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**A JOURNEY WITH ANIMALS:
MAKE THE ZOO OUR SPIRIT SHELTER**

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**A Journey with Animals:
Make the Zoo Our Spirit Shelter**

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**A thesis submitted in partial fulfilment of
the requirements for the degree of
Doctor of Philosophy**

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CERTIFICATE OF ORIGINALITY

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ABSTRACT

Tourism is being considered as a potential supplementary approach for mainstream mental healthcare. Despite extensive research into the positive psychological outcomes of various tourism activities, there has been a lack of investigation into the impact of animal-based tourism on mental health and its underlying mechanism. Moreover, previous research fails to collect data base on randomized controlled trails (RCTs), which are necessary for the practical application of tourism as a supplement to mainstream mental healthcare.

To address these research gaps, the current study aims to: (1) investigate the immediate and enduring effects of animal-based tourism on mental health; (2) explore the dynamic processes through which mental health is promoted during animal-based tourism; and (3) identify the underlying psychotherapeutic mechanisms of animal-based tourism by establishing and testing theoretical frameworks.

Two studies were designed to achieve these objectives. **Study I** adopted a mixed-method approach, combining structural equation modeling (SEM) and in-depth interviews to examine how animal-based tourism impacted mental health through a series of dynamic processes during the journey. **Study II** employed a randomized controlled trial along with a longitudinal approach to investigate the immediate and long-lasting causal effects of animal-based tourism on mental health. Additionally, a two-criteria analytical model by van de Leur et al. (2024) was used to identify the psychological mechanisms underlying the impact of animal-based tourism on mental health.

The quantitative data in **Study I** revealed that human-animal interactions during such tourism experiences indirectly relate to tourists' self-efficacy, self-esteem, and depression emotions, mediated by the human-animal relationship. Meanwhile, qualitative findings in **Study I** indicated that different types of human-animal interactive activities uniquely affected mental health in the context of tourism. The results of **Study II** suggested that animal-based tourism had immediate and enduring effects on self-efficacy, anxiety, and depression. Notably, the long-lasting effect on anxiety was moderated by the type of human-animal interaction. Findings from the two-criteria analytical model indicated that social support mediated the psychotherapeutic impact of animal-

based tourism, and this mediating effect was also moderated by the type of human-animal interaction.

This study expands the understanding of the psychological impact of animal-based tourism, an area that has not been thoroughly explored in relation to mental health. It integrates tourism studies with mental health research by investigating the immediate and enduring effects of animal-based tourism on mental health outcomes such as self-efficacy, anxiety, and depression. The study also pioneers the exploration of the dynamic processes and underlying psychotherapeutic mechanisms of animal-based tourism, filling a critical gap in existing literature. By establishing and testing theoretical frameworks through empirical research, this study provides a new lens for understanding the potential of tourism as a supplementary approach to mainstream mental healthcare.

Keywords: Animal-based tourism; Mental health; Human-animal Relationship, Social Support

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*“Looking back five hundred times in past lives, in exchange
for passing by once in this life”*

——— *Buddha*

Reflecting on the journey that has brought me to this moment, I recall a childhood prophecy from a fortune teller who, after examining my "eight characters" (the year, month, day, and hour of my birth according to the traditional lunar calendar used for divination), declared that I was destined to pursue a Ph.D. From then on, my family offered wholehearted and unconditional support. In this journey, my fate seemed to guide me step-by-step toward the path foretold by the divination, despite it being strewn with stumbling blocks named "failure."

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Buddha said, "Looking back five hundred times in past lives, in exchange for passing by once in this life." We must have shared countless lives together for our paths to cross in this one. And if we do not meet again soon, let us hope to meet in the next reincarnation.

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CHAPTER 1 INTRODUCTION

1.1 Research Background

The shadow of mental health issues has long covered contemporary human society. According to World Health Organization (WHO) (2022b), one billion people are estimated to have mental health problems worldwide. After the COVID-19 epidemic, the situation is expected to deteriorate further. The reported rate of poor mental health in developed countries has increased from 13% to 40% during the epidemic (Kabasawa et al., 2021; US National Center for Health Statistics, 2021). Meanwhile, the prevalence of anxiety and depression worldwide went up by a massive 25% in the first year of the epidemic (The World Health Organization, 2022a). Mental health issues not only affect individuals and their families but also have an impact on the wider community and society.

Against this grave situation, global mental health care services and recourses are still at a relatively low level. According to a recent report, government investment in mental health is less than 1% of the overall health budget in numerous countries (Rajkumar, 2022). The low government leads to a “treatment gap” or “care gap,” which Rajkumar (2022, p.1) refers to as “a discrepancy between the need for mental health services and their availability”. This phenomenon is more evident within low- and middle-income countries. For example, the WHO Mental Health Atlas (World Health Organization, 2021) estimated prior to the COVID-19 epidemic, only 29% of people diagnosed with psychosis had access to mental health care. However, 70% of these people were from high-income countries, while low-income countries reported only 12% of individuals receiving treatment. The treatment gap for some mental disorders, such as depression, is particularly severe in all countries, with around 23% of people with depression receiving formal mental health services in high-income countries, and the percentage is as low as 3% in middle- and low- countries (The World Health Organization, 2022b). Furthermore, the gap is predicted to be widen due to the growing population experiencing poor mental health as a result of pandemic. In general, mental health services and resources worldwide are far from enough to meet global mental health needs.

In an effort to transform the situation, the World Health Organization (2022b) makes some recommendations aiming at shifting attitudes towards mental health and strengthening of mental health care systems. Among these recommendation, two notable ones are to *reshape environments that influence mental health, including homes, communities, schools, workplaces, health care services, natural environments; and to strengthen mental health care by changing where, how, and by whom mental health care is delivered and received*. Both recommendations emphasize the important role of the environment and place on individuals’ mental health. Given the limited resources of mainstream mental healthcare,

such as government health agencies, insurance and qualified psychologists and psychiatrists, seeking the assistance and collaboration of other sectors is necessary. The market sectors including spa, tourism, nutrition, cosmetics, beauty, and fashion industries are believed to have similar distribution and delivery mechanisms to mainstream healthcare (Buckley, 2023), which enable them to play a complementary role.

As the health service value of tourism and recreation is gradually embedded in the structure of modern human societies and economies, many scholars begin to consider tourism industry as a complement to mainstream healthcare (Buckley & Westaway, 2020). A considerable number of studies have documented the healing effect of vacation on tourists' mental health, which is known as the "vacation effect." For example, Kühnel and Sonnentag (2011) find that levels of emotional exhaustion were significantly alleviated after a vacation. De Bloom et al (2009) discover the positive impacts of vacation on improving the visitor's mental health, mood, and happiness, as well as relieving work pressure and mundane concerns. A more recent study conducted by Buckley and Westaway (2022) indicates that women suffering from psychological trauma can derive psychological benefits from engaging in nature tourism.

The healing effect of tourism on mental health largely relies on tourism features (i.e., destination, setting, and activities) and tourists' individual characteristics (i.e. gender, age, and personality) (Buckley & Westaway, 2022). Therefore, the relationship between tourism and mental health should be understood in diverse contexts, as different tourism activities may result in varying mental health outcomes. Generally, literature on tourism and mental health can be divided into three sub-sectors: urban and indoor; nature and outdoor; and adventure and sport (Buckley, 2023). The healing effect of urban and indoor activities is mainly reflected in the art viewing (Wang, Mak, & Fancourt, 2020), music listening (Bibb, 2021), and museum visiting (Van Hoven, 2020). However, their mental benefits are often not discussed from a tourism view. Nature tourism emphasize the psychological restoration and recovery function of the natural environment. For example, studies show that nature and outdoor tourism have advantages in enhancing concentration, ameliorating feelings, and reducing stress (Akhoundogli & Buckley, 2021). Finally, adventure and sports tourism produce mental health benefits through bringing tourists massive emotional experiences such as thrill, exhilaration, and excitement (Buckley, 2018b; 2021; Niedermeier, Einwanger, Hartl, & Kopp, 2017). Adventure and sports tours can be further divided into two categories: small-scale high-difficulty activities with more risk, skill, and costs, but fewer social contacts; and large-scale low-difficulty activities with less risk, skill, and costs but include more social components (Buckley, 2007). Two types of activities benefit tourists' mental health via different paths. The effect of small-scale high-difficulty activities is more inward and relies on increased self-esteem. In contrast, the effect of large-scale low-difficulty activities is more outward and depends on social interaction (Buckley, 2018a).

However, Buckley (2023) may ignore a potential sub-sector that may also contribute to tourists' mental health in a way different from the above, namely *animal-based tourism*. Although some may argue that animal-based tourism should fall under the nature and outdoor subsector, they differ in underlying psychological mechanism. While nature tourism emphasizes mental health maintenance and restoration through nature exposure, animal-based tourism is expected to generate psychological benefits through the development of relationships between humans and animals. The investigation of the role of animal-based tourism in mental health has the potential to extend Buckley's (2023) tourism subsector classification and open up a new area of research for animal-based tourism.

Animals are enormously important to the tourism industry. With the rapidly growing interest of tourists in animals-related experiences, animal-based tourism, including zoos, adventure, nature- and wildlife tourism, is increasingly popular (Buckley, 2009; Campos, Mendes, Valle, & Scott, 2017). Despite the absence of global economic impact indicators, wildlife tourism is estimated to take up 20%–40% of all international tourism (Moorhouse, D'Cruze, & Macdonald, 2017). According to World Animal Protection (2021), over 50,000 wild animals are used for tourist entertainment, and the Airbnb platform offers more than 1000 categories of animal activities, involving over 300 different species, across 58 countries (Sunkara, 2019). As predicted by Carr and Broom (2018), the market of animal-based tourism will experience a new period of vigorous development.

Though related studies are lacking, the inclusion of animals in the tourism experience may have special effect on people's mental health, which distinguishes this tourism from other types of tourism regarding the mental health effect. In fact, a large body of clinical psychology literature has examined the effect of animals on mental health solely, and found that the inclusion of animals in psychotherapy can largely enhance the healing effect, known as animals-assisted intervention (AAI). AAI can benefit mental health via four paths: emotional, cognitive, social, and physical (Koukourikos, Georgopoulou, Kourkouta, & Tsaloglidou, 2019). It has been well-documented that contact with animals can provide emotional support and reduce levels of arousal, stress, depression, and anxiety (Berget & Ihlebæk, 2011; Koukourikos et al., 2019), and thus promote people's life quality generally. In addition, people with mental illnesses often feel powerless and have no faith in themselves. AAI can positively affect one's self-perception by improving self-efficacy and locus of control, hence ameliorate behavioral deficits (Kruger & Serpell, 2010). AAI can also help to promote social interaction in two ways. First, as facilitators of social support, animals' companion can "top up" human support for people who cannot achieve it from human relationships (McNicholas & Collis, 2006). On the other hand, animals can serve as catalysts or mediators of social contact, encouraging individuals to interact and communicate with others (McNicholas & Collis, 2001). In this way, AAI can help to alleviate feelings of social isolation and promote positive social

connections. Finally, people with limited mobility due to mental disorders can benefit physically by re-practicing coarse and fine motor skills with the assistance of animals, which can in turn, alleviate their mental symptoms (Velde, Cipriani, & Fisher, 2005).

Kruger & Serpell (2010) suggested that there are now two streams of thoughts in the existing literature on AAI. The first one contends that animals possess unique intrinsic qualities which contribute to the therapy. According to this perspective, animals can serve as a sedative, an agent of socialization, and an attachment figure (Berget & Ihlebæk, 2011; Kruger & Serpell, 2010). As such, the mere presence of animals can provide mental health benefits. Another set of theories focuses on the value of animals as living and interactive instruments which help reshape peoples' views of themselves and the world and help them acquire various skills. Theories on this view include *social cognitive theories* and *role theories*. In addition, a considerable number of literature attempts to interpret the mechanism of AAI from a physical perspective. For example, interaction with animals can increase the release of neuropeptides such as oxytocin (which promotes social approach behaviors), serotonin and endorphins (which generate feelings of happiness and calm), cortisol, and adrenaline (stress hormones).

However, while all these theories are proposed and tested in the therapeutic milieu, the theories may be not applicable in other contexts. For example, the AAI literature abounds with “anecdotal statements concerning the loving bonds that are forged between humans and animals” (Kruger & Serpell, 2010, p.29). Such human-animal relationship plays an important role in mental healthcare. According to Attachment theory, people tend to form attachments to animals which are similar to that formed with their friends and family, and such strong human-animal bonds can largely improve the healing effect of mental treatment (Berget & Ihlebæk, 2011; Kruger & Serpell, 2010). However, when shifting from a therapeutic context to others, the human-animal relationship undergoes significant changes as the roles played by animals vary. Human-animal relations can be a parent-child bond, a companion relationship, or a supervisor and subordinate relation in different scenarios (Ahuvia, 2008; Meehan, Massavelli, & Pachana, 2017). Affected by the awakening in animal ethics, the call for animal welfare and rights, the introduction of the co-creation policy, and the insight into sense-making and kin-making from an eco-feminist perspective, the human-animal relationship in tourism has gradually transformed from the previous purchasers-commodities relationship to a reciprocal bond. However, it is still unclear if reciprocal human-animal relations in animal-based tourism can contribute to human mental health as they do in the therapeutic context or not, and its underlying mechanism. As such, new frameworks should be established to reexplore the role of animals in mental health specifically in the tourism context.

Furthermore, while there is considerable research on the effect of tourism on mental health, there is still a lack of detailed evidence from randomized controlled trials to illustrate the causal relationship between

them (Buckley, 2023). Zheng et al. (2023) also advocate for the use of RCTs to obtain unbiased causal knowledge in this domain. The absence of rigorous examination of the causal relationship between tourism and its mental health benefits may hinder the accumulation of necessary evidence for the psychotherapeutic effects of tourism, posing an obstacle to its inclusion in mainstream mental healthcare. Moreover, this gap may impede the practical application of tourism-based mental therapy. Most existing studies in this area rely on interviews (Buckley & Westaway, 2020; Holmbom et al., 2017) or conduct experiments without proper controls (Buckley, 2020; Levi et al., 2018).

In sum, this research primarily aims to examine the effect of animal-based tourism on mental health and develop an initial dynamic framework to explain how mental health benefits from various processes (**Study I**). Additionally, a second framework, adopting a static perspective, is proposed to investigate the causal and enduring psychotherapeutic effects of animal-based tourism, as well as the underlying psychological mechanisms (**Study II**).

1.2 Problem Statement

Extensive studies have found different tourism activities could produce considerable psychological benefits (Buckley, 2023). Yet, such effect has not been investigated in animal-based tourism. In other words, research on the association between animal-based tourism experiences and mental health is missing (**Gap 1**).

In addition, despite numerous theories and frameworks responding to the benefits of including animal into psychotherapy, these theories are often limited in the context of the therapeutic milieu and may not be applicable in other contexts (Kruger & Serpell, 2010). There is a need to develop new frameworks to explore the role of animal in mental health with the tourism context. The exploration of the underlying mechanism may answer how the animal-based tourism contributes to tourists' mental health (**Gap 2**).

Finally, in terms of methodology, most research on tourism and mental health has employed non-randomized control designs. According to Buckley (2023) and Zheng et al. (2023), data from RCTs can provide unbiased causal knowledge, making them crucial for the practical application of tourism as a supplement to mainstream mental healthcare. To the best of our knowledge, no existing research in this area offers robust empirical evidence based on RCTs (**Gap 3**).

1.3 Research Objectives

The thesis comprises two studies, both of which focus on the topic of "the effect of animal-based tourism on mental health." These studies aim to provide a deeper understanding of this emerging research area, exploring how interactions with animals in tourism settings can influence mental health outcomes.

The main purpose of **Study I** is to initially investigate how various mental health benefits are produced through a series of processes in animal-based tourism. To achieve this purpose, a variety of theories and conceptual models are involved to establish a new framework from a dynamic perspective. In this study, the effect of animal-based tourism on mental health is expected to result from a dynamic process. This process begins with interactions with animals, which foster a sense of connection between humans and the entire animal population, or an attachment to specific animals, ultimately contributing to improved mental health outcomes. Frameworks from both tourism and animal research, such as attachment theory, social support, social cognitive theory, role theory, and attention restoration theory are referred to in the current research. On the other hand, due to the lack of "a unified, widely accepted, or empirically supported theoretical framework" in animal and mental health research (Kruger & Serpell, 2010, p.25), the proposed framework also refers to the literature covering other disciplines such as evolutionary psychology, clinical psychology, and biology. Moreover, a mixed method incorporating structural equation modeling approach and in-depth interview is employed to examine the proposed framework.

The primary objective of **Study II** is to investigate the immediate and lasting effects of animal-based tourism on mental health. This study delves into understanding how engaging with animals in a tourism context can lead to sustainable immediate and long-lasting improvements in mental health by providing causal empirical evidence. Furthermore, potential mediating factors, such as the types of human-animal interactions, and potential moderating factors, such as human-nature connection, social support, and coping strategies, are tested. This examination aims to provide a deeper understanding of the psychological mechanisms behind the psychotherapeutic effects of animal-based tourism. To achieve these objectives, the study employs a randomized controlled trial design combined with a longitudinal approach.

1.4 Significance of Research

This study contributes to the current literature in terms of theoretical development and practical implications.

Theoretically, despite the abundant empirical evidence of the positive outcomes of animal-based tourism experience, few studies investigate these outcomes from the perspective of mental healthcare. This study is among the first attempts to identify the effect of animal-based tourism on mental health. The findings of this research contributes to the existing literature on animal-based tourism by bringing new perspectives and insights to the field.

In addition, this study provides a novel contribution to the literature on animal and mental health research by filling the gap in understanding the mechanism of animal-assisted therapy beyond the context of the therapeutic milieu. In Marino's (2012) eyes, a robust theory of AAI should differentiate it from other psychotherapy. Therefore, the distinctive features of animals or human-animal interaction that generate the therapeutic effect should be further identified. This study improves the mechanism of AAI by introducing new components and changing contexts.

Methodologically, this study revamps the traditional paradigms dominated in tourism and mental health research, by including a randomized controlled trial design approach. In studies on tourism and mental health, most are conducted using non-randomized control designs (Buckley, 2023). However, it should be noted that RCTs are usually regarded as the "gold standard" for determining intervention efficacy due to their ability to reduce biases (Maujean, Pepping, & Kendall, 2015). As referred to by Zheng et al. (2023), RCTs should be "encouraged to improve the robustness of results and implications in medical research." Moreover, by combining this approach with a longitudinal design, we can examine the enduring psychotherapeutic effects of animal-based tourism. The data obtained from these two methods are also crucial for facilitating the widespread adoption of tourism as a mental healthcare intervention. Additionally, the two-criteria analytical model of van de Leur et al. (2024) is used in the tourism context for the first time. This approach is valuable for examining potential mediators within a combined RCT and longitudinal design framework. The employment of this approach can help to identify the underlying psychotherapeutic mechanism of animal-based tourism. These methods used in the current study provide valuable methodological references for future research at the intersection of tourism and mental health.

For practical significance, this study explores the potential of adopting animal-based tourism as a mental health intervention, which can relieve the conflict between the increasing demand for mental health care

and limited service sources. The tourism industry is regarded as having a huge potential to be involved in mainstream mental healthcare (Buckley, 2023). If animal-based tourism is proven to be an effective way to alleviate people's psychological suffering, millions of animal-based tourism facilities, such as zoos, can be utilized to make up for the shortage of mental health care resources.

Besides the inaccessibility to mental health care, the high cost of treatment is another factor that makes mental therapy become a luxury. In the USA, the costs of consulting a psychiatrist are normally US\$400 per hour, and they can reach thousands or tens of thousands of dollars for each course if people purchase some mental health drugs (Buckley, 2023). The costs of AAI are much higher due to the inclusion of additional costs of animal care, including the expenditure of food, hygienic items, and veterinary (Morrison, 2007). By contrast, most tourism products, including animal-based tourism, are less costly than these psychotherapies *per capita*. Therefore, the findings of the current research lower the threshold regarding mental treatment costs, and make universal mental health care possible, particularly for those who cannot afford expensive treatments.

