

The Grief Cycle: Investigating the Influence of Cycling on Grief Outcomes in Individuals who have Experienced a Bereavement.

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The Grief Cycle: Investigating the influence of cycling on grief outcomes in individuals who have experienced a bereavement.

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Keywords: Cycling, Physical activity, Bereavement, Grief, Support, intervention, therapy

Ethics approval and consent to participate

The University of Bedfordshire, Research Centre for Applied Psychology (RCAP) approved the study (1/2022). Informed consent was gained from all participants involved in the study.

Authors' contributions

JW and HW conceptualised the study; both JW and HW carried out data collection and analysis. AC was consulted during the data collection process. The original draft was written by JW and HW with AC editing. AC reviewed and edited the original draft, with all authors reviewing the final manuscript.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Consent for publication

Not applicable

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The authors declare that they have no competing interests.

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Abstract

Background: There is a lack of research that investigates the influence of physical activity on grief outcomes. This research aimed to examine the influence of cycling on grief outcomes in individuals who have experienced a bereavement.

Method: Semi-structured interviews with 14 participants ($n = 8$ males; age $M = 47.5$ years) who engaged in cycling behaviour and had experienced a bereavement. Reflexive thematic analysis was used to guide analysis.

Results: Four key themes were generated, providing: an 1) *Embodied experience of cycling*, within the 2) *Cycling community*, helping to provide support, alongside the 3) *Nature connectedness*, which led to 4) *Post traumatic growth*, following bereavement.

Conclusion: Evidence suggest that cycling can provide an opportunity for a physical challenge, an immense connection to nature and a community of support from likeminded individuals. These therapeutic qualities of cycling should be considered for future interventions and adds novel findings to the area of cycling, bereavement and grief.

Keywords: Cycling, Physical activity, Bereavement, Grief, Support, intervention, therapy

Introduction

Within the United Kingdom (UK) in 2022 there were 666,434 registered deaths (National Records of Scotland Web, 2022; NISRA, 2023; Office for National Statistics, 2022b). Across the UK, the death rates are above the 5-year average (National Records of Scotland Web, 2022; Office for National Statistics, 2022b). Grief can be experienced after a death, and bereavement presents a unique experience with a variety of outcomes felt at different levels, at different times (McDonald & Grau, 2019; Oliver et al., 2014). Anxiety, depression, guilt, suicidal ideation and isolation are among some of the common grief outcomes experienced (Aldrich & Kallivayalil, 2013; Bartik et al., 2013; Brewer & Sparkes, 2011a; Brewer & Sparkes, 2011b; Chater et al., 2022; Crunk et al., 2017; McClatchey et al., 2009; Palmer et al., 2016; Wilsey & Shear, 2007; Zhao et al., 2014). Yet those who have been bereaved have also described that their experiences of death have led to post-traumatic growth and a sense of resilience and stronger connections with people, nature and a drive for goal-directed physical activity achievements (Chater et al., 2022; Williams et al., 2023). The Dual-Process Model of Grief (Stroebe & Schut, 1999) describes an oscillating process, moving between loss-oriented and restoration-oriented stressors. Bereavement support can assist in these processes, offering a space to process grief, confront emotions and accept the reality of loss through loss-oriented processes. While also helping to address life changes, practical adjustments, and facilitating identity following the loss, building relationships and engaging in future activities through the restoration-oriented processes.

Individuals who have been bereaved have the ability to access bereavement support services if needed. Across the UK there are a variety of services to support individuals with their grief. Professional bereavement support typically comprises talking therapies involving individual or group counselling sessions. A recent survey investigating 711 individuals who had experienced a bereavement (Harrop et al., 2021; UK Commission on Bereavement, 2023) found that those trying to seek support struggled to access it, experienced long waiting lists, or were not eligible to receive support despite 74% of the participants experiencing grief vulnerability. The survey reported that 39% of individuals who have experienced a bereavement relied on family and friends as a support system.

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Families commonly support each other throughout grieving processes; however, this is less common when a bereavement occurs within a family and they are grieving themselves (Fletcher et al., 2013).

Furthermore, friends may not be able to offer the support required due to lack of experience or knowledge of circumstances relating to bereavement (Chater et al., 2022; Thomas & Thomson, 2011).

Research has shown that bereavement support can include a variety of services (Hewison et al., 2020) however, not everyone who has experienced a bereavement will want to seek nor need typical professional support (Brewer & Sparkes, 2011a; Lenferink et al., 2021; Thomas & Thomson, 2011).

Alternatives to typical therapies can be seen as music (McFerran, 2011; Merrill et al., 2022; Rosner et al., 2010), art (Slyter, 2012) and physical activity (Williams et al., 2021, 2023). A systematic review (Williams et al., 2021), has suggested that a variety of physical activities may be able to support common grief outcomes in both adults and young people, with a particular focus on outdoor activities.

