly highlighting to other staff members that a bond of trust had been cultivated between myself and the gatekeeper.

The literature emphasises how recruitment is 'widely acknowledged as being critical for the success of research' (Bonisteel et al 2021, p2) and in order to ensure success, I distributed posters to all three facilities outlining my project aims and encouraging staff member to participate in the study (see Appendix A). In two of the research facilities gatekeepers allowed me to present my research project to staff members, which was well attended in both instances and these presentations served a number of purposes. Firstly, by providing me with a forum to present my research, gatekeepers signalled their trust in me to the wider laboratory community. Gatekeepers attended both presentations and signalled their support for staff to participate in my study verbally, as well as emphasising their support in more active ways. For example, in one of the facilities the gatekeeper provided a free lunch for staff members which greatly increased attendance at the presentation. These gatekeepers took on the role of informer within the facility, an individual which has been described as mediating social access within the field and

assisting the researcher in navigating the new environment (Gobo & Molle 2016). Secondly, the presentation was also a more engaging way of introducing my research in comparison to a simple email which participants would be unlikely to read in considerable detail. Presenting my research also enabled potential participants to listen to my own narrative of why I was completing this data collection. I was keen to emphasise during my presentation that I had completed data collection in a research facility before and that I was a trustworthy individual, attributes which my participants valued when deciding whether to volunteer for the research.

An email was then distributed around the facility staff members on my behalf which provided a brief overview of my study aims, alongside an attached recruitment poster. Interested participants then liaised with the gatekeeper to express an interest in the project and a timetable was devised in order to make the most of my time at the facility. All three gatekeepers held a position of authority within the research facility, which meant that they were able to take an active role in participant recruitment. However, it was clear that some of them used this to their advantage in recruiting participants. In one facility, the gatekeeper exercised complete control of the recruitment campaign and seemed to actively seek out individuals who she felt it would be useful for me to talk to, rather than allowing individuals to actively volunteer. This approach to recruitment may have unfairly removed individuals who wished to express contradictory views about the facility, as the gatekeeper may have actively chosen to avoid these individuals. The impact of authority on recruitment was apparent in another facility, where the gatekeeper had actively forced a staff member into participating in the study, creating a difficult situation for me as the researcher interviewing. In other spaces, minimal assistance with the recruitment process was offered which revealed the difficulties of canvassing candidates as an external recruiter and navigating these 'complex negotiations' within the laboratory alone (Latchem-Hasting 2019, p1). This was made more difficult in the highly secure research environment which did not trust external individuals very readily.

In total, 37 participants took part in the study across 3 different sites in 2019. This included 12 Named Animal Care and Welfare Officers, 4 facility managers, one Named Veterinary Surgeon and 20 Animal Technicians. This range of occupations enabled sufficient 'quality and positionality of information' collected, as encouraged by Crang & Cook (2007, p46). It also enabled me to gain an understanding of the different

occupations which can be found within the research facility and the ways in which these roles interacted with one another. However, most of the data collected within this thesis, ended up focused on the experiences of animal technicians, a vocation which has been examined in other studies (Freise 2019, Greenhough & Roe 2018, 2019). This was partly due to convenience, as animal technicians frequently volunteered themselves for participation within the study, however it was also beneficial for my data collection as Animal Technicians have the most consistent contact with animals through their role, which gave important insights into the embodied and practical facets of the human and animal relationship. Research participants agreed to take part in either semi-structured interviews, ethnographies or both methodologies. Before either interviews or ethnographies took place, participants were asked to read the participant information sheet in line with the Southampton ERGO guidelines and physically sign or verbally agree with the conditions outlined on the consent form. These forms have been retained and securely stored in line with ERGO guidelines, ensuring that the confidentiality of the participants is protected.

4.5.5 Interviews

Interviews took place within the research facility and were conducted in a quiet place free from disruption, as recommended by Cloke et al (2004), with sufficient time provided in order to work through the full list of questions. One of the challenges of facilitating interviews within the research facility was finding a space which was secure and free from interruption, as it has been recommended that interviews 'should be conducted in areas free from distractions' (Gill et al 2008, p292). In this study, interviews took place in staff rooms, communal and private offices. Despite best efforts to provide a distraction free environment, in a number of interviews, participants were interrupted by other staff members walking into the room, a distraction which was likely to impact on the quality of data produced as participants could lose their flow in the conversation, or actively alter what they were saying for fear of judgement. This was one of the challenges of conducting interviews within the research facility environment, as I had very little control over the spaces within which interviews were conducted.

During the semi-structured interviews, individuals were asked a series of 'predetermined open-ended questions' (DiCicco-Bloom & Crabtree, 2006, p315) which ensured the

coverage of certain topics but meant that a rigid structure did not have to be followed (See Appendix B). This 'lightly structured' interview framework (Jamshed 2014, p87) enabled previously unconsidered ideas to come to the fore, if deemed to be important to the participant who raised them. Throughout the data collection process, insights from participants were used to shape and alter the interview format. Participants frequently raised new insights about particular areas which required the inclusion of extra questions, whilst misunderstandings of questions during the interviews encouraged me to alter the wording of the questionnaire.

All interviews were recorded with a Dictaphone. Jamshed (2014, p87) describes how 'handwritten notes during the interview are relatively unreliable' and it was felt that sufficient chunks of detail could be missed if this approach was used. Furthermore, Gobo & Molle (2016, p186) emphasise the importance of allowing pauses and silences throughout the interview itself describing how 'silences, too, are actions'. Without the Dictaphone to record these moments of reflection and quiet, they would be lost to the researcher when completing data analysis. Despite the benefits of recording interviews, Al-Yateem (2012) describes the negative impact that Dictaphones can have when completing data collection within the medical sphere, as they have been recognised to place participants on the edge and increase the formality of their responses. This finding was applicable to my own research as I noticed that some participants became uncomfortable and their speech stilted once the Dictaphone was turned on, although after a few minutes its presence was promptly forgotten. Al-Yateem's (2012) findings, alongside my own anecdotal experience, highlighted the importance of managing the usage of the Dictaphone during the interview process. I sought to reassure participants that every effort was being made to ensure the confidentiality of the recorded conversations. I also turned on the Dictaphone as soon as possible during my interaction with staff members, in order that participants could acclimatise to its presence over a series of warm up questions.

4.5.6 Ethnographies

Ethnography is founded on the basis that 'If we look, we will find the whole worded folded into a field site or a practice' (Law 2012, p4) and data collection therefore involves continuous and sustained observation of the culture in question.. The practical process of

completing ethnography is best typified by a quote from Jeffrey & Troman (2004, p538) who describe it as 'A lot of hanging around, soaking up every tiny detail' and this was certainly the case throughout my ethnographic data collection.

In total 17 ethnographies were conducted within the 3 research facilities, with around 4-6 hours spent per participant, totalling over 112 hours of ethnographic observation conducted directly with my participants. The total ethnographic observation conducted within facilities was considerably more than this, totalling around 201 hours, as time was spent following staff in their daily routines, participating in care tasks, as well as sharing lunch breaks with them in their communal staff rooms. The table below provides an overview of the total number of hours spent within facility A,B and C.

Facility	Time conducting direct ethnographic observation (hours)	Overall time spent in facility (hours)
A	30	75
B	48	83
C	34	43
Total	112	201

Table 1- Total Number of Ethnographic Observation Hours

As Reeves et al (2008, p513) recognise, much ethnographic data collection takes the form of 'informal or conversational interviews' which contrasted with the more structured schedule of the interviews and allowed me to ask questions as and when a specific practice was occurring. In some interviews, participants found it challenging to recall a relevant example in order to supplement the question asked, whereas questioning participants about what they were doing and it's meaning for them during the practice itself appeared to be incredibly valuable. Ethnography also allowed me to witness the actual care routines which were discussed in the interview process.

When completing ethnographies within the facility I was aware that there was a need to forge good relationships with staff members quickly. It has been well recognised that the 'ability of ethnography to deliver a faithful portrait […] relies […] on the communicative trust developed between ethnographers and their participants' (Madden 2015, p279). In order to cultivate this quickly I frequently engaged in animal related conversations, asking

technicians about their pets, as pictures of these were often displayed in offices, on computer backgrounds or visible on personal items of clothing such as socks. These provided a means of orientating myself as a fellow animal lover, as well as enabling me to acknowledge that I saw them as animal carers in turn. Over the course of the time I spent within facilities, I noticed that staff gradually acclimatised to my presence, as I became an expected and trusted feature of the laboratory landscape, in ways which weren't possible within the short interview process.

Throughout the ethnographic observation period, attention was also focused on the experiences and actions of the animals in the animal research facility. This methodological approach can be recognised as multispecies ethnography, as the animal was a crucial feature of the ethnographic observation and in in turn my ethnographic writing. Throughout data collection, I observed, documented and reflected on my interactions with animals, observations which were supplemented in turn by my own animal welfare training. These knowledges enabled me to cultivate my own unique form of multispecies ethnography which had a mixture of welfarist observation alongside more personal and intuitive reflections. Using my own experience of animal welfare observation and conjoining it with the liveliness and fluidity of ethnographic experience created an exciting methodological hybridisation.

Focus was also placed on novel laboratory animal species which have yet to be studied. Focusing on the experiences of large laboratory animals is a rare approach within the welfare science and animal studies literature, on account of the larger quantity of small rodents and aquatic animals which are represented in the annual Home Office statistics (2022). This is notable within the animal studies literature which focuses mainly on human – rodent relations within laboratories (Friese 2019, Davies 2013 a). Although in recent years, this scope has expanded, with increasing attention now placed on aquatic animals (Message & Greenhough 2019) and even sheep (Miele 2016). However, these studies remain anomalies rather than the norm, an observation which makes it increasingly relevant for the experiences of large laboratory animals to be included within this methodology. Furthermore, the agricultural industry has maintained strong associations with the Five Freedoms framework (Brambell 1965) since its inception and so studying the experiences of typically agricultural species within the laboratory (sheep, pigs, cows, and chickens) is of considerable relevance. Throughout the empirical chapters,

experiences with a variety of different animal species are referenced, allowing us to recognise central and more specific themes which impact laboratory animals.

Despite the value in this observing a variety of different animals, there were some limitations in the use of multispecies ethnography. It was not possible for me to spend considerable periods of time with specific animals in order to create a highly detailed ethnographic record of their experiences. As a result, I followed in the methodological footsteps of other researchers and focused on the ways in which animal caretakers interacted with and spoke about their animals during interviews. This enabled me to witness and collect expert knowledges about human – animal interactions, from those who spend the most time with these animals. Whilst such an approach is not perfect, it did enable me to gain a significant understanding of both the human and the animal within the research facility and ensured that the caretakers were active collaborators in my work.

I found that both ethnography and interview methods worked effectively in collaboration with one another throughout the data collection process. Participants were often happy to participate in both the ethnographic and interview data collection methods and this dual approach to data collection was incredibly valuable. It appeared to be most effective when the ethnographic data collection took place initially and was then followed by a more in-depth interview, which enabled me to draw on moments witnessed in the ethnography in order to supplement the discussion, as well as assisting my own understanding of what was being discussed. Offering a mix of methods also enabled research participants to participate in my data collection in the ways which felt most comfortable for them Some individuals preferred to participate in either one method or the other, rather than completing both, a decision which may have occurred as a direct result of time constraints but may also have been indicative of preference. Put simply, it would not have been possible to secure the quality of data collection without using both methods concurrently.

4.5.7 Analysing Data

After completing data collection, a process of data analysis began. Interviews culminated in the production of recorded clips which had to be transcribed into workable transcripts. Whilst transcription by hand is an extremely lengthy process, it is seen as an ‘interpretive

process […] the first step in analysing data' (Bailey 2008, p127) and it was therefore the chosen method for this study, rather than relying on specialist software. Once transcription was complete both ethnographic notes and interview transcripts were analysed within NVIVO software for themes, as computer software is deemed to lessen the burden of 'time consuming and labour intensive' qualitative analysis (Zamawe 2015, p13). This process created an initial sift of the data before the original transcripts were returned to and looked over in more detail in order to formulate the empirical insights. Ethnographies culminated in detailed ethnographic notes, which were written during time spent shadowing participants and shortly afterwards. These notes created a first-hand account of the research environment with reference to my own thoughts, emotions and experiences and were a rich resource to draw on during data collection. Snippets of conversation were also included in these notes which enabled me to catch the feelings and thoughts of my participants outside of the formal interview framework.

Once both the transcripts and ethnographic notes were compiled and reviewed, data analysis could formally begin. The two freedoms were used as an etic code when reviewing the data, which meant that moments from the ethnographic and interview data were explored via the lens of these two freedoms, which involved consideration of whether human and animal experienced 'freedom from fear and distress' and 'freedom from discomfort' within the research facility. Whilst a wealth of experience's were uncovered, it was felt that the performance of euthanasia and the provision of enrichment were suitable areas to explore these freedoms further. These freedoms were also valuable in structuring my own experiences within the research facility during data collection, an area of emphasis in a subsequent empirical chapter. Approaches which have proved the value of the five freedoms as a structural framework for exploring human and animal relations within the facility.

4.6 Conclusion

In this chapter, the methodological approaches of the animal welfare and animal studies disciplines have been outlined and critiqued, allowing us to recognise some of the difficulties and inconsistencies of these approaches. Despite the imperfections of current methodologies, ethnographies and interviews have been chosen as the methods of this thesis, due to their ability to document human – animal relations in intriguing ways within

the laboratory, as creating powerful data when used in tandem. Furthermore, the use of qualitative methods within the structure of specific freedoms (Discomfort, Fear and Distress) has cultivated a novel methodology which encourages interdisciplinarity insights from both disciplines.

5 Freedom From Discomfort

> 'I had been in here on sunny afternoons and even then the dank gloom of the crumbling walls and rotting beams was like a clammy blanket and all warmth and softness seemed to disappear among the cobwebbed rafters high above. I used to feel that people with starry eyed notions of farming ought to take a look inside that barn. It was evocative of the grim comfortless other side of agricultural life'.
>
> **(Herriot 1979, p302)**

5.1 Introduction

In its traditional usage, 'Freedom from discomfort' recognises that animals should be provided with comfortable spaces in order to experience good welfare via the provision of an 'appropriate environment' (FAWC 2009, p2). Current understandings of animal comfort focus on the physical make up of an animals environment, recognising the need to provide 'shelter, suitable housing and comfortable resting areas' (Mellor 2016 b, p3). The EU Welfare Quality project's welfare assessment protocol, as quoted in the 2009 FAWC report, also focuses on the physical features of the production landscape. In its definition of 'Good housing', it emphasises the need for 'comfort around resting, thermal comfort and ease of movement' to be provided within animal production spaces. We can therefore recognise the importance of space, quality of landscape and thermal comfort within animal production spaces, notions of discomfort which are already proactively managed within the laboratory setting. Indeed, the literature encourages spacious enclosures and cages (Sevnson 2019), appropriate thermal conditions (Metze 2016), comfortable bedding (Blom et al 1996) and the provision of enrichment (Ratuski & Weary 2022, p1)

FAWC (2009, p16) have also outlined a definition of 'freedom from discomfort' which encourages caretakers to provide environments 'that animals seek out and enjoy' in order to fulfil the criteria of a 'good life'. A important means of facilitating enjoyable landscapes within the research facility, is via the provision of enrichment. Enrichment involves distinct and intentional alterations to the spatial landscape by animal caretakers, in order

to enrich the animals experience and enjoyment in captivity. It's value has been well recognised within the welfare science literature (Beattie et al 2000, Baumans 2005) and laboratory animal caretakers view enrichment as a crucial tool for facilitating animal wellbeing (Williams et al 2009). The decision was therefore taken to focus exclusively on the provision of animal enrichment within this chapter.

When exploring 'freedom from discomfort' via the lens of enrichment, it is important to consider how successful the provision of enrichment is in achieving experiences of comfort for research animals, when viewed from a welfare science perspective. The welfare science literature has long recognised the benefits of enrichment for laboratory rodents (Ratuski & Weary 2022), rabbits (Baumans 2005) and fish (Stevens et al 2021, p11). It's value comes from its ability to facilitate 'sensory and motor simulation', encourage 'species-typical behaviour and allow animals to have 'some degree of control over their environment' (Bailoo et al 2018, p2), as well as generating feelings of 'comfort, pleasure, interest' (Jacobs et al 2023). Enrichment can therefore be seen to facilitate both behavioural and physical experiences of comfort for animals within the laboratory. Therefore, a traditional welfare science approach already views enrichment provision as a successful means of ensuring 'freedom from discomfort' within animal production spaces and the research facility more specifically.

In recent years, the animal studies literature has also begun to directly explore enrichment provision within the laboratory landscape, recognising its value in 'producing health and well-being across species' (Friese 2019, p120), making it fruitful site of interdisciplinary exchange between the welfare science and animal studies literatures. The animal studies literature has also begun to recognise the distinct impact of enrichment on caretaker wellbeing, Indeed, Friese (2019, p130) describes how 'enrichment went beyond the mice…. targeting animal technicians as well'. We can therefore see the value of bringing in the animal studies literature to inform our understandings of enrichment, as its inclusion of both the caretaker and the animals experience is something which this thesis has sought to encourage from the outset.

As has been emphasised, the contemporary welfare science definition of 'freedom from discomfort' focuses exclusively on the thermal and spatial qualities of the landscape. In the animal studies literature, Friese (2019) also cultivates a spatial understanding of comfort, when exploring enrichment in the context of animal technicians, emphasising

the structural layout and quality of certain buildings and their impact on staff wellbeing. Despite the value in assessing physical and thermal comfort, this thesis is more interested in the felt experiences of discomfort which exist between human and animal within the research landscape, cultivating a notion of discomfort which is not found within specific structures but is instead experienced directly in the provision of enrichment. Discomfort is defined as a physical response to the landscape, an atmosphere of unease and an experience of ethical disquiet, cultivating a new understanding of 'freedom from discomfort' within the production landscape, which moves away from the traditional definition of this freedom as the provision of 'an appropriate environment' (FAWC 2009, p2)

This chapter begins by exploring the different types of enrichment which can be provided within the facility including environmental, relational and feed enrichment. It draws on the animal welfare literature in order to understand the animals experience of this enrichment, as well as recognising the role of the caretaker in providing these beneficial experiences. The chapter goes on to explore the contested nature of enrichment, following in the footsteps of literatures which have already emphasised the 'perceived risks or requirements of enrichment' (Ratuski & Weary 2022, p26) including the necessary 'time and resources' (Maple & Perdu 2013), and the financial support required (Williams et al 2009). This chapter seeks to engage directly with the first of my research questions, which explores the role of enrichment in providing 'freedom from discomfort' for both caretakers and their laboratory animals, from a social sciences and animal welfare perspective.

5.2 Types of Animal Enrichment

During my data collection and whilst reviewing the animal welfare literature, I noted that there were three distinct types of animal enrichment which could be provided in the research facility. These include the provision of environmental enrichment, the use of food and the manipulation of the human – animal relation itself in order to ensure animal comfort. Whilst the animal studies literature increasingly recognises the value of enrichment in cultivating animal wellbeing (Friese & Latimer 2019), it is often used as an interchangeable term within the discipline and as a result the specificities of different enrichment types have yet to be explored in further detail. In this section, a typology of

enrichment types is outlined in order to create a more nuanced understanding of the provision of animal enrichment, as well as highlighting the diverse experiences of discomfort that this practice can create for both human and animal.

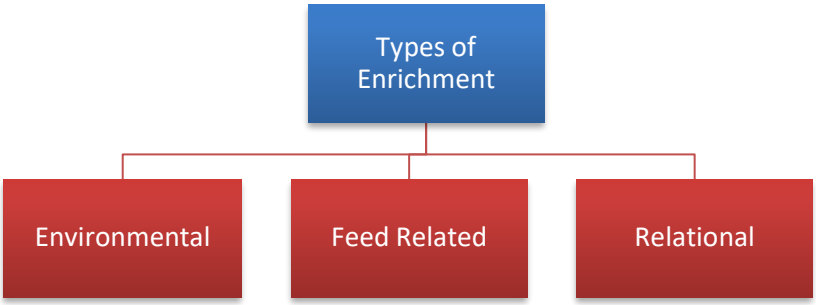

Figure 2 - Types of animal enrichment found within the animal research facility.

5.2.1 Environmental Enrichment

An important means of creating animal comfort within the facility involved the provision of environmental enrichment. Traditionally, this has been recognised to involve the active manipulation of the facility landscape via the provision of 'several resources, environmental complexity and sometimes novelty to the standard housing conditions' (Bailoo et al 2018, p2) .). Prior to the provision of this enrichment , the conditions experienced by laboratory animals were extremely uncomfortable, consisting of in 'cages that were cramped, bare and without simulation' (Beaver 1989, p5). These 'transparent "shoebox" cages' were deemed to prevent 'sensory and motor simulation' as well as obstructing the expression of normal behaviours (Bailoo et al 2018), cultivating poor animal welfare within the research facility.

5.2.1.1 Reshaping the Cage Environment

During discussions with technicians, it was clear that they saw considerable value in providing a range of objects for laboratory animals to interact with and many were keen to list and describe the enrichment provision they provided within their own facilities during our interviews.

> 'There're loads of different environment enrichments [for mice]. So, we've got balconies, tubes, houses. [For the] tubes we've got plastic and cardboard, same with the houses. We've got balconies, hammocks and wheels.'

Agnes, Interview

In this interview Agnes lists a range of different objects which she provides for the animals in her care. A welfare science perspective would encourage us to view these items as important objects in the facilitation of different behaviours, such as 'resting, nest building, hiding, exploring, foraging and gnawing' (Bauman's 2006, p162). By applying an animal studies lens we can also recognise the role of these items in redesigning the spatial environment for the laboratory animal, in order to provide comfort . Tubes and hammocks provided animals with shelter, whilst wheels facilitated activity and movement within the research space. It became increasingly clear that in a number of scenarios it was not so much about providing objects, but rather providing the right object for the scenario.

> 'We had some breeding animals that weren't breeding because we don't know why and we were like 'right we'll give them little houses, we'll give them a bit more privacy' and then we started raising litters and it's just those little tweaks'.

Gabriel, Interview

In Gabriel's example, we can see the ways in which the houses provided an appropriate means of shelter for the animals within the cage, echoing findings from the welfare science literature which recognise the value of environmental enrichment in improving the breeding success of rodents (Lecker & Froberg-Fejko 2016) The addition of a house repurposed the facility landscape, created more privacy, as well as reducing the stress of the rodents and enabling them to 'engage in natural behaviours such as foraging, sheltering and nesting' (Lecker & Froberg-Fejko 2016, p407). . Enrichment provision in this scenario can be recognised as a form of attunement to the animal form, wherein animal need was recognised and catered for by technicians. Greenhough & Roe (2018, p373) in their paper describe how 'acts of care… evidence a process of attuning to the needs of animals' which is recognisable in the provision of these houses. This attunement enabled caretakers to care more effectively for their animals and has also been discussed in a paper by Friese (2019) when she describes the specific value of different types of feed enrichment depending on the age of the mice. However, this attunement has yet to be specifically explored in relation to the provision of environmental enrichment.

Environmental enrichment was also used to counteract potentially uncomfortable experiences for animals within the facility, including isolation, large groups or indoor living. In the following quote, Gabriel describes the addition of extra enrichment when dealing with animals which were singly housed in the facility.