Third, examining the mental health effect of AAI beyond the context of the therapeutic milieu helps, to some extent, complement the practical limitations existing in traditional psychotherapy treatments. Previously, visiting a psychological clinic or a therapist may be an embarrassing and painful experience that leads patients to avoid and withdraw from the therapy finally (Kruger & Serpell, 2010). Moreover, the resistance to formal psychological treatment may prevent people, who have already shown early signs of mental health issues, from seeking the help of a mental health professional. If the treatments are not offered immediately, the cumulative effect of risk and absence of protection results in a transition from a healthy state to a state of mental illness (Arango et al., 2018). Therefore, Purcell, Gwyther, and Rice (2019) advocate that it is necessary to provide early intervention and that innovation is needed in general mental health services to achieve this. Although the involvement of AAI can relieve the tension between the therapist and visitors by serving as an "ice-breaker" (Cirulli et al., 2011, p.342), delivering the treatment beyond the therapeutic milieu can provide a more relaxed and enjoyable and thus reduce the withdrawal behavior and increase the revisit motivation (Kruger & Serpell, 2010), and offers early prevention and intervention imperceptibly to people who have early mental health issues with subtle symptoms.

1.5 Structure of the Thesis

This thesis is organized into seven chapters, each designed to systematically delve into different aspects of the research study, examining the topic of the role of animal-based tourism in mental health. Below is a detailed outline of each chapter:

Chapter One briefly sets the foundation for the research by briefly describing the research background and the problem statement. It specifies and justifies the research questions and objectives and discusses the significance of this study. This provides the necessary context to understand the issues addressed and the motivation behind the study.

Chapter Two reviews relevant literature on key topics such as *tourism and mental health*, *animal-based tourism*, as well as *animal and mental health*. This chapter illustrates fundamental concepts, emerging trends, and theoretical frameworks related to the current studies. It aims to establish a comprehensive backdrop against which the research questions are set.

In Chapter Three, theoretical frameworks for two distinct studies are constructed. This involves incorporating theories of AAI, alongside theoretical perspectives from other disciplines including clinical psychology, positive psychology, and evolutionary psychology, integrated with the unique features of animal-based tourism. This chapter also proposes corresponding research hypotheses.

Chapter Four details the research methodologies for the two studies. It covers the research paradigm, research approach, detailed techniques, sampling strategies, data analysis, and ethical issues. The methodology chapter ensures that the reader understands the procedural basis upon which the studies' findings are derived.

Chapter Five presents the analysis results of the two studies, detailing both quantitative and qualitative findings in **Study I** and experimental findings **in Study II**. This chapter also includes the examination of hypotheses, providing a robust analysis of the data collected.

Chapter Six synthesizes the findings from both studies, discusses these findings on the basis of existing literature, and draws conclusions based on the evidence presented throughout the thesis. This chapter aims to weave together the study's results with broader academic discourse.

Chapter Seven discusses the broader implications of the research findings for the existing knowledge system, practitioners, and policymakers. It also critically examines the limitations of the current study, proposing areas for further investigation.

CHAPTER 2 LITERATURE REVIEW

2.1 Tourism and Mental Health

2.1.1 Mental Health Interventions

Poor mental health can have far-reaching impacts on both individuals and society. For example, one in six individuals are estimated to suffer from the anxiety disorder, one of the most concerning mental disorder (Strawn & Levine, 2020). The situation is even worse after the Covid-19. While poor mental health brings disaster to individuals and families, it also imposes significant social and economic costs (McDaid, Park, & Wahlbeck, 2019). According to the Diagnostic and Statistical Manual of Mental Disorders (the fifth edition) (American Psychiatric Association, 2013), mental disorders can be systematically classified into anxiety disorders, psychotic disorders, mood disorders, dementia, and neurodevelopmental disorders such as autism. These disorders are reflected by abnormal or intrusive thoughts, perceptions, emotions, behavior, and interpersonal relationships in people's daily life. The impact of mental health issues on individuals and society highlights the importance of mental health care and intervention.

Conventional mental health interventions can be typically classified as either pharmaceutical or non-pharmaceutical (Anjorin & Wada, 2022). Pharmaceutical treatment refers to interventions that manage the symptoms of mental health conditions by using medications, such as antidepressants (Ecks, 2005), anti-anxiety drugs (Sarkar, 2020), antipsychotic medications (Miyamoto, Duncan, Marx, & Lieberman, 2005), and even herbs (Anjorin, & Wada, 2022). A key advantage of such treatment is that drugs can be targeted to specific symptoms, such as depression or anxiety, to provide more effective treatment (Moss et al., 2016). However, despite its effectiveness, pharmaceutical treatment may produce some side effects, such as weight loss, drowsiness, diarrhea, dry mouth, frequent urination, and loss of libido (Himmerich, Kan, Au, & Treasure (2021). Moreover, there are growing concerns about pharmaceutical treatment may lead to an overreliance on drugs and then make the treatment ineffective and result in the medicalization of the distress (Bernard et al., 2023).

As such, an expanding range of non-pharmaceutical interventions are increasingly being offered as alternative forms of care for patients with common mental health disorders (Tanner et al., 2023). Non-pharmaceutical interventions aim to contribute to mental health by addressing psychosocial factors. These interventions include social prescribing, bibliotherapy, cognitive-behavioral therapy, and meditation, (Bernard et al., 2023; Monroy-Fraustro et al., 2021; Tsoli et al., 2018). Compared with pharmaceutical interventions, non-pharmaceutical interventions are more acceptable for patients with mild symptoms due to their non-intrusive nature and long-term benefits (Hollon et al., 2005). Nevertheless, non-

pharmaceutical interventions can require a significant time commitment, with therapy sessions lasting several hours per week. Moreover, the lack of robust published evidence regarding the effectiveness makes non-pharmaceutical interventions doubtful (Tanner et al., 2023).

Pharmaceutical and non-pharmaceutical treatments for mental health conditions work through different therapeutic mechanisms. The therapeutic mechanism of pharmaceutical treatment is based on the belief that most mental patients, to some degree, have biochemical imbalances in their brains and psychotherapeutic drugs can correct the imbalances (Valenstein, 2002). For example, serotonin and dopamine are two neurotransmitters related to suicidal behavior, aggression, and depressed mood (Ryding, Lindström, & Träskman-Bendz, 2008). The interaction between these two neurotransmitters is, therefore, the target of antidepressant drugs to address the mental disorder (Esposito, 2006). On the contrary, the action mechanisms of non-pharmaceutical treatments are various. For instance, cognitive-behavioral therapy is a classical non-pharmaceutical treatment that works by helping individuals identify negative thought patterns and develop strategies to challenge and change them (Rothbaum, Meadows, Resick, & Foy, 2000). Other non-pharmaceutical treatments involve therapeutic lifestyle changes (TLCs), such as meditation, exercise, relaxation, recreation, and time in nature, which benefit mental health by improving overall physical health as well as self-esteem, and reducing stress (Walsh, 2011).

Overall, both pharmaceutical and non-pharmaceutical interventions have their advantages and disadvantages, and the choice of intervention will depend on the individual's needs and preferences, as well as the type and severity of their mental health condition.

2.1.2 The Effect of Tourism on Mental Health

Links between mental health and tourism have been extensively explored. There is agreement that tourism experiences can yield a wide range of mental health benefits (Biedenweg, Scott, & Scott, 2017; Buckley, Zhong, & Martin, 2021; Davies, 2018). For example, through a long-term panel study, Buckley (2020) found a causal connection between outdoor nature-based tourism and human mental health, based on which he suggested that outdoor nature tourism can be served as an effective tool to boost people's mental health and psychological well-being. In another study, Buckley et al. (2021) used the term "jing hua xin ling" to describe the mental health benefits generated by peaceful tourism. Moreover, tourism can provide a psychotherapeutic effect for those who have certain mental diseases. For example, a study conducted by Buckley and Westaway (2022) revealed that nature tourism could benefit people suffering from psychological trauma, such as death or terminal illnesses of relatives or friends, domestic abuse, and divorce. Therefore, tourism is regarded as a potential supplementary approach to mainstream mental healthcare (Buckley & Westaway, 2020).

The effect of tourism on mental health may have a dual nature, incorporating both pharmaceutical and non-pharmaceutical treatments. Some studies suggest that certain tourism experiences, such as nature-based tourism, can positively impact neurotransmitter release and influence mental health in a beneficial way (Beute & de Kort, 2014). Exposure to natural environments, for example, has been linked to increased serotonin production, which is associated with improved mood and reduced symptoms of depression and anxiety (Ryding et al., 2008). Furthermore, tourism that involves adventure and sport not only promotes the release of neurotransmitters through physical activity (Clark & Mach, 2016; Fuss et al., 2015), but can also lead to therapeutic lifestyle changes. These activities encourage individuals to adopt a more active lifestyle and overcome challenges, resulting in increased self-esteem and self-efficacy (Mikkelsen et al., 2017).

Therefore, the relationship between tourism and mental health needs to be examined based on the type of tourism, as different tourism activities can affect mental health through various mechanisms (Buckley, 2023). Recently, Buckley (2023) identified three kinds of tourism subsectors based on their distinct effects on mental health, promoting the initial understanding of the mental mechanism underlying the impact of various tourism activities on mental health

Urban and Indoor Subsector

The impact of urban and indoor attractions such as arts, music concerts, and museums has been widely explored, but most of these studies are not in the context of tourism. Moreover, the mental mechanisms underlying each attraction's psychotherapeutic effects are slightly different from another. For example,

the mental benefits of music concerts may originate from the entertainment and escape images they deliver (Recours, Aussaguel, & Trujillo, 2009), the emotion regulation function of music (Bibb, 2021), or the empowering effect of music (Rolvsjord, 2004). In contrast, museum can promote mental health by providing a diverse range of exhibits that can trigger people's memories. Such “reminiscence” activities are beneficial for “socialization, orientation, and validation of life experiences” (Ander et al., 2013, p.209). Recently, Han and Hyun (2019) discuss how a range of green items, such as flowers and trees, and green interior decorations, can improve employees’ and customers’ perception of mental health in a tourism setting. The principles they use in the indoor environment are similar to those in the nature and outdoor subsector.

Nature and Outdoor Subsector

Nature tourism is always admired for the feelings of peace, tranquility, psychological restoration, and recovery it brings, along with its positive impact on attention, cognition, emotions, relaxation, and worldview (Akhoundogli & Buckley, 2021; Buckley & Westaway 2020; Cooper & Buckley, 2022). Though a general framework for how nature tourism impacts on individuals’ mental health is currently lacking (Buckley, 2023), the mechanism of nature tourism can be inferred from the literature on environmental psychology. Most theories regarding the mental health effects of natural environments are based on the supposition that people have not fully acclimated to urban environments and the deprivation of contact with nature may lead to a sense of loss (Bratman, Hamilton, & Daily, 2012). Two main explanatory theories have been derived from this supposition.

One theory, call the “stress reduction theory” (SRT), posits that nature’s power stems from people’s unconscious physiological and psychological inclination to natural places. From an evolutionary perceptive, these natural places, which are often located near water or with visible horizons, can increase our species' survival rates, and are thus regarded as safe havens and help to moderate and diminish states of arousal and negative thoughts (Ulrich, 1993). Another theory, call the “attention restoration theory” (ART), suggests that natural landscapes can benefit our direct attentional capacities through a process of restoration (Kaplan & Kaplan, 1989). Though these two theories focus on different functions of nature’s power (with SRT emphasizing the affective and stress-related components while ART centering more on natural effects on cognition), they can both be used to explain the mental health effect of nature and outside tourism.

Adventure and Sport Subsector

The adventure and sport tourism are renowned for providing unique emotional experiences, such as thrill, excitement, and transformation (Buckley, 2018b; 2021; Niedermeier et al., 2017). The healing power of

adventure and sports tourism can be attributed to two pathways. The first is psychological empowerment through a series of adventure activities. These activities normally include real obstacles which are not easy to overcome. By successfully navigating these challenges, participants can not only gain a sense of self-efficacy and mastery, but also meanings which can be incorporated back into their individual and social worlds (Bowen, Neill, & Crisp, 2016). The second pathway may originate from the beneficial impact of physical exercise on mental health (Buckley, 2023). There is a considerable number of studies identifying the positive impact of physical exercises on mood states, such as anxiety, stress, and depression (Mikkelsen et al., 2017). Exercise-induced healing effects mainly come from physiological changes, such as increased endorphin levels (Fuss et al., 2015), the generation of neurotransmitters (Clark & Mach, 2016), and weakened hypothalamic pituitary-adrenal (HPA) responses to stress (Droste et al., 2003). Moreover, completing a workout can boost one's self-esteem, contributing to a feeling of mastery (Mikkelsen et al., 2017).

In Buckley's (2023) systematic comparison of mental health research focuses across three tourism subsectors in fourteen aspects (see Table 2.1), nature tourism is regarded as the subsector focusing most on tourists' mental health outcomes; whereas adventure tourism pursues to provide intense and immediate emotional experiences, which can motivate tourists to change their lifestyles (Holmbom, Brymer, & Schweitzer, 2017). Finally, the indoor tourism subsector tends to prioritize business and marketing values.

Table 2. 1 Mental Health Research Focuses Among Three Tourism Subsectors.

Factor or component	Indoor	Nature	Adventure
Business and marketing aspects	***	*	*
Economic valuation via mental health	*	***	*
Wellbeing measures	***	***	*
Mental health outcomes	*	***	**
Short-duration psychological processes	*	**	***
Neurological processes	*	*	*
Sensory experiences	*	***	*
Emotional experiences	*	*	***
Randomized controlled trials	*	**	*
Representative population panels	*	**	*
Quantitative surveys	***	**	*
Qualitative phenomenology	*	**	***
Personality difference	**	*	**
Activity and setting effects	**	**	**

***, receives major emphasis; **, moderate emphasis; *, little or no emphasis

Source: Adapted from Buckley (2023)

2.1.3 Two Issues in the Study of Tourism and Mental Health

The role of tourism in mental health is a compelling and ongoing research topic, particularly after the pandemic situation of COVID-19. Buckley's (2023) categorization of the tourism subsectors provides researchers with a systematic and integral understanding of tourism's impact on human mental health. This can help integrate the tourism industry better into the mainstream mental healthcare system. However, Buckley (2023) may overlook a potential subsector that could contribute to tourists' mental health in a unique way, namely *animal-based tourism*. While some may argue that animal-based tourism can be considered part of the nature and outdoor subsector, it may operate through different psychological mechanisms to generate mental healing effects. For example, nature tourism emphasizes mental health maintenance and restoration through nature exposure (Buckley, 2020). However, animal-based psychological therapy relies on the development of relations between humans and animals (Allison & Ramaswamy, 2016; Signal et al., 2017). The investigation of the role of animal-based tourism in mental health can extend Buckley's (2023) tourism subsector classification and open up a new area of research for animal-based tourism.

Another issue in the research of tourism and mental health is the so-called "evidence obstacle" (Buckley, 2023, p.11). Integrating tourism into mainstream mental healthcare requires robust empirical evidence based on RCTs, where participants are allocated into two or more intervention groups. RCTs are widely used in medical research for their ability to examine the causal effects of interventions without direct or indirect biases (Zheng et al., 2023). However, most studies investigating the psychotherapeutic effects of tourism have used non-randomized controls (Levi et al., 2019; Wheatley, 2023), which provide weaker evidence. The lack of robust data hinders the integration of tourism into mainstream mental healthcare and may impede the practical application of tourism-based mental therapy. Therefore, Zheng et al. (2023) advocated for more RCT-based research to promote the robustness of results and implications when researching mental health in tourism.

In general, the lack of research on animal-based tourism and its effects on mental health, along with the corresponding empirical evidence from RCTs, represent two significant gaps in the field of tourism research.

2.2 Animal-based Tourism

2.2.1 Rapid Development of Animal-based Tourism

We are sharing the planet with an estimated 8.7 million various species (Goldenberg, 2011). Over thousands of years, human beings gradually form their ways of coexisting with other species. Some particular species (i.e. poultry and livestock) are raised and kept in feedlots or farms to provide a sufficient food supply for modern societies. Some species (i.e., those from feline and canine families) are bred at home as domestic pets, and have become integrated into human sociality as “companions”. In Carr’s (2009) eyes, animals can be systemically divided into wildlife, farm species, working partners, pets, companion animals, and assistance animals, based on their usage. Regardless of their purposes, there is no doubt that animals have already permeated each aspect of human society and play a vital role in all aspects of our lives.

Animals play a crucial role in the tourism industry. With the rapidly growing interest of tourists in animals-related experiences, animal-based tourism, including zoos, adventure, nature- and wildlife tourism, is increasingly popular (Buckley, 2009; Campos, Mendes, Valle, & Scott, 2018). Although there are no global economic impact indicators, wildlife tourism is estimated to account for 20%–40% of all international tourism (Moorhouse et al, 2017). According to World Animal Protection (2021), over 50,000 wild animals are used for tourist entertainment. The Airbnb platform now offers more than 1000 categories of animal activities, involving up to 300 different species, across 58 countries (Sunkara, 2019). According to Carr and Broom (2018), this trend is expected to continue, leading to a new period of vigorous development for animal-based tourism.

One reason why people in the contemporary society are increasingly drawn to animals can be explained by the profound influence of urbanization and industrialization on their relationship with nature (Gossling, 2002). As humans become increasingly distant from nature, the fuel “a resurgent interest in biophilia and a romanticized view of wild animals” (Wolch, West, & Gaines, 1995, p.736). Furthermore, people are no longer satisfied with traditionally ‘loveable’ kinds of animals but are eager to encounter as many different varieties as possible (Ingold, 2001). On the other hand, motivated by a desire to escape from “conventional social norms and regulations that structure everyday life” (Kim & Jamal, 2007, p. 184), people pursue a sense of “authenticity”, a feeling of their “real” selves and the “real” world. In a sense, animals are regarded as “symbolic of authentic wilderness, of particular places and Mother Nature” (Curtin, 2005, p.7). The emergence of animal-based tourism provides a unique use of animals for human pleasure and entertainment (Winter, 2020). Some species, especially those that people may not encounter in their daily lives, can be viewed through an animal-based journey. Some agencies offer animal

interactive activities, such as feeding, touching, riding, and swimming, providing tourists with both object-related and existential authenticity (Curtin, 2005).

2.2.2 Human-animal Relationship in Animal-based Tourism

The human-animal relationship is at the core of animal-based tourism. The complexity of the human-animal relationship lies in various factors, but the most fundamental one is the diverse functions that animals have performed, and continue to perform in human society (Kline & Fischer, 2021). For example, the human-animal relationship is hierarchical and non-egalitarian in a farm environment, where animals are treated as “a thermodynamic machine” for the maximum economic return (Larrère & Larrère, 2000, p. 56). However, when animals are raised as pets, the relationship becomes more complicated. In this context, human-pet relations can take the form of a parent-child bond, a companion relationship, or a supervisor and subordinate relation (Ahuvia, 2008; Meehan et al., 2017). The relationship between humans and non-human animals have been explored in various fields, such as psychology, sociology, anthropology, agriculture, and economics. These disciplines reach a consensus that a good human-animal relationship can benefit both humans and animals (Amiot & Bastian, 2015; Mota-Rojas, 2020; Mullin, 1999).

The commercialization of animals as tourist attractions for leisure can be seen everywhere in the field of animal-based tourism. Yet, the "rights" and "needs" of these non-human species have often been neglected for extended periods of time (Carr, 2009). Countless animals in the tourism industry are forced to live in isolated places where they are impossible to escape and spend their entire lives pleasing tourists without any freedom. The exploitation and abuse of animals in the tourism industry are widespread. Unfortunately, people take for granted the involvement of animals in their journey, showing indifference to whether animals are alive or dead. Even worse, some selling points of tourism activities are deliberately built on the sacrifice of animals. For instance, tourism based on the *corrida* indirectly leads to the death of 250,000 bulls every year (Humane Society International, 2020). In most people's eyes, animals in the tourism industry are “products” and “commodities” rather than sentient creatures (Carr, 2009).

The arguments of animal welfare and rights began to pick up the stream within the tourist literature with the publication of Fennell's (2012) major work *Tourism and Animal Ethics*. This was followed by several contributions within the last ten years. In a recent systematic review that involves 74 articles regarding animal ethics published in ten tourism journals, Winter (2020) identified six main themes within the field of animal ethics in tourism including 1). *animal ethics positions*, 2). *a tourism-animal ontology*, 3). *evidence of harm caused to animals in tourism*, 4). *proximity: feeding and confinement*, 5). *Ethics of the*

tourism system: Regulators, operators and tourists and 6). *the animal gaze: Power and manipulation of animals' identity*. These works have greatly contributed to the theoretical systemic construction of animal ethics in the tourism area.