The benefits of engaging in physical activity to support mental health outcomes are well researched (Brady & Grenville-Cleave, 2017; Department of Health and Social Care, 2019). Current UK guidelines for physical activity involve undertaking a minimum of 150 minutes of moderate (i.e., walking) or 75 minutes of vigorous (i.e., running) intensity aerobic activity a week, paired with muscle strengthening (i.e., using weights) activity 2 days per week (Davies et al., 2019; World Health Organisation, 2023.). Qualitative research (Williams et al., 2023), suggests that physical activity can be therapeutic, providing social support and an emotional outlet to individuals who are grieving. Whilst other research (Brewer & Sparkes, 2011; Gorman & Cacciatore, 2020; Williams et al., 2021) successfully identifies physical activity as beneficial in supporting grief outcomes following a bereavement, in general, it fails to clarify which specific forms of physical activity (i.e., cycling) has been performed (Williams et al., 2021). Thus, specifically examining the type of physical activity as a mechanism to benefit grief outcomes is important.

Cycling is a type of physical activity which is participated in internationally (Carter, 2022; Cox, 2019). Recent impacts of the COVID-19 pandemic and associated lockdown (whereby residents could only

leave their home for physical activity or essential needs) stimulated a concomitant rise in leisure cycling, with increases as much as 200-300% observed on some lockdown weekends (Sport England, 2021; Weed, 2020). During the height of the pandemic, cycling provided individuals with access to green spaces and exercise, enhanced through the reduction in car use (Buehler & Pucher, 2021). In 2021, 6.4 million individuals were recorded as participating in cycling, and 145,000 were affiliated cycling club members (Sport England, 2021).

Recent studies evidence that cycling is a convenient way for populations to meet physical activity targets, while also providing an active travel option, and is increasingly selected by individuals as an effective means to becoming healthier and happier, contributing to both physical and mental wellbeing (Hansen & Nielsen, 2014; Nugraha et al., 2022; Redberg et al., 2021; Rissel et al., 2014). A review of the literature, (Götschi et al., 2016) recognised a positive dose-response relationship between amount of cycling and physical health outcomes, confirming from a diverse range of studies that engagement in regular cycling decreases the risk of all-cause mortality and protects against cardiovascular disease. In addition to physical health benefits, multiple studies (Garrard et al., 2021; Götschi et al., 2016; Muñoz et al., 2013; Xu et al., 2019) have identified the mental health benefits from cycling.

Recreational cycling offers potential psychosocial benefits as it provides a means to interact with others through a shared interest, enabling social relationships to form, through the participation in formalised clubs or informal groups dedicated to cycling (Rissel, 2015; Stuij, 2015). Development of a shared interest in cycling stimulates a sense of belonging, which can subsequently enhance self-confidence and increase motivation for participating in the activity (Lamont et al., 2019). A sense of belonging following bereavement has been found to be beneficial in qualitative research (Williams et al., 2023). In addition to bolstering social identity, research has highlighted how cycling stimulated pleasure, empowerment and self-development of those participating in it for leisure purposes (Falcous, 2017; Rowe et al., 2016; Zander et al., 2013).

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Furthermore, the benefits of exercising outdoors via a sport such as cycling, can offer greater psychological benefits compared to indoor exercise (Flowers et al., 2018). A systematic review of the effects of 'green exercise' on mental health reported higher levels of enjoyment compared with indoor exercise (Lahart et al., 2019). Other studies (Klaperski et al., 2019; Rogerson et al., 2020) found outdoor environments play an important role in reducing stress levels and facilitating wellbeing.

Despite the cross over between many mental health aspects and common grief outcomes (e.g., anxiety, depression, stress), there is a lack of research which has investigated the benefits of cycling as a coping mechanism to benefit grief outcomes. Previous research (Roberts et al., 2018), reported that 33.8% of participants from a cross sectional questionnaire used mountain biking as a coping strategy for their mental health. The results highlight the use of cycling as a coping strategy but fail to provide additional details on what aspects of cycling enhance the coping aspects. Within Williams et al.'s, (2021; (Williams et al., 2021) review, cycling was cited (Granek et al., 2016), whereby medical professionals used cycling as a coping strategy after the death of a patient, yet the mechanisms again were unclear.

Given that cycling is a free activity to those with access to a bicycle, offering physical, psychological and social benefits, and can be a form of active travel, it provides a potential avenue for accessible and sustainable bereavement support. This study aims to expand what is known about the influence of physical activity to support grief outcomes in individuals who have experienced a bereavement with a focus on cycling, to zone in on this particular physical activity to understand its influence on grief outcomes.

Research Question

What role does cycling play in supporting grief outcomes within individuals who have experienced a bereavement?

Method

Design

Given the lack of research in this area, this study drew from a constructivist paradigm, using a qualitative design with semi-structured interviews to gain in-depth information on how those who participate in outdoor cycling, who have experienced a bereavement, may be influenced by this type of activity, with a particular focus on grief outcomes.

Participants

Eligible participants were over 18 years of age, who had experienced a bereavement and who participated in outdoor cycling. They were recruited using a social media advertisement, and a total of 14 individuals were recruited ($n = 8$ males; and $n = 6$ females), aged between 25 and 69 (Mean = 47.57, SD = 15.02) and included into the analysis, until saturation was reached. Participants had experienced the death of their parent(s) ($n = 7$), sibling ($n = 4$), friend ($n = 3$), spouse ($n = 1$), child ($n = 1$), grandparent ($n = 1$), other ($n = 1$) with five participants experiencing more than one bereavement. Participants had been cycling for an average of 16 years (range = 1 year – 62 years), cycling on average 13 days per month with nine participants cycling before experiencing bereavement and five starting cycling after experiencing bereavement. Participant details can be found in Table 1.