> 'I've got a little rule if there's a single housed animals then they get a nice house. I give them enrichment because they're by themselves'.
>
> **Gabriel, Interview**

In this quote from Gabriel, we can see how personalised enrichment has been provided for this singly housed animal. This action recognises the challenges of living alone within the research facility, which has also been widely documented within the welfare science literature. Isolation has been recognised to have ' a profound effect on mouse behaviour' (Kulesskaya et al), however in instances where social housing cannot be provided, there is unanimous agreement on the beneficial impact of enrichment for fish (Collymore et al 2015), primates (Scott 1991) and mice (Zidar et al 2019) Greenhough & Roe (2018, p373) emphasise the importance of 'environmental enrichment tailored to the specific species, strain, and/or life-stages of animal' from an animal studies perspective, a tailoring to individual need which can be recognised within these excerpts. In these quotes, we also gain a glimpse of the discomfort felt by Gabriel at the thought of animals being housed by themselves, a feeling which is likely to stem from the considerable welfare science evidence which recognises the inherent harms of this housing approach. It is clear he is concerned enough to counteract the experience of living alone through the provision of additional items, which signifies the discomfort that he believes the animals may experience in this set up, as they afforded extra care. A similarly proactive approach to enrichment was also shown by caretakers as cage numbers grew.

> 'Sometimes I'll give them [rodents] - especially if there's like 4 or 5 in a cage, erm and they've only got 4 wood chews. I might make sure that they have one each because then it's just nice for them'.
>
> **Jane, Interview**

> 'And then as the group increases, they'll get a bit of enrichment. So, for a single group of 4 mice, I use a rat tube so all 4 mice can fit in that tube in the dark rather than just giving them a really small, short one.'

Gabriel, Interview

In both instances, the technicians attempted to provide the animals with equal access to the cage enrichment in order that all the animals were able to experience the positive benefit of these objects. Rather than forcing animals to share wood chews between individuals, Jane specifically allocates one wood chew per rodent. Zidar et al (2019) also report similar occurrences in their survey of singly versus group housed rodents, describing how group housed animals were often provided with more enrichment, due to the benefits which these items are known to bring from a welfare perspective. Such an act again enables us to recognise the perceived value of enrichment items in reshaping the laboratory landscape when animals where singly housed or in large groups.

A similar harm was felt to be experienced by animals when they were housed within the facility for a long period of time. Some animals were kept within the laboratory walls for up to several years which technicians felt was deserving of additional enrichment.

> 'They've [Cows] been in that building for a long time and they're very, very big. It's just trying to…. keep them enriched. It can be difficult, so we've got scratching posts in there, salt licks, balls… But it can be tricky obviously because they stay in those four walls for 7 years or whatever, it's a long study and that's all they see, so it can be difficult, but we try with what we have available'.

Ted, Interview

As this quote suggests, often a greater quantity and wider range of enrichment items were provided when animals had been housed for long periods within the facility. . The welfare science literature has emphasised the value in providing a diverse range of enrichment objects. For example, in an enrichment study on pigs Schmitt et al (2020, p1837) notes how 'different forms of enrichment' have the ability to promote welfare. However, Ted's quote reveals more than a need for diversity, he implies that long-term individuals are more deserving of positive experiences because they have experienced a long life within the facility. Such an understanding has also been recognised in the work of Friese (2019, p293) when she describes concerns around different types of feed enrichment, which stem from a worry about 'keep[ing] the mice properly interested, especially if they are alive for so long'. These quotes start to suggest the limitations of facility life without enrichment, indeed there was an implication that enrichment-free

laboratory conditions were not sufficient for animals to thrive, as enrichment needed to be provided in ever greater quantities, the longer the animals stayed within the facility walls. Such an observation enables us to recognise the implicit discomfort experienced within certain instances within the research facility and the importance of the technician in alleviating it.

5.2.1.2 **Human – Animal Negotiation**

Caretakers were also keen to increase the quality of spaces for large animals within the research facility by actively reshaping the landscape provided. One of the more notable examples of this involved an animal technician called Anne, who improved the experience of a group of pigs by securing them access to and then reshaping the outdoor landscape.

> 'Anne tells me that it was her idea to allow them outside access […] She also created a wallow for them in the summer months, they would leave the hose pipe running for a day and then the pigs would create a wallow of mud. There are so many pictures of the animals lying in the dirt and bathing together in the sunshine.'
>
> **Ethnographic Notes, shadowing Anne, 2019**

Anne conjures up an image of pigs experiencing good welfare within the research landscape, as it is clear that they actively experiencing 'freedom to express normal behaviour' (FAWC 2009, p2). Anne describes how the pigs spent time wallowing in the mud, a behaviour which is known to have a positive impact on pigs as it is commonly observed in feral pigs and wild boar (Bracke 2011). The welfare science literature has also emphasised the value of 'incorporating novelty' into the laboratory space in order to facilitate animal wellbeing (Overall & Dyer 2005, p204) and the opportunity to engage with novel substrates such as mud and water is likely to have been extremely beneficial for Annes pigs.

From an animal studies perspective, the pigs were also given the opportunity to experience and interact with their caretaker in new ways, as shown through the co-creation of a wallow by human and animal bodies. Anne's intentional running of the hosepipe and the pigs' bodily movements to create the wallow cultivated new embodied experiences within the human – animal relations as well as reshaping the landscape in turn.

This example can also be seen to provide a new understanding of human-animal collaboration within the laboratory landscape, a concept which has already been explored in the animal studies literature in relation to dog walking (Fletcher & Pratt 2018) and the cultivation of scientific knowledge (Miele 2016, Levina 2018). Recognising collaboration as the moment 'in which the human partner cedes authority to the non-human, at least temporarily' (Dashper 2016, p13). The experience between Anne and her Pigs offers a glimpse of such a state thorough the pigs active manipulation of the facility landscape. Although, as noted by Fletcher & Pratt (2018), caretakers are often 'allowing their… [animals] to behave in certain ways' rather than temporarily delegating their authority, making for more of a negotiation than a collaboration. Either way there was a shared sense of wellbeing in the cultivation of these wallows. The interaction appeared to have a beneficial impact on Anne, as recognised in her interview,

> 'I just thought why not? Why shouldn't I be able to? The facility is there, the land is there so they might as well use it […] I still think that it was definitely one of the best things that I've ever done for an animal or a group of animals in sort of pushing that'.
>
> **Anne, Interview**

Here there is a palpable sense of benefit for Anne whilst providing this experience for the pigs and she describes it as one of the 'best things' she has done to facilitate animal welfare and secure animal comfort. As well as facilitating a comfortable experience for the pigs in question, it truly appears as though Anne is experiencing pride and comfort in turn, due to her role in this enrichment provision. Whilst the animal studies literature has placed considerable attention on the ways in which animal technicians must follow the status quo of facility culture or risk being made 'replaceable' (Freise 2019, p287), Anne's actions did not appear to come with an associated risk. Anne was able to shape animal comfort in new and exciting ways without risking her own job security or creating personal discomfort in turn.

Technicians were also keen to cultivate human - animal negotiation in more day-to-day practices. Caretakers actively sought to involve pigs in the provision of their own comfort, with bedding purposefully piled into tall piles within the pen in order to facilitate nest building behaviour.

> ‘We add some more straw to the beds, purposefully piling it high to create a cushiony straw mountain for the pigs to manipulate. Later, I watch one of the pigs trample on the bedding in the far side of the pen and start tossing straw in the air to rearrange the bedding into a more comfortable orientation’
>
> **Ethnographic Notes, shadowing Etienne, 2019**

Ultimately, these images of collaborative nest building and wallow creation, serve as an important reminder of the joint role that both human and animal play in creating comfort within the laboratory landscape. Technicians were required to advocate on the animal’s behalf and take a proactive role in the provision of enrichment if comfortable experiences were to occur. Whilst caretakers could be seen as the facilitators of these behaviours through the provision of certain substrates, the animal also had to be willing and able to engage with these in order for animal enrichment to be deemed to be successful. The welfare science literature is keen to emphasise how enrichment is beneficial for the ‘sense of control’ (Bailoo et al 2018, p2) it provides for animals, however this requires active engagement with the provided substrate in order that animals can experience this benefit. . Comfort provision therefore required space, objects, technician enthusiasm and active animal participation.

5.2.1.3 Pushing Spatial Boundaries

Alongside the provision of specific objects, adjustments to space could also be recognised as a key part of environmental enrichment. Enriched environments have been recognised to ‘incorporate extra space’ for laboratory animals (Beattie et al, 1995, p207) and more generally within the welfare science literature are deemed to cultivate ‘movement and exploration, expression of natural behaviours… ability to make choices regarding social companions and environmental conditions’ (Browning & Maple 2019, p1). During my fieldwork it was clear that caretakers valued the provision of space for animals in their care and in certain scenarios, they actively manipulated the laboratory landscape in order to achieve this.

> ‘The first job once we’re outside is to move some cattle out into the field. They are running out of space in the barn and even though it’s still below legal stocking densities, they want to give the animals some more space.’
>
> **Ethnographic Notes, shadowing Cathy, 2019**

In this anecdote, I witnessed a number of technicians actively expanding the space available to their animals in order to ensure laboratory animal comfort. Technicians showed a clear sense of attunement towards their animals by recognising the increasing overcrowding within the barn and actively seeking to create more space within the laboratory. Furthermore, whilst the animals were well inside the legal requirements of the ASPA (1986), technicians did not allow the written legislation to dictate the spatial provisions available to their animals within the laboratory. The space available was actively manipulated and expanded by the animal technician themselves showing that technicians were making their own judgements as to the level of 'freedom from discomfort' which could be experienced.

As a result of this personal role in increasing spatial boundaries, staff were often quick to defend the comfort of laboratory spaces when challenged on the welfare of their animals, particularly when in conversation with those external to the research facility.

> 'I have a vegan friend who is very judgmental… we were talking about cattle in one of these buildings and she was quizzing me about the size of enclosure they get, the size of the pens and she was really like 'You can't do that!'… about the size of the pens, when we're very generous with the pens in terms of the legal requirement and welfare.'
>
> **Cathy, Interview**

In this example, Cathy is dismissive of her friend's attempts to delegitimise the facilities provision of animal comfort and instead emphasises how the laboratory stocking densities go above and beyond legal requirements. The legal framework in this instance is used to justify the facilities 'very generous' spatial provision' in order to alleviate her concern. Here we can see the ways in which the spatial features of the landscape are used to justify the animal welfare experienced within the laboratory, a narrative which is similar to those used by scientists to justify their practices to members of the public (Yon-Seng Khoo 2018).Cathys justification of animal welfare is also cognisant with FAWC's (2009,p16) definition of a 'good life', where the animals experience is recognised to be 'substantially higher than any legal minimum'.

One can also recognise a sense of personal affront in Cathy's exchange which is indicative of the personal responsibility she feels in providing comfort for her animals. Comfort creation was often a very personal action, with staff showing that they 'cared about'

animals within the facility by providing them with larger and better-quality spaces. Cathy's own identity appeared to be questioned by her friends' preconceptions, which ultimately cultivated ethical disquiet for Cathy in turn. Whilst considerable literature has already explored the criticism of animal technicians by members of the public (Mills et al 2018), minimal attention has been placed on critiques which arise for technicians from their own personal network. The provision of environmental enrichment in this instance enabled Cathy to counteract the claims of animal discomfort which had come from her friend. Manipulations of spatial provision within the laboratory setting appeared to ensure animal comfort, as well as reassure the technician that the provision of care went above and beyond societal perceptions.

By focusing in detail on the provision of environmental enrichment within the research laboratory, this chapter has uncovered a number of key conclusions surrounding the provision of comfort within the facility. Far from the provision of a set of random objects, in some instances enrichment served a bespoke purpose within the facility and was used as a means to ensure a specific experience of comfort and wellbeing for the animal in question, in recognition of the inherent discomfort in the laboratory space. This provision relied on attunement between the animal and caretaker, in order that the animal's needs could be sensed and then provided for. Comfort provision for both animal and caretaker also relied on an active human – animal negotiation, which sought to ensure that the animal engaged effectively with the enrichment in question. Furthermore, environmental enrichment was also used to remove any ethical disquiet for caretakers around the realities of the research laboratory, as the quality of enrichment provided was often used to justify the practices of animal research to members of the public. One can begin to recognise the importance of enrichment in facilitating experiences of comfort for both human and animal within the laboratory.

5.2.2 Relational Enrichment

The interactions which exist between human and animal within the laboratory can also be recognised to enrich the experience of the animal and in certain instances, human – animal interactions have already been described as a form of 'environmental enrichment' (Baker 2004, p239). This assertion was confirmed by my own data collection, which recognised the value of these interactions in creating positive experiences for both

human and animal. Whilst the animal studies literature often looks to emphasise the benefits of more tactile and affectionate interactions, my fieldwork also recognised the value of more distanced care which was preferrable in certain human – animal dyads. In this section, the importance of the caretaker in negotiating these relations on the animal's behalf is explored, emphasising their role in mediating animal discomfort within the research facility.

5.2.2.1 Tactile & Affectionate relations

Handling and other forms of human – animal interaction have already been recognised to have a considerable impact on the experiences of laboratory animals. The welfare science literature is keen to emphasise how laboratory rodents are 'highly sensitive to interaction with humans' (Gouveia & Hurst 2019, p1), as well as recognising more generally that 'the nature (positive, negative or neutral) of the interactions between the stockperson and livestock has a strong impact on the animal's welfare' (Luna et al 2020, p2), . The importance of human – animal interactions was also noted during my fieldwork, with caretakers frequently describing the tactile human-animal interactions which existed within the facility.

> 'If they've [Sheep] been hand reared then they're very sort of loveable. They'll run over to you, and as you're trying to count the flocks which you have to do on the rounds, you just feel a head rubbing up and down on your leg and then looking for like a chin scratch or a neck rub or head massage or something, which is quite nice to do'.
>
> **Troy, Interview**

In this interaction between Troy and his sheep we can recognise a shared sense of affection and comfort between both human and animal. These findings are not surprising, as the welfare science literature has recognised how both 'behavioural and physiological observations support the hypothesis that gentle physical contact with the caregiver is perceived positively by lambs' (Coulon et al 2015, p1). From an animal studies perspective, this excerpt can also be seen to recognise that sheep have a sense of agency, as Troy is keen to emphasise that they are the ones seeking out tactile interactions with the caretaker by actively facilitating petting and affectionate. Whilst Troy describes 'sheep' more generally, tactile interactions were often cultivated by a small handful of specific individuals, who were more likely to form these 'special

attachments' (Bayne 2002, p4). In their analysis, Bayne (2002) describes a typology of different individuals who were more likely to cultivate these attachments in the laboratory, including 'friendly, amusing or intelligent animals', those requiring 'extra supportive care' and those that represented 'A milestone in a particular scientific advancement'. In the instance of the sheep, the individuals who had been hand reared and received 'extra supportive care' were the ones who sought these attachments.

In other settings, technicians took a more active role in building these embodied interactions with their animals, rather than waiting for animals to initiate contact.

> 'I was very aware of the fact that pigs build a better relationship with humans if you have more physical contact with them, so I always made of point of sort of touching their faces, giving them like an ear scratch or scratch on their back- they absolutely love a scratch on their back… they always loved it and you could tell that they loved it because sometimes they would like go down on to the ground and show their bellies to you and obviously that's quite a vulnerable thing for an animal to do, especially an intelligent one.'
>
> **Anne, Interview**

Here considerable emphasis is placed on actively building affectionate relationships with the pigs, in order to cultivate their comfort and trust within the facility. Anne's actions sought to actively reduce the stress of the animals in her care as the welfare science literature has shown how pigs exposed 'to regular gentle contact are less afraid of people and experience lower stress levels' (Luna et al 2020, p2). These interactions also discredit the public's perception of animal research personnel as 'unfeeling' (Bayne 2002, p4) or 'objective' towards their animals. Rather than something to be avoided, human-animal interactions were actively encouraged within these settings and were perceived to be an important way of developing a strong bond. Whilst Anne's actions appeared to be facilitated by her own affection for these individuals, affectionate relations were also encouraged for more practical reasons with the facility landscape.

> 'If you see the size pigs that we've got at the minute that came in yesterday and yeah If something that size doesn't want to behave you've got no chance. So, it just makes our lives a lot easier if they trust us'.
>
> **Tamsin, Interview**

As discussed by Tamsin, it was common for technicians to actively manipulate affectionate relations in order to enable animals to contribute meaningfully to research aims. However, the use of affection to create good relations and thus effective science within the facility has been critiqued within the literature. Whilst gentle handling can be recognised as a means to reduce the stress and fear of the pigs (Luna et al 2020, p2), Giraud & Hollin (2016, p39) would describe this the affection cultivated between human – animal as an attempt to 'actively manipulate[d]' and 'mould [animals] to 'ensure their compliance' with research aims. This animal studies perspective provides a novel interpretation of affectionate relations within the laboratory and encourages us to recognise that relations can have slightly uncomfortable and ethically challenging motives within the facility, despite the clear sense of affection and animal wellbeing which could be witnessed and is documented within the welfare science literature.

5.2.2.2 Negotiating Relations

In other scenarios, tactile and affectionate relations were carefully negotiated by caretakers. Despite the fact that caretakers and laboratory animals spent considerable time together within the facility, some animals were keen to maintain their space, a preference which was recognised and respected by technicians.

> 'There are some cows that […] are tamer than others and others that don't want to come anywhere near you. But I would just give attention to the ones that would want it and not to the others. Because it's not- like even though I would love all animals to come up to me and be able to like give them like a cuddle and a scratch (laughs) at the same time it's not fair- I appreciate like that it needs to all be about the animals and it wouldn't be fair if they didn't want it.'
>
> **Anne, Interview**

In this excerpt from Anne, it is clear that interactions within the facility were often initiated on an animal-by-animal basis. There is a sense of choice in the actions of these cows, as they negotiate different distances from the technicians who care for them. These differing preferences for tactile animal interaction have also been noted within the welfare science literature, with Lange et al (2020, p1) observing how 'cows that are fearful of humans avoid their [farmers] close presence and touch'. Comfort in human – animal relations can begin to be recognised as a highly personal experience for the

animal, which for some involved ‘cuddles and a scratch’, and for other consisted of them ‘not com[ing] anywhere near’. A similar notion was shown in an excerpt from an interview with Jane, who describes her interactions with the research facilities rats.

> ‘I think also I can tell when- especially with the Rats- when they’re getting very stressed, and they don’t want to be picked up. So, its little things like ushering them into a tube, moving them that way. Because I do want to handle them but at the same time if it’s making them stressed it’s just not worth it’
>
> **Jane, Interview**

In this excerpt, it is clear that Jane prides herself on being aware of when animals are enjoying engaging with her and when they are not. The welfare science literature recognises that Rats are sensitive to human interaction as they ‘are primarily a prey species’, which means that they often ‘initially find interactions with humans frightening’ (LaFollette et al 2018, p92) Whilst human and rat can attune to one another via repeated handling over time, Jane shows a more nuanced understanding of this interaction by being aware of specific moments or ‘atmospheres’ (Lorimer et al 2019) of rat discomfort even when particular rats and humans are well-known to each other. . In this example, experiences of human – animal contact appeared to shift on an almost daily basis, rather than simply being enjoyed or avoided by specific animals within the facility. The space maintained between human and animal can be recognised as a negotiation, with some instances of touch being deemed acceptable, whilst others are uncomfortable for the animal. This notion of negotiation has already been recognised by Greenhough & Roe (2018, p381) when they describe ‘the complex and ongoing negotiation of human – animal relations’. However, my own field work goes beyond this to highlight the centrality of animals within this negotiation, as their behaviour in response to the technician could determines the tactile nature of these interactions. Caretakers then, have a responsibility to ensure that they are remaining open and aware of this behaviour.

This responsibility for attuning to the requirements of the animal was also witnessed in other moments during my data collection. After witnessing the inoculation of rabbits, I watched as Anne actively negotiated a less tactile form of relationship with the group, maintaining her distance in order to ensure their comfort.

> 'As she sits in the cage, I notice that the rabbits become more and more confident around her, they snuffle round her feet and stand on their back legs to get a closer look. She sits quietly and doesn't attempt to stroke them- it's a prime example of caring from distance. All her actions are calm and methodical, there are no sudden movements or jerky actions.'
>
> **Ethnographic Notes, shadowing Anne, 2019**

It has been emphasised within the welfare science literature that 'routine laboratory procedures can be stressful', particularly for laboratory rabbits (Swennes et al 2011, p41). In recognition of this, Anne seeks to maintain her distance from them, allowing them time to adjust to her presence within the pen. In these examples it was clear that Anne was attuning to the requirements of the animal, as has been popularised in the human–animal relationship by Despret (2004) and defined by Greenhough & Roe (2018, p371) as 'attention to the fleshy bodily and emotional susceptibilities, potentialities and vulnerabilities' of the animal form. Anne recognised the discomfort that could be created for these animals If she was to pick them up, a dislike of handling which is also recognised in wider understandings of rabbit welfare. Whilst attunement has traditionally been conceptualised as the creation of tactile, embodied relations between human and animal, this thesis views the creation of distance as a form of attunement in its own right.

Despite the value of maintaining distance from certain species, caretakers were often most comfortable when cultivating tactile and caring relations. This required them to actively manipulate their distance from individuals in order to ensure animal comfort.

> 'There is that urge [to cuddle them] but they [chicks] really don't enjoy it! They really hate it. It's more fun watching them from afar…. I know if I went in there, they'd [Chicks] be freaking out, trying to get away. They've got no co-ordination until about 4 days so they'd just be falling over, it would be awful. You'd be freaking them out for no reason'.
>
> **Troy, Interview**

Whilst Troy admits that there is often a natural urge to want to spend time with these chicks on account of their aesthetic appeal, he recognises that the sheer discomfort that this would cause them would be too damaging for it to be worthwhile. The comfort Troy would gain from cuddling these chicks, is strongly outweighed by the discomfort this would cause them. Thus, cultivating comfort for animals within the facility continued to

be a negotiation, which often involved comprise on the behalf of the technician. This was also noted in other scenarios, where technicians actively encouraged their animals to maintain space from them, even whilst the animals were keen to initiate contact.

> 'Whilst considerable affection is bestowed on the ponies, a common form of caring for them and also caring for the techs themselves was teaching them to maintain space. Rather than actively encouraging the ponies to approach, the technicians are keen to ensure that they know to maintain a safe distance. It's important that when the techs are working with a specific horse, the other individuals remain away and give one another space.'
>
> **Ethnographic Notes, shadowing Jackie, 2019**

In this instance, distance was actively negotiated by the technicians, as tactile human – animal interactions were minimised in order to ensure the comfort and safety of animal technicians. Rather than facilitating a continually tactile interaction, technicians negotiated a compromise with the ponies, where touch and affection was bestowed sometimes but could not always be initiated by the ponies. This scenario complexifies understandings of affectionate relations within the facility, which are often viewed as either affectionate or objective. As this example shows, it was a much more complicated relational experience which combined human and animal preferences, safety and research aims.

Similarly, other technicians preferred to keep their distance from animals within the facility due to their own emotional comfort. This was discussed at length by Nick.

> 'There are a lot of people who are instantly very lovey dovey, and they build up a lot of emotional bonds [with the animals]. Having come from a science background... you build up that distance quite early on because you know that it's sensible thing to do, not to get emotionally involved. I have like a big group emotional bond with the animals (laughs) but not like 'aww I love this pig'. You'll go round other techs and they'll be like named pigs, there's a lot of like… 'Aww this is - and she's lovely and she comes over blah blah blah' and I keep out of that, cause it's a big way of getting yourself into trouble emotionally.'
>
> **Nick, Interview**

In this excerpt we can begin to recognise how there was an element of choice in how affectionate technicians could chose to be towards their animals, provided that the animals were willing and reciprocal. Nick is keen to emphasise that a more logical and distanced approach was a better way of interacting within the facility as it prevented caretakers from 'getting […] into trouble emotionally' in the future. Again, we can recognise the caretaker as taking a more proactive role in the human – animal negotiation, as individuals could actively chose to avoid tactile interactions themselves, in order to ensure their own emotional comfort. In this scenario, one can begin to recognise the importance of both animal and caretaker behaviour in shaping the quality of relational enrichment within the laboratory.