The increasing focus on animal welfare and rights call for a new demand and theoretical view of the human-animal relationship in the contemporary tourism. Descartes' (1637) view of animals as "automata" is outdated and go against mainstream society (Kalof & Fitzgerald, 2007). Instead, animals should be conceptualized as "subjects" rather than "objects" and people should have moral responsibilities towards them (Bertella, 2014). The concept of "co-creation" provides a fresh perspective on the ever-evolving human-animal connection, and gives animal-centered tourism with a novel connotation and aesthetic. Co-creation in the tourism field refers to "the tourist's active participation and interaction during an experience" (Campos et al, 2017, p.100). It has recently been widely used in various tourism contexts, including heritage tourism (Minkiewicz, Evans, & Bridson, 2014), rural destinations (Kastenholz, Carneiro, & Marques, 2012), and destination experience networks (Binkhorst, 2007). In the animal-based tourism industry, co-creation experiences are exemplified by programs such as swimming with dolphin (Bertella, Fumagalli, & Williams-Grey, 2019) and dog sledding expeditions (Hoarau-Heemstra & Nazarova, 2021), which even allow tourists physically interact with animals.

Co-creation-driven animal tourism creates mutual values for all parties involved. From a supply perspective, co-creation has gradually become a market approach for competitive performance which can generate economic value (Campos et al., 2018). Animals also benefit from co-creative interactions and have the opportunity to lead a meaningful life (Hoarau-Heemstra & Kline, 2022). Moreover, literature from various disciplines suggests that healthy human-animal bonds can decrease animals' heart rates (Lynch & McCarthy, 1969) and morning cortisol levels (Schöberl et al., 2012), and thus reduce animals' stress levels and improve their quality of life (Amiot & Bastian, 2015). On the stance of tourists, co-creation animal experiences increase tourists' motivation, arousal, and interest in activities, leaving them with unforgettable impressions (Campos et al., 2017).

The emergency of co-creation idea provides a new thinking about the human-animal relationship in the context of animal-based tourism. Animals and humans are no longer linked in a purchasers-commodities relationship, but in a deeper bond, as Haraway (2008) refers to it as "messmate"

2.2.3 New Human-animal Relationship Based on Make-kin Theory

“Make Kin Not Babies!” This clangorous slogan was coined by Donna Haraway (2015, p.161), one of the most preeminent scholars in ecofeminism. In the face of various challenges posed by the Anthropocene, such as resource shortage, population growth, and climatic issues, Haraway (2015) highlights the need for unexpected collaborations and combinations. In her eyes, kinship not only exists within species (human-to-human, animal-to-animal), but can be stretched and composited within all earthlings (Haraway, 2016). As such, even those that seem unlike ourselves could be made kin with. Haraway’s profound thoughts are highly respected by Ren (2021), who introduced them to the tourism area and showed how to interpret “make tourism kin” (p. 27) by giving an example of smart tourism. Recently, Hoarau-Heemstra and Kline (2022) expanded Haraway's ideas to animal-based tourism and pointed out the “the alienating neoclassical economic practice of monetising, pricing and commodifying nature and animals in tourism”, calling for a shift from “an exploitative to a kinship type of relationship” (p. 1) between humans and non-human animals. One requisite approach to paving the way for making kin, as suggested by them, is empathetic sense-making. This approach can help us find common ground with non-human beings and build a deeper understanding of their needs and perspectives. By empathizing with animals, we can begin to appreciate their value beyond economic gains and commodification, and see them as individuals with their own unique experiences and agency. This perspective shift is crucial for developing a kinship relationship between humans and non-humans in the context of animal-based tourism. Empathetic sense-making can also lead to more responsible and sustainable tourism practices, as it encourages a deeper consideration of the impact of our actions on the natural environment and its inhabitants.

Hoarau-Heemstra and Kline (2022) provide a new angle for understanding the relationship between providers and animals in animal-based tourism and shed light on how kin-making and sense-making are realized by animal providers, leading to positive changes for animals’ situations. However, it is important to acknowledge that all actors in this relationship, including providers, tourists, and animals, have the opportunity to engage in co-creation. The bonds formed between tourists and animals are valuable for all three parties, as they can increase tourists’ revisit intention and creating memorable experiences, improve the current situations of animals and bring more economic benefits (Campos et al., 2017).

To conclude, the animal ethics movement, the growing emphasis on animal welfare and rights, the implementation of co-creation policies, and the ecological feminist perspective of sense-making and kin-making all contribute to the development of reciprocal multilateral relationships in animal-based tourism. However, despite our deeper understanding of animal-human relationships in animal-based tourism, there is a notable absence of knowledge regarding the role of animal-based tourism in people’s mental health,

as well as how human-animal relationships contribute to such an impact. This is particularly surprising given that the effect of animals on human mental health has been extensively studied in the context of clinical psychology.

2.3 Animal and Mental Health

2.3.1 The Psychotherapeutic Effect of Animal

Human beings have an inherent inclination to pay attention to other animals' 'activities (Kellert, 1993). Though the enduring relationship between humans and non-human animals can be traced to ancient times, scientific investigation of this relationship is a relatively recent development (Cirulli, et al., 2011). Boris Levinson (1962), a child psychotherapist, first brought animals into mental therapy and coined the term "pet therapy". In his book *Pet-Oriented Child Psychotherapy*, Levinson (1969) introduced the therapeutic use of dogs by using numerous examples. Since then, pet therapy garnered continuously positive attention from scientists and health professionals, and various terms for one phenomenon are derived (e.g. pet-facilitated therapy, animal-assisted therapy, and companion-animal therapy) (LaJoie, 2003). To distinguish, the "Delta Society," one of the largest US organizations that organize and provide animal-assisted programs, has released the widely cited definitions regarding the therapeutic use of animals (2008). Animal-assisted therapy (AAT) refers to a targeted and structured intervention which includes a specifically trained animal in the therapeutic process; while animal-assisted activities (AAA) are delivered by expert professionals or volunteers in association with specially trained animals, but lack specific treatment targets. The term "animal-assisted intervention" refers to a more general field that encompasses both AAT and AAA. According to Kruger & Serpell (2010), AAI is defined as all interventions that "intentionally includes or incorporates animals as part of a therapeutic or ameliorative process or milieu" (p. 25). Given the flexibility of this definition within a medical model and those of a more quasi-medical nature, this study adopts animal-assisted intervention to refer to the integration of animals into mental health therapy.

Previous research documented that the inclusion of animals in therapeutic programs can have a positive impact on mental health, encompassing emotions, cognition, and externalizing symptom (Koukourikos et al., 2019). For example, the company of animals has been proven to be an effective tool to reduce loneliness, stress, and enhance social connections (Friedmann & Son, 2009). In addition, such interactions can also influence individuals' self-perception, including self-efficacy and self-esteem (Kruger & Serpell, 2010). Some people with high empathy may even project themselves into animals, enabling them to learn new skills while understanding and making sense of animals' thoughts and behaviors from their perspective (Rockett & Carr, 2014). AAI is also widely applied for the treatment of some mental disorders, such as autism spectrum disorder (ASD) (O'Haire, 2013). For example, a study conducted by

Bass, Duchowny, and Llabre (2009) revealed that after a twelve-week riding training, children with ASD experienced significant improvement in sensory sensitivity, social communication skills, attention ability, and other areas. Similarly, the findings from another study showed that the interaction with dolphins could effectively enhance ASD children's ability of verbal speech (Breitenbach, Stumpf, Fersen, & Ebert, 2009).

2.3.2 Theories of Animal-assist Treatment

Considerable attention has been devoted to trying to elucidate the mechanisms underlying the effects of animals on mental health, resulting in various AAI theories. Generally, the theoretical constructs are most often divided into two streams, as proposed by Kruger & Serpell (2010). The first stream of thought is based on the idea that animals have unique intrinsic qualities that contribute to the therapy process. Theories on this view include *biophilia hypothesis* and *attachment theory*. The second stream holds the idea that animals can serve as living and interactive instruments, providing opportunities for learning new skills and behaviors. Theories that fall under this perspective include *social cognitive theories* and *role theories*.

Biophilia Hypothesis

Quantitative studies have shown that the mere presence of animals can generate physiologically de-arousing effects in humans. Edward O. Wilson first proposed the concept of the biophilia hypothesis in his book *Biophilia* (1986) to explain this phenomenon. He assumed that humans have a natural tendency to focus on other living organisms (Kahn, 1997). From the perspective of evolution, this tendency increases humans' survival chances via more attention to environmental cues (Kruger & Serpell, 2010). Therefore, people's positive responsiveness to nature is genetically based (Kellert, 1993). The biophilia hypothesis is widely used to explain the stress-reducing effect of outdoor and natural settings (Annerstedt & Währborg, 2011). In AAI literature, this hereditary trait is also regarded as a potential mechanism of calming or de-arousing effect induced by animals. However, as mentioned by Serpell (1996), "any stimulus which is attractive or which concentrates the attention has a calming effect on the body". It remains unclear if such a de-arousing effect derives from human's innate attraction to animals, or if animals may just serve as a means to divert attention.

While the evolutionary theory is too expansive and under-determined to render it a useful theoretical conclusion for AAI (Joye & Van den Berg, 2011), extensive studies have attempted to measure people's physiological indicators when they interact with animals. Research reveals that besides the decline in blood pressure and heart rate (DeMello, 1999), the de-arousing effect of animals is embodied in controlling the release of some hormones, such as the increase of oxytocin, which serves the function of

relaxation and stress release (Amico, Johnston, & Vagnucci, 1994); or the reduction of cortisol and adrenaline, also known as “stress hormones” (Koukourikos et al., 2019), which further lead to lower blood pressure and heart rate.

Attachment Theory

Attachment theory was first developed by John Bowlby (1969) to explain how an infant forms an emotional bond with a primary attachment figure (i.e. a mother or primary caregiver). According to Bowlby (1969), humans are born with an innate attachment system, which infants can use to manage their behaviors which are designed to maintain or initiate proximity with attachment figures (Bretherton, 1985). When infants feel threatened, stressed, frightened, or fatigued, the attachment system is voluntarily activated and “toned down” when attachment figures give comfort (Bowlby, 1969).

Theoretical arguments have been forwarded in support of the idea that humans can have multiple attachment figures and are not limited to the primary caregiver. The formed attachment bonds constitute an attachment “hierarchy” or “network,” each serving different attachment functions (Hazan & Shaver, 1994). It is noted that this attachment hierarchy formed in childhood is gradually (but never completely) relinquished over time, and new attachment bonds are established in adulthood (Rockett & Carr, 2014).

A considerable amount of literature has proved that attachment figures can not only be humans, but also dolls (Bisiani & Angus, 2013), places (Cole, Coleman, & Scannell, 2021), gods, or religious leaders (Bradshaw, Ellison & Marcum, 2010). Regarding animals, the findings suggest that people can also form an emotional attachment to companion animals which is similar to that they experience with friends and family (Rockett & Carr, 2014). In the therapeutic context, these attached animals can help achieve therapeutic gains via several ways.

According to Triebenbacher (1998), humans have a genetically rooted, intrinsic desire for social interaction, mainly reflected in the interaction with attachment figures. In this sense, the existence of attachment figures serves a comforting and diverting role during distressing times to fulfill what Hazan and Zeifman (1994) describe as “a secure base” and “a safe haven” functions. On the other hand, attached animals are also regarded as “vehicles for projection” (Berget & Ihlebæk, 2011, p.124). For example, people, especially those who live in a “non-supportive world” (Mikulincer & Bucholtz, 1995, p. 666)”, often put themselves in the animal’s position to observe how those animals are treated by others (Berget & Ihlebæk, 2011). Through observation of the interactions between animals and others, people can be inspired to trust the human other (Noonan, 2008).

Social Cognitive Theory and Role Theory

Supporters of social cognitive theory believe that an individual's cognition, behavior, and environment are continuously interconnected. The target of therapy is to transform people's self-perception through observation, imitation, or direct instruction, to improve their behaviors (Kruger & Serpell, 2010). In AAI literature, observation is a common means for clients to learn appropriate behaviors. This is because animals' responses to stimuli are more "honest" and "immediate," making people more easily understand the cause and effect of their behaviors. As such, the inclusion of animals in therapy may play a role in many cognition aspects, such as self-efficacy and self-esteem (Berget & Ihlebæk, 2011; Kruger & Serpell, 2010). Self-efficacy refers to an individual's faith in his or her capacity to perform behaviors necessary to create a desirable outcome (Bandura, 1986), while self-esteem is the positive or negative evaluations of the self, as in how we feel about it (Smith & Mackie, 2007). As depression and low mood in contemporary society are largely attributed to the loss of faith, self-efficacy and self-esteem are vital to human mental health. Some animal involved activities such as equine programs, involving animal training and caretaking activities such as patting, washing, grooming, and riding, can improve levels of self-efficacy and self-esteem and boost individuals' mental health (Maujean et al., 2015).

Role theory, which fits within a social cognitive framework, also emphasize the relations between the social environment and individual development. According to this theoretical framework, a majority of daily activities are acting-out of socially defined categories (i.e. father, cook, teacher), and each role has a set of corresponding duties, norms, behaviors, and expectations (Newman & Newman, 2017). The rationale for using this theory in a therapeutic setting is that when a person is endowed with a new role, he or she will adjust behaviors to meet the role expectations (Kruger & Serpell, 2010). Normally, AAI practices based on this theory will first ask clients to assume a new role, such as a trainer or caretaker of animals (Brickel, 2016), through which they can learn relevant skills and behaviors of the role. Moreover, clients can generate a sense of competence during the process of role-acting, which can generalize beyond the intervention's context (Adams, 2010).

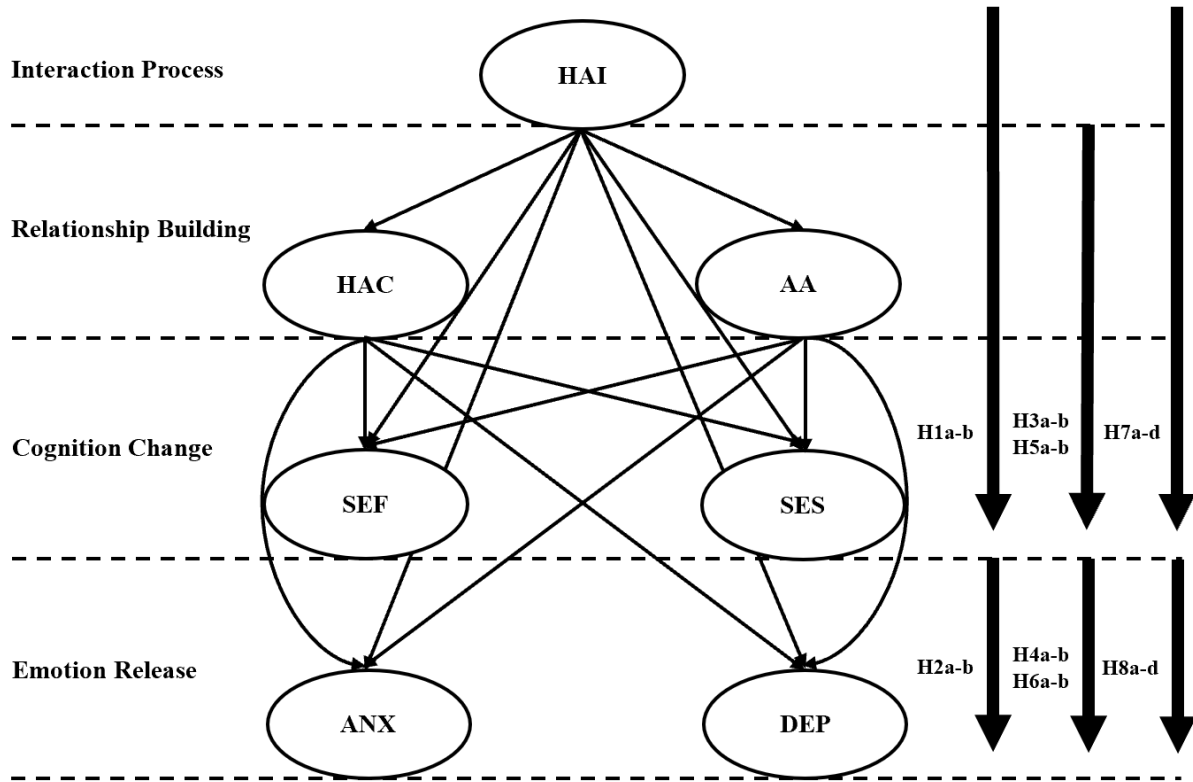
However, while all these theories have been proposed and tested in the therapeutic milieu, they may not be applicable in tourism contexts. Thus. Frameworks in the new context are needed to understand the impact of animal-based tourism on mental health. The current study hence proposes two potential frameworks to illustrate the impact of animal-based tourism on mental health by synthesizing theoretical perspectives from different disciplines.

CHAPTER 3 FRAMEWORK

Chapter 3 presents two theoretical frameworks for understanding the impact of animal-based tourism on mental health. The first framework aims to illustrate how individuals' mental health is promoted during animal-based tourism from a dynamic perspective, while the second framework takes a static viewpoint to focus on the immediate and enduring effects of tourism, identifying various potential moderating and mediating factors. While previous research has examined various theories related to mental health, tourism, and animals, such as attachment theory, social cognitive theory, role theory, and attention restoration theory. Some of these theories appear in clinical psychology, specifically in the area of incorporating animals into psychotherapy (Berget & Ihlebæk, 2011; Kruger & Serpell, 2010), while others are more prevalent in other tourism areas (i.e., nature tourism and adventure tourism) rather than animal-based tourism (Buckley, 2023). However, very little research has been done on the conceptualization of mental health within the context of animal-based tourism. To address this gap, this study proposes two theoretical frameworks that synthesizes various theories and perspectives from different fields to fully explain the complex dynamic and static mechanisms involved in the relationship between animal-based tourism and mental health.

3.1 Conceptual Framework of Study I

Of most relevance to the present study is *attachment theory* and *the biophilia hypothesis*, as it provides a logical explanation of why people are keen to forge bonds with animals and how such bonds facilitate mental health (Fine & Beck, 2015). Given the importance of human-animal relations in animal-based tourism, attachment theory and the biophilia hypothesis therefore serves as the theoretical basis for this study. However, as mentioned, there is still a lack of a unified and widely accepted theoretical framework in the field of AAI (Kruger & Serpell, 2010). Though attachment theory and the biophilia hypothesis basic theories in the AAI field, their multiple and complex mechanisms still require exploration and verification. Moreover, attachment theory and the biophilia hypothesis has not been applied and testified in contexts outside of the therapeutic setting, which may limit its applicability to animal-based tourism. Therefore, the current study further advances attachment theory by synthesizing it with other AAI theories, incorporating theoretical perspectives from other disciplines, such as clinic psychology, positive psychology, and evolutionary psychology, and incorporating the unique features of animal-based tourism. To guide hypothesis formulation and further empirical testing, an overall theoretical framework (Figure 3.1) is proposed.



Note. HAI=Human-animal Intervention, HAC = Human-animal Connection, AA = Animal Attachment, SEF = Self-efficacy, SES = Self-esteem, ANX = Anxiety, DEP = Depression.

Figure 3. 1 The Conceptual Model of Study I

3.1 The Role of Human-animal Interaction

Numerous studies have examined the therapeutic effects of human-animal interaction (HAI). It has been found that HAI can effectively delay the onset, decrease the severity, or slow the progression of stress-related conditions by reducing anxiety, loneliness, and depression (Wilson & Barker, 2003). As described by Jennings (2010) in his book, “just to touch our dogs is enough to calm us down, enough to soothe us” (p. 153). This phenomenon can be explained by the biophilia hypothesis (Wilson, 1986), which suggests that humans have an inherent tendency to connect with other living organisms (Kahn, 1997). Therefore, contact with animals can produce what is known as "calming" and "de-arousing" effects, which are also reflected in various physiological responses related to anxiety and depression, such as heart rate, blood pressure, and skin temperature (Kruger & Serpell, 2010). Moreover, human-animal interaction can lead to cognitive changes, particularly in terms of self-esteem and self-efficacy, which are essential cognitive components related to mental health (Adams, 2010). According to role theory, during human-animal

interaction, individuals may assume the role of caregivers and trainers. This new role allows them to acquire various skills through observing and caring for animals, consequently improving their self-image (Koukourikos et al., 2019).