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<Insert Table 1>

Materials

Participants were provided an information sheet, detailing the nature and aims of the research, before providing written and verbal consent. A demographic information sheet on Qualtrics was used to collect participants age, sex, religion, characteristics of their bereavement (who died, cause of death, when they died and if it was expected/unexpected), details of their cycling behaviour (length of time they have been cycling, how many days per month they cycle, who they cycle with [alone or with others] and if they are members of cycling groups), finally the form asked for any other physical activities participated in. To reduce any psychological distress, which may have been experienced within bereavement demographic questions, tick boxes were used to reduce the thought process.

A semi-structured interview schedule was used, based on previous research experience in the area (see Table 2). The interview schedule asked questions about bereavement experiences, and experiences of how cycling influenced grief outcomes. There were further questions that asked about perceptions and recommendations of using cycling to support grief outcomes, for individuals who have experienced a bereavement. Interviews were audio recorded using Microsoft teams, and a dictaphone (Olympus VN-731PC).

<Insert Table 2>

Procedure

Eligible participants contacted the researchers to arrange an interview at a time, place and date convenient. Interviews were held between April 2022- July 2022. Participants received the information sheet, were given time to ask the researchers any questions, then provided written and verbal consent for the audio recording of the interview. Interviews were held on Microsoft teams ($n = 8$), in person ($n = 5$) and phone call ($n = 1$). Interviews lasted between 31 – 98 minutes ($M = 49.22$; $SD = 17.12$). In-person interviews took place in a bright open space, with refreshments and tissues available. During all interviews, participants had the opportunity to pause or stop the interview, with the researchers

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following a distress protocol, allowing the researchers to be aware of the psychological and physical distress due to the sensitive topic. After the interview, participants received a verbal and written debrief with signposting for any distress experienced and a follow up communication the next day, to ensure they were comfortable with everything discussed during the interview.

Ethics

Ethical approval (1/2022) was awarded. Anonymity and confidentiality were maintained, with all participants receiving a pseudonym. General Data Protection Regulation (GDPR)(EU GDPR, 2018) was followed throughout. Participants received information about the study and provided written and verbal consent. Participation was voluntary, with the participants being able to withdraw at any time up to four weeks after data collection. The British Psychological Society's Code of Ethics and Conduct (British Psychological Society (BPS), 2021) was followed. Due to the sensitive nature of the interviews, participants were informed that confidentiality would only be broken if there was considered a risk to themselves or others. This did not occur in this current study. Participants currently seeking professional support for grief outcomes were excluded from the interviews, this was to reduce the risk of psychological distress. With the sensitive nature of the topic, researchers attended regular check in meetings to discuss any distress raised within the interviews among themselves. It is recommended when discussing sensitive topics to develop a rapport with the participant which can allow them to share their experiences in a safe and sensitive environment (Pinto et al., 2022). The researchers were respectful of participant experiences and followed active listening and non-verbal communication skills.

Analysis

Interviews were transcribed verbatim and coded using NVIVO. Reflexive Thematic Analysis (Braun & Clarke, 2006, 2021), was used following the 6 phase guidelines: 1. Familiarising yourself with the dataset, 2. Coding, 3. Generating initial themes, 4. Developing and reviewing themes, 5. Refining, defining and naming themes, 6. Writing up. An inductive approach was used on the dataset, whilst following these guidelines, this was not a linear process, therefore three different iterations of generated themes were produced by the researchers until final themes and sub-themes were agreed upon. Author reflexivity can be found in supplementary documents.

Findings

Four main themes were developed to answer the research question: “What role does cycling have in supporting grief outcomes of individuals who have experienced a bereavement?”: 1) ‘Embodied experience of cycling’, 2) ‘The cycling community’, 3) ‘Nature Connectedness’, 4) ‘Post-traumatic growth’. Main themes are presented in **Bold**, with sub themes presented in *italics*. Participants pseudonyms and who died are presented in parentheses after a quote.

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<Insert Figure 1>

Grief outcomes for context

Participants experienced a range of physical and psychological grief outcomes following a bereavement. It is important to note that grief is individual and not all participants reported experiencing these outcomes. Physically, some participants reported developing skin irritations or reactions, to developing chronic illnesses such as Crohn's, and obsessive compulsive disorder (OCD), during bereavement. There were reports of weight loss, and sleep issues with some participants isolating themselves from others. Participants experienced a range of emotions, such as anger, numbness, guilt, shock, pain, relief, with some reporting that they felt like life was a blur or felt lost. A few participants reported seeking professional bereavement support services offered through employment or hospices, whilst others sought support from family or declined professional support services.

Theme 1 – 'The embodied experience of cycling'

The data demonstrated that the practice of cycling was an embodied experience for the participants, involving multiple sensory interactions of the body moving through places. The intensity of this physically demanding embodied activity enabled feelings of freedom and escapism for individuals coping with grief.

Physicality of cycling

The physical challenge of cycling, specifically up hills, was beneficial to the participants, enabling them to challenge and push their bodies, gaining a sense of achievement and confidence afterwards. Colin (grandparent, other death) described the physical challenge of cycling as '*a fundamental pillar of my mental and physical wellbeing*', during the difficult time following a bereavement. Pushing one's body to physical limits through cycling stimulated the production of 'positive-feeling' neurotransmitters, known as endorphins.