In this section a new understanding of relational enrichment has been created, challenging typically held beliefs around the types of human – animal relation which can be cultivated in the laboratory. Animals were given considerable choice about the types of relations they could create with their caretakers, allowing their personal comfort to be taken into consideration. These relations were highly personal and tended to vary according to the species of animal which were found within the facility. On the whole, pigs, sheep and horses appeared to encourage tactile relations with their caretakers, whilst prey animals such as rodents and rabbits preferred to keep their distance. Caretakers were expected to respect these preferences, as well as actively negotiating these relations to ensure their own physical and emotional comfort. Relational enrichment can therefore be seen as a crucial element of enrichment provision within the facility walls and provides a useful lens for exploring how discomfort is entangled within specific human – animal relations.

5.2.3 Feed Enrichment

The value of feed-based enrichment from an animal welfare science perspective has been recognised in a number of production settings, including zoos (Riley & Rose 2020) farms (Orihuela 2018) and laboratories (Dean 1999, Stevens et al 2021), due to its ability to allow 'animals to express normal behaviour when obtaining food' (Dean 1999, p312) as well as ensuring animals have 'freedom from hunger and thirst' (FAWC 2009, p2). The animal studies literature also recognises its value, describing the provision of sunflower and mustard seeds for rodents as a demonstration of the 'intimate knowledge[s] of

caring for laboratory animals'(Friese 2019, p288) .In this section, feed enrichment is explored as means to facilitate movement within the animal research facility, enable creative expression for animal caretakers and disrupt certain atmospheres which were created within the laboratory landscape post procedure. Such explorations offer a novel insight into the provision of feed enrichment and ultimately comfort within the research facility.

5.2.3.1 Facilitating Movement

Caretakers frequently sought to facilitate the movement of animals through the research landscape by utilising feed enrichment. As was noted during discussions with Jude, an animal technician who was responsible for aquatic animals within the facility.

> 'Generally, the major enrichment that our zebra fish get is live feeding, so that will facilitate hunting behaviour within fish and it's something that they have to hunt down. It's several live foods that they get fed every day.'
>
> **Jude, Interview**

In this quote from Jude, we can see the ways in which live feeding encouraged the performance of normal foraging behaviour and movement within the tank.. This has been emphasised within the welfare science literature, as live feeding encourages 'natural predatory behaviour' (Stevens et al 2021, p11), as well as encouraging fish to move around the tank. A similar facilitation of movement was also shown by caretakers of terrestrial animals, such as pigs.

> 'Etienne fetches some food and slowly sprinkles it along the walkway in small piles. The pigs are released from their enclosure, and they work their way down the corridor stopping at each pile to feed. It's an interesting way of repurposing the landscape and getting them to interact with the space in a different way. She tells me that it's a good way to get them moving.'
>
> **Ethnographic Notes, shadowing Etienne, 2019**

In this example, enrichment encourages the movement of the animal through the facility landscape in a more comfortable, gentle way. The pigs observed during this ethnography were actually suffering from considerable joint pain due to their age, which meant that they were often reluctant to move around the research landscape due to the discomfort

that this caused. However, this approach to feeding encouraged the animals to keep their joints moving which not only ensured and supported hopes for 'freedom from discomfort' in the future, but also enabled 'freedom from hunger and thirst' simultaneously (FAWC 2009. This example sheds light on the importance of feed enrichment in ultimately facilitating animal comfort day to day.

Well considered feed enrichment could also provide timid animals with an opportunity to move through their environment more confidently, particularly after experiencing an uncomfortable procedure.

> 'After the blood sampling procedure, many of them [the rabbits'] are huddled in the far corner, but one of the techs sprinkles what she laughingly calls 'bunny crack' around the cage to get them moving back through the various tunnels and the space again.'
>
> **Ethnographic Notes, shadowing Anne, 2019**

By sprinkling food around the cage in this manner, caretakers provided their animals with an incentive to move around their pen post procedure, reinstating experiences of comfort within the laboratory space. Immediately after their inoculation with a vaccine the rabbits had taken to sheltering under tunnels, however the food incentive provided by technicians increased their confidence and encouraged them to interact with the space again, rather than sheltering.

In order to explore this ethnographic observation further, it may be useful to draw on Lorimer et al's (2019, p27) notion of animal atmospheres, which are recognised as 'the affective intensities of a particular space that give(s) rise to the actions, feelings and emotions'. Arguably, blood sampling had created an atmosphere of unease and discomfort within the landscape, and the rabbits reaction to this could even be described as one of 'fear and distress' (FAWC 2009, p2). This atmosphere was disrupted by the introduction of a food incentive within this space which encouraged movement and more positive feelings for the rabbits. Technicians witnessed during my data collection appeared to have an implicit awareness of these atmospheres and to be able to actively manipulate these through their actions within the space, recognising that 'their presence [could] […] shift the experience of those spaces for others around them' (Lorimer et al 2019, p26). Discomfort then, is more than just the spatial feature of a particular landscape but can instead be recognised as something more diffuse and ever shifting, an

atmosphere of sorts. By encouraging movement via the provision of food, technicians have already begun to alter these atmospheres of discomfort, cultivating more comfortable experiences for animals within the space.

5.2.3.2 Creative Expression

Whilst creativity could be recognised in all 3 typologies of enrichment provision, feed enrichment in particular appeared to be an area of creative expression. The animal welfare science literature is keen to emphasise the value in providing 'creative enrichments' in order to improve an animals 'mental wellbeing' within the laboratory, particularly in the instance of primates (Medina 2022, p42). During my data collection, caretakers frequently used food as a means of expressing their creativity within the facility walls, which cultivated a sense of comfort and enjoyment for both human and animal.

> 'The good thing about pigs is the enrichment, It's fun! You can go wild with the enrichment because they love it. When I was looking after a pig study…. I was in charge of the enrichment, and I put various amounts of food in different boxes and put them almost out of reach. So, I like tied them up and then they would try and grab them. They'd have like piñata type enrichment, so they enjoyed that.
>
> **Troy, Interview**

In this quote we begin to understand the effort that goes in to creating different enrichment experiences, with Troy finding, filling and tying up various boxes in order to create a 'piñata type' experience for the animals. This feed enrichment not only facilitated the pigs foraging skills and created enjoyment for them, but Troy also gained enjoyment from envisaging, creating and then watching the animals interact with this enrichment, which made this effort all the more rewarding. One can begin to recognise how enrichment provided interest not just for the animal, but also for the caretakers in turn. Whilst it's important to note that some technicians were forced to adhere to a strict enrichment policy, others were given creative expression in the types of enrichment which they could provide. For those who were given creative freedom, this cultivated a sense of agency within the research facility, allowing them to exert their own influence over the animals, through the objects they provided.

5.2.3.3 Enrichment Effectiveness

As well as enabling creative expression within the facility walls, the provision of effective feed enrichment could also be extremely rewarding for staff members. This sense of fulfilment was particularly prevalent in the instance of pigs, as their reactions to the enrichment provided were often very rewarding.

> 'Yeah, pigs are the most fun to enrich because you really see the rewards'.
>
> **Troy, Interview**

In this short excerpt, it is clear that pigs cultivated a sense of fulfilment for the animal technicians who provided this enrichment. We can also begin to recognise the contractual nature of enrichment in this quote as pigs were expected to react in a fun way in order to reward the technicians for their trouble. In order for technicians to feel good about their role in enrichment provision, animals had to show enjoyment in what had been provided. This was highlighted strongly in instances where feed enrichment was not successful. For example, sheep were deemed to show relatively little interest in enrichment which in turn cultivated a lack of interest in providing them with this.

> 'Sheep you literally can't enrich because you give them anything and they don't care. They just care about grass and water and that's almost exclusively that. Um they'll like a cabbage occasionally but that's kind of it.'
>
> **Troy, Interview**

In this example, Troy is keen to emphasise that little joy is gained through the provision of enrichment for sheep. He goes so far as to state that they 'don't care', ascribing them with a sense of agency. Interestingly, the animal welfare literature is increasingly recognising the value of providing enriched environments for sheep (Aguayo-Ulloa et al 2014) however some staff members within the facility had simply deemed these species to be 'unenrichable'. We can begin to recognise that in order for enrichment to be deemed successful, animals had to pay back their caretakers for their initial generosity. Liddy was also keen to describe the frustration she experienced during a study where there was minimal payback from the animals.

> 'We've had problems with pecking hens, so they'll like literally peck…. And then you're putting in loads of enrichment and I think it can be quite frustrating because you're just

> like 'Can you stop hurting each other? Because I'm like giving you everything here. Like give me a break!' So, in terms of that it can be a bit stressful.'
>
> **Liddy, Interview**

Despite the value placed on enrichment as a means to reduce incidences of feather pecking within the welfare science literature (Dixon et al 2010), enrichment was not always the cure for boredom or aggressive behaviour, which created frustration for caretakers in turn. Far from a 'one size fits all' solution within the facility, enrichment could sometimes fail which Technicians often felt responsible for. By focusing on moments where enrichment has failed, we can begin to recognise the implicit requirements of enrichment which were not always mentioned in successful cases. Animals were expected to interact with the enrichment in the correct way, in order that the process was perceived to be rewarding for both caretakers and their animals. There was a sense that animals should 'pay back' their human caretakers, by expressing the right forms of behaviour. This has been emphasised by Chang & Hart (2002, p17) when they describe how enhancing animal behaviour and comfort often 'increase[d] the attractiveness of the species and job satisfaction for the person'. However, this job satisfaction was challenges when certain species did not interact with or actively appear to enjoy certain enrichment methods.

Ultimately then, the provision of feed enrichment provided caretakers and their animals with a variety of experiences within the research facility. Food had an important role in encouraging the movement of animals through the facility landscape, as well as disseminating any atmospheres of discomfort which may have been created as a result of a particular procedure. Feed enrichment also enabled caretakers to express themselves creatively within the research landscape and experience pay back as a result of their efforts, creating comfort for them in turn as they witnessed animals interacting with their enrichment.

5.3 Factors Impacting Enrichment Provision

Now that differing types of animal enrichment have been explored within this chapter, attention can now turn to factors which impacted the provision of enrichment within the facility, external to the human – animal bond. Whilst considerable emphasis has been

placed on the proactive role required of both human and animal in order to cultivate successful enrichment, the practice itself was often curbed by a need to comply with wider cultures of standardisation and economic constraints, as has been well recognised within the literature (Williams et al 2009, Sanz et al 1999). There is value in exploring these factors further, in order to ensure that the caretaker is not deemed wholly responsible for the failings in ensuring 'freedom from discomfort' as were observed within the research landscape.

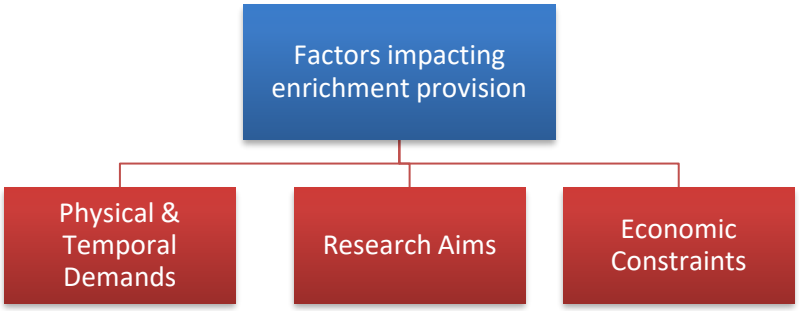

Figure 3 - Factors impacting enrichment provision within the facility

5.3.1 Physical & Temporal Demands

Caretakers within the facility were very aware of the temporal and physical challenges which often prevented the implementation of additional enrichment. During our interviews animal technicians were often concerned about having enough time in their daily schedule, time which could be impacted by the provision of extra enrichment.

> *'I mean it would be nice to have the* [cages] *slightly bigger for more enrichment, but then you've also got to think of time and things like that.'*
>
> **Jane, Interview**

In this quote we can recognise the conflict between the provision of more enrichment for animals, and the associated time it would take to check these cages. Even though normal behaviour is compromised as a result of these decisions, Jane is acutely aware of the impact that extra enrichment could have on her own workload, a recognition which was also echoed by other individuals within the facility.

> *'I would prefer more enrichment but logistically it's a nightmare, especially when you're trying to look in a tank to see which fish are healthy. If they're hiding behind a weed and you can't see them then you can't judge whether or not that fish is sick and in need of euthanising or not so, that's one of the dangers.'*
>
> **Jude, Interview**

In this excerpt we can begin to comprehend the additional time which would be necessary for welfare checks if each tank was filled with enrichment. Jude's comment highlights the scale of animal research and the difficulties of spending too long on a particular fish tank when there are hundreds more to check. He even emphasises that enrichment could potentially mask aversive welfare states within the cage, enabling the minimalistic enrichment provision to be justified within the facility on the basis of animal welfare.

As well as adding additional time to welfare checks, enrichment also increased the time spent cleaning within the facility, as I experienced first-hand when I was given the opportunity to clean out a large concrete enclosure for a group of pigs.

> *'Etienne hands me a collection of tools, including a fork, brush and dustpan. Dirty and wet bedding is flicked behind us and then collected for disposal in one of the metal bins. Faeces are scooped up, enrichment toys cleaned and the muddied cardboard, a remnant of old enrichment, is peeled off the floor and chucked as well. The smell is overwhelmingly strong, and the cardboard is challenging to peel off the ridged cement floor.'*
>
> **Ethnographic Notes, shadowing Etienne, 2019**

During this cleaning task, I experienced the additional time constraints provided by the provision of enrichment first hand, constraints which are starting to be recognised within the welfare science literature. For example, when describing different types of feed enrichment which could be provided for laboratory monkeys, Dean (19313) caveats their provision by emphasising that some methods are 'too labour intensive to provide to large numbers of animals'. Whilst the provision of cardboard boxes had provided the pigs with an enjoyable experience within the facility, the pigs ultimately created an unpleasant space for staff members in turn, by rolling their enrichment toys through faeces and

trampling straw and cardboard into the facility floor. It is therefore clear that enrichment provision added additional time and physical labour to the act of caring for animals within the facility, a burden which not all technicians were keen to shoulder.

5.3.2 Research Aims

Caretakers were also restricted in the provision of enrichment by the research aims of the study. For the majority of technicians sticking to the enrichment policy was a crucial requirement to ensure the quality of science which was produced.

> *'It's about the bigger picture as well as the animals. It's great with the animals, giving them loads of care and giving them loads of enrichment and stuff which is brilliant but you may upset a behaviour study if you chuck a load of enrichment in cage, so you know, you've got to think about the whole thing.'*
>
> **Tess, Interview**

Tess's quote reveals that far from having a lack of interest in providing animal enrichment, technicians were frequently constrained by the research study itself, which required them to standardise their provision. Whilst the welfare science literature is increasingly recognising the value of enrichment in enhancing the 'validity and reproducibility of the research' (Bayne & Wurbel 2014, p274) technicians have frequently expressed concern 'that enrichment may negatively affect standardisation' (Stevens 2021, p2). These concerns are recognisable in Tess's quote as she describes how she could 'upset a behavioural study' by tailoring the types and quantities of enrichment provided. .It is therefore clear that perceived issues around standardisation had a real impact on the amount and type of enrichment found within the research facility.

Despite the clear rules around enrichment provision within the research facility, some caretakers continued to express themselves creatively and with agency in relation to the enrichment policy, as was mentioned by Gabriel and Marcia during their interviews.

> *Over here we can provide extra* [Enrichment], *as it's not so clinical. You can have those enrichments and stuff like that. But even down, you know in other units that I do sometimes work with. If it's just breeding animals I'll try and give them a bit of extra, different types of bedding so they can construct a proper nest.*

Gabriel, Interview

> *'The main standard enrichment is usually a tube and a little cardboard house. However, we do have plastic enrichment, lots of different things, we have little hammocks and- we have all sorts! So, I do tell the other techs, change it up a bit…. I'm quite happy for them to change different bits of their enrichment to keep the mice happy and more engaged in their environment.'*

Marcia, Interview

Both excerpts emphasise how some staff members actively went above and beyond to ensure that effective enrichment was provided within the facility. Despite the clear enrichment policy which was in place, caretakers felt that the needs of their animals were too great and chose to prioritise animal comfort over scientific standardisation. Such an admission emphasises how there was often a haphazard and unstandardised approach to enrichment within certain pockets of the facility landscape, whilst in other areas enrichment policies were strictly adhered to. These variable approaches to enrichment provision within the research facility, created an ever-changing landscape of 'freedom from discomfort' for laboratory animals, which depended on the rebellious nature of the caretaker who was responsible for them.

In certain spaces, enrichment could not be so easily provided due to the concrete constraints of the research study. The enrichment requirements had to be respected by staff members, which cultivated a unique form of discomfort for the caretaker in turn.

> *'We had chickens in…. and for the purposes of the study, they have to be on mesh flooring…. We said to them* [Researchers] *'Right, because they have a week where we're not going to be collecting samples, can we put them on solid flooring?' and they* [Researchers] *said no. Even though we said it's a massive welfare concern, we expressed how we felt- they said no. So that was quite difficult'.*

Liddy, Interview

In this example Liddy strongly feels that the research landscape does not provide 'freedom from discomfort' for the chickens, and she sought to enrich their lives via the provision of a more comfortable substrate. However, despite recognising the discomfort of the mesh flooring and actively seeking to improve this, the quality of the space could

not be altered due to the research aims. In this anecdote, the chickens can be seen to exist in a 'carceral space' as first conceptualised by Morin (2016, p1317). Despite considerable attempts on Liddy's behalf to alleviate the discomfort of these chickens, they remain trapped on the mesh flooring. This experience also created a palpable feeling of discomfort for Liddy in turn as she describes how difficult it was to deal with.

Through these examples we can begin to recognise the variable provision of enrichment within the facility landscape. Whilst the provision of more comfortable and enriched spaces was championed by certain staff members, it was not always something which was possible for the technicians to provide. In some scenarios, the ethical discomfort of animals which technicians attuned to, simply had to be felt and could not be altered due to the constraints placed upon them by the facility. This notion of coping in challenging emotional circumstances is one which has been explored extensively within the animal welfare science (Van Hooser et al 2021, Lafollette et al 2020) and animal studies literature (Roe & Greenhough 2021). However, the examples presented here conceptualise a notion of technician discomfort, as cultivated as a direct response to the spatial provisions provided for animals within the facility.

5.3.3 Economic Constraints

Enrichment provision was also compromised by economic constraints within the facility Despite the generous actions of animal caretaker's day to day, animal research facilities are also run as a business which meant that decisions were often made to benefit the facility financially, which could sometimes act in opposition to the provision of animal care.

> *'It's an animal care job; it is an animal service job. We are providing a service; we are customer care. The academics are our customers, the animals are the products. You have to with this industry think of it as a business, erm obviously animals are more sentient and you need to make sure that they are happy and everything, but at the end of the day if the academic goes 'I need this for this and this, that's what they have'* […] *It's what the animals are there for'*
>
> **Gabriel, Interview**

Despite the desire for animal caretakers to express their generosity and creativity within the facility landscape through enrichment provision, all decisions were mediated by the economic impact they would have. Indeed, economic factors have been recognised as one of the main reasons why certain species, such as zebrafish are provided with 'little or no enrichment' (Stevens 2021, p2). Gabriel recognises these economic challenges when he describes providing a service for researchers. This meant that technicians were sometimes unable to provide as much enrichment as they would like, forcing them to make economic choices about the types of enrichment that they could and couldn't provide for their animals. The power of economics was also recognised during discussions with another animal technician.

> *'There is always like budget constraints…. The reason we were making those swings. You can buy chicken swings but they're £20 each and we need like hundreds of them so…. There are always limitations to what you can do but if it's a cheap method of enrichment you won't get stopped from doing it and obviously if it's right for the animal…. If it's expensive than you have to have really good justification for it. You can, you know, still ask. It's not like 'oh you'll never get it' but if there's a cheaper alternative than you would be expected to do that.'*
>
> **Cathy, Interview**

Finance appeared to have a mediating influence over which enrichment was and was not able to be provided within the facility, impacting the alleviation of animal boredom in turn. Due to the budgetary constraints faced by staff, technicians either had to justify their reasoning for needing a new product within the facility or make their own cheaper versions. Despite these economic limitations it is notable that technicians responded to this barrier by crafting their own versions of enrichment. Whilst economics could be described as having the final say in the ability of caretakers to provide 'freedom from boredom' within the facility, some technicians were able to overcome and adapt to these constraints.

By exploring external factors which impacted on the provision of enrichment, we can begin to recognise that enrichment is not simply cultivated within the human – animal relation. Whilst the interactions between technician and laboratory animal is crucial, enrichment provision was also impacted by wider concerns such as temporal demands,

economic constraints and research aims. Emphasising this is crucial as it enables us to recognise that caretakers are not always culpable when 'freedom from discomfort' is not achieved within the research landscape. The animal welfare science literature often highlights that it is the actions of the animal caretaker which ultimately decide an animals welfare day to day, however this thesis finds fault with this logic when there are wider external factors at play. Factors which the welfare science literature does not consider to a great enough extent.

5.4 Conclusion

This chapter has sought to explore the myriad of ways within which freedom from discomfort can be created within the research facility, via the provision of animal enrichment. By exploring three types of enrichment provision, including environmental, relational and feed enrichment, this thesis creates a new understanding of discomfort within the research landscape, recognising discomfort as a physical experience, an atmosphere and a feeling of ethical disquiet in relation to the practices of animal research.

As this thesis is attempting to cultivate a welfare science perspective, it is important to consider the impact of enrichment on the animals physical and mental state, as proven through my fieldwork and engagement with the welfare science literature. Through my explorations, it was clear that animals experienced implicit discomfort as a result of their surroundings within the research landscape, which persisted unless it was actively altered or amended by the provision of environmental, relational or feed enrichment. This was implicitly recognised within the welfare science literature, which actively encouraged enrichment provision for all laboratory animals (Baumans 2006, Lecker & Froberg-Fejko 2016, Collymore et al 2015). This discomfort was also recognised in the actions of technicians who sought to provide extra enrichment for individuals who were housed in the facility for long periods of time, as well as providing additional enrichment for those who were socially isolated from conspecifics. An atmospheric form of discomfort was also recognised within the facility landscape, which appeared to be experienced by animals when a specific procedure was performed or when they were forced to interact with a specific caretaker. During my data collection, it was clear that enrichment was used as a

method to disrupt these aversive atmospheres, emphasising its value in providing 'freedom from discomfort' within the research landscape.

Whilst 'freedom from discomfort' has been exclusively drawn on throughout this chapter, it is clear that enrichment provision also facilitates additional freedoms within the laboratory. As has been noted throughout this chapter, all three typologies of enrichment had a crucial role in facilitating the expression of 'normal behaviour'(FAWC 2009, p2) as enrichment provided opportunities for animals to forage, interact and explore with their surroundings, allowing them to experience a 'good life' (p16). Feed enrichment also provided caretakers with opportunities to ensure that animals were not experiencing 'hunger and thirst', a freedom which is achieved through the provision of a 'diet to maintain health and vigour' (FAWC 2009, p2). Certain forms of enrichment were also used as a tool to minimise feelings of 'fear and distress' (FAWC 2009, p2) within the facility walls, as a direct result of aversive procedures or inappropriate living conditions. Thus, there is considerable value in viewing the provision of enrichment from a multi-freedom approach in order to understand the benefits that enrichment provision can bring for animals within the facility.