While these effects have mostly been examined within therapeutic settings, animal-based tourism also provides opportunities for tourists to observe, stroke, feed, and care for animals. Therefore, the following hypothesis is proposed:

H1. *Human-animal interactions lead to changes in individuals' cognitions, including a). self-efficacy and b). self-esteem;*

H2. *Human-animal interactions reduce individuals' negative emotions including a). anxiety and b). depression.*

3.2 The Role of Human-animal Relationship

The literature on AAI bounds with “anecdotal statements concerning the loving bonds that are forged between humans and animals” (Kruger & Serpell, 2010, p.29), underscoring the crucial role of the human-animal relationship in mental health. According to attachment theory, individuals have a propensity to form strong emotional bonds, known as attachments, with animals that are akin to those formed with friends and family (Rockett & Carr, 2014). Animals with whom individuals develop attachment relationships can provide a sense of reassurance, calm, and security, particularly in the face of perceived threats (Melson, 2001), by serving as a "secure base" and "safe haven." As explain by Weiss (1974), attachment is one of important components in the social provision theory, emphasizes the importance of social relationships in self-development. In this sense, the attachment relationship between humans and animals can fulfill individuals' need for social relations by serving as a "compensatory" or "supplementary" source (Rockett & Carr, 2014), which contributes to a positive internal representation of the self (O'Callaghan et al., 2010). In the context of tourism, individuals may also develop attachments with specific animals during their journey (Bertella, 2014; Notzke, 2019). Such bonds can even serve as a significant incentive for tourists to return or consider adopting the animals (Hoarau-Heemstra & Kline, 2022). Therefore, we hypothesize that the human-animal attachment formed in the context of human-animal tourism may also have psychotherapeutic effects which are in the therapeutic context. Specifically:

H3. *Animal attachment influences individuals' cognitions, including a). self-efficacy and b). self-esteem;*

H4. *Animal attachment reduces individuals' negative emotions including a). anxiety and b). depression.*

Within animal-based tourism, individuals have the opportunity to encounter a wide variety of animals. Consequently, in addition to forming emotional bonds with specific animals, tourists can also develop a collective connection with animals as a whole (Skibins & Powell, 2013). This broader animal connection

can replicate the sense of being immersed in nature (Fine, 2014), and fulfil individuals' need for connecting the nature (Lumber, Richardson, & Sheffield, 2018). As described by Curtin (2005), animals are “symbolic of authentic wilderness, of particular places and Mother Nature” (p.7). In light of this, it is plausible that the human-animal connection, similar to the human-nature connection, can yield mental health outcomes with positive impacts on individuals' emotions and cognitions (Divya & Naachimuthu, 2020). Therefore, we hypothesize that:

H5. *Human-animal connection influences individuals' cognitions, including a). self-efficacy and b). self-esteem;*

H6. *Human-animal connection reduces individuals' negative emotions including a). anxiety and b). depression.*

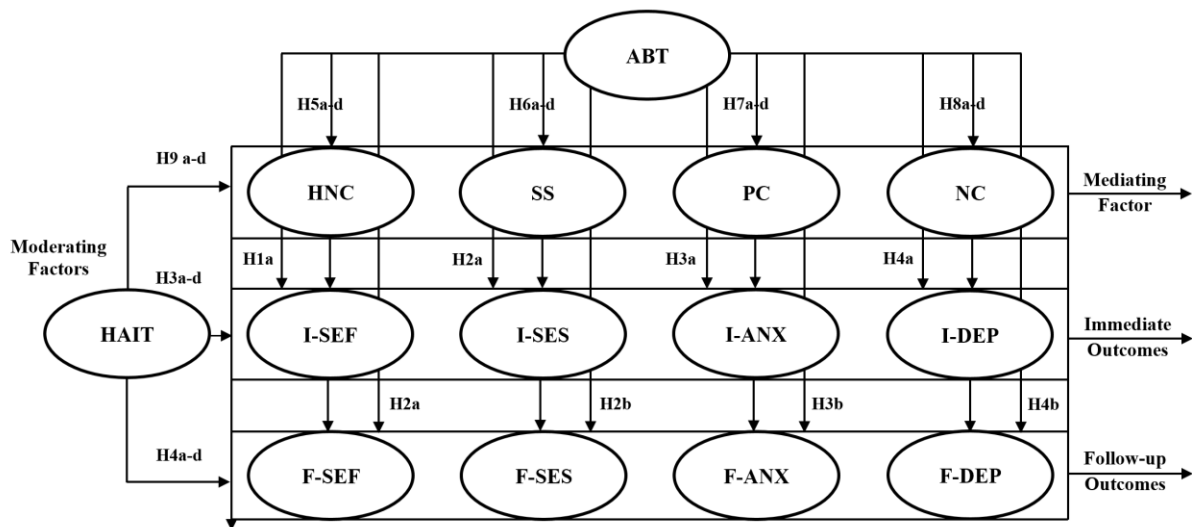
A multitude of studies have extensively explored how human-animal interaction can foster emotional and cognitive connections with animals, both at collective and individual levels. Dashper (2017) illustrated how tourists can develop profound interspecies relationships with horses through interactions. Hoarau-Heemstra & Kline (2022) explained that human-animal interaction can activate social mechanisms such as trust, understanding, and kinship formation, which strengthen and deepen the emotional bonds between humans and animals. Additionally, sensorial human-animal interactions in natural settings can lead to “the heightened recognition of the inter-relatedness of all life forms” (Curtin, 2005, p.10). Therefore, it is assumed that human-animal interaction can yield mental health benefits, encompassing both cognitive and emotional aspects, through the cultivation of strong and meaningful human-animal relationships at both individual and collective levels. Stated formally, our hypothesis is as follows:

H7. *The influence of human-animal interactions on cognition is mediated via human-animal relationships. Specifically, animal attachment mediates the influence on a). self-efficacy and b). self-esteem; likewise, the human-animal connection mediates the influence on c.) self-efficacy and d). self-esteem.*

H8. *The influence of human-animal interactions on emotions is mediated via human-animal relationships. Specifically, animal attachment mediates the influence on a). anxiety and b). depression; likewise, the human-animal connection mediates the influence on c.) anxiety and d). depression.*

3.2 Conceptual Framework of Study II

The framework in Study I illustrates how tourists boost their mental health through animal-based tourism from a dynamic perspective. Study II focuses more on the psychological mechanisms underlying the effect of animal-based tourism on mental health. Specifically, the framework identifies various psychotherapeutic elements in animal-based tourism that play a causal role in enhancing individuals' mental health. Moreover, it includes the enduring psychotherapeutic effects of animal-based tourism. Similar to Study I, theories in the AAI area are integrated with perspectives from psychology, positive psychology, and evolutionary theory within the tourism context. To guide hypothesis formulation and further empirical testing, a theoretical framework (Figure 3.2) is proposed for study II.



Note. ABT = Animal-based Tourism, HAIT=Human-animal Intervention Type, HNC = Human-nature Connection, SS = Social Support, PC = Positive Coping, NC = Negative Coping, I-SEF = Immediate Self-efficacy, I- SES = Immediate Self-esteem, I-ANX = Immediate Anxiety, I-DEP = Immediate Depression, F-SEF = Follow-up Self-efficacy, F- SES = Follow-up Self-esteem, F-ANX = Follow-up Anxiety, F-DEP = Follow-up Depression.

Figure 3. 2 The Conceptual Model of Study II

The Impact of Animal-based Tourism on Immediate Mental Health Outcomes

As illustrated in the framework of Study I, various experiences in animal-based tourism, including human-animal interaction and the development of human-animal relationships, may contribute to changes in cognition, such as self-efficacy and self-esteem, and emotions, such as anxiety and depression. Moreover, previous studies have found that the psychological benefits of tourism reach their peak immediately after the vacation (De Bloom et al., 2009). Therefore, we hypothesize that animal-based tourism may lead to immediate mental health benefits, including improvements in self-efficacy, self-esteem, anxiety, and depression:

H1. *The animal-based tourism increases individuals' immediate a) self-esteem; b) self-efficacy; c) anxiety, and d) depression.*

Though tourism can produce mental health benefits, these benefits quickly fade out over time once tourists return to their daily routines. According to the conservation of resources (COR) theory, people have a tendency to obtain, retain, foster, and protect resources, and the loss of resources can be detrimental to their mental health (Hobfoll, 2002). Tourism reduces individuals' daily exposure to various stressors and provides an opportunity for active recovery of resources (Reizer & Mey-Raz, 2019). While there is no consensus on the specific duration of the psychotherapeutic effects of tourism, most studies have documented that these effects fade within two weeks, after which the mental health benefits of tourism return to pre-tourism levels (De Bloom et al., 2009; Reizer & Mey-Raz, 2019). Therefore, we hypothesize that the mental health effects produced by animal-based tourism can last at least one week.

H2. *The animal-based tourism increases individuals' follow-up a) self-esteem; b) self-efficacy; c) anxiety, and d) depression.*

Human–animal interactions play moderating roles in the effect of animal-based tourism on mental health. According to Stebbins' theory, different types of tourism activities can produce different mental benefits. For example, Park and Ahn (2022) outlined four types of tourism activities—pleasure, detachment, eudaimonic personal meaning, and self-reflection—which can produce different mental outcomes. Therefore, different types of animal-based interactions each have their own implications (Park & Ahn, 2022).

An animal-based journey can involve multiple leisure activities. Watching and photographing animals, whether domestic or non-domestic, from a safe distance falls under casual leisure. These activities foster hedonic well-being and relieve fear and distress (Friedmann, Son, & Saleem, 2015). However, some direct human–animal interactions that do not require specific skills or concerted effort may cause tourists' fear due to the risks involved (e.g., stroking, feeding, or brushing an animal). Tourists may overcome their fear to perform such interactions and truly enjoy the experience. Therefore, such activities endow

participants with a sense of accomplishment and behavioral control due to constant stimulation of the vestibular system (Grandin, Finae, & Bowers, 2010).

Furthermore, the duration of effects differs among various types of leisure activities; activities that require more effort and training can produce long-lasting mental impacts (Voigt et al., 2010). This suggests that different types of animal-based tourism can moderate the impact on immediate and enduring mental health outcomes. Therefore, we hypothesize:

H3. *The human-animal interaction type moderates the impact of the animal-based tourism experience on immediate a) self-esteem; b). self-efficacy; c). anxiety, and d), depression.*

H4. *The human-animal interaction type moderates the impact of the animal-based tourism experience on follow-up a) self-esteem; b). self-efficacy; c). anxiety, and d), depression.*

In previous AAI research, animals may fulfill multiple psychotherapeutic roles simultaneously. They can symbolize nature, offering individuals a sense of "authenticity" and meeting their desires to break away from standard social norms and connect with the broader natural world (biophilia hypothesis) (Kruger & Serpell, 2010). Additionally, animals act as attachment figures, providing social can provide secure, supportive relationships. These connections facilitate positive internal self-representations and views of others. In this capacity, animals in AAI are providers of social support, giving individuals a sense of being loved, unconditionally accepted, valued, and interconnected. These relationships effectively reassure people of their worth, thus reinforcing their commitment to living a meaningful life (social provision theory) (Kruger & Serpell, 2010). Furthermore, animals are viewed as vital resources for coping, helping mitigate the negative impacts of stress (McNicholas & Collis, 2006). They encourage positive coping strategies for handling life's stressors (Berget, Ekeberg, & Braastad, 2008). Although the setting extends beyond clinical environments, these roles are similarly significant in tourism contexts, contributing to mental health improvements among tourists. Therefore, we hypothesize:

H5. *The human-nature connection mediates the impact of the animal-based tourism experience on a). self-esteem; b). self-efficacy; c). anxiety; and d). depression.*

H6. *The social support mediates the impact of the animal-based tourism experience on a). self-esteem; b). self-efficacy; c). anxiety; and d). depression.*

H7. *The positive coping mediates the impact of the animal-based tourism experience on a). self-esteem; b). self-efficacy; c). anxiety; and d). depression.*

H8. *The negative coping mediates the impact of the animal-based tourism experience on a). self-esteem; b). self-efficacy; c). anxiety; and d). depression.*

As mentioned, different types of human-animal interaction can yield varied mental health benefits. These differences are reflected not only in their moderating role on the effects of animal-based tourism on mental health but also in their underlying psychotherapeutic mechanisms, or in other words, the mediating factors. For example, relaxing activities such as watching and photographing animals without any effort or risk may promote mental health by only enhancing the human-nature connection. Conversely, activities that require more effort may yield mental health benefits by promoting coping abilities, while those that allow deeper interaction with animals may forge stronger emotional bonds, which in turn provide substantial social support for individuals. Given the potential differences in the underlying mechanisms of the psychotherapeutic effects of different types of human-animal interactions, the following hypothesis was proposed:

H9. *The human-animal interaction type moderates mediation effect of a). human-animal connection; b). social support; c). positive coping; and d). negative coping.*

CHAPTER 4 METHODOLOGY

This research undertook a multimethod investigation of the role of animal-based tourism in mental health, with the goal of uncovering its fundamental psychological pillars and practical application. Our investigation consisted of two independent studies, which applied a wide range of methodologies, including in-person depth interviews, questionnaires, field experience. Through a process of abduction (Haig & Haig, 2018), this methodology combination enabled us to advance the mental health framework in the context of animal-based tourism.

4.1 Methodology of Study I

The purpose of **Study I** is to initially investigate the effect of animal-based tourism on mental health, and explore its underlying mechanism. In this part, a cross-sectional approach with self-administrated questionnaire was employed to collect data. Then, the relationships among constructs were examined by utilizing SEM to test the research the framework 1 and hypotheses (Study I: H1– H8).

4.1.1 Research Design

A mixed-methods approach incorporating both quantitative and qualitative (interviews) methods were utilized in Study I. The mixed method measure can provide a more comprehensive understanding of a research problem by incorporating multiple perspectives and types of data. Ivankova and Creswell (2009) described four types of designs to conduct mixed methods study. Among them, the triangulation design (Figure 4.1) is most appropriate for the current study as it involves collecting different types of data

simultaneously to understand a single phenomenon. Through the triangulation design, quantitative and qualitative data can be compared and contrasted to draw well-validated conclusion (Creswell et al., 2003).

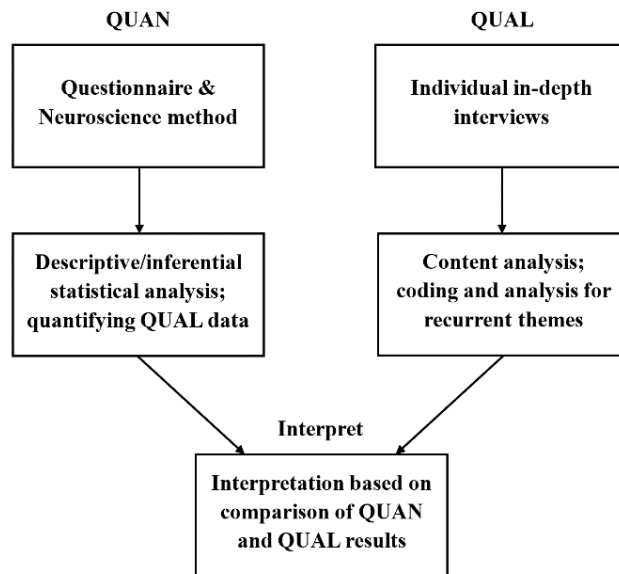


Figure 4. 1 Logistic of the Triangulation Design

4.1.2 Research Site

The study took place at Gulin Zoo, located in Guangxi province, China. Gulin Zoo houses a diverse range of animals, including approximately 100 different species and over 1,000 animals, such as Manchurian tigers, gibbons, and flamingos. The zoo provides opportunities for close interaction between tourists and animals, along with various themed animal shows.

4.1.3 Quantitative Methodology

The quantitative portion of this study primarily employed a cross-sectional approach utilizing self-administered questionnaires. Furthermore, to examine the relationships among the constructs, SEM was utilized.

Research Instrument

The questionnaire utilized in this study consisted of four sections.

Section 1 included four items focused on measuring human-animal interaction, which were adapted from Campos et al. (2017)'s scale. Section 2 collected data on human-animal relationships, specifically assessing the strength of the human-animal connection using a four-item scale developed by Skibin and Powell (2013). Animal attachment was also evaluated in this section, utilizing five items adapted from Johnson, Garrity, and Stallones (1992). Prior to completing the animal attachment scale, participants were

asked to recall the type of animal they liked best in the zoo and were instructed to respond to the scale based on their impressions of that particular animal (s). Section 3 focused on mental health outcomes, including five items for self-efficacy (Jerusalem & Schwarzer, 1986), five items for self-esteem (Rosenberg, 1965), three items for anxiety, and three items for depression (Zigmond & Snaith, 1983). Participants were requested to evaluate their current status in relation to these outcomes. Demographic information of the participants, such as age, gender, and histories of mental illness, was collected in Section 4.

Data Collection

Questionnaires were distributed to tourists who had already spent a significant amount of time visiting the zoo. A convenience sampling approach was employed, and a total of 502 tourists were approached to participate in the study. Ultimately, 476 valid questionnaires were collected, resulting in a response rate of 94.8%. This substantial number of valid responses allows for the application of SEM criteria. The respondents were roughly balanced in terms of gender, with 57.6% being female and 42.4% being male. The profile of survey participants can be found in Table 4.1.

Table 4. 1 Profile of Survey Participants

Variables	Category	Valid n=476/502 (94.8%)	
		Frequency	Percentage
Gender	Female	274	57.6
	Male	202	42.4
Age Group	< 20	174	36.6
	20-34	151	31.7
	34-49	132	27.7
	> 50	19	4.0
Education Level	Junior high school and below	170	35.7
	Senior high school	78	16.4
	Junior college	55	11.6
	B.A. and above	164	34.5
	Other	9	1.9
Marital Status	Married	235	49.4
	Unmarried	226	47.5
	Other	15	3.2
Pet Owner	Yes	184	38.7
	No	292	61.3
Psychiatric History	Yes	17	3.6
	No	459	96.4

Data analysis in study consisted of 4 stages which are presented in Figure 4.2. Software of SPSS and Amos were used for data analysis.

Data Analysis

The procedure of data analysis is shown in Figure 4.2.

Descriptive Analysis

In Stage 1, descriptive analysis was employed to describe the characteristics of the sample according to the socio-demographic questions in the questionnaire. Mean and standard deviation were used to reflect the central tendency and variability of the dataset, and frequency was used to determine the survey respondents' profile.

Confirmatory Factor Analysis (CFA)

The aim of confirmatory factor analysis was to validate the factor structure of observed variables. The maximum likelihood method, as the most widely used estimation in SEM research, was utilized in this study (Hair, Anderson, Tatham & Black, 2002). To evaluate the goodness of fit of the model, a range of fit indices such as Chi-square statistics, Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA) were employed.

Reliability and Validity Tests

Reliability assessed the extent to which items indicate the corresponding latent construct (Netemeyer, Bearden, & Sharma, 2003). Composite reliability (CR) was used to test the reliability of the scale. A rigorous level of 0.7 or above is recommended for CR score (Hair et al. 2002), yet Bagozzi and Yi (1988) suggest values above 0.6 threshold are still acceptable. Validity comprised convergent validity and discriminant validity. Convergent validity reflects how closely an item relates to other items which measure the same or similar constructs, while discriminant validity evaluates whether two constructs or variables that are theoretically different are, in fact, empirically distinct from each other. Convergent validity is measured by average variance extracted estimate (AVE), with a recommended threshold of 0.45 or 0.5 for an acceptable level (Netemeyer et al. 2003). Discriminant validity is measured by comparing the square root of the AVE of each construct with the inter-factor correlations between that construct and other constructs in the model. If the square root of the AVE for a given construct is greater than the inter-factor correlations between that construct and other constructs, then it is assumed that the construct has discriminant validity.

Structural Equating Model

SEM was used to test a variety of hypotheses about the relationships between the constructs in this study, including both direct and indirect effects. The structural model is estimated using path analysis, which involves specifying a series of regression equations representing the relationships between constructs. The path coefficients in the model indicate the strength and direction of the relationship between two constructs.