'When I'm feeling fit and fast, I feel in a free space where my legs are working and I feel good, like I can push and feel the burn in my legs, getting that endorphin hit and yes, it makes me feel good...that endorphin hit is something I use a lot to destress' (Frank, parental death).

'I have never, ever regretted it cos as soon as I'm out, once the endorphins kick in, I need about 20 minutes to, you know, get up the first couple of hills and then, it's hard to describe the feeling... I just feel invincible and I feel so confident on my bike, I just feel great' (Robert, parental death).

Freedom and escapism

Participants appreciated the headspace and thinking time that cycling provided them, in order to process their thoughts. The rhythmic physical practice of cycling was regularly referred to as quite meditative and mindful. In demonstrating this, Susan (Sibling death) said *'I get the same affect from cycling as I do when I meditate'*. Many participants described how this thinking time on the bike gave them a sense of freedom or escapism from focusing on emotions related to grief, whilst also enabling them a space to think about the person who had died.

'I found cycling from an emotional perspective to be really peaceful, you are blocked away from digital social media... it gives you an opportunity to escape. You can be in the middle of nowhere on your bike and start crying, it gives you that freedom. It has pretty much saved me to be honest'. (Phil, parental death).

'Being out on the bike just gives me that headspace and time to think, and process really. I can push myself and come back with a clearer head'. (William, sibling death).

'When I'm out cycling, there are moments in which I just allow myself to, you know, cry and, you know, think about things or, you know, just think about memories of my childhood or the time we spent together' (Phoebe, parental death).

Theme 2: The Cycling Community

The cycling community was a key component discussed by participants, in benefiting their grief outcomes. The group environment created within the community, allowed participants to be around like-minded individuals and find comfort and social support. Participants recognised the different

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benefits elicited and supported that cycling could provide when riding alone compared to in a group environment.

The Group Environment

The group environment was a key and integral part of the support participants received from cycling by having an open community, where there were like minded individuals who you had the option to talk to or not. Being able to cycle with others, helped participants to become more social, feel less lonely and to commemorate anniversaries.

“Cycling that is set up to bring together people who are grieving. It’s a common cause they can have together. You can get a group of people and you don’t have to chat, you know if you are sat, looking straight ahead, you don’t have to have that intense engagement and you can sort of choose the conversations. It’s not the same as being around in a circle and having to openly feel as though you have got to discuss your grief or anything like that, but when you are cycling beside people you can choose not to talk, or have eye contact, yes, so I think groups that are specifically for people grieving, I think you can definitely get a lot from that.”
(Susan, sibling death)

“The 1st anniversary of my dad's death and I asked my cycling friends ... if they would like to go out together with me and it was really nice because they sort of like we had a moment at the beginning when they sort of all greeted me and said well, he's with you and each of them decided to say one or two words about it and we had that moment” (Phoebe, Parental death)

The bike and I

Participants reported receiving different benefits from cycling when riding alone compared to riding in a group setting. Cycling alone allowed individuals the time to process their thoughts, allowing them space and time to talk to those who have died, which allowed participants to find comfort in their bikes. Riding alone, gave participants the ability to develop upon qualities of themselves which may have been impacted by their grief.

"But I think as a default if I'm having to process anything, I'll probably go by myself ... One of the things I do is like I have a couple of places that I sort of like to talk to my dad." (Louise, Parental death)

"When mum died, all of a sudden, I found a lot more comfort going on my own. All of a sudden, I found a love of going on my own. I wouldn't dream of listening to music, I like whatever sounds are around you. I found it a really nice way to think, whether that is going up a steep hill that's killing your lungs, or whether that's flying down and screaming, grandma hopping down! It just really gives me a chance to think, which I never did that before. It never entered my head you would do that to think really." (Reuban, Parental Death)

"It makes me feel super independent which I really value" (Colin, Grandparent, and other death)

Theme 3 - Nature connectedness

All participants reported enjoying cycling outdoors on the road to enjoy views of the natural landscape and feel connected to nature. Whilst outdoor riding was not always an option due to COVID-19 restrictions, or weather, some participants described using indoor training indoors to maintain fitness and fulfil training needs.

Out on the road

Participants regularly commented on how *'cycling and being outside in the fresh air'* (Lily, Child death) helped them to *'feel more connection'* (Susan, Sibling death) with the natural environment and enjoy the physical characteristics of the environment such as changing weather conditions or landscapes. This exposure to nature, the outdoors and *'being in the elements'* (Reuben, Parental death), helped individuals to destress and feel happier during times of bereavement.

'I remember the first time we went out to the reservoir and it was just freezing cold, but it's so beautiful and I just felt different. I felt you know momentarily like a weight had been lifted off my shoulders' (Laura, Spouse death).

'I would always rather get outside, I don't feel the same... I feel uplifted and energised outdoors, if it's indoors I feel weirdly lethargic, I don't know if it's the lights or something' (Colin, Grandparent death).

I'm looking at mountains, it is just a very de-stressing thing for me to do... Being out on the bike is that freedom and the fresh air that you are not going to get in an

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indoor setting. Going outdoor riding offers the escape from urban living, it is the quickest way out the city for me, I can get out to the green space pretty quick and not feel like I live in a city and that is very important to me. I don't spend many weekends in the city either, I go out and ride my bike' (Frank, Parental death).