In recognition of the implicit animal discomfort which was found within the research space, this chapter has charted how technicians actively worked to attune with the animal, in order to determine the enrichment that would be most appropriate for each individual. This enabled them to provide enrichment which encouraged a particular type of movement, experience or feeling within the landscape which had a positive impact on the animal in turn. Alongside this active facilitation from the caretaker, animals were also expected to collaborate in the provision of enrichment in turn, reacting in proactive ways to the items or experienced which were provided. Throughout this chapter, I have seen considerable benefit in conceptualising enrichment as a negotiation between human and animal, rather than something which is solely provided by animal technicians. Both human and animal were necessary and important parts in ensuring that enrichment experiences were successful within the research facility, an extension of agency towards the animal which is not always recognised within the literature. This chapter has enabled us to recognise the intricacies of enrichment provision, with its crucial reshaping of not just the laboratory landscape but also our understandings of the human – animal relation.

Despite these proactive approaches, it is important to note that enrichment could not always prevent experiences of discomfort within the research facility. In these instances, it is imperative that emphasis is placed on the external factors at play in the facilitation of enrichment rather than viewing this as a shortcoming of animal technicians. Whilst the welfare science literature would be quick to emphasise that caretakers have ultimate control over the provision of enrichment within the facility, during my data collection it was clear that there were also external factors. These included economic, scientific and temporal constraints which are not always afforded due emphasis within the facility but are key facets of understanding human - animal relations from an animal studies perspective. When discussing the implicit discomfort within research spaces, it is important that technicians do not shoulder complete responsibility for its occurrence, as it was often dependant on factors outside of the technician's control, despite attempts to actively overcome these challenges. Emphasising the discomfort associated with the research facility is an important and novel approach to take within the literature, recognising that whilst enrichment went some way to mediate this, life within the laboratory was still an uncomfortable experience for both human and animal.

6 Freedom From Fear & Distress

> 'I looked again at the horse. He had recommenced his blind circling of the box, stumbling round and round in a despairing attempt to leave his agony behind. As I watched he raised his lolling head and gave a little whinny. It was a desolate, uncomprehending, frantic sound and it was enough for me. I strode quickly out and got the killer from the car […] There was a sharp crack and the horses legs buckled. He thudded down on the peat and lay still.'
>
> **(Herriot 1976, p44)**

6.1 Introduction

In its traditional usage, 'Freedom from Fear and Distress' (Brambell 1965) recognises that domestic animals should be given opportunities to live without fear, as this behavioural state is deemed to be the antithesis of good welfare. Both FAWC (2009,p2) and Mellor (2016 b, p2) describe 'freedom from fear and distress' as a state wherein animals should be assured 'conditions and treatment which avoid mental suffering' in order that they are able to fulfil the criteria of what constitutes a 'good life'. Reducing fear and distress is a popular area of interest within the welfare studies literature, where both physiological and psychological indicators of distress are sought to be countered by improving human – animal interactions, facilitating more benign treatments and procedures, as well as enhancing management practices for animals found within production settings.

Distress is a common buzzword within the laboratory setting and Morton (2009, p6) outlines numerous situations where 'non-pain induced distress' is likely to occur within research facilities. Morton (2009, p6) describes a range of situations, including 'social isolation', 'barren environments', 'food and water withdrawal' alongside specific study conditions, within which fear and distress, alongside other freedoms, will be actively experienced by laboratory animals. Whilst Morton's (2009) examples are study dependant, the welfare science literature has also recognised fear and distress in more day-to-day experiences, encountered by the majority of laboratory animals. Hurst & West (2010, p1) describe the 'profound effect' of routine laboratory animal handling on

the fear responses of rodents, , Carstens & Moberg (2000) describe the impact of routine husbandry practices, whilst certain forms of euthanasia have been recognised to have a distressing impact when they are performed on mice and rats (Steiner et al 2019, Valentim et al 2016). It is therefore clear that freedom from fear and distress is not always achievable within the landscape of the research facility.

Across the disciplinary divide, distress is also frequently recognised within the animal studies discipline, particularly by authors who have chosen to draw on methodological techniques such as ethnography. This is most poignantly shown in the work of Gillespie (2013, 2020) in her depictions of the violence of the auction yard, where she draws on distressing vignettes of animal suffering to encourage the reader to show some empathy towards and ultimately anger at the experiences of spent dairy cattle within America. Interestingly, the animal studies literature which explores laboratory settings, often seeks to emphasise the care experienced by animals, rather than focusing on the distress that may be facilitated in certain scenarios (Friese 2019), although Greenhough & Roe (2021) provide a notable exception with their exploration of the harms associated with animal death. Ultimately, both the animal welfare and animal studies literatures recognise the prevalence of distressing experiences for animals within production settings, emphasising the relevance of exploring this freedom within the laboratory.

Recognition of the distress experienced by animal caretakers within production settings is also a popular theme of both literatures, as shown in studies which have explored the suffering of farmers (Convery et al 2005, Porcher 2011) and veterinary professionals (Morris 2012) in relation to caring for their animals. These studies recognise the implicit harm that can be cultivated for caretakers as a result of the human – animal relationship, as a result of particular disease outbreaks (Convery et al 2005), or the more menial, day to day challenges of providing animal care (Porcher 2011). Significant emphasis has also been placed on the distress experienced by animal technicians within the laboratory, due to the challenging ethical conflicts which surround the provision of care and the simultaneous infliction of suffering which is required by animal caretakers (Haraway 1997, Greenhough & Roe 2011, Holmberg 2011). The application of 'freedom from fear and distress' to the caretaker within the laboratory, is a particularly pertinent and timely approach within this thesis.

In order to explore 'freedom from fear and distress' within the laboratory setting, the performance of animal euthanasia appeared to be the most appropriate human – animal experience to focus on, due to a number of key factors. Firstly, the performance of animal death is a common and homogenous experience across all animal research facilities. This is due to the large quantities of animals which need to be euthanised, as over 3.06 million procedures took place on UK research animals in 2021 (Home Office, 2022) and only a small number of these will be rehomed (Skidmore & Roe 2020). The welfare science literature has also raised a number of concerns with current methods of euthanasia from an animals perspective (Clarkson et al 2022, Steiner et al 2019), challenging the notion that 'freedom from fear and distress' is experienced in this context. The enactment of death also appeared to be the procedure which staff members found the most emotionally challenging, an assertion which is well supported by the animal studies literature (Gibbs 2021, Holmberg 2011, Greenhough & Roe 2019) but has yet to be explored more widely by the welfare sciences. This may be partly due to the popular animal welfare phrase which states that 'death is not a welfare concern' (Webster 1995, p15), an assertion which has convinced animal production industries to not place emphasis on the experience or emotion of performing animal euthanasia, so long as the death is performed humanely. My own conversations during data collection also refuted this claim as it revealed animal euthanasia to be an emotionally charged and topical issue for staff members.

In this chapter, a typology of laboratory animal death is outlined, which categorises different forms of animal euthanasia which currently take place within facilities. This outline is the first of its kind within the literature and gives an insight into the diversity of animal deaths which are performed, as well as placing emphasis on the emotional currency of these forms of euthanasia for the caretakers involved. Two of the most common euthanasia techniques, CO_2 culling and cervical dislocation, are then explored, in order to conceptualise the distress these procedures create for human and animal bodies. This chapter seeks to engage directly with the second of my research questions, which queries the role of euthanasia in the provision of 'freedom from fear and distress' for caretakers and their laboratory animals.

6.2 Typologies of Animal Death

As death is a well-established procedure within the animal research laboratory, it is often viewed as a homogenous process, wherein euthanasia is deemed to occur for very similar reasons. Whilst recent emphasis has been placed on animal deaths which occur as a result of 'wastage' or overbreeding (Gibbs 2021) within the laboratory, the need for a more detailed exploration of euthanasia remains. In this section, a typology of animal deaths is outlined, cultivating a more nuanced understanding of laboratory animal euthanasia, as well as highlighting the ethical and emotional costs that these forms of culling create.

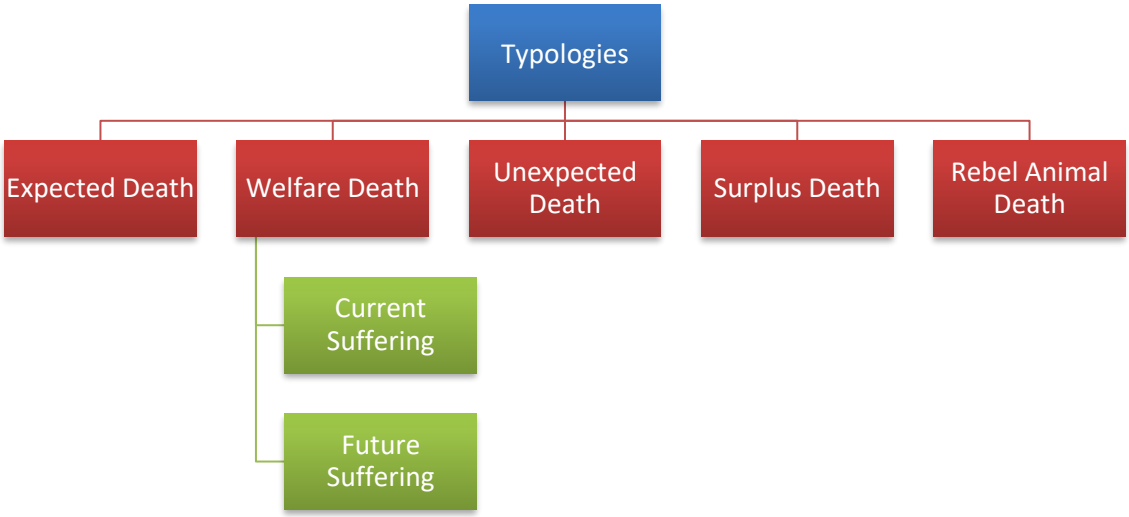

Figure 4 - Typologies of animal death performed within the animal research facility.

6.2.1 An Expected Death

> **Definition:** A managed death, which occurs at the right time in the right place allowing the animal to be used in data collection.

The most common form of animal death which occurred within the laboratory setting was an expected death, which took place when research study aims had been met and the animal was required for data collection. Deaths which took place on this planned time scale appeared to cause minimal emotional disruption for staff members as there were clear expectations in place about when this euthanasia would occur.

> *'The majority of the stuff* [animals] *we have is all time pointed so you know sort of… this line will go for 6 months; this line will go for a year. Yeah, you kind of know and expect it.'*
>
> **Clement, Interview**

When Clement makes reference to 'time points' within this study, he is describing the designated endpoints which would've been approved by the ethical review board at the start of the study. Designated endpoints detail the severity of the procedure and stipulate exactly when the animal is due to be culled (ASPA 1986). Whilst this legally justified time point worked to fulfil ethical review and research aims, it also enabled technicians to have expectations of when and where their animals' deaths were likely to occur. This schedule of anticipated death appeared to make it easier for caretakers to manage their emotions and ensure minimal distress for these staff members day to day. Furthermore, this thesis would argue that severity end points functioned as a protective tool for caretakers, as recognised in the way staff members spoke about them.

> *'Every mouse that's on a project licence has a severity end point… so there are some that you think would need to go but their severity end point has agreed to be a lot further along, so that is our main gauge'*
>
> *' I mean I go towards them, and I think is this one alright? But as long as you speak to someone in that area of the facility, they know the severities that their animals are on.'*
>
> **Sue, Interview**

Sue describes how end points functioned as a 'gauge' for caretakers, which worked to enable the performance of animal distress within the facility within certain predefined constraints. Despite worrying observations of animal distress as observed by Sue, the fact that these studies had already been approved by an ethics board ultimately minimised her distress in turn. So important were the severity end points of these studies, that technicians would rely on these over their own intuition, trusting that animal welfare had already been evaluated and protected by the AWERB of the facility. Staff confidence in ethically approved procedures had an integral role in minimising the distress experienced by animal technicians.

Deaths which occurred at an expected time and place also came with their own connotations of a sacrifice and greater good, which worked to reassure the caretakers who were performing these deaths.

> *'It's nice to get the chicks from a day old. You raise them to six weeks and then you terminally bleed them, take them to the incinerator and the blood is being used for a much greater reason than any other chicken I can think of.'*
>
> **Troy, Interview**

Here narratives of greater good and sacrifice can be recognised in association with the performance of expected deaths within the facility. Research animals have been seen in some facilities as 'deathless angel' (Svendsen et al 2018, p27), as they provide their bodies for the production of scientific knowledge, as well as being 'carefully prepared, and sometimes bred, as a sacrificial victim' within laboratories (Lynch 1988, p275). Levina (2018) takes this notion one step further by arguing that laboratory animals are in fact 'active collaborators and participants in their own sacrifice' (p233). An Expected Death was not a 'literal extinction of life but a symbolic annihilation' which ultimately ensured the creation of knowledge for scientific researchers (ibid 2018). Such imagery cultivates an altruistic animal which is happy to be euthanised for broader scientific gain. It is therefore unsurprising that the performance of this death was an ethically benign practice within the facility, as the animal was deemed to be an active participant in their own destruction.

These narratives of sacrifice and the implicit trust in the designated end points, created a death which was ethically acceptable within the facility walls. Animals euthanised in this way, have been described as having the 'best ending' (Svendsen et al 2018, p27) as death was deemed to occur at the right time and allow the collection of scientific data. There was a sense of inevitability to the performance of this euthanasia day to day, which worked to obscure the realities of animal euthanasia within laboratory, notably, that the 'edifice of what we call scientific, medical, knowledge is built upon animal corpses' (Birke, 2012, p2).

6.2.2 A Welfare Death

Definition: Euthanising an animal due to a welfare complaint which is experienced in the present moment or is likely to occur in the future.

Euthanasia was also performed in the laboratory when animals were experiencing compromised welfare. This form of death was geared towards alleviating the distress of the animal and relied on technicians effectively recognising and alleviating this suffering as swiftly as possible. Two different forms of welfare death were common within the facility; including euthanasia as a result of current suffering, as well as the performance of euthanasia to alleviate the perceived future suffering of an animal.

6.2.2.1 Current Suffering

Most commonly, welfare deaths involved the euthanasia of animals who were recognised to be suffering in the present moment. These individuals were often instantly recognisable to technicians as they would show 'abnormal behaviours', decreased food and water consumption', 'loss in body weight' or even 'unexpected traumatic wounds', as recognised by Sivula & Suckow (2018, p6). Individuals found in this condition scenarios were thought to be experiencing severe distress, and 'the overall goal [was] to mitigate the pain or distress… that would be otherwise unrelieved'. Thus, emphasis was often placed on a humane and quick death for these individuals.

> *'Jude tells me how he identifies fish with poor welfare. 'Anything that's shied away from the shoal of fish or any* [fish] *that are gasping at the surface, anybody lying on the bottom of the tank, obviously they need removing and humanely culling immediately.'*
>
> **Ethnographic Notes 2019**

> *'Sometimes when you see mice that, I don't know have had their penises completely bitten off, your just like 'Oh my god' and you don't hesitate, you do it straight away. It's just like 'Urgh the pain that animal must be in'. I am a bit of a bugger because the symptoms I see I'm like 'well… what would that be like for us?'* […] *'well If I had that, would I want to have been treated?'*
>
> **Grace, Interview**

In this quote we can see the importance of dispatching both aquatic and terrestrial species in a timely and effective manner, a speed which has been recognised in the animal studies literature by Holmberg (2011, p147) when she describes how a good cull should be completed 'quickly and compassionately'. In Grace's interview, it is clear that this need to act quickly stems from a sense of distress, which is not just experienced by the mouse in this scenario but also by Grace herself, as she empathises with what the animal is experiencing. She describes a shared sense of bodily affect, when she applies symptoms experienced by the mice, to her own understanding of what would be painful. This approach to animal care echoes what Haraway (2007, p71) describes in her notion of 'shared suffering' when she encourages caretakers to have the 'capacity to respond, and so to be responsible' when interacting within laboratory. A similar notion to what Greenhough & Roe (2021, p12) describe as 'somatic sensibility', which involves situating the self in understandings of animal experience. This shared experience of distress and ultimately responsibility towards the animal, appeared to be crucial for dispatching animals in a timely manner, providing a sense of urgency to staff action.

Despite this sense of urgency, as demonstrated by Jude and Grace, there were examples where the timelines of animals' euthanasia were extended rather than curtailed. This is recognised by Sivula & Suckow (2018, p2) when they describe how the decision to euthanise 'may be complicated by other factors, such as […] greater public good', as in certain scenarios the inherent value of the animal can overrule the requirement for euthanasia from a welfare perspective. This was recognised during my data collection.

> *'If you have to cull one than you're a bit worried then, have you got anymore to set up? So sometimes you can't actually just cull them off when you needed to. You know, if there really poorly than you have to but something where you know they're having difficultly giving birth, and then the next pregnancy she might be fine'*
>
> **Agnes, Interview**

In this quote, Agnes justifies this delay in dispatching the animal by stating that in the next pregnancy the animal 'might be fine', which provides a reason for keeping this suffering animal alive. This active manipulation of the timing of animal death reveals the value which is associated with this breeding individual. A value which has been factored

into a complex harm – benefit calculation which caretakers are constantly assessing on the animal's behalf. This notion of inner harm – benefit analysis is something which Technicians frequently emphasised, as there were implications for breeding more animals to fill the space of culled animals, as described by Damon in the following quote.

> *'If there are any welfare issues we will email straight away, say 'this mouse is sick' – if it needs to go straight away, we'll just cull it. If it can last 24 hours than we'll say 'err this mouse is sick but if you come in, in the next half hour you can come in and take tissues'. Because there's no point culling a mouse, if we can keep it going for the next 30 minutes because we'll just have to keep breeding. So, the idea is to get what we need from what we bred, so we don't need to go round again and rebreed.'*
>
> **Damon, Interview**

Here we can see that Damon believes in maximising the potential of animals whilst alive, rather than simply replacing them. Damon's inner analysis echoes Yeates's (2010, p238) discussion of the complicating factors surrounding an animals death, including 'productivity, economics and [the] health of other animals', all of which must be taken into account before an animal can be euthanised. Despite the narratives of urgency which surrounded the performance of welfare deaths within the facility, Damon clearly believed that in some scenarios, greater value could be gained by extending the animal's life. To simply euthanise the animal without allowing it to contribute to the research, was something which Damon found wasteful. A similar notion of value was described by another technician, whilst completing a terminal blood sampling procedure on chickens

> *'You sort of push the needle in, you're like 'I've now…. This is the end of your life…. I want to get as much blood as possible so that your life has been the most valuable, the most utilitarian it could possibly be. Instead of 'meh I've got 5ml out, that will do'. 'Oh it* [the chicken] *moved very slightly, I'll end it there.*'
>
> **Troy, Interview**

In this quote, Troy talked me through his mind-set whilst completing terminal blood sampling. He describes a desire to create as much value as possible from the chicken by extracting the most blood possible, even referring to the use of the term 'utilitarian' in his

analysis of his actions. By achieving this, Troy feels that he has created a valuable life for the animals involved, even if this involves potential detriment to the animals 'freedom from distress'. Troy does admit to continuing the procedure despite witnessing a potential moment of animal distress, demonstrated in this example by the movement of the chicken. Here Troy shows a tolerance towards animal suffering which is justified by the need to create maximum scientific output. This is a similar conclusion to work by Yeates (2010, p238) which suggest that 'keeping alive […] an animal that has a life worth avoiding may be justified' when the life is entangled with arguments of 'public health, disease control, laboratory work'.

Alongside a need to create maximise utilitarian value from the animal, moments of animal suffering could also be temporary and ever shifting within the facility, which often made the decision to cull more difficult for animal technicians.

> *'It can be quite difficult in some studies because the animals all get sick and then they'll be fine and then they'll get sick, then they'll be fine and then they'll die. So, it's making sure we get them before they die and that's when it's more difficult because it's like 'it's really not well- it really needs to go' and they [Researchers] can be like 'hmmm I don't know? Let's give it a bit more time' and you have to kind of respect that they need the results as well, I think that is quite challenging at times'*
>
> **Liddy, Interview**

In this quote Liddy describes the constant cycle of illness and health which many animals underwent in the laboratory. Knowing when to initiate a welfare death was often difficult to judge, a decision made more challenging by the expectation that animals should be culled in preference to being found dead. These decisions, which involved weighing up issues of current suffering with potential scientific output, have been described as 'A tension between two different temporalities' (Svensden et al 2018, p27), a balancing act between maximising animal sacrifice and minimising animal suffering. Rather than a clear-cut decision, culling within the facility was once again a cost benefit analysis between animal suffering and maximising scientific gain, which had to be carefully managed by animal technicians on the researcher's behalf.

From these quotes it is increasingly clear that welfare deaths were reliant on the extension of empathy towards the animal form, in order to ensure that they received a timely and effective cull. However, this recognition of suffering was not always immediately acted upon, as whilst staff members sought to minimise animal distress as rapidly as possible, utilitarian influences also mediated the timelines of these deaths. Animal suffering was often tolerated in order to maximum scientific gain, an act with came with its own ethical challenges in turn for the animal caretakers.

6.2.2.2 Future Suffering

As well as alleviating current experiences of animal suffering, staff members actively euthanised animals who might experience compromised welfare in the future. This was a common practice when working with juvenile animals, as some individuals were deemed to be unsuitable for the rigorous demands of scientific research.

> *'One of the pups doesn't look very well. She is the smallest in the litter, with an overly rounded skull, squinting eyes and a thin frame. 'I don't think this one will improve', Hannah says, so she makes the decision to cull.'*
>
> **Ethnographic Notes, Shadowing Hannah, 2019**

In this example, the animal is culled on the basis that their condition is only likely to deteriorate, leading to the accumulation of welfare problems further down the line. For these animals, we can draw on Yeats's (2010, p237) work which recognises that in some instances it was 'better not to live any life at all than live the life worth avoiding'. These juvenile animals were deemed to be on a trajectory towards a life worth avoiding and were therefore culled before this could be experienced. From an animal studies perspective, these individuals are what Law (2012, p9) would label as an 'anomaly', animals which divert from the expected look and function of production animals and are ultimately euthanised. Law (2012, p9) highlights the inevitability of these individuals within fish farming, when he states that the 'process of normalisation always breeds excess'. As on the fish farm, excess and unhealthy laboratory animals diverting from the expected look and function were common. Despite the inevitability of finding these animals within the laboratory, staff members still expressed their severe dislike of culling them, due to the juvenile characteristics of these individuals.

> *'I still hate killing pups, like babies. And if they're like very new-born I have to like to apologise to every single one as I do it, I don't know why! I remember…. it was only like… my first few years anyway and I was killing these babies and I was crying. It was ridiculous!'*
>
> **Charlotte, Interview**

Whilst these deaths were justified on the basis that future animal suffering would occur, they still created a feeling of unease and distress for technicians within the facility. Despite the understanding that technicians were completing a good kill, by dispatching these animals 'quickly and compassionately' (Holmberg 2011, p147), staff members recognised that they were ultimately killing 'babies' who had yet to serve a function within the facility. Dispatching juvenile animals appeared to create a particular type of distress for technicians, in comparison to older animals. Despite their dislike of this task, staff members still completed culls on juvenile animals within the facility, supressing their distress in order to get the task done. Charlotte even describes her emotional reaction to the killing of these pups as 'ridiculous' in an attempt to distance herself from what she deems to be an inappropriate reaction to this euthanasia. The performance of juvenile animal euthanasia was therefore deemed to be a necessary task, in order to prevent these animals from experiencing a 'life worth avoiding' (Yeates 2010, p237)

Future welfare deaths were not just restricted to juveniles; they were also performed on animals that had the potential to require high levels of care from technicians in the future. Whilst these demands of care might seem achievable to a pet owner, for a technician working within the busy schedule of a facility, they would often be hard to achieve, which meant that it was often easier to euthanise the animal.