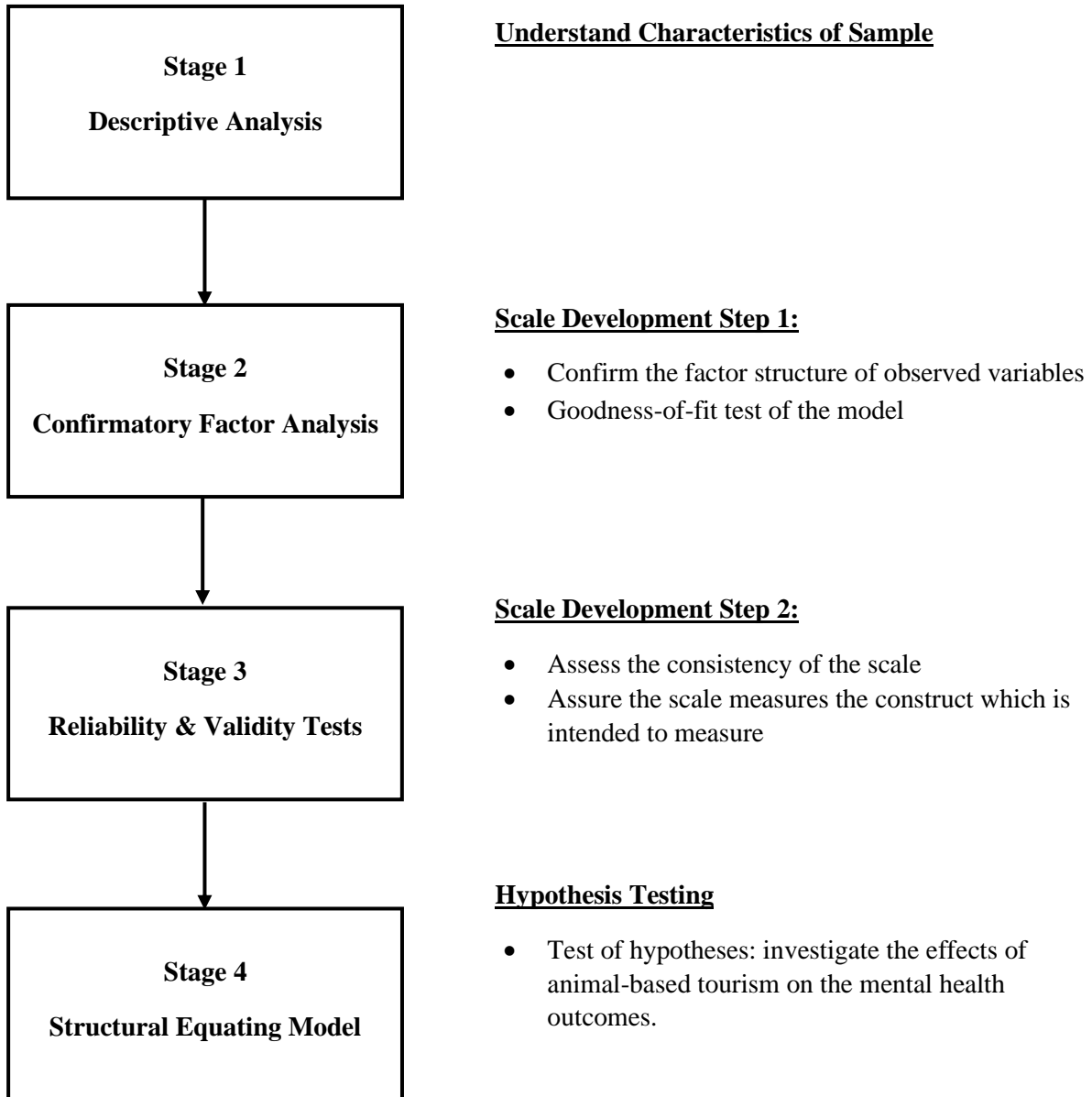


Figure 4. 2 Data Analysis Procedure

4.1.4 Qualitative Methodology

The qualitative component of the current research relied on in-depth interviews to enhance the interpretation of the quantitative results by providing additional depth, meaning, and context to the numerical data. These interviews were conducted to capture rich and detailed insights from participants, allowing for a more comprehensive understanding of the phenomena under investigation.

Interviews Topic

Interview questions covered the following topics: 1). Participants' backgrounds (e.g., age, gender, and education); 2). Their daily lives and mental health (e.g., types and sources of mental issues [if applicable] or stress); 3). Previous experiences interacting with animals (e.g., pet keeping experiences and attitudes towards animals); 4). Their tourism experiences at Gulin Zoo (e.g., animals seen and activities participated in); and 5). The influence of zoo visits on their mental health (e.g., the impact of different human-animal interaction activities on emotions and cognitions).

Data Collection

Participants for the interviews were primarily selected from respondents who completed the questionnaire survey and met a specific criterion, either having a history of diagnosed mental illness or occasionally experiencing emotional issues without reaching clinical levels of mental illness. The interviews had an average duration of approximately 50 minutes. Each interview was recorded with the consent of participants, and personal details were safeguarded via data anonymization to maintain confidentiality. Detailed participant information can be found in Table 4.2.

Table 4. 2 Profile of Interview Participants

No.	Gender	Age	Education	Number of Zoo Visits*	Attached Animal	Psychiatric History	Frequency of Emotional Problems
p1	Male	18	Senior high school	2	Alpaca	None	Occasional
p2	Female	30	B.A.	5	Tiger	Depression	Occasional
p3	Female	11	Primary school	4	Monkey	None	Often
p4	Female	20	B.A.	1	Chinchilla	Anxiety	Often
p5	Female	29	B.A.	1	Piglet	None	Often
p6	Female	20	B.A.	1	Goat	None	Often
p7	Male	14	Junior high school	3	Monkey	None	Occasional
p8	Male	14	Junior high school	3	Fine tailed	None	Occasional
p9	Female	20	B.A.	2	Parrot	None	Occasional
p10	Female	21	B.A.	2	Alpaca	None	Occasional
p11	Male	13	Junior high school	1	Tiger	None	Occasional
P12	Female	16	Senior high school	5	Parrot	None	Occasional

Data Analysis

Data analyses were conducted after all the interview recordings were transcribed. The recordings were transcribed by using an online transcription and editing platform in the first round. Then the interviewers who conducted the interview were responsible for checking and correct the transcripts in the second round. Finally, each researcher familiarized with all the transcripts by reading them many times. We followed Strauss (1987) to coding, engaging in open coding followed by axial, selective coding to listen the informants' "voices". Firstly, the open coding was conducted through in-vivo coding technique, which quoted codes from the raw transcripts (Hung, Xiao, & Yang, 2013). Then, there followed the axial coding which began to draw the connections between the discrete pieces broken by opening coding. After axial coding, a number of categories emerged based on the existing codes. Moving on to the axial coding, all categories developed from the previous axial coding were connected together around one core category. And such core category finally represented the central thesis of our study.

4.2 Methodology of Study II

The purpose of **Study II** is to understand the causal and enduring effect of animal-based tourism on mental health. Based on the finding in **Study I**, this study introduced a potential moderating factor, namely human-animal intervention type, and some potential mediators, including human-nature connection, social support, coping strategies. Corresponding hypotheses are therefore examined (**Study II**: H1a-d – H9a-c).

4.3.1 Research Design

To achieve the objective of **Study II**, a longitudinal design alongside a randomized controlled trial framework was employed. Longitudinal panel studies are widely used in evaluating mental health outcomes of a certain intervention (Dzhambov et al., 2018; Song et al., 2018). By following a group of individuals over an extended period, and collecting data at multiple time points, long-term panel studies can provide valuable insights into the potential causal factors that influence mental health over time, including social and environmental factors, life events, and individual characteristics.

In addition, RCTs were combined with the longitudinal approach used in this study. RCTs are frequently regarded as the "gold standard" for determining the efficacy of an intervention (Maujean, Pepping, & Kendall, 2015), while longitudinal studies are beneficial for monitoring changes over time. Therefore, the combination of RCTs and longitudinal approaches can offer a powerful way to evaluate the long-term effects of interventions. In this design, participants are randomly assigned to receive an intervention or a control condition, followed up over several weeks or years to assess the long-term effects of the intervention. Following participants over time allows researchers to observe how the effects of the intervention may change over time.

In this study, participants were randomly assigned to two groups, each receiving different levels of interaction with specific animals as part of their interventions. Their mental health outcomes, along with potential mediators, were assessed prior to the experiment, immediately afterwards, and one-week post-experiment.

4.3.2 Research Preparation

The research paradigm in AAI research served as a good reference for this study. Similar to other AAI research, several issues such as intervention identification, measurement, species selection, ethical concerns regarding animals, should be considered beforehand.

Intervention Type Identification

To determine the specific experimental intervention for **Study II**, a prior study was conducted. This involved collaboration with two experts in the relevant field and the organizer of the destination to first identify twelve human-animal interaction activities based on their reasonableness and feasibility, as shown in Table 4.3. Subsequently, 125 participants were recruited to assess the type of intervention by responding to the query: "Which of the following ways of interacting with animals might make you feel, at a certain moment, 'it's just like a family member to me'?" using a 7-point Likert scale. This approach allowed us to quantify the kinship sense associated with each interaction activity. Out of the responses, 106 were deemed valid, resulting in an 84.8% response rate. The gender distribution among respondents was relatively even, with 42.5% female and 57.5% male participants. Through factor analysis, two distinct factors emerged (see Table 4.3): Factor 1, encompassing six activities (feeding, touching, hugging, naming animals, brushing fur-covered animals, and talking to animals), was indicative of kinship human-animal interaction (KHAI). In contrast, Factor 2 comprised five activities (observing animals, photographing animals, taking photos with animals, posing, or making faces in front of animals, and approaching animals), representative of normal human-animal interaction (NHAI). These categorizations reflect the varied impacts of human-animal interaction types on individuals' sense of kinship with animals.

Table 4. 3 Factor Analysis Results

Items	Factor 1	Factor 2
1. Observing Animals		.797
2. Feeding Animals	.520	
3. Touching Animals	.752	
4. Hugging Animals	.845	
5. Photographing Animals		.881
6. Taking Photos with Animals		.844
7. Naming Animals	.761	
8. Brushing Fur-Covered Animals	.876	
9. Talking to Animals	.604	
10. Posing or Making Faces in Front of Animals		.629
11. Approaching Animals		.796

Measurement

Participants in this study were asked to complete four distinct questionnaires at various stages of the study. The initial questionnaire, used in a pilot study, aimed to identify participants with poor mental health conditions. It incorporated diagnostic tools such as the Rosenberg Self-Esteem Scale (1965), General Self-Efficacy Scale (Jerusalem & Schwarzer, 1986), and the Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983).

The subsequent three surveys—administered before, immediately after, and one week following the experiment—were designed to track changes in mental health outcomes and potential mediators over time. Each survey comprised the same sections, featuring single-item measures for aspects of mental health such as self-esteem (Robins, Hendin, & Trzesniewski, 2001), self-efficacy (Di et al., 2023), anxiety and depression (Williams, 2014), as well as potential mediators like human-nature connection (Kleespies, Braun, Dierkes, & Wenzel, 2021), social support, positive coping, and negative coping (Williams, 2014). These measures were all validated for their reliability.

In addition to assessing mental health outcomes and mediators, the second survey included a manipulation test to assess the level of interaction in the formal experiment. For this purpose, four items from the scale developed by Campos et al. (2017) were selected.

Species Selection

Both groups of participants were required to interact with specific animal species during the experiment, which should be determined in advance. One important criterion for selecting the animal species should be their character and temperament. A wide range of animals can be included in animal assisted intervention projects. According to previous systematic reviews on animal assisted intervention (Brelsford, Meints, Gee, & Pfeffer, 2017; O’Haire, 2017), the most commonly used types of species include: dogs, cats, horses, and dolphins. These animals are known for their friendly, calm, and well-behaved nature, making them suitable for therapy. It is also important to consider the actual conditions of the zoos where the animals are kept when selecting species. After discussions with one of the organizers at the selected zoo, it was decided that herbivorous animals, specifically alpacas, would be used for the interaction sessions. This decision was based on their friendly and calm characteristics, which enabled tourists to engage in more physical interactions with them.

Ethical Concerning Regarding Animals

While conducting the experiment, ethical considerations must be followed to ensure the welfare of animals involved in this study. At no point should an animal's physical or emotional well-being be

jeopardized. Animals must be protected from any form of abuse or danger, including physical harm and distress caused by tourists, and should be maintained in good physical condition. These restrictions are vital not only for ensuring the welfare of the animals, but also for enhancing the zoo's reputation.

4.3.3 Formal Experiment

Sample Size and Selection

Previous studies of animal-assisted intervention have been limited by small sample sizes. According to a systematic literature review on empirical research on animal-assisted intervention from 2012 to 2015, approximately half of the studies (54%, $n = 15$) had relatively small sample sizes of 20 (O'Haire, 2017). The sample size was specified a priori as a minimum of 20 for each condition **Study II**.

In contrast to the cross-sectional approach in **Study I**, the **Study II** employed a longitude approach combined with RCTs. The participants for this study were individuals who had reported experiencing poor mental health conditions, including high levels of depression and anxiety, as well as low levels of self-esteem and self-efficacy. These individuals were contacted through telephone and email to determine their interest in participating in the research. They were then randomly divided into two groups: an intervention-a group (performing normal human-animal interaction, NHAI), and an intervention-b group (performing kinship human-animal interaction, KHAI). By following the two groups over time, the long-term effects of interventions in this study were examined. Via a pilot study, 66 participants were recruited based on their poor mental health conditions

Table 4.4 presents results of self-esteem, self-efficacy, anxiety, and depression. It was evident that the levels of anxiety and depression for both participant groups exceeded the cutoff points, indicating significant symptoms of anxiety or depression (Rishi et al., 2017). Although neither group reached the low-esteem threshold, their scores were close to the cutoff point. Furthermore, in the absence of a recommended cutoff point for distinguishing between low and high self-efficacy, we compared scores to the mean value reported by Scholz et al. (2002), derived from a study of 19,120 individuals across 25 countries. The results revealed that the mean value of self-efficacy in the current study was significantly lower than the one reported by Scholz et al. (2002) (both $ps < .001$). Additionally, this study examined mental health outcomes between control and experimental groups, finding no significant differences (all $ps > .05$), which suggests homogeneity between the two groups.

Table 4. 4 Profile of Interview Participants

Items	Intervention-a Group (n=33)	Intervention-b Group (n=33)	The Cut-off Point
1. Self-esteem	16.15 (.46)	15.97 (.86)	15
2. Self-efficacy	25.18 (.67)	25.48 (.86)	29.55 *
3. Anxiety	11.12 (.36)	10.51 (.48)	8
4. Depression	12.39 (.41)	11.30 (.49)	8

Note. * Because the GSE scale lacks recommended cutoff points, we compared self-efficacy scores to those found by Scholz et al. (2002) in their analysis of 19,120 individuals across 25 countries.

Research Procedure

The field experiment was carried out between November 1 and December 31, 2023. Zoo Dongqu Wangguo allocated between four to eight visiting slots to visitors participating in the experiment. Before the official start of the experiment, the researchers scheduled appointments with each participant based on their availability.

The experiment was divided into three phases. As illustrated in Figure 4.3, Phase One is the pre-measurement phase. The day before their scheduled visit, participants were required to complete questionnaires assessing their mental health outcomes and other mental variables over the previous week. These assessments established a baseline for mental health outcomes.

Phase Two took place on the day of the visit. Initially, participants explored the zoo's facilities at random for one hour, except for the alpacas house, which was designated as the experimental site. After this tour, participants were directed to the alpacas house, where they engaged in various degrees of human-animal interaction for five minutes. The intervention-a group was limited to normal human-animal interactions such as observing, photographing, posing with, and approaching the animals without engaging in deeper interactive behaviors. In contrast, the intervention-b group was encouraged to partake in more intimate interactions (see Figure 4.4), including feeding, touching, hugging, naming, brushing, and conversing with the animals. Following the 5-minute interaction period, participants visited other zoo facilities for an additional hour. This sequence aimed to minimize the potential impact of primacy and recency effects on the experiment's outcome (Glanzer & Cunitz, 1966). Post-visit, participants were asked to complete a survey assessing their immediate mental health outcomes and other psychological variables.

Phase Three involved evaluating the long-term effects of the human-animal interaction. One week after the visit, participants were asked to assess their mental health outcomes and other psychological variables

from the past week (excluding the day of the visit), providing insight into the enduring impact of their experiences.

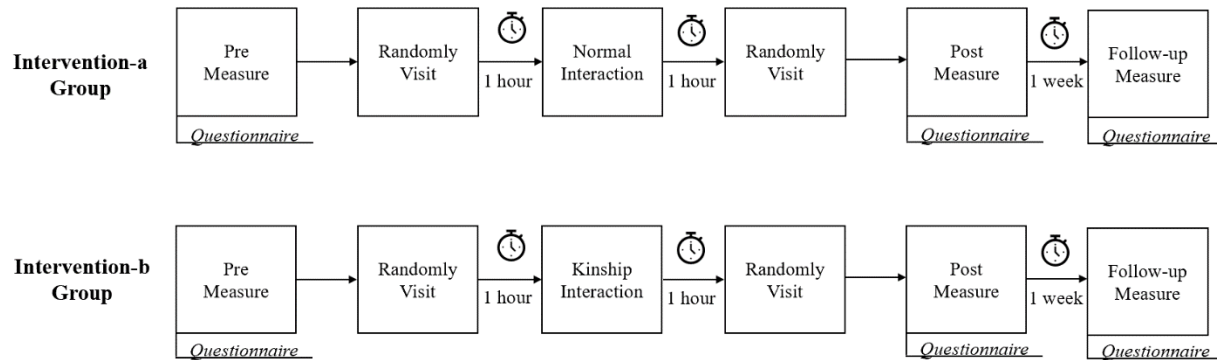


Figure 4. 3 The Experiment Tasks and Procedures for Each Group



Figure 4. 4 Kinship Human-animal Interaction in the Formal Study

4.3.4 Data Analysis

The analytic process encompassed three steps. Several analytical steps were undertaken in the study. First, an independent *t*-test was the effectiveness of the intervention. Second, mixed ANOVAs were utilized to evaluate the immediate and long-term psychotherapeutic impacts of animal-based tourism, along with the moderating effect of the human-animal interaction type.

Third, to explore the mechanisms underlying the therapeutic benefits of animal-based tourism, the mediation of potential mediators in the condition without a control group was examined using the newly developed two-criteria analytical model by van de Leur et al. (2024). Mediation was considered established if: 1) mediators varied with changes over time, and these changes were associated with changes in mental health outcomes; 2) the changes in the potential mediators preceded subsequent changes in mental health outcomes. For the first criterion, repeated measures ANOVAs assessed the effect of measurement time on potential mediators, and correlation analysis explored the association

between changes in potential mediators and mental health outcomes. For the second criterion, several cross-lagged panel models were established to verify the time precedence of changes in potential mediators.

Finally, multi-group cross-lagged panel models were employed to compare mediation effects across different groups, identifying distinct mechanisms between the two interventions.

CHAPTER 5 FINDINGS

5.1 Findings of Study I

5.1.1 Quantitative Results

Common Method Variance Test

To assess the common method variance (CMV) resulting from the use of a single instrument, Harman's single-factor test was conducted prior to performing confirmatory factor analysis (CFA) (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The results of the single-factor model indicated that it accounted for only 31.25% of the variance, which falls below the recommended threshold of 50%. Moreover, the CFA results showed that the one-factor model did not adequately fit the data ($\chi^2 = 4202.639$, $df = 464$, CFI = 0.528; RMSEA = .130). These findings indicate that common method variance was not a significant concern in this study (Wu, Raab, Chang, & Krishen, 2016).

Measurement Model

Based on Anderson and Gerbing's (1988) two-step approach, the study first evaluated a measurement model using CFA in Amos 26. The reliability and validity of seven principal constructs were assessed through an analysis of outer loadings, composite reliability (CR), average variance extracted (AVE), and discriminant validity. The model showed a good fit to the data: $\chi^2 = 882.344$, $df = 436$, CFI = .944 ($> .90$), TLI = .936 ($> .90$), RMSEA = .046 ($< .08$), SRMR = .041 ($< .08$). Furthermore, the standardized loading estimates for all items, ranging from .605 to .901, satisfied the criteria established by Hair et al. (1998) as shown in Table 5.1. Furthermore, all CR scores (.751–.905) and AVE values (.503–.708) exceeded the recommended thresholds of 0.7 for CR and 0.5 for AVE (Fornell & Larcker, 1981). Hence, the model exhibited satisfactory internal consistency and convergent validity.

Table 5. 1 CFA Results of Scales.