In on the Turbo trainer

Indoor cycling training was less commonly mentioned as a means to improve mood but formed an alternative option for individuals to improve their fitness during winter months or bad weather conditions.

'Indoor sessions to smash your fitness and get that endorphin hit which I like, but the benefits of being outdoors compared are pretty immeasurable' (Frank, Parental death).

'I don't really like cycling indoors, I only do it when cycling outdoors isn't an option and it's a means to an end, cycling indoors, rather than something I particularly enjoy' (Colin, Grandparent death).

Theme 4 – Post traumatic growth

Despite the trauma of experiencing loss and grief, participants reported that cycling and the associated goals or challenges, enabled them to undergo personal transformations that enabled them to become *'a little bit more resilient'* (Louise, parental death), with less anxiety. Josh (sibling and friend death) described this as living *'more of my true self'*. Additional associated outcomes from these experiences included changes and growth in their personal relationships with others.

Personal transformation

Many participants were empowered to feel more self-worth or confidence, improved their resilience and *'put life into perspective'* (Louise, parental death) during a difficult period. Some individuals used emotive thoughts about the people they had lost, to push themselves harder on the bike and in other aspects of their lives such as their careers.

'It's very clichéd to say but it does have a big impact. I actually feel like I've come out of this a much better person... It has brought me out of my shell. You appreciate things more, even a quick ride. I went for a ride just before the clocks went forward,

it was only like a two-hour ride on my own but I just felt amazing after it. Riding back, the sun was setting and I certainly wouldn't have enjoyed it the same before mum was diagnosed, you look at things differently... You start being grateful for the smaller things you have, before those big changing events really... Sometimes you are holding on for dear life and other times it makes you feel incredible that you've done something you didn't think you could do' (Reuben, Parental death).

I think it's changed me as a person, the cycling as well as the grief. Yeah, it's made me. Probably realize I can do more than I ever thought I could, so it's given me that boost of confidence.... I used to think that when I was cycling up a hill, I would think how painful it was and I didn't like it, but then I just used to think what my son would have gone through' (Lily, Child death).

'There are definite things that have changed about me... in the longer term I'm sure there will be changes because mum had an amazing influence on me. Living your life being kind to others. Initially I suppose the highest explanation of love that I could give to my mum would be to carry on and do the things that make me happy and give me joy. To show that love and loyalty to her would be to continue doing things and to honour her as well' (Frank, Parental death).

Growth of relationships

Every journey of grief experienced by the participants was unique, however a commonality described by many was the growth of relationships with other people in their lives and how cycling acted as a catalyst for this. Improved social relationships as an outcome of grief included with both existing family members and new connections forged through cycling groups, where often *'bereavement forced me to find a community'* (Phoebe, Parental death).

'Cycling gives you that opportunity to reset and revalue how you interact with other people and how you look at yourself. The relationships with my siblings weren't great before and now I think they are mending. It resets everyone. A big event like that erases everything and you realise that with your siblings, you are in exactly the same situation and there is no point being obnoxious and stupid towards each other' (Phil, Parental death).

'I invested in myself and my relationships... I met other people who also used cycling to deal with grief, and I could see myself sort of like reflected in what they were saying and those feelings' (Phoebe, Parental death).

'I think it [cycling] just helped me to well, it helps me to socialise when that was the last thing that I wanted to do, I didn't go out for years' (Laura, Spouse death).

Final participant thoughts and recommendations

All participants would recommend cycling to anyone who has experienced a bereavement, to offer beneficial support for grief outcomes. Participants felt strongly about using cycling as an outlet for their grief outcomes with some who believed they would not have been able to cope with their grief if it wasn't for cycling *"I wouldn't have got through it. I would have been incredibly lonely and quite introverted"* (Jessica, Parental death) with cycling being able *"To help people process and bring them down to earth to a certain degree, put things in perspective"* (Louise, Parental death). One participant encouraged *"non-cyclist - get on a bike and open your heart and mind"* (Adrian, Friend death), because of the connection with nature and the *"sheer pleasure that you get from riding a bike in the beautiful setting"* (Laura, Spouse death).

Discussion

There were four core themes which were generated from the data set to answer the research question 'What role does cycling have in supporting grief outcomes of individuals who have experienced a bereavement': 1) Embodied experience of cycling, 2) The cycling community 3) Nature connectedness, 4) Post-traumatic Growth. Each theme offered new insight into how individuals who have experienced a bereavement were able to use cycling to support grief outcomes.

The embodiment paradigm is concerned with the ways in which an individual's body moves through space and engages with their surroundings through the human senses (Waite et al., 2021). The practice of cycling is fundamentally centred around the body moving through and interacting with space and thus, considering this experience the lens of embodiment is appropriate. Additionally, embodied experiences are fundamental to experience and wellbeing outcomes (Chan & Lee, 2020). The physically demanding experiences of cycling up hills in particular provided the participants with a means to push themselves and challenge their bodies physically. The findings suggest that the

participants had a strong desire to seek out the embodied experience of hill climbing to physically push themselves and subsequently feel a rush of immediate sensory feedback through endorphins. Successfully pushing one's body to this physical state and mastery of the hills helped the participants to feel confidence and an increased sense of achievement, which improved their state of mind during a difficult time of bereavement. Learning that bodily engagement through cycling stimulates positive outcomes to individuals who are grieving, builds on existing knowledge in sport tourism contexts. For instance, high altitude mountaineering expeditions in which individuals pushed their physical limits were found to have drastic impacts on wellbeing, enabling mountaineers to feel a sense of resilience and accomplishment (Allen-Collinson et al., 2018).