> *'You might be culling for welfare reasons; the mice get too old, and they get sick. We're limited with how much attention we can pay to each mouse each day, so we've got to make sure they're in a healthy condition'.*
>
> **Rodger, Interview**

In this quote from Rodger, it is clear that future welfare deaths also occurred due to the limits of animal care which could be provided within the facility. Due to the finite amount of attention that could be paid to each animal within the production setting, animals with

more complex needs often suffered a similar fate to Law's (2012, p9) 'anomalies' by being euthanised. This form of death could ultimately be seen as a cull of convenience, minimising future distress and effort for technicians by reducing the complexity of care which needed to be provided. Interestingly, deaths like these within the veterinary setting would cultivate strong emotional reactions, with Morris (2012, p25) describing how 'veterinarians… abhor euthanising animals whose diagnosis is considered treatable'. However, in the laboratory, these deaths appeared to be emotionally benign for caretakers, or if emotion was cultivated it was something which staff sought to actively supress, as described in Charlottes interview. Culling on the basis of future suffering was therefore something which was anticipated within the research space due to the number of animals which required care within the facility and the realities of the technician's role.

6.2.2.3 Coping Strategies for Welfare Death

The performance of welfare death within the laboratory was often accompanied by a certain amount of ethical unease and distress on behalf of animal technicians. As a result of this, technicians actively worked to ensure their own 'freedom from distress', by sharing euthanasia decisions within the facility. Decision making was often shared between animal technicians and those with a greater level of responsibility such as a NACWO's or a NVS's. This has been recognised within the welfare science literature, as 'the veterinarian is generally called on to investigate' particularly when the 'concerns involve[e] endpoints for animals on study [which] can be particularly emotional' (Sivula & Suckow 2018, p2).

> *'A lot of the ones where they've* [Technicians] *got a question is- um you know 'I'm actually not sure that this can go on any longer…. you know. Can you come in and have a look at it?' and I'll come in and almost invariably decide that we ought to terminate that animal'.*
>
> **Patrick, Interview**

Patrick, an NVS at this facility, is keen to emphasise the similarities between his decisions and those which have already been made by the staff, reinforcing how morally beneficial welfare deaths were for the individual animal. Even though decisions about whether or not to cull were rarely challenged by senior staff members, technicians appeared keen to continue to share the decision-making process.

> *'There are plenty of people I can see before I have to make that decision on my own, so there are lots of line managers, lots of NACWO's that are here that can make decisions before I have to make decisions.'*

Reuben, Interview

Here Reuben appears to 'not make a decision' regarding a welfare death until he has spoken with a more senior staff member. This reluctance to take full responsibility for a welfare death reveals some of the ethical conflicts staff members felt within the facility, even when guided by severe end points and an understanding that the animal was experiencing distress. Sharing difficult decisions was a common approach within the facility, as by asking for a second opinion, technicians appeared to be sharing out the ethical burden of a welfare death amongst their colleagues.

As well as sharing this decision, technicians also strongly believed that in certain scenarios the welfare death was the right thing to do. Rather than creating emotional discomfort as was so often the case in the enactment of other euthanasia, staff members frequently described how an emotional weight was lifted when performing these deaths.

> *'If I had to kill an animal for health reasons, welfare concerns. Absolutely got no problem doing that, in my head that's the best thing for that animal and my feelings go out the window.'*

Anne, Interview

Technicians believed that their role in facilitating a welfare death was the best choice for a suffering animal and they appeared to hold very few ethical qualms about this form of animal euthanasia. Interestingly, technicians often used welfare deaths in discussions with members of the public, as a means to alleviate public distress about animal research. This came up during a conversation with one technician who described how a recent tour of the facility by sufferers of Huntingdon's disease had sparked conversations about access to euthanasia.

> *'It was being explained* [to the Huntingdon's group] *that we have endpoints associated with our projects, so once you get to a point where you think 'that's it we won't go any further, this is as far as we go' then those mice are put down. One of them said 'but what about me'. He's going to have to live to the bitter end,*

there's no euthanasia and it makes you think, actually these mice are getting the better end of the deal really because when enough is enough, like our pets, you can say now's the time.'

Lyra, Interview

In this setting, the deaths experienced by these animals are viewed with envy by the human disease carriers. As rather than experiencing the full symptoms of the disease, mice were able to avoid this suffering. These observations fed into dialogues widely circulated in laboratory culture, which viewed the performance of animal death as a benevolent practice. Furthermore, technicians highlighted that euthanasia was a practice completed by caring and compassionate individuals, a dichotomy explored in more detail in Gibbs (2021) killing and caring paradox. This justifying narrative was frequently used by technicians when discussing euthanasia with friends and family.

'A lot of my friends are like 'I don't know how you do that, like when you care about animals.' But I'm like 'yeah but when it's the best thing for them, we can actually do that. We can actually put them out of their misery. You know, put them out of their pain, when they're not going to get better.' Why prolong it?'

Tess, Interview

Staff appeared ready and willing to defend their role in animal research by drawing on the benefits that a welfare death could bring for individual animals. Narratives like this were reminiscent of those used by veterinary surgeons in order to justify that an animal should be euthanised, as have been explored in veterinary practices. Morris (2012, p29) describes numerous examples where veterinarians viewed 'owners refusal to euthanise… as an act of cruelty' and these scenarios often cultivated the expression of strong ethical opinions and emotions. By using the example of welfare deaths to justify their role to those outside the facility walls, technicians showed the ethical acceptability of welfare deaths within their own minds.

Ultimately then, welfare deaths were branded as a means to alleviate future and current suffering of laboratory animals within the facility, and they were deemed an important component in the technicians caring tool kit. Whilst some welfare deaths could be recognised to prevent immediate animal suffering, other deaths existed within a more

complex harm benefit analysis, with caretakers actively harming animals in the creation of scientific knowledge or by curtailing animal lives. Despite this, caretakers still maintained that welfare deaths were a justified and ultimately an important part of the provision of care within the laboratory, choosing to recognise the benefits of this typology rather than the ethical uncertainty that this death can create in reality.

6.2.3 An Unexpected Death

> **Definition:** The death of an animal which occurs unexpectedly, without assistance from the animal caretaker.

Whilst the majority of animal deaths were managed by animal technicians, some deaths did occur within the research facility which were out of the technician's control. These deaths were similar to those witnessed on farms during the 2001 Foot and Mouth outbreak, where the depopulation of animals created deaths 'in the wrong place and at the wrong time' (Convery et al 2005, p100). Whilst these deaths were no fault of the technicians, they were treated with real seriousness by the Home Office, which required facilities to legally submit their annual 'found dead figures' to the government, as discussed by Troy in the following excerpt.

> *'All of the ones* [animals] *that have died randomly have to be notified and sent to the Home Office, whether they are found dead, whether they've drowned or something, whatever.'*
>
> **Troy, Interview**

Whilst an animal dying naturally within other settings, such as the domestic space of the home is a natural enough occurrence, within the research facility it was preferred if technician guided the animal through this process. Svensden et al (2018, p26) described how piglets involved in medical research 'were not meant to die by themselves' and deaths facilitated and supervised by animal technicians were perceived to be a 'better death' in comparison to those occurring unexpectedly. Facilities were keen to remain off the Home Office radar, as an unnaturally large number of animals 'found dead' would raise concerns about the care provided within the facility. Damon, a manager, even went so far as to state that unexpected deaths were not to be tolerated, highlighting the damaging impact that these deaths could have on a facilities reputation.

> *'It's a severe on the Home Office licence so we can't have any found dead, so we have to spot any welfare issues straight away.'*
>
> **Damon, Interview**

In these quotes, we can start to recognise the considerable worry that unexpected deaths could create for staff members within the facility. Such was the concern of these unexpected deaths, that in some instances they triggered the involvement of the Named Veterinary Surgeon, as described by Reuben.

> *'If we've had some die in the space of like a few days that would be a welfare issue* […] *we've had 2-3 that have died in the space of 5 days* [and] *that would be a concern* […] *That has happened before and obviously we've had advice from the vet and it all depends on the strain we've got, there's some very temperamental strains'*
>
> **Rueben, Interview**

More than an accident and a shock, in this example unexpected deaths have evolved into a potential welfare concern, requiring the assistance of the NVS. Whilst the unexpected deaths are not deemed to be the technician's fault, indeed Rueben is keen to qualify the unruly nature of the genetic strain of mice; it was clearly felt that expert advice was needed as animal welfare was deemed to be at risk within the facility. The overall goal of euthanasia is 'to mitigate the pain or distress… that would otherwise [be] unrelieved' (Sivula & Suckow 2018, p2), however in this scenario, animal suffering was being not being mitigated, as animals were repeatedly being found dead. An occurrence which was deemed to imply compromised welfare. Staff members also experienced distress in turn, as they were mentally unprepared to witness dead bodies when they came into work on a morning.

> *'There was one* [mouse] *line in here that we called 'DIM' because we would find them 'dead in the morning', it was horrible'.*
>
> **Charlotte, Interview**

Charlotte describes the unpleasant experience of finding mice 'dead in the morning', which stems mainly from the shock of encountering a dead animal before it was anticipated to occur. Despite death commonly being described as 'not a welfare concern'

(Webster 1995), occurrences of death before the animal is deemed to be 'made killable' (Harraway 2008) appear to be emotionally significant for animal caretakers. This has been highlighted by Convery et al (2005, p100) who describe the considerable emotional trauma of deaths which take 'in the wrong place and at the wrong time'. Distress is also cultivated in this scenario due to the wastage of animal life that this death represents. Lynch (1988, p274) describes how the animal body must be 'carefully prepared… as a sacrificial victim' and the death must occur at the right time in order to create useful data. Deaths which occur before the animal body can be appropriately processed, remove these sacrificial connotations, as well as preventing the creation of knowledge from the extracted data.

A less shocking, but no less distressing form of unexpected death also occurred when specific animals were culled without prior warning. Some staff described instances of going to visit a particular animal, before realising that it had already been culled as part of the research schedule.

> *'Um I think it was quite difficult when the rats went. Yeah, because I went into the room, it must've been Tuesday and it was empty, and I was like 'Oh they've all gone'. And that was quite, I think it was sadder than I was expecting it to be.'*
>
> **Jane, Interview**

Whilst these animals have arguably been euthanised in the right place and at the right time, there is a similar sense of shock as would be experienced upon finding the animal dead in the cage. There is a palpable sense of distress in Jane's quote, which stems from the loss of a specific individual from the facility, alongside the unexpected nature of this cull. The shock which surrounds unexpected deaths can therefore be seen as its defining feature, in comparison to a death which is planned and can be emotionally prepared for.

6.2.3.1 Coping Strategies

Out of all the deaths listed, unexpected deaths were one of the rarest forms of death which technicians had to deal with within the facility. Staff members were often keen to emphasise their rarity during our discussions, as a way of coping with their occurrence.

> *'There's only been two* [pigs] *on the study that have died, and we came in last week and one was dead, but the previous afternoon-evening was showing no signs*

> *of ill health whatsoever, but you never really know what's going on in there...* [Another] o*ne died of a heart attack; we weren't actually with her when she died because she died overnight. Very rare, but its research and…. You expect it.'*
>
> **Edward, Interview**

In this quote, Edward takes great pains to remove the blame from staff members by framing deaths as a common and unavoidable occurrence within the facility, whilst simultaneously qualifying how rare this form of death is within the facility. Edward is keen to justify the lack of physiological warning that technicians had before these deaths occurred, emphasising how animal distress was not visible, removing the likelihood that these deaths could be viewed as a missed opportunity for the performance of a welfare death. Here we can recognise the use of narratives, in order to minimise the distress experienced by staff within the facility and brand these deaths as 'unexpected' rather than welfare related. Yet despite these narratives, unexpected deaths remained a source of discomfort for both the animals experiencing them and the technicians expected to cope with their occurrence.

6.2.4 A Surplus Death

> **Definition:** Euthanasia which occurs because the animal has become surplus to research requirements.

Animals which were surplus to study requirements also had to be euthanised within the laboratory. This was often the case in facilities which bred their own rodent lines, as animals would be bred, genotyped and then ultimately euthanised by animal technicians if they were deemed to be Biological Surplus 'animals of the wrong sex or genotype for the experimental purpose' or Managed Surplus 'Animals of wrong age or weight for the experimental purpose' (Lewejohann et al 2020, p152) .

> *'Obviously we do have excess* [mice] *that we do have to cull but that's the nature of the role, the nature of the science, if they're not carrying the gene that you're interested in they don't have a purpose.'*
>
> **Grace, Interview**

Some facilities highlighted the inevitability of a surplus animal death. Grace describes surplus animals as expected within animal research, describing how their appearance was the 'nature of the role', which led to a death which had to be dutifully managed. A sense of inevitability was also present in Arthur's conversations about surplus animals, where he describes how his work within a breeding facility involved a high proportion of surplus animal culls.

> *'Most of the time the animals are not sick, you're just having to terminate them to control the number of animals and the colonies.'*
>
> **Arthur, Interview**

Arthur's description of numerous surplus animals is an accurate depiction of laboratory life, as surplus animal deaths and their worrying associations with wastage were very common. Discussions of rodent wastage within animal research are not new, technicians have often been described as having to 'cull large numbers of apparently healthy animals' (Davies 2013 a, p20). Whilst Madrell (2019, p110) even describes the 'new geographies of death' which had to be navigated by technicians culling surplus animals, as a result of the recent COVID-19 pandemic.

From an animals perspective, a surplus animal death is the most wasteful of all the typologies, as the animal is not able to fulfil any particular research purpose within the facility. Whilst it has not experienced any direct experiences of pain, injury, and disease, as in the 'suffering typology', it has arguably experienced a 'life worth avoiding' (Yeates 2009, p239) as it has unnecessarily experienced the facility conditions for no real purpose. Furthermore, the scale of surplus animal death is often considerable and frequently involves more than just a handful of individual animals. A surplus death cannot be seen to be 'morally permissible' when viewed from an animals perspective (Yeates 2009, p240).

This attitude was also recognised by animal technicians,. as unsurprisingly, surplus animal deaths appeared to cultivate a strong ethical and emotional burden , as shown in the literatures of Lewjohann et al (2020) and Festing & Wilkinson (2007). The expectation to perform surplus animal death cultivated a strong emotional reaction during my fieldwork, suggesting a less benign acceptance of animal surplus than first suggested by Grace.

'When it comes to sort of killing animals because you don't need them it's… I think it can get quite degrading… I've worked in other places where I've been responsible for killing other animals and it's…. not a nice feeling'

Anne, Interview

Here Anne explicitly mentions the distressing impact that this task has on her emotions and also her professional values within the facility. The performance of surplus deaths appeared to cultivate emotional and ethical turmoil, a reaction which was often linked to the scale of deaths which had to be completed.

'When you have to replace an entire colony and I killed something like 4,000 fish in one day. And I was like 'For god sake I can't do this anymore'. And yeah, I think that was probably my only time… When a fish is sick then obviously you don't have any qualms culling a sick fish because it is much better for them. But when you're culling animals that are in excess or are just not needed for an experiment than that's when you think well this is a bit…'

Jude, Interview

In this quote Jude emphasises the clear emotional impact that euthanising so many individuals had on him personally, a task which increasingly led to feelings of disengagement with the facilities values. Interestingly, he also emphasises how much easier it was to justify the performance of welfare deaths within the facility, as it was seen to alleviate animal suffering, In comparison to surplus animal death which came with their challenging associations of wastage. Once again, this suggests that there is an ethical implication to animals living without purpose within the facility, especially when it is on this scale.

Whilst rodents are the usual protagonists in conversations about waste, surplus animals were also found within large animal research. This could occur when a particular procedure was no longer performed within the facility, creating surplus animals within the facility landscape. Interestingly, managers and technicians often held differing notions of what constituted as surplus.

'Blood sampling started to dry up and Anne's large group of pigs started to be seen as surplus to requirement. One of the vets finally told her that six had to be

> *removed from the herd. Anne was present when the vet went round and chose which needed to go, she tells me that the vet picked out small problems with them, like a slight stiffness when walking, which weren't even serious issues as they would've been picked up on before. Once they had been selected the animals were culled over a period of about 6 weeks in pairs. She tells me it just seemed ridiculous as the blood sampling was very likely to pick up again soon. There was space in the facility, they hardly messed up their beds and hardly any feed was required.'*
>
> **Ethnographic Notes, 2019**

In this example we can see the differing perspectives of waste held between Anne and the Vet, who was also a facility manager. Whilst the vet clearly believed that these animals had become drain on resources, Anne did not see them as surplus, deeming them to be valuable to the facility on account of their individual personalities, rather than their quantifiable research output. Anne also believed that the vet found various health complaints on purpose, justifying that the animals were experiencing distress and therefore needed to be culled on welfare grounds, when in reality the pigs were merely deemed to be surplus to requirement. In this instance, Anne believes that 'A welfare death' was used as a smokescreen to mask the more troubling enactment of a 'surplus animal' death within the laboratory.

During data collection it also became clear that these pigs had actually been replaced by younger individuals. The culling of Anne's pig's starts to seem as though it occurred due to 'future welfare concerns', even though Anne maintains that nothing was visibly wrong with the animals. In this death, there is an entanglement of age, waste and welfare but it was ultimately these associations of surplus with these individual animals which cultivated strong feelings of distress within technicians.

6.2.4.1 Coping Strategies

To overcome the strong emotional reaction that this typology of death cultivated, staff employed a range of active coping methods within the facility. In some instances, this involved actively attempting to reduce the occurrence of surplus animal euthanasia within the facility. All three facilities were committed to minimising the production of surplus animals, an attempt which mainly relied on timely communication with the researchers, as described by Damon.

> *'When we're at stock meetings, which we have every 4-6 weeks, we'll be saying you haven't done anything with this line, it's on a staggered tick over, is it worth banking it? Freezing it down and then if you need it in a years' time we'll get it back, rather than just keeping it on the shelf'.*
>
> **Damon, Interview**

Damon's desire to reduce the occurrence of surplus animal death within the facility emphasises the discomfort that staff felt around it's occurrence. Staff also appeared to feel a sense of responsibility for the occurrence of this death, as they actively monitored of researchers in order to reduce surplus animal death. The attentiveness shown by researchers has also been recognised in recent publications, where the importance of 'careful breeding and experimental design' (Hose et al 2022, p1) has been emphasised. Rather than simply feeling distress about the occurrence of surplus animal death, we can clearly see the ways in which emotion has been converted into action in order to minimise the performance of this death for technicians.

However, in instances where practical intervention was not possible, staff increasingly had to accept the realities of their role within the facility. It was common for staff members to adopt an attitude of acceptance to the prevalence of surplus animal euthanasia within the facility in order to cope emotionally.

> *'I wouldn't be an animal carer if I didn't feel some negative emotions. Like if I have to cull a perfectly healthy animal because it's been used in an experiment- but then I have to remember that animal's purpose- it is livestock, it is- (Pause) I can't save everyone, sort of thing.'*
>
> **Gabriel, Interview**

Ultimately Gabriel describes how staff members had to remember the disposability of animal life within the research facility to cope with the realities of the research world. Rather than believing that surplus animal death was something which could be minimised, there is a sense of inevitability towards this type of euthanasia, despite the emotional burden it cultivated for staff members. Here we can recognise the acceptability of emotional turmoil within the facility, which staff members were expected to manage, in order to be deemed a useful animal carer to the facility.

Staff members were often so uncomfortable with this form of euthanasia, that individuals often pretended that the removal of surplus animals, was actually occurring for welfare reasons. This technique allowed them to feel less distressed about the euthanasia they were performing.

> *'If I have to cull any mice, I tell myself that they're not well. Some aren't well… but it makes me able to go home and sleep at night.'*
>
> **Sue, Interview**

In Sue's interview, she is keen to emphasise that the only way to reduce her feelings of distress around euthanising animals within laboratory, is to convince herself that they are all unwell. This need to reframe the reasoning for this particular type of animal euthanasia was also shown by Charlotte, who struggled to remain truthful during conversations with her 10-year-old daughter.

> Interviewer: '*Does she know, so she knows that you work with mice then?*
>
> Charlotte: '*Yeah, she* [Charlotte's daughter] *says 'oh do you have to kill them?' and I lied and said, 'Oh only if they're poorly' (laughs).'*
>
> **Charlotte, Interview**

Whilst Charlotte's alternative form of the truth makes sense for conversations with a 10-year-old, it reveals the palatability of culling animals based solely on welfare needs. Deaths were much easier to accept within the facility when they were seen to occur in line with the animal's best interests. Staff members were keen to advertise their role in this form of animal euthanasia over all others when engaging with members of the public, using the performance of animal deaths as means to calm ethical disquiet around their role in animal research.

Surplus animal deaths can therefore be seen to cultivate a significant amount of distress and ethical unease for both humans and animal within the research landscape, as animal's lives were created and then actively curtailed for no real purpose. Whilst caretakers worked to actively minimise this occurrence, in many scenarios caretakers chose to obscure feelings of distress by deeming this surplus as unavoidable or convincing themselves that the animals were unwell. In the performance of this euthanasia, we can

recognise the ways in which caretakers prioritised their own emotional wellbeing over that of the animal, so to minimise their own distress.

6.2.5 Rebel Animal Death

> **Definition:** Euthanising an animal on the basis that they do not comply with study aims, as they are displaying difficult or aggressive behaviour.

Death also occurred when individual animals displayed disruptive behaviour within the facility, due to the distress they created for animal technicians in turn.

> *'Jackie mentions a ram who is well known for his bad temper, he's caused multiple accident report forms for staff in recent months. In order to get rid of him, the staff have swapped him on to a terminal research study. It seems to be a means to terminate him without feeling too guilty about it.'*
>
> **Ethnographic Notes, 2019**

In this example we can see how the disruptive personality of the ram had created distressing experiences for animal technicians, which could no longer be tolerated within the facility. This need for animals and animal technicians to comply within the laboratory walls has been discussed by Giraud & Hollin (2016) in their paper about caring for laboratory beagles. They describe how both caretakers and beagles are 'moulded into 'model' objects' (p36) by laboratory culture in order that they do not disrupt or 'threaten experimental goals'. By moving the ram onto the terminal research study, staff ensured that he no longer disrupted experimental goals, minimised the stress of working with this individual in turn.

By subtly moving the ram between research studies, complex and difficult decisions were ultimately simplified for the technicians, leaving little ethical cost or guilt associated with their actions. Whilst this action seems ethically ambiguous, one cannot escape the fact that the animal's timelines has been drastically curtailed, moving from a 3–4-year role as a breeding animal to a 1–2-month role on terminal research study. By drawing on Yeates (2010), we could argue that the curtailment of this ram life does have an associated ethical cost, as 'deadness' (p290) creates a lack of positive experiences for this animal. However, technicians had instead chosen to prioritise their own experiences within the laboratory which over ruled the ethical cost of this euthanasia.