Dim.	Loading	CR	AVE
Human-animal Interaction (HAI)			
HAI1: In this experience, I directly interacted with animals	.650	.905	.708
HAI2: In this experience, I've been able to act as the friends of animals	.853		
HAI3: In this experience I had a great play time with animals	.933		
HAI4: In this experience with animals, I have been physically active	.901		
Human-animal Connection (HAC)			
HAC1: I actively seek opportunities to view animals	.844	.858	.604
HAC2: I feel a deep connection to animals	.822		
HAC3: I am highly motivated by the need to interact with animals	.739		
HAC4: I spend a lot of time learning about animals	.693		
Animal Attachment (AA)			
AA1: This animal may know when I am feeling bad	.783	.850	.533
AA2: This animal understands me	.830		
AA3: This animal and I have a very close relationship	.722		
AA4: I consider this animal to be a friend	.648		
AA5: This animal adds to my happiness	.650		
Self-efficacy (SEF)			
SEF1: It is easy for me to stick to my aims and accomplish my goals	.679	.843	.520
SEF2: I am confident that I could deal efficiently with unexpected events	.771		
SEF3: Thanks to my resourcefulness, I know how to handle unforeseen situations	.773		
SEF4: I can remain calm when facing difficulties because I can rely on my coping abilities	.653		
SEF5: I can usually handle whatever comes my way	.721		
Self-esteem (SES)			
SES1: I feel that I'm a person of worth, at least on an equal plane with others	.691	.836	.507
SES2: I feel that I have a number of good qualities	.706		
SES3: I am able to do things as well as most other people	.605		
SES4: I take a positive attitude toward myself	.783		
SES5: On the whole, I am satisfied with myself	.763		
Anxiety (ANX)			
ANX1: Worrying thoughts go through my mind	.627	.751	.503
ANX2: I get a sort of frightened feeling	.764		
ANX3: I feel restless as I have to be on the move	.730		
Depression (DEP)			
DEP1: I can laugh and see the funny side of things	.766	.793	.562
DEP2: I feel cheerful	.794		
DEP3: I look forward with enjoyment to things	.685		

To assess the discriminant validity, the square root of the AVE for each construct was compared to the inter-factor correlations respective inter-factor correlations, thus confirming satisfactory discriminant

between any two factors. Table 5.2 displays the results, indicating that the square root of each construct's AVE exceeded their validity (Fornell & Larcker, 1981).

Table 5. 2 Discriminant Validity Testing.

Factors	1	2	3	4	5	6	7
1. HAI	.841						
2. HAC	.738	.777					
3. AA	.501	.606	.730				
4. SEF	.368	.410	.423	.721			
5. SES	.365	.446	.380	.672	.712		
6. ANX	-.012	-.107	-.002	-.108	-.318	.709	
7. DEP	-.327	-.474	-.381	-.540	-.681	.405	.750

Note. HAI=Human-animal Intervention, HAC = Human-animal Connection, AA = Animal Attachment, SEF = Self-efficacy, SES = Self-esteem, ANX = Anxiety, DEP = Depression (The same below).

Structural Model

In the subsequent phase, SEM was conducted to assess the interconnections among the variables of HAI, HAC, AA, SEF, SES, ANX, and DEP. Four structural models are developed according to different dependent variables (SEF, SES, ANX and DEP). All models displayed sound fits to the data, with χ^2 values ranging from 276.351 to 409.489 and degrees of freedom ranging from 99 to 130. Additionally,

CFI values ranged from .940 to .958, TLI values ranged from .930 to .948, RMSEA values ranged from .060 to .067, and SRMR values ranged from .060 to .064 (see Figure 5.1).

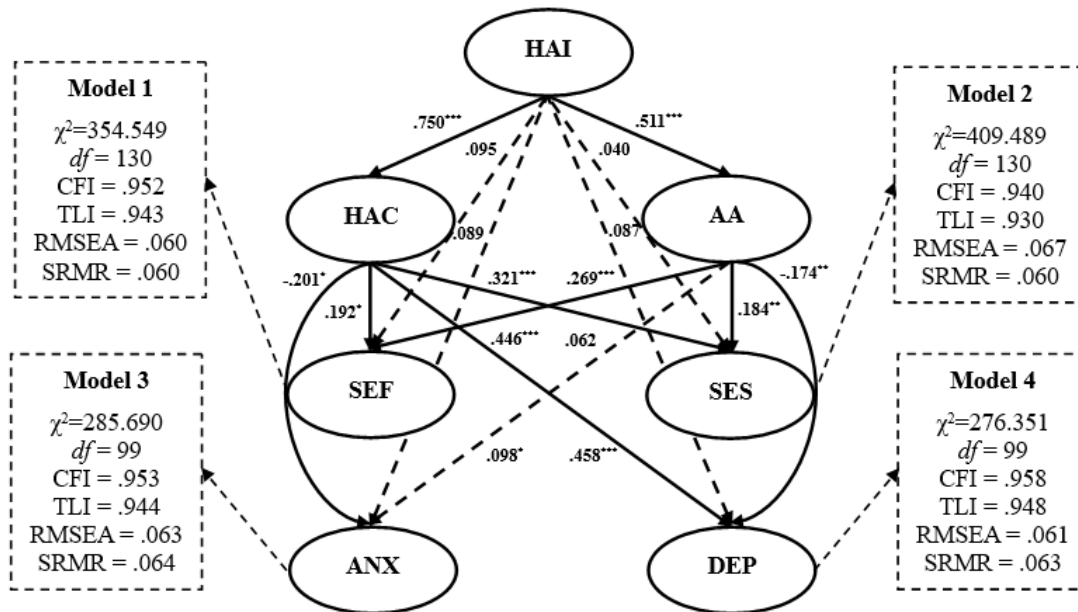


Figure 5. 1 Fit Indices of Each Model.

The relations among seven variables under investigation are presented in Table 5.3. The results indicated human-animal interaction positively related to both human-animal connection and animal attachment ($\beta_{HAC} = .750, p < .001$; $\beta_{AA} = .511, p < .001$). However, no significant relationships were found between human-animal interaction and mental health outcomes, either in cognition (self-efficacy and self-esteem) or emotion aspects (anxiety and depression), resulting in the rejection of H1a-b and H2a-b.

On the other hand, the human-animal connection demonstrated significant relationships with self-efficacy ($\beta = .192, p < .05$), self-esteem ($\beta = .321, p < .001$), anxiety ($\beta = -.201, p < .05$), and depression ($\beta = -.446, p < .001$). Hence, hypotheses H5a, H5b, H6a, and H6b were supported. Similarly, animal attachment displayed significant relationships with self-efficacy ($\beta = .269, p < .001$), self-esteem ($\beta = .184, p < .05$), and depression ($\beta = -.174, p < .01$), while the relationship with anxiety was not significant. Therefore, hypotheses H3a, H3b, and H4a were supported, but H4b was rejected.

Table 5. 3 Results of Path Analysis.

Path		β	t	Hypothesis	Result
Interaction → Relationship	HAI → AC	.750	12.649***	-	-
	HAI → AA	.511	9.065***	-	-
Interaction → Cognition	HAI → SEF	.095	1.080	H1a	Not Supported
	HAI → SES	.040	.650	H1b	Not Supported
Interaction → Emotion	HAI → ANX	.089	.377	H2a	Not Supported
	HAI → DEP	.087	.953	H2b	Not Supported
Relationship → Cognition	AA → SEF	.269	4.373***	H3a	Supported
	AA → SES	.184	3.044**	H3b	Supported
	HAC → SEF	.192	2.304*	H5a	Supported
	HAC → SES	.321	3.768***	H5b	Supported
Relationship → Emotion	AA → ANX	.062	.908	H4a	Not Supported
	AA → DEP	-.174	-2.793**	H4b	Supported
	HAC → ANX	-.201	-2.095*	H6a	Supported
	HAC → DEP	-.446	-5.013***	H6b	Supported

Mediating effects

The examination the mediating effects of animal attachment (H7a–b, H8a-b) and human-animal connection (H7c-d, H8c-d) used a bootstrapping approach with 2000 iterations (Hair et al., 1998). The result showed that animal attachment mediated the relationships between human-animal interaction and self-efficacy, self-esteem, and depression, as evidenced by the confidence intervals that did not include zero (see Table 5.4). However, it did not mediate the relationship between human-animal interaction and anxiety (as the confidence interval included zero). Consequently, hypotheses H7a, H7b, and H8b were supported, while H8b was rejected. On the other hand, the results revealed that human-animal connection mediated the positive relationships between human-animal interaction and self-efficacy as well as self-esteem. Additionally, it mediated the negative relationship between human-animal interaction and anxiety and depression, as indicated by the confidence intervals that did not include zero. Therefore, hypotheses H7c, H7b, H8c, and H8d were supported.

Table 5. 4 Mediating Effects (Bootstrap = 2000).

Independent variable	Mediator	Dependent variable	Indirect effect	95% confidence interval		Hypothesis	Result
				Lower bound	Upper bound		
HAI	AA	SEF	.065**	.029	.117	H7a	Supported
HAI	AA	SES	.035*	.008	.072	H7b	Supported
HAI	AA	ANX	.015	-.022	.063	H8a	Not Supported
HAI	AA	DEP	-.038**	-.079	-.009	H8b	Supported
HAI	HAC	SEF	.068*	.017	.136	H7c	Supported
HAI	HAC	SES	.090**	.038	.153	H7d	Supported
HAI	HAC	ANX	-.073*	-.144	-.004	H8c	Supported
HAI	HAC	DEP	-.142***	-.210	-.092	H8d	Supported

5.1.2 Qualitative Results

Three major themes were qualitatively identified. The first theme centred around human-animal interaction activities within the realm of animal-based tourism. The second theme explored the formation of human-animal relationships within the context of tourism. Lastly, the third theme highlighted the paths by which animal-based tourism promotes mental health.

Types of Human–animal Interaction Activities

Zoo visitors had the opportunity to engage in two primary forms of human-animal interaction. The first form included activities such as animal observation and animal shows, which generally involved one-way interaction. In these instances, visitors could observe animals but did not have direct feedback or interaction from the animals themselves. The second type of activity featured two-way interaction, such as when stroking or feeding animals. In these activities, visitors could directly interact with the animals, allowing for the possibility of receiving feedback from the animals. It is widely recognized that two-way interaction experiences tend to evoke stronger emotional responses and leave deeper impressions on individuals. Some examples regarding the experiences of two-way interaction from participants’ response are as follows:

P7: “When the monkey accepted the food I offered, I felt a sudden and unique emotion. In my perception, this particular monkey stood out from the other animals.”

P9: “One of the most remarkable moments was when a parrot perched on my shoulder and patiently awaited me to feed it. At that instant, an indescribable feeling emerged from the depths of my mind..”

Interestingly, it was observed that even one-way interaction activities could elicit diverse emotional responses among participants. Several participants highlighted the distinctions between animal observation and animal shows, offering explanations for their varying experiences:

P2: "I experienced struggling emotions when watching the animal show. I could imagine the hardships the animals must have endured to master those skills. It made me feel a sense of bitterness. In comparison, I would prefer to see animals living a carefree life in their in their natural habitats without having to perform."

P12: "Merely observing the animals brought me happiness and relaxation. However, when I witnessed the animal show, I felt a deep sense of disappointment and sympathy. I believe it would be better to eliminate these shows and instead introduce more two-way interaction activities."

Human–animal Relationship Development

Animal-based tourism offers the opportunity to establish a profound human-animal relationship, characterized by a sense of connectedness to the animal population and a deep attachment to specific animals. The majority of tourists reported that engaging in human-animal interaction, regardless of whether it was one-way or two-way, intensified their desire and intention to establish meaningful connections with animals. Here are a few quotes that exemplify the formation of this human-animal connection:

P1: "this trip provided me with a genuine opportunity to engage with animals and witness their true nature, which makes firstly have a real sense of relatedness to these fascinating creatures. Unlike when I saw them in textbooks and on TV, I had never felt such a feeling before"

P4: "During this trip, I had the opportunity to get remarkably close to various animals. Additionally, I gained extensive knowledge about their habitats and behaviors. Through these close interactions, I realized that animals hold a greater significance than I had previously recognized. Perhaps it is because of the deeper connection I formed with them."

Furthermore, it was observed that two-way interaction activities played a pivotal role in cultivating visitors' attachment to specific animals, as these interactions elicited distinct and memorable emotions. In fact, the majority of animals to which tourists formed attachments were those with whom they had engaged in two-way interactions. For instance:

P6: "As I approached the goat, it came over to greet me, displaying a desire to interact and observe my actions. In turn, I observed the goat and found it to be quite amusing. If given the opportunity, I would have loved to pet the goat."

P11: "When I engaged in conversation with the tiger, it immediately came closer to me. It felt as though the tiger understood what I was saying. This experience has made me want to develop a closer bond with the tiger and visit it regularly."

Pathways of Animal-based Tourism Promoting Mental Health

This theme shed light on how animal-based tourism improved visitors' mental health via two main pathways.

The pathway via human-animal interactive activities

The first entailed interactive activities. Merely observing animals could temporarily help participants forget negative feelings and experience comfort, relaxation, and peace. Two-way (vs. one-way) animal interactive activities were believed to have more poignant psychotherapeutic effects. Engaging in two-way interactions with animals amplified this psychotherapeutic effect, reinforcing the positive impact on mental health. Some examples regarding the psychotherapeutic effect of two-way interactive activities from participants' response are as follows:

P4: "I gradually overcame this fear and mustered the courage to touch them, a sense of pride washed over me. Furthermore, I noticed that the animals were also willing to engage with me, which boosted my confidence. The interactions with animals played a significant role in alleviating a considerable amount of my anxiety. Although some anxieties remained due to unresolved underlying causes, I overall felt an improvement compared to how I felt before embarking on this experience. "

P5: "Interacting with animals has the remarkable ability to temporarily suspend all my worries and grant me a sense of pure joy and contentment. When I encounter these animals, it's as if time itself stands still. Observing their slow and leisurely existence prompts me to contemplate the idea of slowing down my own life. It makes me realize that there is beauty and tranquility in taking things at a more relaxed pace."

However, in the context of animal shows, several participants expressed that these events fell short in fostering a meaningful human-animal connection and did not significantly contribute to their mental health. Instead of feeling relaxed and healed, many participants reported feeling uneasy and sympathetic while watching these shows. It became evident that the experience of witnessing animals perform in shows did not resonate with the participants in the same way as other forms of interaction did. The scripted nature of these shows and the emphasis on entertainment seemed to detract from the genuine connection that participants sought with animals. These findings highlight the importance of considering

the ethical and emotional implications of animal shows and the potential for alternative forms of engagement that prioritize the well-being and meaningful connection between humans and animals.

The pathway via human-animal relationship building

The second pathway encompassed the formation of relationships. Human-animal connection innate longing for a deeper connection with a wider nature, which may provide temporary respite from worries and concerns, it also offers tourists the opportunity to expand their perspectives and open their minds. For example,

P9: “The experiences of interaction opened my mind to the wonders of the natural world and sparked a desire to learn more about animal life and conservation. The interconnectedness with the animal kingdom not only provided a temporary escape from my worries but also reminded me of the importance of trust, communication, and mutual respect in any relationship.”

P10: “The connection with animals brings me a sense of comfort and happiness that allows me to momentarily escape from the pressures of my routine life. It shifts my attention away from the stresses, enabling me to forget about exams and other concerns.”

Furthermore, the development of attachments to specific animals played a significant social support role in the lives of participants, fostering a profound sense of being needed and valued. Participants found solace and sought comfort from their attachment to these animals, particularly during times of negative emotions or challenging experiences. In addition, many tourists expressed their intention to revisit the zoo specifically to see their attachment animals if they were to encounter tough times in the future.

P2: “Animals serve as a source of comfort and connection for individuals to open up to. In times of depression and isolation, people often seek something or someone to rely on. I believe that these animals are the perfect companions for individuals going through such situations, as they provide a non-judgmental presence that actively listens and understands..”

P4: “Chinchillas are good listeners. They truly understand me and never engage in arguments or conflicts. Unlike interactions with other people, where excessive talking can make me feel irritable and upset, I find solace in the quiet companionship of chinchillas.”

P8: “I have formed a friendship with the fine-tailed animals at the zoo. Their innocence and peaceful demeanour bring me a sense of relaxation. Whenever I feel stressed, I know I can revisit the zoo to reconnect with my animal friends.”

P11: “The tiger exudes immense power and strength. Witnessing its majestic presence inspires me to be as brave and resilient as the tiger.”

5.2 Findings of Study II

The Effect of Intervention on Human-animal interaction

As shown in Table 5.5, an independent *t*-test to examine if the experimental intervention achieved its intended effect in the formal study. The result revealed that the intervention-a group scored higher on average human-animal interaction than the intervention-b group ($t = 3.038, p < .01$), indicating that the manipulation in the formal experiment was successful.

Table 5. 5 The Perceived Human-animal Interaction Between Control Group and Experiment Group

Human-animal Interaction (HAI)	Intervention-a Group	Intervention-b Group
HAI1: In this experience, I directly interacted with animals	5.55	6.42
HAI2: In this experience, I've been able to act as the friends of animals	5.15	5.82
HAI3: In this experience I had a great play time with animals	5.45	6.03
HAI4: In this experience with animals, I have been physically active	5.88	6.21
Cronbach's α	.779	.774
Average Score	5.51	6.12
Independent <i>t</i> test	$t = 3.038, p < .01$	

The Impact of Animal-based Tourism on Mental Health Outcome

The Immediate Impact of Animal-based Tourism on Mental Health Outcome

Several mixed ANOVAs were conducted to explore the immediate influence of animal-based tourism on mental health outcomes. Figure 5.2 illustrates the results of 2×2 ANOVAs (with factors: Time - pre-measure vs. post-measure; Interaction type: intervention-a vs. intervention-b) across four mental health outcomes. For self-esteem, neither significant main effects (both $ps > 0.05$) nor a significant interaction effect ($p > 0.05$) were evident, resulting in the rejection of H1b. However, significant main effects of measure time were found on self-efficacy [$M_{pre} = 2.970, M_{post}=3.727, F(1, 64) = 34.692, p < .001$], anxiety [$M_{pre} = 6.894, M_{post}=2.409, F(1, 64) = 344.775, p < .001$], and depression [$M_{pre} = 5.879, M_{post}=2.167, F(1, 64) = 160.173, p < .001$]. These findings suggest that animal-based tourism can yield immediate psychological advantages for tourists. Therefore, H1a, H1c, and H1d were supported.

However, the study did not observe a significant interaction effect between time and interaction type across all mental health outcomes (all $ps > .05$), indicating that human-animal interaction was unlikely moderate the immediate impact of animal-based tourism on mental health. H3a, H3b, H3c and H3d were therefore rejected.

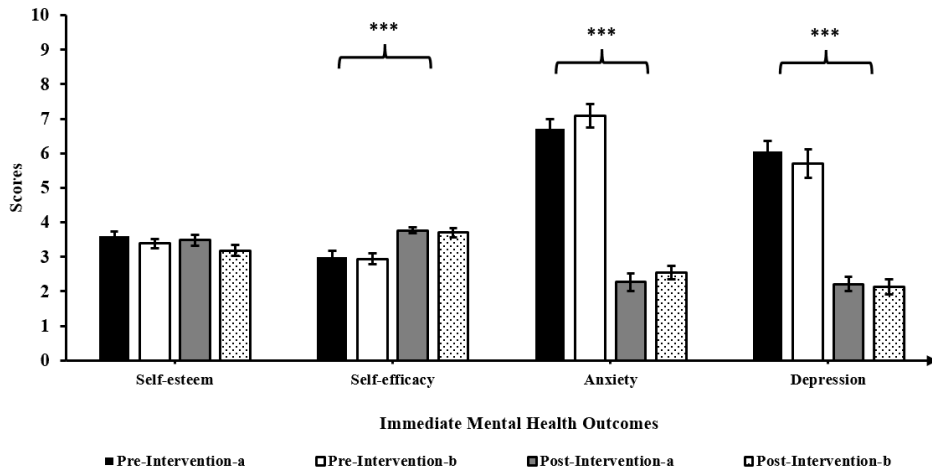


Figure 5.2 The Immediate Impact of Animal-based Tourism on Mental Health

The Enduring Impact of Animal-based Tourism on Mental Health Outcome

Several mixed ANOVAs were conducted to explore the long-term influence of animal-based tourism on tourists' mental health outcomes (Figure 5.3). The results of 2×2 ANOVAs (with factors: Time - post-measure vs. follow-up--measure; Interaction type: intervention-a vs. intervention-b) showed that neither significant main effects (both $ps > 0.05$) nor a significant interaction effect ($p > 0.05$) were evident in self-esteem, leading to the rejection of H2b. However, significant main effects of measure time were found on self-efficacy [$M_{\text{post}} = 2.970$, $M_{\text{follow-up}} = 3.333$, $F(1, 64) = 6.832$, $p < .05$], anxiety [$M_{\text{post}} = 6.894$, $M_{\text{follow-up}} = 5.045$, $F(1, 64) = 44.739$, $p < .001$], and depression [$M_{\text{post}} = 5.879$, $M_{\text{follow-up}} = 4.773$, $F(1, 64) = 15.585$, $p < .001$]. These findings suggest that animal-based tourism can yield long-term psychological advantages for tourists and support the hypotheses of H2a, H2c, and H2d.