In the context of grief, previous research has reported that physical activity generally provides an opportunity to mentally escape and process thoughts (Brewer & Sparkes, 2011; Williams et al., 2023). Existing studies fail to consider why particular types of physical activity could offer escapism and enhanced wellbeing. The current findings deepen knowledge for how cycling specifically offers this as a type of physical activity for individuals who experiencing bereavement: 1. the physical action of cycling prevents an individual from using their phone, enabling digital disconnection from the stress inducing noise of social media (Radtke et al., 2022), 2. the repetitive rhythmic action of turning the pedals can connect the body and mind in a meditative sense which aids thought processing (Spinney, 2006) and 'switching off', and 3. the practice of cycling offers a peaceful space which is removed from one's home environment, enabling individuals to feel more comfortable to release their emotions through crying.

Cycling offers a uniquely intimate experience whereby the body moves through and interacts with the weather, sensory stimulants of nature and the topographical character of the natural environment (Waite & Buchanan, 2023; Xu et al., 2019). The importance of connection to the natural environment engendered through cycling and the associated positive wellbeing outcomes was reflected in the

findings, with participants consistently reporting an improvement in their psychological wellbeing after spending time cycling amongst nature. Existing studies suggest activities such as cycling whilst experiencing nature, can be termed as 'green exercise' and unanimously report a link to improved wellbeing through 'nature connectedness' (Glackin & Beale, 2018; King & Church, 2013; Lahart et al., 2019; Lesser & Nienhuis, 2020; Pretty, 2004). This occurs through a closeness and rich engagement with nature, fostering a sense of relatedness; which is considered essential for psychological growth and eudaimonic well-being (Ryan & Deci, 2000). Similarly, the findings in this study support that exposure to nature through cycling is profoundly salutogenic (Seymour, 2016), with participants explaining how the closeness to nature and freedom of riding outdoors helped them destress and gain perspective on their situation, for many offering personal growth.

Cycling specifically, as a form of physical activity, offers a unique immersion of the moving sporting body into the surrounding physical environment (Gazzola et al., 2018). This immersion comprises feeling changes in topography and sensing temperate changes in weather conditions or external stimuli posed by nature, over a significant distance. The 'vehicle' of the bicycle facilitates this exposure to sensory experiences, which is impossible to gain through indoor cycling or other forms of physical activity which occur within more controlled or indoor environments. Sensory engagement with the natural world enables greater implications for wellbeing (Fossgard & Fredman, 2019) which aligns with outdoor cycling specifically being more commonly referred to by the participants, as a means to improve mood.

Although nature engagement activities have been identified as a potential alternative intervention to support wellbeing outcomes, few studies exist to examine how this could specifically support those experiencing grief (Cacciatore et al., 2020). A study evaluating the therapeutic use of farming practices (care farming) reported effective efficacy in the intervention reducing subjective distress to grief intensity (Cacciatore et al., 2020). Findings from this study similarly support that a connection between

nature and activity (in the form of cycling), can uplift individuals who have experienced a bereavement and benefits grief outcomes. This finding is suggestive that access to natural environments and specifically hills, alongside and via cycling poses the opportunity for individuals to physically challenge themselves and potentially experience direct and positive impacts on psychological well-being.

In addition to the connections formed with the natural environment, many participants reported upon social connections with others through cycling. The cycling community played an invaluable role in supporting many participants with their grief. Cycling with others as part of a community, created a sense of group belonging, research (Levi-Belz & Feigelman, 2021) suggests that belongingness to a community can help as an antidote to adverse grief outcomes, however this finding was in individuals who had experienced bereavement by suicide, whilst the current sample population experienced the death of significant others from a variety of causes. Grief outcomes such as isolation and loneliness are common among a variety of causes of death (Vedder et al., 2022), which suggests belonging to a community can reduce these feelings of isolation and loneliness in individuals who have experienced bereavement of all causes, not just suicide.

Experiencing a bereavement can impact an individual's social identity (Broadbent, 2013). Research has shown that cycling can be used to enhance social interactions amongst older adults (Zander et al., 2013), while social aspects are seen as a facilitator to riding for older adults (Winters et al., 2015). Despite these studies being with older adult samples specifically, the current findings support this, as the majority of older participants in the current study are members of formal cycling groups and use this to enhance their social interactions and support their social identity. Communities which create purpose and meaning allow for positive psychological outcomes such as an increased well-being (Haslam et al., 2009), this is explained through our participants' experiences of cycling in groups.

Whilst participants benefited from cycling in groups creating a shared community, they openly discussed how cycling alone allowed them to gain different mechanisms of support. This is confirmed

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through interviews with adult males, who identified a core theme 'alone but connected' where cycling alone could enhance the cycling experience in the outdoors (Glackin & Beale, 2018). Further supporting this, (Plante et al., 2007) suggested that cycling alone presented calmer moods than cycling with someone else for women. This calmness can be seen in the current study, by cycling alone presenting participants the opportunity to seek comfort and time for themselves.