Euthanasia can therefore be recognised as an important tool in minimising animal disruption within the facility, accelerating timelines for noncompliant animals whilst elongating them for those who were well liked. Whilst unexpected death appeared to be something which technicians felt 'happened to them' and was out of their control, here we can see the ways in which technicians actively used culling as a tool to service their own preferences within the facility by choosing who lived and died.

Throughout this section we have traced a narrative through the different typologies of animal death experienced within the research facility. Whilst these typologies provide an important starting point for recognising the different reasons and scenarios as to why animal death occurs, it is crucial to recognise that these categories are not mutually exclusive. Often the reasoning behind the performance of euthanasia could be a mixture of one or more typologies, alongside other factors such a monetary concerns and scientific demands. Far from viewing death as a homogenous term, instances of animal euthanasia can instead be viewed as diffuse and complex, creating a broad spectrum of emotions for the staff members who are expected to perform them and ethical challenges for the animals who experienced them. It is increasingly clear that they cultivated specific experiences of distress and ethical discomfort for the human and animal bodies involved, challenging the current notion that euthanasia always ensures 'freedom from fear and distress' within the laboratory space.

6.3 Methods of Death

Animal euthanasia within the animal facility occurs by two main methods, which includes cervical dislocation and induction via gaseous CO_2 . Whilst both procedures are legal under the ASPA regulations (Directive 2010/63/EU), their performance has historically created divisive opinions within facilities. In this section, the differing emotional experiences and animal welfare consequences of these two euthanasia techniques will be explored, following in the footsteps of Greenhough & Roe (2021) who have evaluated these methods in their recent paper. Emphasis will be placed on the factors which influence the acceptability of euthanasia technology in some facilities and create its contested role in others, highlighting the ways in which human and animal distress modulates euthanasia choices within the animal research facility.

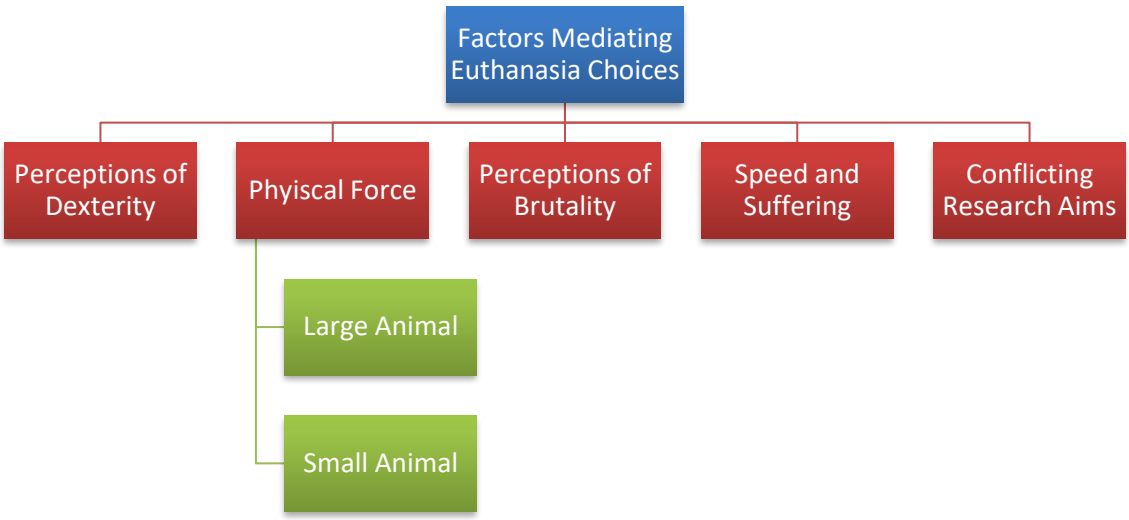

Figure 5 – Factors mediating euthanasia choices within the facility

6.3.1 Perceptions of Dexterity

One of the main reasons why a reliance on CO_2 chambers has become commonplace within research facilities is the perceived dexterity that cervical dislocation demands of its staff members. In contrast to the CO_2 chamber, which required staff members to simply place, monitor and then remove the mice from a gas chamber, cervical dislocation of rodents required the individual to personally detach the animals brain stem.

> *'Lyn takes her metal paddle, labelled with her name and chops it down on the small neck of the mouse. As she presses down the mouse's eyes bulge and then the paddle is through- she wiggles it from side to side to create a floppy area between the head and body. Then she feels with her hand to ensure that the breakage is complete, 2 pieces of skin rather than hard bone connection head to body*.'
>
> **Ethnographic Notes, 2019**

Cervical dislocation required a specialised set of movements which included pressing, wiggling, and feeling in order to ensure a successful euthanasia. Whilst many staff members felt confident in dispatching animals using these methods, the welfare science literature has noted a number of concerns relating to 'potential inaccuracy in application' (Clarkson et al 2022, p419) of cervical dislocation which could lead to 'unsuccessful euthanasia' (Carbone et al 2012, p356). In order to mitigate against this, technicians had

to ensure that they recreated this specialised set of movements for each and every cull, which required constant improvement and introspection.

> *'Even though I was signed off, I'd ask someone to check me every now and again just to make sure that I hadn't got into bad habits and that I'm actually doing this* [Cervical Dislocation] *properly. Because you know you can get into a habit where you'll keep doing it and at some points you think what you're doing is right but it's actually not.'*
>
> **Clara, Interview**

Clara describes how 'bad habits' can sneak into the performance of cervical dislocation, as noted by Clarkson et al (2022). It is therefore easy to understand the reluctance of some staff members to complete this form of euthanasia, particularly as the gas chamber was much simpler to operate.

> *'The mouse is placed in a small red box by Liddy, the lid is attached securely and then Liddy moves to switch the gas chamber on. The chamber runs on an automatic system so we both watch as the gas gauge slowly crawls upwards. The mouse is seemingly oblivious to begin with, moving backwards and forward in the cage – sniffing the corners.*'
>
> **Ethnographic Notes, 2019**

As described, the action of starting the CO_2 machine was much less complex than the skilled dispatches of cervical dislocation. There was an element of skill involved in cervical dislocation which involved a 'manual manoeuvre' (Marris 2006, p570) by highly trained individuals. In contrast, technicians using the CO_2 machines simply had to turn the machine on and off. We can therefore start to recognise how CO_2 culling was a much easier and more convenient method for caretakers to perform within the facility.

6.3.2 Physical Force

In addition to these specialised movements, cervical dislocation also required staff members to exert a particular amount of force on the animal, which some technicians found physically demanding and emotionally challenging to exert. In this section,

narratives involving small and large laboratory animals will be discussed in turn, in order to explore the nuances of the cervical dislocation procedure for these animals.

6.3.2.1 Small Animal

Discussions of the force required to complete cervical dislocation on small animals within the laboratory varied considerably. In some narratives, emphasis was placed on the considerable force required to complete this procedure, whilst others described it as requiring no more exertion than would be required to handle the animal.

> *'Lyn tells me she's changed culling technique due to arthritis in her wrist which prevented her from pressing as hard as she felt she needed to. 'My culls were always good enough, I just felt panicked and anxious that I wasn't applying enough pressure' she tells me. She describes how the mice started to struggle the more stressed she became, as they sensed her upset, which made the culling process even more difficult'.*
>
> **Ethnographic Notes, 2019**

Helen's perceived inability to press down with enough force during cervical dislocation highlights the strength which is required to dispatch rodents. It is clear that a considerable amount of strength is required in order to ensure an effective cull, referred to in the welfare science literature as the application of 'sufficiently forceful tension' (Carbone et al 2012, p352). She also describes the distress she experienced when she felt unable to cultivate this force, which was recognised in turn by the animals she was seeking to dispatch. Confidence whilst performing euthanasia appeared to be a crucial technician attribute, as distress could easily travel between human and animal if sufficient force was not mustered euthanise effectively. ..

Despite Helen's personal difficulties with applying sufficient force, other staff members found the cervical dislocation process easy enough to administer and master. Some technicians were keen to dispel the myths around the difficulties of force required.

> '*It* [Cervical Dislocation] *sounds a bit hands on but actually it's very swift and if you're handling mice all the time it's no different to picking them up if you like; it's that quick.'*

Lyra, Interview

In contrast to Helen, Lyra emphasises the minimal strength involved in the cervical dislocation of rodents. The movement was a described as a rapid and easy motion, which Lyra equates to the handling of mice.

> *'I go like that with a pinch, some people go like that (shows me a sliding gesture). So, there's a couple of different ways* […] *So when we are culling that we don't need, we'll do dislocation of the neck'.*

Damon, Interview.

Damon highlighted the ease of completing cervical dislocation on rodents, by showing the simple movements involved in the provision of a cull. These narratives from Lyra and Damon work to negate the notion that it is a dexterous or physically demanding task, as once the skill had been mastered, technicians appeared to perform it rapidly and easily, highlighting their confidence in this procedure. In these narratives of cervical dislocation, we can begin to recognise the conflicting opinions which surrounded the performance of the same procedure, as well as the perpetuation of myths about brute force which the procedure was deemed to hold.

6.3.2.2 Large Animal

In contrast, the cervical dislocation practices of larger animals cultivated unanimous narratives about the sheer brute strength, which was required, an exertion of force which staff members often found emotionally and physically challenging. This was notable when discussing the euthanasia of chickens at one of the facilities.

> *'Their* [juvenile chicken] *necks are very thin, so the pressure to break their neck is about the same as starting a lawnmower. Whereas a large chicken, it feels like they've like wronged your family, because you're like* (Mimes the gesture, face showing exertion, makes noise to demonstrate neck breaking) *it's like Ugh and it makes your neck feel super vulnerable. It's… you're like Ugh!* (Feels his neck)*.'*

Troy, Interview

Troy describes his physical aversion to the cervical dislocation procedure within the facility, as well as emphasising his distress through his facial gestures and hand

movements. In this scenario, Troy shows considerable empathy for the chickens he is cervically dislocating, as when he performs the action on the animal it makes his own neck in turn feel vulnerable. Despite his aversion to this process, Troy was aware of the importance of consistently applying a considerable amount of pressure to dispatch the animal, despite it being emotionally unsettling. The welfare science literature recognises the challenges of exerting this physical force when it emphasises 'the potential difficulties encountered with manual cervical dislocation related to… operator strength and fatigue' (Hernandez et al 2019, p1). . Cathy experienced a similar feeling of unease when performing the same procedure, which was again visible on her facial features, however it appeared to be an experience which staff members acclimatised to over time

> *'It's a really horrible feeling when you do it. So, when I first did it, I used to get comments on the ridiculous face that I pull, like 'ugh!' every time I do it. But as I went on, because you get more used to the motion and it's not as – you know what to expect in terms of how it's going to feel when you do it. Like I can't really describe it – the crunch- the like yeah, I think it's just getting used to that aspect.'*
>
> **Cathy, Interview**

Once again, we recognise the unpleasant sensations that cervical dislocation creates for technicians. The procedure creates an audible crunch when it is performed on chickens, but also creates an overtly noticeable toll on Cathy as shown through her facial contortion. However, in a similar way to small animals, staff members acclimatised to its performance after repeatedly practicing the procedure on their animals. They learnt exert the appropriate amount of strength in order to ensure an effective kill. Despite its effectiveness, it still retained an emotional toll for the animal caretaker which I also personally experienced whilst witnessing.

> *'The chicken is held across Troy's body, legs up in the air neck down towards the ground, I notice that he looks away to the far ceiling and then pulls down in a sharp gesture which detaches the neck. There's a slight ripping sound and a general feel of unease one the procedure is done, and the chicken is still. '*
>
> **Ethnographic Notes, 2019**

The audio scape of the procedure was particularly unpleasant to experience and cultivated an atmosphere of unease within the facility. Distress was furthered by the fact that Troy's motions were in no way subtle, as cervical dislocation requires big, forceful motions which make unpleasant noises and take physical strength to perform. It was clear that the more force However, despite the unease and distress that this procedure created, staff members continued to complete these motions over and over in order to euthanise animals in line with study aims.

6.3.3 Perceptions of Brutality

In research facilities, preference was also placed on what the euthanasia method looked like to perform. Staff members would often chose the least aesthetically aversive technique, showing a preference for the 'least horrendous' methods of culling as has been described by Porcher (2011, p7) in the context of the pork industry. Andreas described how one staff member chose to use the CO_2 machine within the facility, due to issues with the aesthetics of cervical dislocation.

> *'There's one other* [Animal Technician] *that just likes to use CO_2 because he doesn't- he doesn't like the look of cervical dislocation because it does look quite brutal.'*
>
> **Arthur, Interview**

Here one can see that notions of brutality have become an important mediator in decisions surrounding the choice of euthanasia used. The technician clearly found the aesthetics of the procedure distressing and so had altered their own actions to ensure that cervical dislocation was avoided altogether. This is similar to Marris's (2006, p570) exploration of cervical dislocation, where she quotes a researcher who describes feeling 'more brutal if you've got a wriggling, living creature and you break its neck' This view was commonly held, as during my interviews one of the facility managers drew attention to the large proportion of the workforce who relied on CO_2 culling rather than dislocation methods.

> *'We have CO_2 as a lot of people can't physically, can't cope with the physical methods of culling and I'm happy. I would never push anyone to do a physical method if they weren't competent.'*

Isabella, Interview

Here cervical dislocation is seen as something to cope with, an unpleasant practice which some staff members are able to put up with, others found it too distressing. This notion of anticipated distress appeared to be a common phenomenon within the facility, with Isabella describing 'A lot' of animal technicians who felt unable to complete mechanical culls. It is likely that much of this distress stemmed from observations of the animal during and after cervical dislocation had been performed.

> *'After the cull it's almost worse as the fitting begins, the mouse jerks and jumps across the blue tissue paper, legs cycling in the air aimlessly. I've seen it before with pigs in an abattoir, but I must've forgotten the reality of witnessing it first-hand. It is distressing to watch and yet research suggests that they feel nothing at all'.*

Ethnographic Notes, 2019

Even though the animal is known to be insensible during this fitting (Cartner et al 2007), the imagery associated with cervical dislocation is distressing, unpleasant and noticeable to witness. In contrast, the CO_2 machine ensures that animal death is much less noticeable and distressing to witness, as during the procedure the animal is partially concealed from view. Marris (2006, p570) recognises how 'untroubling' this form of euthanasia is for the researchers, as 'the rodent appears to drift off to a peaceful death'. Furthermore, the animal also has to be placed in a coloured gas chamber, which meant that staff members were prevented from witnessing the death too closely. Yet for many staff members, performing death via the CO_2 chamber was just as distressing to watch as cervical dislocation as they were aware of the animal welfare implications of this form of death.

> *'Liddy emphasises that it's an awful way to die and that I'm welcome to look at the racks of other animals if I prefer. 'It's really grim' she tells me before it begins. The gas gauge slowly crawls its way up automatically and soon the mouse begins to scrabble at the boxes edges. There is a sense of urgency in this mouse's movements. The panicked distress is palpable as the animal desperately attempts to find an exit but isn't able to navigate the boxes smooth walls.'*

Ethnographic Notes, 2019

Liddy's summary of a CO2 death resonated strongly with my own, allowing me to understand why other technicians chose to avert their gaze. Staff often chose to obscure their view of the animal whilst the CO2 machine was in use. This has been noted in explorations by Greenhough & Roe (2021, p12) who describe this as an attempt 'to care for themselves' whilst witnessing this procedure. However, this suggestion to look away actually muddied the ethical waters, as technicians did not allow themselves to witness the distress experienced by the animal. Suffering which has been proven to be occur experienced within the scientific literature (Steiner et al 2019, Conlee et al 2005, Moody & Weary 2014, Krohn et al 2003) with Moffitt (2019, p430) even describing instances of 'emotional contagion' in a group of mice, wherein distress passed between individuals who were experiencing this form of euthanasia, which implies that it cultivates considerable emotional potency. By choosing to look away, caretakers missed the opportunity to empathise, care for and experience the suffering of their animals. In short, they chose not to experience distress, which in turn limited the opportunity to minimise this distress for their animals in turn. Some caretakers perceptions of brutality were also inaccurate, as they assumed that CO2 gas was a benign method of euthanasia, despite the considerable scientific literature which proved otherwise.

6.3.4 Speed and Suffering

Emphasis was also placed on the speed and temporalities of both culling procedures and the perceived lack of distress that was experienced by animals if these deaths were performed quickly.

> *'I prefer to do the cervical dislocation just because it's very quick- It doesn't stress out the animals much, um compared to CO_2 for instance. It does look brutal to us but for the animal it's so quick.'*

Arthur, Interview

In the following quote, there is a clear belief that the faster the euthanasia is performed, the less stress will be experienced by the animal. Such an assertion is hardly surprising, as the quicker animals are euthanised, the more rapidly they will be rendered nonsensical and the 'duration of the period where suffering is a possibility' is reduced (Clarkson et al

2022, p426). This has also been emphasised by Holmberg (2011, p155) who described how deaths which were 'quick, painless and stress-free' were often preferred by technicians.

In terms of the time taken to administer death using each technique, dislocations could be completed in a matter of seconds whereas the CO_2 machine had a set schedule which would usually last between 1-2 minutes. This difference in speed was one of the main justification's technicians used in favour of cervical dislocation, as it was perceived to be and scientifically validated to create 'rapid disruption [to] cortical function' (Cartner et al 2007, p570) meaning it was less distressing for the animal in question.

> *'I think* [Cervical dislocation] *it's personally nicer for the animals. And I don't think I should be stood- you know, I don't want to stand there and watch them suffocate basically. I'd rather just quickly get them, break their necks and then it's done.'*
>
> **Agnes, Interview**

The speed of cervical dislocation has been recognised as a means to ensure good animal welfare, as it has been emphasised that this method can 'provide a fast death with minimal negative experiences' for rodents (Clarkson et al 2022, p430). This preference for speed within the research facility could also be seen as an emotional coping strategy, as it allows staff to dissociate more effectively from the task in hand. Agnes describes how she did not want to observe death for longer than necessary within the facility, which was not possible whilst using the CO_2 chamber as it required technicians to linger and witness animal death for a much longer period of time. We can start to recognise the linkages between speed and suffering which mediated the euthanasia choices within the research facility.

6.3.5 Conflicting Research Aims

Despite these preferences for a specific culling technique, methods of euthanasia were often mediated by the type of scientific data which needed to be collected. Methods which were favoured by animal technicians could easily be overruled due by the aims of the research study.

> '*Liddy tells me she's going to use the CO_2 chamber because the mouse's brain needs to be preserved and looked at under a microscope, if she used mechanical culling it could potentially disrupt the spine and brain. She emphasises throughout our conversation that CO_2 culling is an awful way to die'.*
>
> **Ethnographic Notes, 2019**

In this quote, maintaining the integrity of the mouse's brain stem is a key requirement of the production of data, therefore CO_2 has been chosen as the most appropriate method. However, whilst Liddy performs the death stipulated on the project licence, she simultaneously emphasises it's cruelty, allowing us to recognise the conflicts surrounding euthanasia within the facility. Even though this procedure had been authorised by the facility , Liddy did not always trust this method 'to make the [animals] death a good one' (Holmberg 2011, p155). Liddy went on to express a clear dislike of CO_2 culling methods during her interview.

> *'It's one thing that I just really don't understand* [with CO_2 culling]*, you are like suffocating to death and I think that's quite a cruel way to go, whereas cervical dislocation that's just instant.*'
>
> **Liddy, Interview**

By understanding Liddy's opinion of euthanasia methods, we catch a glimpse of the conflict that she experiences daily. Her clear dislike of CO_2 sits in direct contrast with the permissibility of this method within the research facility, yet she has a duty to enact this method as part of her job, which was emotionally and ethically distressing. . In other laboratories, staff members were not expected to exist within this state of conflict, as in one facility there was a unit wide culture of no-tolerance towards CO_2 culling which led to the adoption of other methods to meet research aims.

> *'We tend to use what we call cervical dislocation, and we don't use CO_2, that is a permissible method but we don't use that here because we don't…. it's a local rule; we don't feel that it's for us'.*
>
> **Lyra, Interview**

This example shows that whilst research aims were often seen as the biggest influence over euthanasia methods, facility led initiatives could alter these standards and enable

alternatives. If technician and facility beliefs were compatible, staff could be protected from performing certain methods of euthanasia. It was ultimately the permissibility of these methods in the wider facility culture which prevented or enabled them from being performed. Distress was modulated to some extents by the unique micro-cultures existing within facility walls, as well as being mediated within specific human and animal relationships.

By exploring specific methods of animal death within the research facility and the distress that these choices could create, we have discovered that euthanasia methods are often informed by personal preference, perceptions of brutality, knowledges from the welfare literatures and facility cultures of culling. These findings add to ongoing conversations around euthanasia methods in both the animal welfare (Clarkson et al 2022, Carbone et al 2012, Marris 2006) and animal studies literatures (Greenhough & Roe,2021,Holmberg,2011). These euthanasia methods also hold specific emotional currencies for the staff members involved, showing the ways in which, the performance of these methods is intimately entangled with the distress experienced by caretakers and their animals.

6.4 Conclusion

This chapter has sought to explore 'freedom from distress' within the laboratory setting, by analysing the highly personal and often emotionally charged experience of performing animal euthanasia. This chapter begun by exploring typologies of animal death within the facility, in recognition of the multiple and diverse ways within which animals can die within the research space. The chapter then went on to explore specific methods of death which are performed within the research facility, focusing exclusively on cervical dislocation and CO_2 culling as these are the most popular methods used within facilities. Whilst a welfare perspective seeks to postulate that 'death is not a welfare concern' for animals, this chapter ultimately concludes that euthanasia was rarely an ethically benign practice for the laboratory animals and their caretakers.

As this thesis is attempting to cultivate a welfare science perspective, it is important to consider the impact that euthanasia has on an animals physical and mental state, as

proven through my fieldwork and engagement with the welfare science literature. It is clear throughout these explorations, that the animals welfare was compromised during the performance of specific typologies of animal death, as well as being present in routine methods of euthanasia. Animal distress was clearly experienced within the research facility, as a result of specific methods of euthanasia, including cervical dislocation and exposure to CO_2. This was shown via engagement with the welfare science literature (Clarkson et al 2022, Moffitt 2019), but was also proven from an ethnographic perspective, when both methods were described during my time spent within facilities. Physical distress was also noted in typologies of animal death, particularly when study aims were prioritised over the alleviation of animal suffering, as described in a Welfare Death: Current Suffering. As well as being present in the occurrence of Unexpected Deaths, as research animal distress was not mitigated via the performance of a 'quick, painless and stress-free' death (Holmberg 2011, p155).

Animal distress can also be recognised when euthanasia was viewed from an ethical perspective. Distress was experienced due to the curtailment of laboratory animal life, as 'deadness' (Yeates 2010, p290) is recognised to create a lack of positive experiences for the animal. This was shown in; a Rebel Animal Death where the animals life was curtailed due to technician dislike of an animal', in a Welfare Death: Future Suffering where technicians chose to euthanise rather than care for the animals needs and in a Surplus Animal Death where animal life was unnecessarily created and ultimately destroyed due to individuals being surplus to requirement, which arguably subjected them to a 'life worth avoiding' (p240). Here it is useful to return to FAWC's (2009, p2) definition of freedom from fear and distress, as it is clear that animals are not always assured 'conditions and treatment which avoid mental suffering' when experiencing euthanasia within the research facility.