Furthermore, we observed an interaction effect between time and intervention [$F(1, 64) = 7.515$, $p < .01$] in anxiety, indicating that the impact of animal-based tourism on follow-up anxiety was more pronounced

in the intervention-a group ($\Delta M = -2.606$) compared to the intervention-b group ($\Delta M = -1.091$). Therefore, H4c was supported.

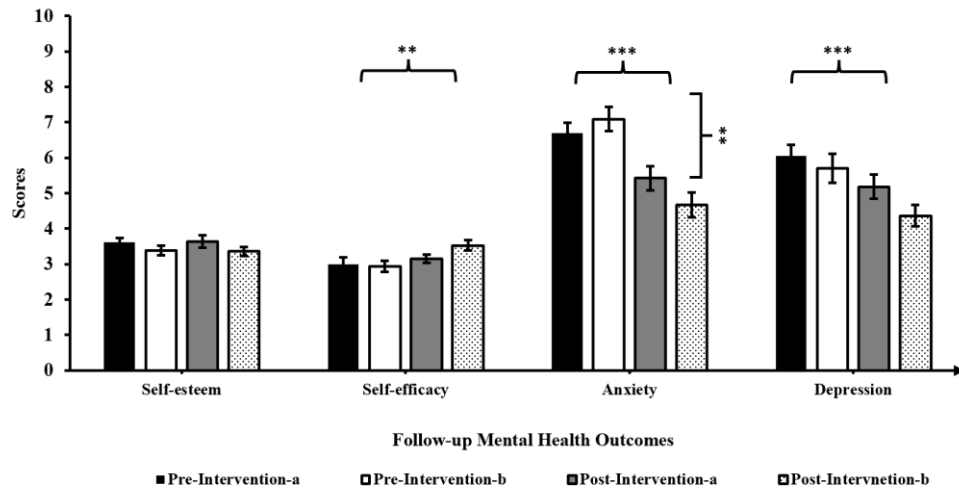


Figure 5. 3 The Enduring Impact of Animal-based Tourism on Mental Health

The Examination of Potential Mediating Factors

To further explore the mechanism underlying the effect of animal-based tourism on tourists' mental health, the mediation of potential mediators was examined via a two-criteria analytical model (van de Leur et al., 2024).

1). Criteria One Examination

Effects of Time on Mediators

As shown in Table 5.6, repeated measures ANOVAs [with factors: Time – pre-measure (T0) vs. post-measure (T1) vs. follow-up measure (T2)] were conducted to examine time effect on each potential mediator. The results shown significant effect of time on human-nature connection [$F(2, 130) = 51.121, p < .001$], social support [$F(2, 130) = 19.235, p < .001$] and positive coping [$F(2, 130) = 32.386, p < .001$]. Post hoc tests indicated significant differences between each pair of measurement times for these potential mediators (all $ps < .01$ or $< .001$). However, no significant time effect was observed for negative coping [$F(2, 130) = .962, p = .385$], suggesting that this variable may not be a potential mediator and was therefore excluded from further analysis. Therefore, H8a-d was rejected.

Table 5. 6 The Impact of Time on Potential Mediators

Potential Mediators	Pre-measure (T0)		Post-measure (T1)		Follow-up Measure (T2)		F-values
	<i>M</i>	<i>S.E.</i>	<i>M</i>	<i>S.E.</i>	<i>M</i>	<i>S.E.</i>	
Human-nature Connection	3.561	.147	4.909	.144	4.500	.145	51.121***
Social Support	5.788	.272	7.606	.217	6.788	.215	19.235***
Positive Coping	6.061	.265	8.045	.142	6.773	.175	32.386***
Negative Coping	6.621	.274	6.697	.273	6.288	.238	.962

The Correlations between Potential Mediating Factor Changes and Mental Health Changes

As shown in Table 5.7, all immediate changes in potential mediating factors were significantly correlated with immediate changes in self-efficacy, anxiety, and depression (all $ps < .05$ or $< .01$). However, there was no significant correlation between human-nature connection and anxiety ($p > .05$). In the analysis of follow-up changes, as presented in Table 5.8, social support and positive coping showed significant relationships with all follow-up mental health outcomes changes (all $ps < .05$ or $< .01$), while the follow-up changes in human-nature connection had no correlation with the follow-up anxiety change, leading to

the rejection of H5a-d. Therefore, only social support and positive coping meet the first criterion for mediation and were therefore included in further analysis.

Table 5. 7 Corrections between Immediate Mental Health Change and Potential Mediating Factors

Variables	1	2	3	4	5	6	7
Self-efficacy (T1-T0)	1	-	-	-	-	-	-
Anxiety (T1-T0)	-.329**	1	-	-	-	-	-
Depression (T1-T0)	-.341**	.707**	1	-	-	-	-
Human-nature Connection (T1-T0)	.334**	-0.221	-.315*	1	-	-	-
Social Support (T1-T0)	.250*	-.416**	-.291*	.144	1	-	-
Positive Coping (T1-T0)	.481**	-.476**	-.341**	.278*	.471**	1	-

Note: *denotes <.05, ** denotes <.01

Table 5. 8 Corrections between Follow-up Mental Health Change and Potential Mediating Factors

Variables	1	2	3	4	5	6	7
Self-efficacy (T2-T1)	1	-	-	-	-	-	-
Anxiety (T2-T1)	-.288**	1	-	-	-	-	-
Depression (T2-T1)	-.404**	.772**	1	-	-	-	-
Human-nature Connection (T2-T1)	-.060	-.321**	-.388**	1	-	-	-
Social Support (T2-T1)	.360**	-.251*	-.356*	.073	1	-	-
Positive Coping (T2-T1)	.370**	-.453**	-.546**	.168	.460**	1	-

Note: *denotes <.05, ** denotes <.01

2). Criteria Two Examination

The time precedence of potential mediators

As shown in Table 5.9, three cross-lagged panel models were developed, one for each mental health outcome, to investigate whether changes in potential mediators preceded changes in mental health outcomes. As indicated in Table 5.9, we observed a significant effect from social support on the follow-up change in anxiety ($\beta = -.280, p < .05$), but no significant reciprocal effect from anxiety on the follow-up change in social support ($\beta = .016, p > .05$). Thus, the results indicate that changes in social support

occurred prior to changes in anxiety, suggesting a mediating relationship between social support and anxiety. However, the study did not find similar cross-lagged effects for other potential mediators, indicating no mediation between these factors and mental health outcomes. Therefore, only H6c was supported.

Table 5. 9 The Cross-lagged Panel Model Results

	Potential Mediator (T1-T0) → Dependent Factor (T2-T1)		Dependent Factor (T1-T0) → Potential Mediator (T2-T1)	
	<i>β</i>	<i>t</i>	<i>β</i>	<i>t</i>
Model 1 (Self-efficacy)				
Social Support	.094	.707	-.045	-.370
Positive Coping	-.099	-.679	-.084	-.657
Model 2 (Anxiety)				
Social Support	-.280	-2.145*	.016	.127
Positive Coping	-.046	.341	.104	.792
Model 3 (Depression)				
Social Support	-.176	-1.427	.071	.619
Positive Coping	.003	.022	.200	1.693

The Mediation in Different Intervention Conditions

To distinguish the mechanisms underlying two interventions, multi-group cross-lagged panel models were utilized to compare mediation effects across groups. The critical ratios of differences test examined cross-lagged paths between groups (Jiang & Liang, 2021). As shown in Table 5.10, the result showed significant difference in the path from social support (T1-T0) to anxiety (T2-T1) across groups ($z = 2.133$, $p < .05$), but no significant reciprocal effect from anxiety (T1-T0) to social support (T2-T1) ($z = -.338$, $p = .735$). Specifically, the cross-lagged effect of social support on anxiety was present only in the intervention-a group, not in the intervention-b group, indicating different psychotherapeutic mechanisms in the two interventions. Therefore, H9c was supported.

Table 5. 10 The Multi-group Cross-lagged Panel Model Results

	Potential Mediator (T1-T0) → Dependent Factor (T2-T1)		Dependent Factor (T1-T0) → Potential Mediator (T2-T1)	
	β	t	β	t
Anxiety				
Model 2 (Intervention-a)				
Social Support	-.515	-3.632***	.043	.237
Positive Coping	-.009	-.063	.158	.860
Model 2 (Intervention-b)				
Social Support	-.068	-.319	-.042	-.241
Positive Coping	.084	.354	-.037	-.211
Difference in effect (z)				
Social Support		2.133*	-.338	
Positive Coping		.336	-.708	

CHAPTER 6 DISCUSSION AND CONCLUSION

6.1 Discussion of Study I

By synthesizing theories from the fields of tourism and clinical research, this study endeavours to establish a model that illustrates the ways in which animal-based tourism promotes individuals' mental health. The study adopts a combination of quantitative and qualitative approaches to further investigate and examine how human-animal interaction and relationships generate psychotherapeutic effects by inducing cognitive changes and releasing negative emotions. The major findings obtained from this study primarily focus on two significant aspects.

First, this study uncovered a positive association between the human-animal relationship, both at the individual and collective levels, and mental health (H3-H6). By combining the qualitative results, a deeper understanding of the distinct psychotherapeutic mechanisms underlying these two relationships can be gained. In today's technologically-driven era, contemporary generations often struggle to connect with others and the natural world. This lack of connection is recognized as one of the contributing factors to stress, anxiety, depression, low self-worth, and low self-esteem (Driessnack, 2009). Within the context of this study, tourism fulfills people's inherent need to be connected with nature. The presence of various animals provides individuals with a sense of "authenticity," allowing them to reconnect with their "real" selves and the "real" world (Kim & Jamal, 2007). This experience offers an escape from daily routines and worries. Furthermore, the connection to animals also restores individuals' "directed attention capacity" (Kaplan & Kaplan, 1989). By restoring attention, individuals with more nature connection can more effectively manage the challenges of daily life, leading to a shift in self-perception and an increase in inner contentment (Divya & Naachimuthu, 2020; Wells & Evans, 2003).

On the other hand, individuals may develop strong emotional bonds with specific animals in animal-based tourism, which can have psychotherapeutic effects through an additional pathway. The physiological benefits of animal attachment are well-documented in AAI literature (Tedeschi & Jenkins, 2019).

According to Payne, Bennett, and McGreevy (2015), human-animal attachment is mutually beneficial, fulfilling basic emotional needs for both species. Therefore, attachment animals are considered highly effective in the release of negative emotions, particularly anxiety and depression (Peacock, Chur-Hansen, & Winefield, 2012). Consistent with previous research, the present study also identifies the influence of animal attachment in alleviating depressive emotions within the context of tourism (H4b). Furthermore, this study echoes previous findings on the impact of animal attachment on the development of self-esteem and self-efficacy (Adams, 2009) (H3a-b). Through qualitative data, this study illustrates how attachment

animals contribute to mental health by providing role of "social support" (Fine & Beck, 2015, p.9). Previous research has found that human-animal attachment has the potential to provide social support, offering individuals a sense of being loved, cared for unconditionally, accepted, esteemed, and interconnected (Melson & Fine, 2015). These feelings can empower individuals, helping them transition from helplessness to a state of empowerment. Conversely, the lack of social support has been associated with higher levels of depressive emotions, low self-esteem, and reduced self-efficacy (McDonald, 2018). Attachment animals can serve as substitutes for human social support, providing acceptance, companionship, and ultimately benefiting the mental health of tourists. Moreover, animal attachment appears to be safer than human attachment, particularly for individuals who have had their trust in humans shattered by past negative experiences.

However, this study did not find evidence of a psychotherapeutic effect of animal attachment on anxiety (H4a). According to attachment theory, attachment styles can be classified as secure (low avoidance and low anxiety), dismissing-avoidant (high avoidance and low anxiety), preoccupied (low avoidance and high anxiety), and fearful-avoidant (high avoidance and high anxiety), based on the dimensions of avoidance and anxiety (Bowlby, 1982; Fraley, Hudson, Heffernan, & Segal, 2015). Individuals with preoccupied and fearful-avoidant attachment styles may experience heightened anxiety in the absence of their attachment figure. Such separation anxiety has also been documented by Boat (2010), who witnessed how individuals relied deeply on attachment animals and feared losing them. Consequently, some participants in this study may have experienced a sense of separation anxiety due to the absence of their attachment figures when filling out the questionnaires. Supporting this assertion, qualitative interviews conducted in this study revealed that anxiety was effectively alleviated being accompanied by the attachment animals. Nevertheless, when discussing the departure or separation from their attachment animals, some interviewees reported feeling a sense of loss and expressed a desire to return to see them in the future.

Second, although this study did not find a direct effect of human-animal interaction on cognitive change and emotional release (H1a-b, H2a-b), it suggests that such interactions can influence these psychological components indirectly through the promotion of human-animal relationships at both individual and collective levels (H7-8). As previously mentioned, the connection between humans and animals can fulfill the psychotherapeutic need for human-nature connection. Lumber et al. (2018) identified seven pathways through which people can enhance their connection to nature, and engaging with animals in an environment free from human influence is considered one of these pathways. Therefore, interacting with animals may foster a connection to animals, which in turn generates a similar sense of connection to nature (Lumber et al., 2018), ultimately contributing to improved mental health in individuals. Moreover,

this study revealed the mediating role of animal attachment between human-animal interaction and mental health. This finding aligns with previous research in the fields of tourism (e.g., Dashper, 2017) and clinical settings (Tedeschi & Jenkins, 2019), which have demonstrated that even mutual gazing between humans and animals can promote attachment. As explained by Nagasawa et al. (2015, p. 333), "looking into one another's eyes" can produce social rewarding effects by triggering the release of oxytocin in both species, resulting in a desire for frequent and regular interaction between humans and animals. Consequently, the strengthening of animal attachment endows animals with special roles in the eyes of individuals, transforming them from mere animals to sources of support, and thereby exerting positive effects on mental health.

However, it is important to note that not all forms of human-animal interaction contribute to the formation of a meaningful human-animal relationship and influencing mental health, as indicated by the qualitative results. For instance, animal shows are often perceived as unrelated to mental health promotion and may even evoke negative emotions, such as feelings of upset and discomfort. In these shows, animals are trained to entertain the audience, but the loss of their natural status and environment does not facilitate the formation of a genuine connection to nature (Lumber et al., 2018). Furthermore, the level of interaction and direct contact with animals is often limited in animal shows, making it challenging for individuals to develop a strong attachment to the animals involved. It is worth noting that two-way human-animal interactions are considered the most effective way to foster meaningful human-animal relationships. This finding aligns with research in the field of animal behaviour, which suggests that affiliative human-animal interactions play a crucial role in the formation of such relationships (Payne, DeAraugo, Bennett, & McGreevy, 2016).

6.2 Discussion of Study II

By utilizing a longitudinal design alongside a randomized controlled trial, the study II made a comprehensive examination of several key aspects: 1) The causal effect of animal-based tourism on both immediate and follow-up mental health outcomes, as evidenced by comparing results from the pre-test, post-test, and follow-up test. 2) The moderating role of human-animal interaction type in the effects of animal-based tourism on both immediate and follow-up mental health outcomes. 3) The mechanisms underlying the impact of animal-based tourism on mental health outcomes, through an investigation of the mediation effects posed by all potential mediators. 4) The distinct mechanisms between the two interaction types. The major findings from this study were primarily discussed within these four areas.

First, this study revealed a causal and enduring effect of animal-based tourism on mental health, characterized by an immediate improvement in self-efficacy and a reduction in anxiety and depression, observable immediately (H1a, H1c, H1d) and one week after the journey (H2a, H2c, H2d). These findings partially align with those of Study I, suggesting that various experiences in animal-based tourism, such as interactive experiences and relationship building experiences, may enhance mental health. Moreover, these results are consistent with other research examining the impact of vacations on mental health. For instance, Reizer and Mey-Raz (2019) found that assessing mental health immediately after a vacation showed significant reductions in exhaustion and provided opportunities for health improvement. They suggested that tourism offers a temporary break from daily stressors, which cumulatively impair individuals physically and psychologically. Furthermore, this study also indicated that the effects of animal-based tourism could last at least one week, demonstrating an enduring psychotherapeutic impact. However, it is important to note that the mental health benefits began to diminish within a week after returning to routine, with a notable decrease in self-esteem ($\Delta M = -.394, p < .01$) and increases in anxiety ($\Delta M = 2.636, p < .001$) and depression ($\Delta M = 2.606, p < .001$), highlighting significant fade-out effects.

Second, while we did not observe a moderating effect of the type of human-animal interaction on the immediate psychotherapeutic effects of animal-based tourism, our findings suggest that different types of interaction can partially moderate the enduring psychotherapeutic effects. Notably, kinship human-animal interactions led to a larger reduction in anxiety one-week post-interaction compared to normal human-animal interactions (H4c). In other words, kinship human-animal interactions appear to "slow down" the fading of the psychotherapeutic effects of animal-based tourism. These results echo previous research on the impact of different types of leisure activities on various mental benefits. For instance, Voigt et al (2010) found that the mental benefits from leisure activities featuring casual characteristics, such as pleasure, relaxation, and sensory stimulation, are short-lived. In contrast, activities that include serious characteristics—such as belongingness to a special social world, effort/perseverance, knowledge, training,

skills, and fulfilling identity-building outcomes—tend to have long-lasting effects. Similarly, in this study, kinship human-animal interactions fostered deeper and closer human-animal relationships, which to some extent align with the serious characteristics, thus producing long-lasting mental health benefits.

Third, the current study examined several potential mediators to identify the underlying psychological mechanisms of animal-based tourism's psychotherapeutic effect. Utilizing the two-criteria analytical model of van de Leur et al. (2024), only the variable of social support was identified as a significant mediator in the effect of animal-based tourism on anxiety (H6c). This suggests that one key psychological mechanism is social support, through which animal-based tourism can lead to a reduction in anxiety. This finding aligns with those from Study I, which noted that animals in tourism can provide a sense of being loved, accepted, and supported, significantly reducing people's negative emotions (McDonald, 2018). Although the study also observed changes in variables such as human-nature connection, positive coping, and negative coping, which are also important for mental health, these were not deemed psychological mechanisms of animal-based tourism since their changes did not causally affect various mental outcomes. A possible explanation is that these factors might not directly cause changes in mental outcomes but should operate through secondary mediators, such as relaxation and mental empowerment, to indirectly influence mental health. Future research should consider including more potential mediators to further explore the psychological mechanisms underlying the psychotherapeutic effects of animal-based tourism.

Finally, this study also identified that the mediating effect of social support is moderated by the type of human-animal interaction (H9c). Specifically, two types of human-animal interactions generate mental health benefits through different psychological mechanisms: normal human-animal interactions rely on providing social support, while kinship human-animal interactions do not. This distinction may explain why the mental health benefits from normal interactions fade more quickly than those from kinship interactions. According to Reizer and Mey-Raz (2019), tourists primarily enhance their mental health during tourism because of the recovery of mental resources related to mental health. When tourists return to their daily lives, these increased resources gradually diminish as they are exposed again to daily stressors and external demands. Moreover, the diminished part of the resource is largely related to perceived external support (Reizer & Mey-Raz, 2019). In the current study, since the source of mental health benefits is the increased social support from normal human-animal interactions, such benefits may be vulnerable to reductions in perceived social support. Conversely, the psychotherapeutic effect of kinship human-animal interactions does not depend on the social support gained during the tourism. Therefore, when individuals return to their routine, the mental health benefits, particularly in reducing anxiety, may be more resilient even if the increased social support diminishes. However, it must be

acknowledged that this study has not yet elucidated the psychological mechanisms behind the psychotherapeutic effect of kinship human-animal interactions, which warrants further research.

CHAPTER 7 IMPLICATIONS AND LIMITATIONS

7.1 Implications

This study enlarges the body of knowledge related to travel therapy and clinical applications in several ways. First, this paper presents a preliminary investigation into effects of a specialized tourism sector—animal-based tourism, on mental health. Researchers in the field of tourism have begun investigating the potential therapeutic benefits of travel, giving rise to the innovative concept of "travel therapy." However, it should be noted that while this field is still in its early stages. More research supported by empirical evidence is needed to address the renewed demand for innovative products tailored to tourists with mental health needs (Smith & Diekmann, 2017). This research echoes Smith and Diekmann's (2017) claim that "new tourism products are constantly being developed which fulfil tourists' needs in this direction" (p. 8). The initial exploration of animal-based tourism's psychotherapeutic benefits offers a theoretical foundation for industry practices.