A systematic review suggests that after a bereavement, individuals can have a personal transformation which allows them to become more courageous and have increased gratitude for things in life, referred to as post-traumatic growth (Chater et al., 2022; Michael & Cooper, 2013). The personal transformation, which participants underwent through cycling after their bereavement, allowed participants to experience a post-traumatic growth. Participants explored the physical challenges of cycling, referring to hills which enabled them to develop this courage to push their limits. A study focusing on cycling outdoors, found that in males, the physicality of cycling allowed them the opportunity to support daily challenges in their lives whilst supporting their personal growth (Glackin & Beale, 2018).

Social support has been identified as a potential aspect in developing post-traumatic growth following a bereavement (Waugh et al., 2018), and this social support can be achieved through family and friends. Participants noted that by giving them space and opportunities to reset, cycling enabled relationships with family to grow and friendships to be created. This is further supported in (Chater et al., 2022), noting how both positive and negative changes with family members can occur after bereavement. Participants in this study did not report any negative changes in their relationships with others, however this does not mean strain and additional stress were not felt within these relationships.

With the increased death rate as a result of COVID-19 (Office for National Statistics, 2022a) and an increased number of people grieving, a great opportunity for individuals to use cycling to support their grief outcomes has risen. Notably in conjunction to this, cycling numbers have risen in popularity since

the pandemic (Sport England, 2023; Weed, 2020). The unique qualities of cycling such as its physicality, embodied connection with the outdoors and further like-minded communities created, presents an opportunity for individuals who have experienced a bereavement to benefit their grief outcomes. The experiences and benefits of cycling following a bereavement, align with much of the Dual-Process Model of Grief (Stroebe & Schut, 1999), facilitating the loss-oriented and restoration-oriented processes. Cycling could therefore be considered as an alternative or addition to traditional counselling-style therapy to help cope with death and grief.

There is limited previous research which has explored how physical activity may act as a support mechanism for grief outcomes, and this is the first to explore mechanisms and functions of a particular physical activity, namely cycling. Using a qualitative approach, allowed for in-depth investigation (Longhurst, 2009) asking participants to share the unique experiences of cycling and how these have been used to support their grief outcomes following a bereavement. Saturation was reached, as themes and meaning within each data set aligned with each other.

The current research lacked participant diversity, recruiting only individuals who lived in England, future research should take into consideration weather and culture from different countries, as it has been shown to have an impact on cycling behaviour (Zhao et al., 2018) and landscape differences and how this may influence cycling behaviour to support bereavement. The current sample of participants, had a large age range, whilst no differences in age were examined during this current study, some previous research has focused on older populations (Winters et al., 2015; Zander et al., 2013), an interesting area would be to focus on young adults or adolescent cyclists, and their interaction with cycling during bereavement, as experiencing bereavement as a young person, may have a different impact on the individual.

This study of individuals who have experienced a bereavement has revealed that multiple aspects of cycling as a specific form of physical activity, can together benefit grief outcomes and lead to post traumatic growth. It reveals these characteristics of cycling specifically as: 1. an embodied practice

which enforces a digital disconnection and a strong connection of the moving body to the natural landscape, 2. a rhythmic and meditative activity which enables escapism and directly improved psychological wellbeing, 3. an activity with multiple opportunities for socialisation and peer support, and 4. a physically demanding practice which poses challenges and opportunities for personal growth to individuals. The findings provide evidence that cycling as a specific form of physical activity provides therapeutic opportunities and could form part of an alternative offer for bereavement support to individuals both unsupported or undergoing existing forms of talking therapy. Thus, by identifying these characteristics of cycling as plausible in improving the psychological wellbeing of individuals who have been bereaved, this research makes a unique practical contribution to the field of grief studies. Whilst offering these insights, the present study additionally presents new avenues for further investigation of other specific forms of physical activity to support grief outcomes, in contrast to cycling behaviour.