Whilst this chapter has drawn explicitly on 'freedom from fear and distress', it has also offered us an insight into the ways in which euthanasia enables or prevents some of the other freedoms which are found within the five freedoms framework. Firstly, Yeates (2010) has enabled us to successfully argue that the prevention of positive states, such as 'expression of normal behaviour' and comfort, are actually an ethical harm for animals which are euthanised, allowing us to recognise the importance of all five freedoms being facilitated within the laboratory simultaneously. Secondly, it has also been noted

throughout this chapter, that certain methods of euthanasia do facilitate aversive and even painful experiences for the animals involved. This was shown in studies which emphasised the potential for cervical dislocation to be performed incorrectly (Hernandez et al 2019), alongside studies which recognised the aversive qualities of CO2 gas (Conlee et al 2005). In recognition of this visceral animal suffering, one could assert that 'freedom from pain, injury and disease' would have been a more appropriate lens through which to view animal euthanasia. However, distress encompasses aspects of both mental and physical animal suffering, as well as providing the most appropriate viewpoint for exploring caretaker experience, as euthanasia cultivated far more mental suffering than pain, injury or disease. However, there is a clear value viewing euthanasia from a multi freedom perspective, in order to capture the nuances of animal experience within the facility.

Explorations of animal euthanasia methods from a 'freedom from fear and distress' perspective, have also emphasised the harms experienced by animal caretakers in turn. Certain euthanasia methods and typologies of animal death were known to be distressing for the animal, which created considerable ethical turmoil for the caretakers who were asked to perform these procedures. Through my observations it was clear that this 'harm' was actively mediated by caretakers, rather than it being passively accepted as the animal studies literature seems to suggest. Some technicians chose to attune and be affected by the distress of the animals within their care, recognising the implicit harm associated with the CO_2 machine, whilst others chose this method due to its perceived lack of brutality in comparison to cervical dislocation, a decision which the welfare science literature has shown to be misinformed. . The personal choices taken by technicians with regards to euthanasia, can be seen to cultivate and also alleviate human and animal experiences of distress within the laboratory, showing the ways in which distress was entangled with, and created within the human – animal relation. However, when discussing the implicit distress of euthanasia within research spaces, it is important that technicians do not shoulder complete responsibility for its facilitation, as it was often dependant on factors outside of the technician's control, including conflicting research aims and facility preferences.

Importantly, caretakers and animals have been recognised to experience fear and distress within the research landscape in ways which have yet to be highlighted in the

literature surrounding death so far. Whilst much of the literature has chosen to focus on the care created within the performance of euthanasia (Holmberg 2011, Friese 2009), my own experiences within the facility observed methods of euthanasia which were much more harmful for the animal and subsequent caretaker in turn. Emphasising the fear and distress associated with this practice is therefore an important and novel approach to take within the literature.

7 Situating the Self Within the Freedoms Framework

> 'I said goodbye and went out of the house, through the passage and into the street. In the bustle of people and the bright sunshine, I could still see only the stark, little room, the old man, and his dead dog.'
>
> **(Herriot 1976, p97)**

7.1 Introduction

In this final empirical chapter, attention shifts from analysing the human – animal relationship within the laboratory, to an exploration of my own personal experiences of data collection as a researcher. Despite the use of ethnographies in the animal studies literature, which draw insights from the researcher's personal perspective, discussion of the emotions and physical sensations felt within the laboratory are often missing from the work of animal studies ethnographers. For example, Holmberg (2011) attempts to ground herself within the research study by providing a section on her own positionality and repeatedly using 'I' throughout the paper, whilst Friese & Latimer (2019) repeatedly reference their presence within the facility – e.g., 'Carrie asked why' (p10). However, in both, key emotional insights remain vacant from the frame of enquiry. Whilst this allows caretakers and animals to be the main focus within the laboratory, this thesis sees considerable value in centring the researcher more clearly within research studies, as has been demonstrated in the autobiographical work of Haraway (2007).

This approach has been particularly encouraged and displayed in the work of Gillespie (2018). Specifically in her chapter on the 'loneliness and madness of witnessing' where she provides some reflections on the inherent harm which can be cultivated in witnessing animal production spaces. This seminal chapter was a considerable source of comfort to me throughout my data collection, on account of its recognition of the 'psychically overwhelming onslaught of visceral suffering' (Gillespie 2018, p78) which can be cultivated for the ethnographic researcher. Gillespie (2018) seeks to 'make seen', experiences which are so often obscured in the pursuit of animal studies knowledge, a supressing of experience which ultimately leads to 'layers of damage' (p79) for the individual researcher. Whilst Gillespie's work makes considerable progress to the types of

insight which this thesis sees value in, it is notable that this discussion around animal harm exists within a separate book chapter rather than being noticeable in her own empirical findings. Whilst Gillespie (2013) provides an insight into the horrors of the auction landscape through her powerful ethnographic writing, the emotions she experienced in reaction to what she witnessed are less visceral and recognisable within her empirical work, emphasising the difficulties of displaying this emotional positionality within the animal studies literature.

As this thesis sought to recognise the harms experienced by both human and animal within the research facility, it makes sense to encourage an extension of compassion to the interviewer and ethnographer completing the data collection. This is achieved by detailing my own emotional experiences within the research laboratory landscape, recognising that my experience of data collection was a significantly challenging one. As in the previous empirical chapters, my personal experiences are structured in accordance with 'freedom from discomfort' and 'freedom from fear and distress', an approach which provides a series of useful prompts for understanding the physical and emotional difficulties which were encountered during my data collection. This chapter seeks to engage directly with the third of my research questions, which asks what can be learnt when both freedoms (fear and distress, discomfort) are used to explore my own experiences as a researcher, within the laboratory space.

7.2 Freedom from Discomfort

As recognised in the earlier 'Freedom from Discomfort' chapter, landscapes of animal research came with their own trappings of discomfort for the animal caretaker (Porcher et al 2011). However, a similar and unexplored discomfort was also felt in my own experiences within the research landscape, due to biosecurity requirements, the menial labour required during ethnographies and my contested identity within the facility landscape.

7.2.1 Biosecurity

When entering animal research facilities to complete data collection, I was subject to a range of biosecurity requirements which demanded physical alterations to what I was wearing and how I moved through the landscape. Whilst the biosecurity requirements of

the research facility were a crucial element of ensuring pathogenic control, they also had an impact on my own comfort within the laboratory landscape, as noted during my first experience within an air shower.

> 'I've been in an air shower before, but it's more aggressive than I remember. It's incredibly loud and the air buffets against my suit, lasting for 20 seconds too long. I'm told it's for 60 seconds, but it seems like longer.'
>
> **Ethnographic Notes, 2019**

Air showers have been discussed within the literature by Friese & Latimer (2019) however emphasis has been placed on these as a means to control pathogenic flow, rather than recognising the discomfort they can create for the researcher. The literature (Friese & Latimer 2019, p9) simply describes how 'air was blown […] from multiple directions for about 60 seconds' which provides a lack of detail into the physical and at time mildly aversive experience of entering the facility for both Friese and Latimer. Air showers are therefore a significant example of how discomfort as noted in personal fieldwork, differed considerably from uncomfortable experiences which were documented in the literature.

7.2.2 Labour of Care

Whilst participation within the practices of animal research was a rare occurrence during data collection due to health and safety concerns, in some instances I was given the opportunity to aid in the completion of care tasks. This experience was incredibly valuable from a research perspective but was also physically demanding.

> 'We move through both enclosures together. Animal faeces are scooped up and the muddied cardboard is peeled off the floor and chucked as well. The smell is unpleasant, and the tools are awkward to use on the cement floor. I also notice how time consuming it is, it requires physical exertion to diligently tidy up the area.'
>
> **Ethnographic Notes, 2019**

Participation within the practices of a particular culture of study have been well documented as an effective means of data collection, aiding 'immersion in the real-world context' (Jones & Smith 2017, p98) and by assisting in these cleaning tasks, I was able to experience the movements, smells and aesthetics of care provision first hand. However, physical discomfort was prevalent throughout this process, in a way which has not always

been emphasised within the literature. Despite the labour of care being extensively theorised on within the literature, this discomfort has yet to be explored from the perspective of researchers completing fieldwork within these spaces.

Discomfort was also prevalent as a result of my proximity to animals within the facility. In one scenario, I was asked to enter into a large pen of pigs to assist with their morning feed, an interaction with animals which felt distinctly uncomfortable.

> 'I am nervous as I walk along in front of the huge animals and scatter the small food piles across the floor. I am aware of the large animals behind me as I move amongst them, diligent in my work, scattering small pile after pile, the technician flashes me my first smile of the day as I turn to leave the pen, 'well done' she says.
>
> **Ethnographic Notes, 2019**

Whilst these experiences were a crucial part of my data collection, it was distinctly disconcerting interacting with large and unknown animals within the laboratory setting. There was also a need to overcome this personal discomfort, in order to prove my worth to caretakers within the facility. Throughout my data collection I was aware that respect seemed to be gained and won by assisting technicians in their care tasks, a necessity which forced me to overcome these personal experiences of discomfort in order to be accepted with laboratory culture. There was a notable change in the technicians attitude towards me once I had completed this feeding task. Throughout data collection there was a need to prove myself to those around me, which created its own discomfort in turn. A feeling of discomfort which has yet to be recognised within the literatures of the animal studies or animal welfare science literature.

7.2.3 A Contested Identity: Facility Staff

Throughout my data collection, there was also a need to continually reemphasise my allegiance to the practice of animal research. In all three facilities there was an expectation that my views should align with pro-research ideology, which meant that staff were constantly seeking my agreement when discussing controversial research practices. This was shown specifically in an interview with Celine an animal tech, who constantly sought to frame me as an ally when discussing animal research within the lab.

> 'I think a lot of people have got their own different perception on animal research… I mean they're looked after better than probably most pets; do you know what I mean?'
>
> **Celine, Interview**

During our interview, Celine repeated 'do you know what I mean?' six times typifying the reassurance that many caretakers within the laboratory seemed to seek from me. Whilst a listening and empathetic demeanour was a crucial requirement to keep the conversation flowing, it was often interpreted by staff members as a sign of agreement with research practices. This was further compounded by the pro-research attitude I actively chose to emphasise when asking for access to facilities. Whilst my current orientation towards animal research remains conflicted, staff were certainly keen to view me as their champion and worked on the assumption that I strongly approved of animal research. This experience has been noted by Thwaites (2017, p1) in her paper on feminist research studies, when she states how cultivating rapport with your participants can often involve 'suggesting an attitude of trust and mutual understanding that may feel disingenuous'. Such an experience was certainly the case within the animal research facility where my perceived and actual attitudes frequently came into conflict, creating uncomfortable experiences for me as a researcher.

Despite this encouragement to champion animal research practices, I also noted that some individuals were keen to ensure that my position as an outsider was maintained within the laboratory landscape. Whilst many participants strived to be as welcoming as possible, in certain scenarios it was very clear that I didn't belong or wasn't fully accepted into the research world. This was notable during discussions with Troy, when I asked him a question about the types of studies which were taking place within a particular building.

> 'In order to make conversation I ask if a particular disease is studied here. Troy instantly bristles 'not applicable, N/A' he says, immediately on the defensive. There's a slight silence where he seems to notice that he's come across a bit abruptly, as he then qualifies his statement with; 'It's one of those things, the less people know the better'.
>
> **Ethnographic Notes, 2019**

In this discussion it was clear that there were certain knowledges which I was not privy to within the research landscape. This understanding of knowledge as something which can and cannot be shared with outsiders was not shocking in itself, as this is a frequent

observation in laboratory culture. What was curious for me as a researcher was the fact that this response came after a lengthy and in-depth discussion about the complexities of performing animal death with this technician. Whilst Troy had shared a considerable amount with me, he still did not feel comfortable sharing other types of information with me as I was still an outsider to the laboratory world.

This experience of contested identity was also recognisable in the extreme security provisions which were in place at all facilities. At all three facilities, security requirements created a considerable amount of strain and stress for me as a researcher, as their actions continually sought to enforce that I was not a welcome or trusted individual to have on site.

> 'The security at the facility is outwardly hostile. Every day I'm told to hand in my security pass at the gate and then pick it up again on the morning, a requirement which wastes a considerable amount of time in my data collection schedule. It doesn't take long for the technicians driving me in to the facility to devise new and elaborate escape plans to get me in and out of the facility without security knowing'.
>
> **Ethnographic Notes, 2019**

The secrecy of research landscapes has already been highlighted in the work of Davies (2010, p4) who describes 'encountering absences' when seeking out research facilities in the British landscape. Whilst 'absence' is an accurate term for attempting to find laboratories within wider public landscapes, entering into research facilities required me to be extremely present as I had to provide personal details, photographs and undergo background checks Indeed, it was this requirement to be present and accountable which cultivated discomfort and annoyance throughout my data collection as I was subject to rigorous security procedures. It was also notable that technicians actively sought to subvert this security requirement by driving me on and off site via a different entrance, which enabled me to keep my security pass overnight. This indicated that I was trusted to a greater and lesser extent by different individuals within the facility landscape. However, this identity of 'outsider' was still maintained by the requirement to wear a special pass, with a striking red lanyard, which sought to highlight to all those I encountered that I was not a member of facility staff.

Discomfort was also created when I transgressed invisible barriers in the facility by accidentally sitting in the wrong place. This created clear moments of discomfort for me when they were guarded by certain staff members, who felt they had ownership of these spaces.

> 'I accidentally sit in a seat which is reserved for a certain member of staff. One of the technician's inhales his breath as I sit down, it's done in a jokey way, but the implication is very much that I need to move. 'You can sit over there' he tells me, 'The other animal technician isn't in today'.
>
> **Ethnographic Notes, 2019**

In this quote my presence within the facility created a clear sense of disruption for this animal technician. As I was unaware of the invisible lines of ownership within this space, I inadvertently created a palpable experience of discomfort for this individual. Whilst these spaces were often humorously maintained by their owners, there was a real sense of territory within these communal spaces.

These explorations of freedom from discomfort have given the reader an insight into my own experiences within the research facility, allowing them to recognise how it felt to complete my data collection within the animal research landscapes. Biosecurity requirements, the requirement to complete labour and my contested role of 'insider' and 'outsider' all came with their own unique experiences of discomfort. Insights into the caretaker's experience which have yet to be consistently highlighted within the welfare science and animal studies literatures.

7.3 Freedom from Fear and Distress

As highlighted in the earlier 'Freedom from Distress' chapter, interactions within the animal research facility came with their own experiences of distress for both the animal and the caretaker. It is therefore unsurprising that a similar notion of distress was cultivated during my explorations of the research landscape. Completing data collection was an inherently distressing experience as researcher, as a result of what was witnessed, alongside the subsequent expectation to cope in the research environment. Observations also cultivated feelings of distress and isolation throughout the data collection process, due to my changed perception of human – animal interactions.

7.3.1 The Distress of Witnessing

There was a considerable amount of personal distress associated with my time spent in the facility, as a direct result of what I observed. Gillespie (2018, p79) is keen to recognise this when she states how data collection experiences can 'carve out new psychological and emotional wounds', wounds which were created as a result of witnessing death, distress and suffering within the research landscape. One such wound occurred whilst a sheep was being weighed in weigh crate as part of a procedure.

> 'One of the sheep runs forward and suddenly it's head is stuck between the bars of the crush. I can see the head protruding through the bars of the crush, the bulging eye and the thrashing animal. Cathy looks horrified, 'Oh my god the eye' she says, 'look at the eye'. She's trying to twist the animals head round, but it's stuck between the bars. 'Don't panic' the other technician snaps, he's climbing over the crush and trying to reach her 'Don't panic you'll only make it worse'. Within seconds he has freed the animal, but a thick red cut has appeared on the side of sheep's eye and it's bleeding profusely'.
>
> **Ethnographic Notes, 2019**

In this observation, the visceral suffering of the animal was immediately apparent to me as welfare science researcher, alongside the distress experienced by the caretakers themselves, as has been encouraged from the animal studies perspective. In these moments I felt a considerable amount of empathy for the animals within the laboratory landscape, even though this injury was a mistake. Other experiences of animal suffering within the laboratory were more intentional, as a result of the requirements of the research study.

> 'I watch Jane make up a special mash for her mice. The mice in this study are experiencing severe kidney damage and are being fed a special water to induce this. Jane has noticed that they are noticeably struggling and wants to make it easier for them to feed. However, in order to make this mash she is forced to mix the toxic water into the mash, an act of care I find deeply disturbing'.
>
> **Ethnographic Notes, 2019**

Again, we can recognise the implicit harm which can be found within the research landscape, which pervades even attempts to care for animals. The provision of deadly mash ensured that Jane worked within research aims but also cultivated considerable

intentional harm for her animals in turn, a provision of care which I found incredibly challenging to witness. By detailing these two brief examples, it is hoped that the reader can see recognise some of the considerable distress which was cultivated whilst witnessing certain procedures within the facility. This created further challenges for me as a researcher, as there was a necessity to observe procedures in order to ensure the quality of collected data, however I often found these procedures emotionally distressing to witness. A distress which has been recognised by Gillespie (2018, p79) when she describes the 'damage to the witness […] as a result of witnessing'.

7.3.2 A Requirement to Cope

Within all three research facilities, there was also an expectation that I should be able to cope and maintain a professional persona whilst witnessing. This need to appear emotionally unaffected arose as a result of needing to integrate myself within facility culture, which meant that it often wasn't possible to react or show my emotions whilst something distressing was being witnessed. This was noticeable in a particularly distressing blood sampling procedure within the facility, as described below.

> 'I try and emotionally detach. I force myself to think of a white screen closing down all the thoughts in my mind as the animals' vocal distress continues on and on. All the while I'm aware that the other technicians are watching me, attempting to assess my reaction to what is happening.'
>
> **Ethnographic Notes, 2019**

In this example, I felt considerable pressure to react to what I was witnessing within the research facility in a disciplined and logical way, which cultivated a significant amount of inner turmoil as the researcher. This example provides an insight into a different type of witnessing which occurs within the animal production landscape, which has yet to be conceptualised by Gillespie (2018). As in numerous scenarios I found myself being witnessed by the technicians in turn, who were keen to watch my own reactions to what I was observing within the research facility. To maintain respect and trust within the facility landscape, I often had to ensure that emotions such as distress and shock did not register on my features or in my actions. Gillespie (2018, p60) is well versed in this form of emotional management within the witnessing landscape, describing how she sought to 'contain them [emotions], and push them down, in order to survive' as an ethnographic

researcher. This constant testing of my capacity to cope added a new element of distress to my experience within the facility, as there was an expectation to react in a certain way within the facility walls. Whilst the management of the self has already been explored in the context of the animal technician literature (Birke et al 2007, Giruand & Hollin 2016), it has yet to be recognised as a requirement for individuals completing data collection within these spaces.

Despite this assessment of my ability to cope, in other scenarios witnessing was used by technicians to care for and protect me within the facility. This was shown by multiple caretakers who sought to warn me before I was about to witness something distressing.

> 'I'm told before the procedure begins that I am welcome to leave the pen at any time and get some fresh air, as the blood sampling of pigs can be distressing to watch the first-time round'.
>
> **Ethnographic Notes, 2019**

> '8 cages are lined up on the desk. Before I've even looked inside Tess has warned me that what I'm about to witness 'can be quite shocking' if you're not used to it'.
>
> **Ethnographic Notes, 2019**

Throughout my data collection, technicians actively sought to warn me about the realities of the laboratory space, an act of care which enabled me to mentally prepare for and cope with what was witnessed. The empathy and warmth which I experienced from select individuals within the animal research facility was an important coping strategy for navigating the complex feelings of distress which I experienced within this environment. This experience of being witnessed by others served both to harm and protect me within the research landscape.

7.3.3 A Contested Identity: Friends and Family

As well as a requirement to cope within the research setting, I also found there was considerable pressure to keep my observations and emotions in check when engaging with my friends and family members. Entering laboratory spaces provided me with exclusive knowledge about animal research, however those closest to me did not always feel able to cope with the realities of these spaces.

> ‘My partner asks me how my day of data collection has been, a question which I am increasingly struggling to answer with any semblance of honesty. Last time we attempted to converse on these matters I could see disgust, distress and even a semblance of panic visible on his features, as I described in raw detail what I had seen. ‘Fine’ I hear myself saying, ‘It’s been fine today’.
>
> **Ethnographic Notes, 2019**

Whilst friends and family were initially keen to be informed of elements of my data collection, I was often fearful about what would happen if I did tell those around me the truth about animal research. Many deemed me to be an expert in animal research and expected me to hold a balanced and utilitarian view of the process, an identity which seemed increasingly incongruous when faced with considerable animal harm day to day. I was also aware that there were subtle but clearly defined limits to how much information those closest to me were willing to be privy to, as the transfer of this information appeared to harm them in turn. Those around me constantly sought reassurance, from the uncomfortable and often unresolved narratives I would tell them. Over time I found myself sharing less and less, due to the uncomfortable experiences that these conversations cultivated, however this led to loneliness in turn, as ‘there is a profound loneliness to looking like you’re coping when you’re not’ (Gillespie 2018, p81)

I also noticed an impatience in those around me to move on and forget what I had witnessed, which was often challenging for me whilst still immersed in the realities of the research world. This created inner turmoil as I was increasingly forced to recognise that those around me did not and could not care about what I had witnessed to the same extent.

> ‘A few weeks ago now, I witnessed an endless production line of euthanasia within the research facility, watching as multiple pregnant mice were killed, sliced open and the embryos, like pearls on a string, extracted. But it’s weeks later and I’m still making excuses to friends - ‘I’m not feeling good, I’ve actually been doing data collection in a research lab’ – and I can sense that people think I should probably have moved on by now. But I don’t quite know how to forget about everything’
>
> **Ethnographic Notes, 2019**

Gillespie (2018, p80) explores this feeling in her work when she describes 'return[ing] to your life – changed, undone- to find that people don't know about, care about think about the suffering of animals at all'. Whilst many around me did show interest in animal suffering, their concern was at best transitory as they themselves had not witnessed animal harms first hand. In contrast, I struggled to move on from what I had witnessed and reintegrate into the normal routines of society, as I was aware that the practices of animal research continued to occur on a major scale. Despite this desire to reflect and stay still, eventually 'I found myself moving forward' (Gillespie 2018, p79), as the rest of the world callously moved on, an experience which brought with it a new sense of distress and ultimately guilt, in the fact that I could observe so much and yet ultimately remain as unchanged and uncaring as the rest of society.

Furthermore, it was not just witnessing these procedures which cultivated this personal discord, but also my own development as an animal studies scholar. The discipline offers a questioning approach to all elements of animal production spaces which was a disconcerting experience to undergo as a welfare studies scholar. Gillespie (2018, p78) writes with Ahmed's (2017) notion of the feminist killjoy, an individual who highlights the realities of inherently violent situations, much to others distress and despair. This killjoy figure was one which I increasingly took on throughout my explorations in this thesis, much to the despair of those around me, who sought to be comforted by me, rather than confronted.

When Gillespie (2018) discusses this notion of a feminist killjoy within her book chapter, she recognises her own femininity in turn, an approach I have also sought to cultivate within this thesis. For many the inclusion of my own emotion within this thesis will speak to the stereotype of the 'crazy animal lady' or the animal rights activist who chooses to ignore the realities of welfare science and instead relies on emotional anthropomorphism in order to over interpret animal suffering. Rather than viewing emotion as a weakness, as the masculine and positivist approaches of science encourage us to do, this thesis sees the value in utilising emotion as a voice of change and dissent. Throughout my data collection I felt a considerable sense of unease towards the practices of animal research and to obscure and ultimately remove this feeling from my thesis did not seem wise or quite frankly possible. In Morris's (2012, p63) exploration of the performance of euthanasia by veterinarians, she describes how the vets are like actors and 'audiences are

only supposed to know what the performers chose to disclose'. Rather than cultivating a performance of animal production settings as is attempted within the welfare science literature, this thesis sees the value in exposing all the emotion and realities of the laboratory setting, which involves placing my own experiences within the spotlight.