Second, this study focused on several mental health components. The evolving notion of travel therapy requires scholars to clearly understand the specific intersection between tourism and mental health. However, this area has frequently been overlooked with respect to tourism's roles in a range of mental health outcomes. Research in tourism and clinical psychology has typically concentrated on interventions targeting singular facets of mental health. This narrow perspective impedes practical applications of tourism for mental health promotion; it constrains tourism's potential in this regard by neglecting the natural diversity of mental health outcomes. The current study examines how animal-based tourism impact various aspects of mental health, such as cognitive and emotion aspects, rather than singular facets. Such investigation could provide deeper understanding of the diversity of psychotherapeutic effect of animal-based tourism.

Moreover, the current research not only focuses on the short-term changes induced by animal-based tourism but also examines the enduring psychotherapeutic effects of such tourism. The long-term impact of tourism on mental health has rarely been addressed in previous research, but often focused on another equivalent concept of "fade-out" effect of tourism's psychophonetic impact, a term that also denotes the temporary nature of such effects (Reizer & Mey-Raz, 2019). By shifting the focus to the enduring effects of tourism, we can alter the negative perceptions associated with this phenomenon. In fact, numerous studies have documented the lasting benefits of tourism through transformative learning processes. For instance, tourism activities that offer challenging and resource-intensive "comprehensive" deep learning opportunities are believed to foster more profound and lasting behavioral changes compared to

"minimalist" superficial learning experiences (Ballantyne & Packer, 2011). In the current study, we examine not only the enduring psychophonic effects of animal-based tourism but also the factors that contribute to these long-term benefits. The identified potential to induce immediate and promoting enduring cognitive shifts and emotional relief in tourists should help advance the concept of travel therapy.

Forth, when considering clinical psychology, this study represents a pioneering effort to assess animals' psychotherapeutic capacities beyond traditional therapeutic settings. The application scope of animal-assisted treatments has hence been expanded. Two novel frameworks have also been introduced that extends the existing animal-assisted intervention model to the tourism realm. The first framework illustrates how mental health can be promoted through animal-based tourism via a series of dynamic processes, such as human-animal interaction and the establishment of human-animal relationships. The second framework further reveals the psychological mechanisms underlying the psychotherapeutic effects of animal-based tourism. These frameworks provide a thorough view of the psychotherapeutic possibilities for animal-based tourism. For instance, in a therapeutic setting, the human-animal relationship often defaults to human-animal attachment due to the limited number and types of animals involved in treatment. Tourists, on the other hand, can engage with various animal species and form diverse human-animal relationships beyond mere attachment. The psychotherapeutic effects of these relationships in the tourism context have yet to be described in full. This study considered multiple levels of human-animal relationships and their distinct psychotherapeutic impacts through the lens of animal-based tourism. Such innovation is also reflected in the psychotherapeutic mechanisms in both contexts. In the AAI domain, the psychotherapeutic mechanism of intervention largely depends on the social support derived from long-term interactions and relationship-building between humans and animals. However, in the context of tourism, it is not feasible for tourists to invest significant time and effort in human-animal interactive activities to establish a deep connection. Despite this, we found that tourists can still receive or perceive social support from animals, which in turn leads to immediate and long-term mental health benefits.

This study also provides novel insights into human-animal interaction in the tourism context. Prior research on animal-assisted intervention has detailed how human-animal interaction enhances mental health (Fine, 2010). However, it should be noted that the animals used for therapeutic purposes are typically trained; their interactions with people are therefore predominantly affiliative. New theoretical framework and empirical research should emphasize on this key aspect for their theoretical and practical relevance within the context of tourism. This paper elaborates on how profound human-animal interactions can significantly enhance mental health through a variety of relational dynamics between

humans and animals. It introduces a dynamic framework that offers a step-by-step examination of how mental health benefits are progressively promoted through these interactions. Furthermore, this study rigorously examines the moderating effect of different types of human-animal interactions on the immediate and enduring psychotherapeutic impacts of animal-based tourism. By doing so, it sheds light on the nuances of how varying degrees and forms of interaction influence these immediate and long-term therapeutic outcomes. Additionally, a comprehensive qualitative analysis is conducted to probe deeper into the potential mechanisms at play in human-animal interactions within tourism contexts. This inquiry uncovers the underlying effects that these interactions have on mental health, providing a richer, more detailed understanding of the factors that contribute to the psychotherapeutic benefits observed.

This study highlights significant practical implications for integrating tourism resources into mainstream healthcare, specifically aimed at alleviating the gap between the high public demand for mental health services and their scarce availability. Mental health challenges have detrimental effects across all levels of society, from individuals and families to broader communities and the economy. Such challenges restrict individuals' educational and social prospects (Becker & Kleinman, 2013), place significant demands on caregivers (Shibre et al., 2012), and generate considerable socioeconomic burdens (Doran & Kinchin, 2017). Moreover, mental health services are currently inadequate to meet the psychological needs of many individuals and families. These shortcomings lead to higher rates of relapse, increased homelessness, greater unemployment, and early death (Gamielien, Galvaan, Myers, & Sorsdahl, 2022). To address these gaps, experts suggest integrating related fields into mainstream healthcare system (Buckley, 2023). Both the tourism and mental healthcare industries share similarities in distribution and service delivery mechanisms, suggesting that tourism could effectively supplement traditional psychotherapy (Buckley, 2023). By bridging the divide between the need for and availability of mental health services, tourism has the potential to lessen the societal burdens often associated with healthcare provision (Buckley, 2023; Rajkumar, 2022). The current study to some extent paves the way for integrating the tourism industry into mainstream mental healthcare by providing empirical evidence.

Furthermore, unlike conventional mental health interventions, this topic focuses on animal-based tourism occurs which offer relaxed, enjoyable, and affordable experiences that can mitigate personal withdrawal symptoms and boost the motivation to revisit such experiences (Kruger & Serpell, 2010). Moreover, this study not only focuses on serving individuals with diagnosed mental illnesses; but is also beneficial for those in good health or those experiencing suboptimal mental states, such as early signs of stress or anxiety, acting as a preventive measure or a mild intervention. Delays in intervention can lead to mental health issues in individuals who might otherwise remain healthy (Arango et al., 2018). Purcell et al. (2019) highlighted the importance of early intervention and called for innovative approaches in mental

health services to reduce risks and provide prompt assistance. Approaches that operate outside traditional therapeutic settings tend to generate less resistance from individuals experiencing mild mental health symptoms. Thus, early prevention and intervention can be implemented in a more discreet manner.

From a social science perspective, travel therapy promotes the development of niche markets specifically catering to vulnerable groups. This research not only meets the unique needs of these groups but also enhances destination competitiveness by offering tailored services and improving locations' capacity to accommodate diverse consumer segments (Zheng et al., 2023). The integration of travel therapy into mainstream offerings could lead to the creation of specialized tourism packages that include therapeutic activities, wellness retreats, and nature-based experiences, all designed to support mental health. The current research revealing the symbiotic relationship between tourism and healthcare could set a precedent for future interdisciplinary collaborations that benefit society at large.

7.2 Limitations and Future Research

Despite its valuable contributions, a few limitations of this study need to be acknowledged. First, although this study identified the psychotherapeutic mechanism of animal-based tourism, it must be noted that the psychological processes behind the psychotherapeutic effects of kinship human-animal interactions are still not fully understood. This calls for further research, incorporating more potential mediators. Additionally, this study did not account for the potential effects of different animal species. Mueller (2014) stated that the animals involved can heavily influence human-animal interaction and associated relationships.

It remains uncertain whether different species may produce varying psychotherapeutic effects in animal-based tourism. Moreover, including biometric methods such as EEG and monitoring of oxytocin and serotonin can significantly improve study designs. These techniques provide objective evaluations of AAI outcomes (Calcaterra et al., 2015; Menna et al., 2019). Incorporating these measures facilitates the creation of "quantifiable interventions" (Mittly et al., 2023, p. 236), thus enhancing scientific rigor and practical application in this area.

Moreover, as Buckley (2023) notes, current tourism research lacks comprehensive data on intervention-related aspects such as "design," "dose," "frequency," "duration," and "response" (Buckley, 2023, p. 11). In the context of tourism, "design" refers to the specific activities, destinations, and settings involved; for example, visits to parks or museums may positively impact mental health. "Dose" indicates the length and intensity of the tourism experience, while "frequency" denotes how often such experiences occur. "Duration" can be likened to a "treatment course" in healthcare, describing the overall span of a program. "Response" represents the mental health outcomes derived from tourism, akin to results seen from traditional treatments. These elements are crucial for successfully integrating tourism into mainstream psychological healthcare (Buckley, 2023). The lack of thorough research exploring the relationship between tourism's design, dose, frequency, duration, and response may hinder clear evidence of its psychotherapeutic benefits. This gap can make stakeholders hesitant to incorporate tourism into established mental health treatment frameworks, questioning the effectiveness of tourism-based mental therapy. Future research should, therefore, focus on gathering detailed "dose-response" data to bolster the case for tourism as a viable mental health intervention.

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Appendix

Questionnaires Used for Study I

Section I

Human–animal Interaction (HAI)

1. In this experience, I directly interacted with animals.
 1. Strongly Disagree
 2. Disagree
 3. Either Agree or Disagree
 4. Agree
 5. Strongly Agree
2. In this experience, I've been able to act as the friends of animals.
 1. Strongly Disagree
 2. Disagree
 3. Either Agree or Disagree
 4. Agree
 5. Strongly Agree
3. In this experience I had a great play time with animals.
 1. Strongly Disagree
 2. Disagree
 3. Either Agree or Disagree
 4. Agree
 5. Strongly Agree
4. In this experience with animals, I have been physically active.
 1. Strongly Disagree
 2. Disagree
 3. Either Agree or Disagree
 4. Agree
 5. Strongly Agree

Section 2

Human–animal Connection (HAC)

1. I actively seek opportunities to view animals.
 1. Strongly Disagree
 2. Disagree
 3. Somewhat Disagree
 4. Either Agree or Disagree
 5. Somewhat Agree
 6. Agree
 7. Strongly Agree
2. I feel a deep connection to animals.
 1. Strongly Disagree
 2. Disagree
 3. Somewhat Disagree
 4. Either Agree or Disagree
 5. Somewhat Agree
 6. Agree
 7. Strongly Agree
3. I am highly motivated by the need to interact with animals.
 1. Strongly Disagree
 2. Disagree
 3. Somewhat Disagree
 4. Either Agree or Disagree
 5. Somewhat Agree
 6. Agree
 7. Strongly Agree
4. I spend a lot of time learning about animals.
 1. Strongly Disagree
 2. Disagree

3. Somewhat Disagree
4. Either Agree or Disagree
5. Somewhat Agree
6. Agree
7. Strongly Agree

Animal Attachment (AA)

1. This animal may know when I am feeling bad.
 1. Strongly Agree
 2. Somewhat Agree
 3. Somewhat Disagree
 4. Strongly Disagree
2. This animal understands me.
 1. Strongly Agree
 2. Somewhat Agree
 3. Somewhat Disagree
 4. Strongly Disagree
3. This animal and I have a very close relationship.
 1. Strongly Agree
 2. Somewhat Agree
 3. Somewhat Disagree
 4. Strongly Disagree
4. I consider this animal to be a friend.
 1. Strongly Agree
 2. Somewhat Agree
 3. Somewhat Disagree
 4. Strongly Disagree
5. This animal adds to my happiness.
 1. Strongly Agree
 2. Somewhat Agree
 3. Somewhat Disagree

4. Strongly Disagree

Section 3

Self-efficacy (SEF)

1. It is easy for me to stick to my aims and accomplish my goals.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree

2. I am confident that I could deal efficiently with unexpected events.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree

3. Thanks to my resourcefulness, I know how to handle unforeseen situations.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree

4. I can remain calm when facing difficulties because I can rely on my coping abilities.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree

5. I can usually handle whatever comes my way.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree

Self-esteem (SES)

1. I feel that I'm a person of worth, at least on an equal plane with others.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree

2. I feel that I have a number of good qualities.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree

3. I am able to do things as well as most other people.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree

4. I take a positive attitude toward myself.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree

5. On the whole, I am satisfied with myself.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree

Anxiety (ANX)

1. Worrying thoughts go through my mind.

1. Strongly Disagree

2. Disagree

3. Agree
4. Strongly Agree
2. I get a sort of frightened feeling.
 1. Strongly Disagree
 2. Disagree
 3. Agree
 4. Strongly Agree
3. I feel restless as I have to be on the move.
 1. Strongly Disagree
 2. Disagree
 3. Agree
 4. Strongly Agree

Depression (DEP)

1. I can laugh and see the funny side of things.
 1. Strongly Disagree
 2. Disagree
 3. Agree
 4. Strongly Agree
2. I feel cheerful.
 1. Strongly Disagree
 2. Disagree
 3. Agree
 4. Strongly Agree
3. I look forward with enjoyment to things.
 1. Strongly Disagree
 2. Disagree
 3. Agree
 4. Strongly Agree

Questionnaires Used for Study II

Prior Study

Rosenberg Self-Esteem Scale (RSES)

Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

1. On the whole, I am satisfied with myself.
 1. Strongly Agree
 2. Agree
 3. Disagree Strongly
 4. Disagree
2. At times I think I am no good at all.
 1. Strongly Agree
 2. Agree
 3. Disagree Strongly
 4. Disagree
3. I feel that I have a number of good qualities.
 1. Strongly Agree
 2. Agree
 3. Disagree Strongly
 4. Disagree
4. I am able to do things as well as most other people.
 1. Strongly Agree
 2. Agree
 3. Disagree Strongly
 4. Disagree
5. I feel I do not have much to be proud of.
 1. Strongly Agree
 2. Agree
 3. Disagree Strongly

4. Disagree

6. I certainly feel useless at times.

1. Strongly Agree

2. Agree

3. Disagree Strongly

4. Disagree

7. I feel that I'm a person of worth, at least on an equal plane with others.

1. Strongly Agree

2. Agree

3. Disagree Strongly

4. Disagree

8. I wish I could have more respect for myself.

1. Strongly Agree

2. Agree

3. Disagree Strongly

4. Disagree

9. All in all, I am inclined to feel that I am a failure.

1. Strongly Agree

2. Agree

3. Disagree Strongly

4. Disagree

10. I take a positive attitude toward myself.

1. Strongly Agree

2. Agree

3. Disagree Strongly

4. Disagree

Self-Efficacy Scale (GSES)

1. I can always manage to solve difficult problems if I try hard enough.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree

2. If someone opposes me, I can find the means and ways to get what I want.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree

3. It is easy for me to stick to my aims and accomplish my goals.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree.

4. I am confident that I could deal efficiently with unexpected events.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree

5. Thanks to my resourcefulness, I know how to handle unforeseen situations.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree

6. I can solve most problems if I invest the necessary effort.

1. Strongly Disagree

2. Disagree

3. Agree

4. Strongly Agree

7. I can remain calm when facing difficulties because I can rely on my coping abilities.

1. Strongly Disagree
2. Disagree
3. Agree
4. Strongly Agree

8. When I am confronted with a problem, I can usually find several solutions.

1. Strongly Disagree
2. Disagree
3. Agree
4. Strongly Agree

9. If I am in trouble, I can usually think of a solution.

1. Strongly Disagree
2. Disagree
3. Agree
4. Strongly Agree

10. I can usually handle whatever comes my way.

1. Strongly Disagree
2. Disagree
3. Agree
4. Strongly Agree

Hospital Anxiety and Depression Scale (HADS)

Anxiety Dimension

1. I feel tense or 'wound up'.

0. Not at all
1. From time to time, occasionally
2. A lot of the time
3. Most of the time

2. I feel relaxed.

0. Not at all
1. From time to time, occasionally

2. A lot of the time
3. Most of the time
3. I feel as if I am slowed down.
 0. Not at all
 1. From time to time, occasionally
 2. A lot of the time
 3. Most of the time
4. I feel restless as if I have to be on the move.
 0. Not at all
 1. From time to time, occasionally
 2. A lot of the time
 3. Most of the time
5. I get a sort of frightened feeling as if something awful is about to happen.
 0. Not at all
 1. From time to time, occasionally
 2. A lot of the time
 3. Most of the time
6. Worrying thoughts go through my mind.
 0. Not at all
 1. From time to time, occasionally
 2. A lot of the time
 3. Most of the time
7. I can sit at ease and feel relaxed.
 0. Not at all
 1. From time to time, occasionally
 2. A lot of the time
 3. Most of the time

Depression

1. I feel unhappy.

- 0. Not at all
 - 1. From time to time, occasionally
 - 2. A lot of the time
 - 3. Most of the time
2. I have lost interest in my appearance.
- 0. Not at all
 - 1. From time to time, occasionally
 - 2. A lot of the time
 - 3. Most of the time
3. I have lost interest in the things I used to enjoy.
- 0. Not at all
 - 1. From time to time, occasionally
 - 2. A lot of the time
 - 3. Most of the time
4. I have slowed down.
- 0. Not at all
 - 1. From time to time, occasionally
 - 2. A lot of the time
 - 3. Most of the time
5. I have been so unhappy that I have been crying.
- 0. Not at all
 - 1. From time to time, occasionally
 - 2. A lot of the time
 - 3. Most of the time
6. The future looks hopeless.
- 0. Not at all
 - 1. From time to time, occasionally
 - 2. A lot of the time
 - 3. Most of the time

7. I feel I have nothing to look forward to.

- 0. Not at all
- 1. From time to time, occasionally
- 2. A lot of the time
- 3. Most of the time

Formal Experiment

Mental Health Outcomes

1. **Self-esteem:** I have high self-esteem.

- 1. Not very true of me 2. Not true of me 3. Neutral 4. True of me 5. Very true of me

2. **Self-efficacy:** I believe I can succeed at most of any endeavor to which I set my mind.

- 1. Not very true of me 2. Not true of me 3. Neutral 4. True of me 5. Very true of me

3. **Anxiety:** On a scale of one to ten, how anxious would you say you are in general? (e.g. feeling tense or 'wound up', unable to relax, feelings of worry or panic)?

Disagree Strongly 1 2 3 4 5 6 7 8 9 10 **Agree Strongly**

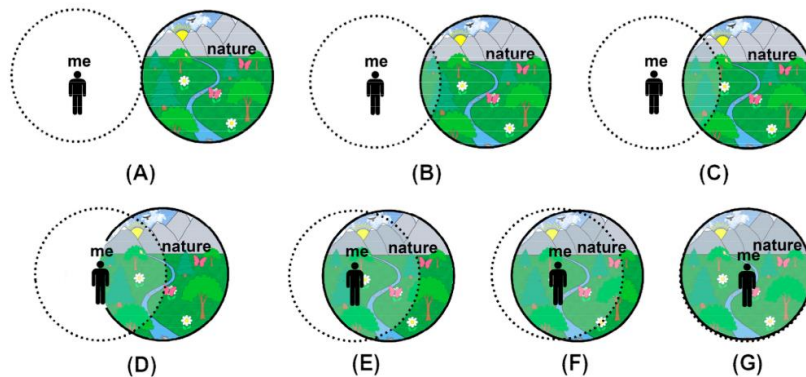
4. **Depression:** On a scale of one to ten, how depressed would you say you are in general? (e.g. feeling 'down', no longer looking forward to things or enjoying things that you used to)

Disagree Strongly 1 2 3 4 5 6 7 8 9 10 **Agree Strongly**

Potential Mediators

1. **Human-nature Connection:**

Please choose the pair of circles that best describes their relationship to nature.



2. **Social Support:** I feel that I have the social support I need (For example: There is someone who will listen to me when I need to talk, there is someone who will give me good advice, there is someone who shows me love and affection)

Disagree Strongly 1 2 3 4 5 6 7 8 9 10 **Agree Strongly**

3. **Positive Coping:** When I find myself in stressful situations I try to deal with it in a pro-active way (For example: by taking one step at a time, by changing something so that it would work out, by learning from the situation, by asking someone for help)

Disagree Strongly 1 2 3 4 5 6 7 8 9 10 **Agree Strongly**

4. **Negative Coping:** When I find myself in stressful situations I tend to look inwardly (For example: I blame myself for the situation, wish that I had the power to change what has happened, wish the situation would go away, try to forget the whole thing)

Disagree Strongly 1 2 3 4 5 6 7 8 9 10 **Agree Strongly**