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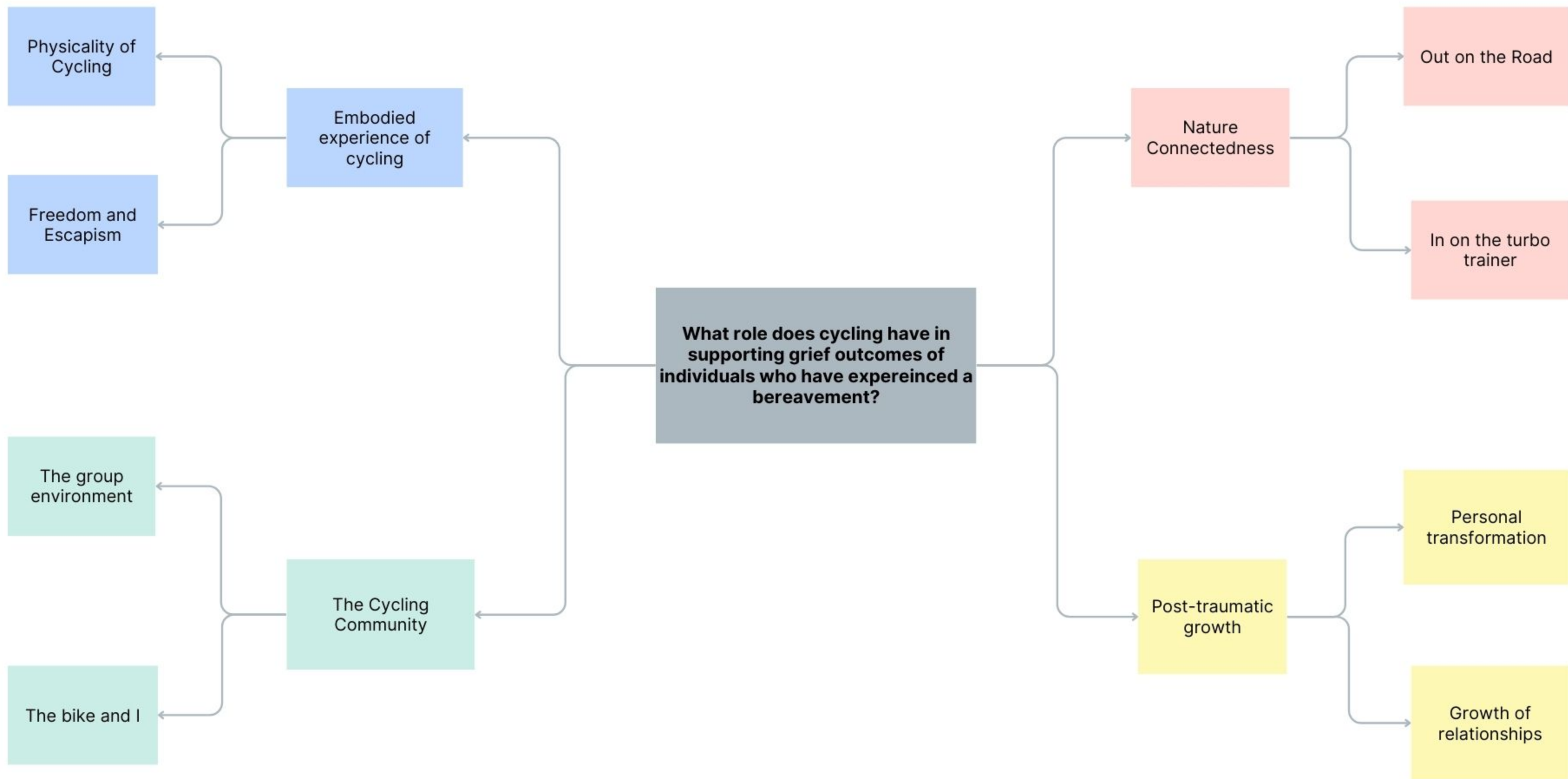


Table 1:

Participant demographics including bereavement and cycling information for those individuals who participated in interviews.

Pseudonym	Age	Sex	Who Died	Cause of death	How long since death	Participant age at bereavement	How long been cycling for	Days cycle per month	Cycling alone with others
Phil	25	Male	Parent	Natural and Other	9 Months	24 years	10 years	10	With others
Colin	27	Male	Grandparent, other	Natural Cause	< 1 Year	27 years	20 years	4	Alone
Robert	58	Male	Parent	Illness, Other	7 Years	52 years	6 Years	15	Alone
William	52	Male	Sibling, Friend	Illness	1 year 4 months	53 years	18	24	With Others
Reuben	30	Male	Parent	Illness	4 years 7 months	25 years	20 years	4-6	With others
Frank	28	Male	Parent	Illness	7 Months	27 years	13 years	15-20	With others
Lily	67	Female	Child	Illness	10 Years	57 years	7 years	20	With Others
Josh	52	Male	Sibling Friend	Natural Cause	4 years 9 months 4 years 7 months	62 and 65 years	47 years	15	Alone
Susan	62	Female	Sibling	Illness	7 months	62 years	All life (5 years serious)	8	With others
Louise	40	Female	Parent	Illness	10 Months	39 years	10 years	2	Alone
Phoebe	40	Female	Parent	Illness	1 Year	39 years	1 year 4 months	20	With others
Adrian	69	Male	Friend	Illness	6 Months	68 years	7 years	12-15	Both
Laura	56	Female	Spouse	Suicide	4 years 9 months	51 years	5 years	16-20	With others
Jessica	60	Female	Parents	Illness	7 years 7 months 6 years 4 months	53 and 54 years	4 years	8	Both

Table 2:

Bereavement and cycling interview Questions asked to participants,

Semi Structured Interview Questions	
Bereavement Focused Questions	<ol style="list-style-type: none"> 1. I wonder if you could tell me a little bit about your [person who died]? 2. How did losing xxx affect you? 3. What support did you receive after the loss of your [person who died]? 4. Did your relationships with others change during this time? 5. Can you explain how losing [person who died] changed you as a person?
Cycling Focused Questions	<ol style="list-style-type: none"> 6. How did cycling fit in with your life at this time? 7. How did cycling make you feel before the bereavement? 8. How has covid influenced your cycling behaviour? 9. 10. How does being on the bike make you feel? 11. How has cycling supported you with your grief? 12. Do you prefer to cycle alone or with someone? 13. What do you think the benefits of cycling outdoors/indoors are? 14. Are you aware of other cyclists who use their time on the bike as a coping mechanism for grief? 15. In general, what are your thoughts on cycling to support grief outcomes?