By documenting my lived experience within the research landscape, it becomes increasingly clear that researchers completing data collection within animal production spaces are often placed in a position of great vulnerability in order to secure research aims. Distress was cultivated as a result of witnessing animal research, being witnessed in turn by animal caretakers and through interactions with friends and family who struggled to conceptualise the harms implicit in animal research. This emotional toll was substantial, yet it is frequently and worryingly obscured within both the animal welfare science and animal studies literatures.

7.4 Learning to Cope

In order to counteract these feelings of discomfort and distress, I developed my own unique coping strategies for dealing with what was witnessed and experienced with the research landscape. Insights which I feel could have particular value when speaking back across the disciplinary divide to the welfare science discipline. Talking openly about what I witnessed with trusted insiders from the animal research world was a crucial part of learning to cope. I was lucky enough to have considerable and lengthy conversations with my supervisor Emma Roe, an individual who has herself traversed these landscapes on numerous occasions (Roe & Greenhough 2021). These discussions were an incredibly valuable opportunity for me to attempt to orientate myself within the research landscape as an animal lover, a welfare scientist and an animal studies scholar, as well as counteracting the inherent loneliness which is cultivated when exploring these landscapes. All researchers completing work in animal production settings should have the opportunity to discuss their experiences in this way. Insights from the animal studies literature also provided me with a language of dissent and critique, which enabled me to start conceptualising some of my experiences into words. I am forever grateful for the work of Gillespie (2018) which provided me with some initial comfort during the process of data collection, as well as encouraging me to write about the importance of witnessing and critiquing animal suffering in our production spaces.

Writing ethnographies was also a crucial tool for enabling me to cope with the realities of what I witnessed within animal production spaces, as they enabled me to process, reflect and question my experiences in this landscape. Rather than feeling as though I was complicit in the practices of animal research, it became possible to step back and reflect on what I had seen. Despite their considerable power in the social sciences world, ethnographies are not something which are actively used by the animal welfare science discipline due to the rigorous demands of positivist research. In welfare science, the thoughts and opinions of researchers are absent which creates a discipline which does not seek to disrupt or question the current status quo. Little interest is also placed on cultivating an ethic of care towards researchers within animal production spaces, In fact, the discipline refuses to recognise the implicit harm that can be witnessed within these spaces of animal production and the emotional burden this can create for researchers. Harnessing the untapped potential of ethnographies within the animal welfare science discipline is therefore one of the key recommendations of this thesis, encouraging welfare scientists to begin to explore and reflect on some of their experiences within animal production spaces.

7.5 Conclusion

By placing considerable emphasis on my own personal experiences within the research facility, it is hoped that the reader can begin to empathise with some of the challenges experienced on my data collection journey. Data collection was far from a benign experience, as is suggested in this thesis's methodology chapter and was instead a physical and emotional challenge which took considerable determination to complete. As well as observing distressing things in the research facility and experiencing discomfort within different spaces, distress was also cultivated by the fact I was continually adapting my emotional responses depending on who was around me. During time within the facility, I was continually tested on my capacity to cope with witnessing harms inflicted on animals, whilst in my home life there were expectations about how information about animal research should be presented and how much emotion should was deemed relevant. It was ultimately this policing of the self, as will be experienced by technician's day-to-day within the facility, which I found to be the most distressing and harmful.

This chapter also seeks to have traction in both the welfare science and animal studies literatures. Rather than stripping away all the emotion and individuality of researchers, as occurs within the welfare science discipline, this thesis seeks to encourage the literature to recognise that researchers have the capacity to be affected and disturbed by the realities of animal production, rather than asking for statistically validated data and nothing more. This chapter also recognises that the animal studies literature is currently disingenuous, as researchers are encouraged to be physically and emotionally involved in animal production spaces and yet they are not provided with any outlet or opportunity to discuss these experiences in the presentation of their data. This considerable emotional toll has yet to be fully discussed in either literature, despite the emphasis on emotion and affect which is so pervasive within the animal studies. Therefore, this chapter sees considerable value in attempting to cultivate an ethic of care for the researchers who work and explore animal production spaces, recognising the importance of their work and the significant emotional investment it takes to achieve.

8 Conclusion

> 'Animals are unpredictable things so our whole life is unpredictable. It's a long tale of little triumphs and disasters'.
>
> **(Herriot 1976, p47)**

8.1 Introduction

In the space of seven chapters, this thesis has sought to explore the unique human – animal relationships which exist within the laboratory, from a multidisciplinary (animal studies and animal welfare science) and multimethodology perspective (interview and ethnographies). As the previous chapters have shown, this aim has been conclusively and effectively achieved through explorations of enrichment, euthanasia and data collection which took place during my empirical analysis. For these insights to do sufficient work and be of value within the laboratory, they now need to be translated into a broader set of understandings about human and animal relations. This thesis also sees considerable value in speaking specifically to the animal welfare sciences, introducing the reader to my own reconceptualised understanding of the welfare sciences.

The concluding chapter of this thesis feels a timely moment to return to the original research questions, as outlined at the end of the literature review. Returning to these enables us to explore how effective this thesis has been in answering all four of these questions, which are as follows:

1. **Is there any value in using 'freedom from discomfort' as a means to explore the provision of enrichment for caretakers and laboratory animals within the animal research facility, from an animal studies and animal welfare science perspective?**

2. **Is there any value in using 'freedom from distress' as a means to explore the performance of euthanasia for caretakers and laboratory animals within the animal research facility, from an animal studies and animal welfare science perspective?**

3. **What can be learnt when both freedoms (fear and distress, discomfort) are used to explore my own experiences as a researcher, within the laboratory space?**

4. **What can the animal welfare science discipline learn from the animal studies literature? How might it lead to a reconceptualization of the animal welfare science discipline?**

When reviewing these questions, it is hoped that questions 1,2 and 3 will feel particularly familiar to the reader as these have already been explored in extensive detail within each of the empirical chapters. In chapters 5, 6 and 7, separate scenarios of human – animal interaction have been outlined, including the provision of enrichment, the performance of euthanasia and the process of data collection as a researcher. Considerable emphasis has also been placed on the 4th research question in both literature review chapters, where the strengths and weaknesses of the animal studies and welfare science literatures have already been evaluated. However, this concluding chapter sees value in exploring all of these research questions further in order to draw together some final conclusions.

In this chapter, considerable emphasis is placed on answering the 4th research question which seeks to understand what the welfare science discipline can learn from the animal studies literature. Explorations of facility life from a 'freedom from discomfort' and 'freedom from distress' perspective have already cultivated a powerful narrative about the implicit harms experienced by animals, caretakers, and data collectors within the laboratory space. These harms can be used to set out a 'More – than – Animal Welfare Manifesto' which encourages a multidisciplinary approach to exploring human and animal interactions. As will be explored, this manifesto also has relevance in alternative animal production spaces, alongside the animal welfare science discipline more broadly. The chapter also acknowledges some of the limitations of study design, recognising the temporal and methodological weaknesses of this study, before the thesis concludes with some final thoughts on human – animal relations within the laboratory landscape.

8.2 A More-than-Animal Welfare Manifesto

This thesis recognises the considerable merit of the welfare science discipline, as can be seen in the continued referencing of this literature throughout chapters 5 and 6. However, there is a considerable benefit to drawing on both the welfare science and

animal studies literatures in tandem, as during each of the empirical chapters it became increasingly clear that the welfare science literature couldn't fully capture all of the harms experienced within the laboratory, by animals, their caretakers and those completing data collection. This manifesto recognises the benefits of identifying these harms and seeks to create a new conceptualisation of the welfare science discipline which emphasises these within the laboratory space.

8.2.1 Conceptualising Harm

As has been outlined in the previous empirical chapters, harms were experienced by three distinct groups within the research facility, including laboratory animals, their caretakers, as well as those completing data collection within these spaces. In the context of this thesis, a harm can be defined as 'an experience of discomfort or distress' and these harms have been shown to be experienced by both human and animal. Each of these groups will now be explored in turn, in order to summarise the harms which, they have been recognised to experience within the research landscape.

The welfare science literature, alongside my own data collection, has helped us recognise the visceral harms experienced by animals within the research facility. Through my explorations of enrichment, it is clear that animals experienced implicit discomfort as a result of their surroundings, interactions and experiences within the research landscape, which persisted unless appropriate environmental, relational or feed enrichment were provided. During explorations of euthanasia, it became clear that animal distress was frequently compromised in the performance of specific typologies of animal death, as well as being present in routine methods of euthanasia. These findings add to existing welfare science knowledges, which recognise the adverse experiences of laboratory animals within particular scenarios, as well as aiding the overarching critique of animal production which lies at the heart of the animal studies discipline.

The animal studies literature, alongside my own data collection has assisted us in recognising the ethical and emotional harms which are experienced by animal caretakers within the laboratory setting. In the context of enrichment, harms were experienced by caretakers when their understandings of what constituted a comfortable life for research animals were challenged by scientific colleagues or even members of the public. Furthermore, economic and temporal constraints frequently prevented colleagues from

facilitating these experiences of comfort. Considerable emotional and ethical harms were also recognised in the performance of euthanasia, as a direct result of the different typologies and methods which staff members were expected to perform. These findings add to existing animal studies knowledges, cultivating a more nuanced understanding of caretaker experience from an animal studies perspective, as well as encouraging the welfare science discipline to explore caretaker experiences in animal production spaces further.

Finally, my own personal experiences within research facilities, facilitated by the animal studies literature, provided me with the perfect opportunity to explore the ethical and emotional harms experienced by individuals completing data collection within animal production spaces. Drawing on my collected ethnographic data, it became increasingly clear that time spent within the laboratory had exposed me to an array of uncomfortable and distressing moments, an emotional and ethical burden which has only just begun to be discussed within the animal studies literature (Gillespie 2018). There is therefore considerable value in highlighting this harm in this thesis, in order to encourage both the welfare science and animal studies disciplines to explore these harms further.

8.2.2 Negotiating Harm

In response to the harms which have been uncovered using a Five Freedoms perspective, animal welfare scientists could argue that these physical and emotional harms are not surprising. The very performance of animal research carries with it an implicit sense of distress and discomfort as it is based on the notion of a cost-benefit analysis' which recognises that suffering must be experienced by animals in order to achieve scientific benefits for wider society. It would therefore be naive to assume that laboratory animals could be sheltered in a life free of harm. Furthermore, the freedoms upon which these harms are based are in fact aspirational and should not be interpreted literally. Webster (2016, p2) states that 'It should be obvious that […] the […] Five Freedoms, are aspirations' rather than ideal states of being for the animals. When viewed from this perspective, the harms outlined in the provision of enrichment, the performance of euthanasia and in the collection of data could be deemed as an unfortunate but necessary side effect of animal production, as 'freedom from discomfort' and 'freedom from distress' are never going to be completely achieved within the laboratory.

Caretakers within the laboratory also have a crucial role in mediating the potency of both physical and emotional harms through their actions within the facility. Caretakers frequently sought to minimise the impact of physical harms on animals within the facility landscape by providing effective enrichment and by completing euthanasia with care. Caretakers also actively worked to minimise their own emotional harms by negotiating the euthanasia method which was used and justifying their own role within the facility to those who were external. Caretakers even sought to minimise my own experiences of emotional harm within the laboratory by encouraging me to look away or justifying particular practices in an attempt to remove any ethical disquiet I experienced. It is therefore clear that caretakers currently have an important role in mediating the harms experienced within the laboratory landscape, however this ethical and emotional burden has yet to fully recognised within the welfare science literature.

Despite the mediating forces of caretakers and the aspirational interpretation of the framework, it is increasingly clear that the welfare science and animal studies disciplines could do more to emphasise the implicit harms experienced by animals, caretakers and welfare scientists within the laboratory. Whilst this thesis recognises that some harm is likely to exist within the laboratory landscape, it is not comfortable with the current lack of attention which is afforded to these harms and the ways in which they are obscured by the discipline. The welfare science discipline in particular, could be seen to place considerable emphasis on achieving what are ultimately aspirational and unobtainable states of animal wellbeing through its continued championing of frameworks such as the five freedoms. This thesis dubs this approach 'welfare washing', wherein narratives of welfare are used to conceal the realities of animal, caretaker and researcher distress and discomfort within the laboratory.

This notion can be supplemented by Shildrick's (2015) work in the disability literature which argues that wellbeing is ultimately not achievable within our current society. Shildrick (2015, p15) describes how neoliberal propaganda promotes unrealistic targets of wellbeing for bodies, encouraging 'personal strategies of body management' to keep debility at bay. These targets of wellbeing always remain just out of reach, yet there is 'moral obligation to strive and self-improve' (Gillies et al 2016, p230) which is often shouldered by those who are most vulnerable. In the instance of the laboratory, it is the caretaker who shoulders this moral obligation on behalf of the animal form, as has been

noted in the discussion on how they mediate current harms. When viewed with this lens, the physical and emotional burden or attempting to achieve good animal welfare within the facility should be shifted away from caretakers and placed instead on animal production systems themselves. In recognition of these systemic harms, the welfare discipline needs to continue to develop the appropriate tools to conceptualise and critique these harms., drawing from the animal studies literature in order to achieve this.

8.2.3 Recognising Vulnerability

To overcome instances of welfare washing which can sometimes occur within the discipline, this manifesto encourages the welfare sciences to be open to the harms experienced by caretakers, animals, and researchers. This is achieved through recognition of physical and emotional vulnerability which is experienced by these groups. In relation to the animal, this involves cultivating an openness to and respect for animal emotion, which is not solely reliant on quantitative data sources. Whilst the discipline currently seeks to cultivate an objective approach towards understandings of animal experience, this thesis has recognised the value of alternative forms of animal knowledge which were shown by caretakers, as well as being personally created within my ethnographies. This thesis sees value in the development of animal welfare ethnographies, which draw on animal welfare observation as well as incorporating moments of personal reflection. This methodological approach would enable the animal's experiences to be documented in a more open and reflective way, as well as allowing animals to 'speak back in ethically and epistemological significant ways' (Giraud & Hollin 2016, p43) within the facility.

Caretaker vulnerability is also an area which should be paid greater attention within the welfare science discipline. Within the current constructs of the discipline, caretakers are not able to be honest or vulnerable about their own experiences within the laboratory, as caretakers are either removed from the frame of enquiry or sought to be standardised. Welfare studies do not always enable emphasis to be placed on the caretaker, which obscures their experiences within the research landscape. The discipline also places little attention on the considerable burden which is shouldered by these individuals in the mediation of harm. . In order to encourage further exploration of these harms, this thesis sees relevance in the use of interviews to encourage emotional and physical insights from a caretaker perspective. Although interviews have already been used within the welfare

science discipline, it is the cultivation of less structured and more conversational forms of interview which would be the most powerful, enabling caretakers to speak at length on the realities of their role within production environments, As well encouraging researchers to recognise the value of contextual interview details, such as the facial expressions of their participants or the intonation of speech.

This thesis also sees the value in recognising the vulnerability of welfare scientists within spaces of human – animal interaction. Currently there is no space for the personal experiences of welfare science researchers to be included within the analysis of the data. This means that researchers are often exposed to the current harms of production systems or even engaged in inflicting harms on the animals themselves in order to recreate the realities of these spaces. To counter this, the thesis recommends the use of ethnographic writing and supportive discussions as crucial tools for protecting/supporting researcher wellbeing within the welfare science and animal studies disciplines. This would ensure that individuals undertaking research into spaces of animal production have an ability to reflect on and explore the emotional facets of what has been witnessed. For many within the welfare science world, such an act would be challenging, as it is likely that many would not yet have the language to describe what it was they had witnessed and felt. However, the animal studies literature has made some progress, and this could be used as a resource to guide researchers, encourage a new ethic of care for these individuals.

8.2.4 Making More of the Manifesto

Now that the more-than-animal welfare manifesto has been outlined in full, we can begin to use this to structure understandings of other animal production settings. Particularly relevant are human – animal interactions which occur in the agricultural sphere, as this thesis has already recognised similarities between this production space and the laboratory setting. Throughout this thesis, animal studies and welfare science literature from the agriculture sphere has been used to explore interactions within the laboratory, including the work of Gillespie (2018), Porcher (2011) and Bard et al (2017). There is considerable relevance in applying the more-than-animal welfare manifesto within the agricultural setting, particularly due to the historical associations of the agricultural with the original Five Freedoms framework. The agricultural literature is also increasingly

recognising the harms implicit within agricultural spaces, from an animal (Gillespie 2018) and caretaker perspective (King et al 2020, Hansen & Osteras 2019), harms which could be explored further by structuring them in a more-than-animal welfare approach. Individuals collecting data within agricultural spaces are also likely to experience harms as a result of witnessing industrial agricultural production, which require recognition in relation to this space. One can therefore recognise the value of more-than-animal welfare in conceptualising experiences within the agricultural space.

The manifesto could also provide a novel perspective within the welfare science discipline more generally, as the Five Freedoms framework is already retained at the heart of current animal welfare science scholarship. The manifesto provides a useful tool for conceptualising the harms implicit within animal production spaces, which are currently ignored or not recognised by many within the discipline. The manifesto would also encourage the experiences of the animal, caretaker and researcher to be championed, in a way which has yet to be achieved within the literature. Questioning if caretakers and researchers have freedom from harms such as 'fear and distress' and 'discomfort' in production settings would be a powerful starting point within the discipline. We can therefore begin to recognise the real-world applicability of the more-than-animal welfare manifesto, impacting our understandings of animal production spaces and the formulation of knowledge.

8.2.5 Recognising Thesis Limitations

When outlining the strengths of this manifesto, it is important to remember that it is based on insights gained from my collected empirical material. Despite the considerable value of this data, a number of limitations can be recognised. These weaknesses relate to the temporal factors which surrounded data collection, alongside the challenges of creating a multidisciplinary methodology in practice. Whilst considerable time and effort was put into data collection, the restraints of a three-year project created challenges in the creation of a robust and representative sample, which led to a total of 37 participants in my study. Despite its comparatively small size in relation to traditional welfare science samples, I was happy with the quality and quantity of data collected, as consistent themes could be identified across all three research facilities which indicated data saturation had been reached. Furthermore, it may also be notable that no animal welfare

assessments were conducted during data collection. Such an observation challenges the multidisciplinary claims of this thesis as only traditional qualitative methodologies were used. The decision not to include welfare assessments was made due to their lack of alignment with my research interests with emphasis instead placed on the creation of animal welfare ethnographies, enabling the experiences of animals to be captured in more qualitative terms, whilst simultaneously drawing on quantitative welfare science knowledges. It is therefore clear that both temporal and methodological limitations were adequately dealt with in my study design.

8.3 Conclusion

This thesis has sought to encourage the development of a new understanding of human and animal interactions within the laboratory. The breadth of animals, experiences and individuals encountered during this research study has made it increasingly clear that there are considerable harms within the laboratory space, which are experienced by animals, caretakers and those completing data collection. Despite the power of the welfare sciences within society, it is a multidisciplinary approach which Is needed, in in order to make sense of the complexities of human – animal relations. In recognition of this, the thesis has sought to outline a more-than-animal welfare, which acknowledges the mistakes, flaws and failings which are implicit within the provision of animal care. It is hoped that this more-than-animal welfare manifesto will have considerable value for the animal welfare sciences, as well as being a useful tool in the animal studies literature, allowing scholars to identify potential moments of multidisciplinary collaboration across these two crucial literatures. Both literatures enable me to cultivate a more honest and ultimately vulnerable understanding of human – animal relationships, in recognition of those 'little triumphs and disasters' which exist when we live alongside animals (Herriot 1976, p47).

Appendix A Participant Poster

CALL TO PARTICIPATE IN RESEARCH!

Calling staff members - animal technicians, researchers, NACWO's, NVS & NTCO's - to participate in work shadowing and/or interviews.

The project aims to explore the welfare of both human and animal within the laboratory. Seeking to understand how staff actively engage in care within certain spaces and utilise various technologies. As well as investigating how it feels to deliver this care.

Ethics No- 49258

Key Information

- This project is funded by the University of Southampton and is part of a 3 year PhD programme, seeking to understand both human and animal welfare within the research walls.
- The project has been approved by the University of Southampton's ethics committee.
- Study contributors will be anonymised and personal data will be stored securely throughout the project.
- **If you are interested in taking part please contact me: r.c.Thomas@soton.ac.uk for a participant information sheet .**

Appendix B Interview Questionnaire

Introductory Questions

- What is your current role in the research unit?
- How long have you been working in this role? At this facility?
- What are the main areas of research undertaken on the animals you care for? Do you feel involved with the science? Do you understand the research aims?
- Which animals do you work with within the animal unit? Do you have preference for a certain species?
- Do you have a preference for specific animals individuals? Do you provide anything extra for these animals?

Routine/ Care

- Talk me through your working day. Timings/Locations/ Animals/Tasks)
- How do you provide care for the animals you are responsible for? What resources do you provide them with (food, water, timely death)? Do you deem culling to be?
- Which tasks do you deem essential to the provision of animal care?
- Do you personally dislike/ find any of these tasks difficult to complete?
- Do you find care provision stressful have sufficient time and/or energy to complete these tasks?
- How frequently do you feel stressed providing care within the animal research unit?
- What does the provision of good care look like/mean to you? Is it more than just providing resources?
- Are there any 'extra' tasks/ actions that you complete for certain individuals/species?
- Do you have a particular memory of good care? Which individuals, technologies, and objects did it include?
- What does the provision of bad care to look like/mean to you?
- Do you have a particular memory of bad care? What individuals, technologies and objects was it missing?
- How do you know when an animal is exhibiting positive welfare? What observations/ knowledge sources would you base this decision on?
- How do you decide when an animal is showing compromised welfare? What observations/ knowledge sources do you base this decision on?
- How would you describe the relationships you hold with animals within the laboratory? Do these vary between species? Depending on your mood?
- Has your relationship to animals changed over time?

Communication

- Which staff members do you interact with day to day within the animal unit?

- How would you rate the quality of your relationships within other animal technicians? Are these supportive (emotionally/ helping you with work)? Do you feel like you work with likeminded individuals?
- How would you describe your relationships with researchers? Are these more professional than those with AT's? Do you feel that they respect your opinion on animal welfare? How do you feel about the 'Us and Them' understanding of the relationship?
- Describe how you would communicate with a researcher, in comparison to how you would communicate with a fellow AT? Is there a difference?
- How would you rate the quality of communication transfer within the research unit?
- Do you feel your opinion/ voice is respected by (co-workers, researchers, managers) within the research unit?
- Do you take pride in your work? Do you believe you receive adequate recognition for the role you play in providing animal care?
- Have you had a memorable conversation with a member of your family/ friends about the work you do?
- Have you had a memorable conversation with a member of the public about the work you do?
- In which spaces in the research unit do you spend the most/ least time? Describe your daily movements.
- Are there any spaces which you feel particularly included/ excluded from within the laboratory?
- How comfortable do you find your work environment? Do you feel there is a lack of natural lighting? How comfortable are the break rooms?
- Do you find animal care a physically demanding task? I.e., cage washing/ injections? Do you experience fatigue after certain tasks?
- Have you experienced any injuries/ near misses within the research unit?
- Do you have any experiences of working with animals within the lab which triggered a memorable emotional response?
- Wellbeing
- What does staff wellbeing within the workplace look/feel like in your opinion?
- How would you rate your current state of wellbeing whilst working within the research unit?
- Do you actively do anything to ensure your wellbeing within the workplace? Does your institution?
- What could/would wellbeing look like for you within the research unit?

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