Dirt Circus League: Power and Belonging in Posthuman Young Adult Fiction

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Abstract

This creative practice-led PhD comprises two parts. The first part, the young adult novel *Dirt Circus League*, features two protagonists: Quarter, an eighteen year old male who has been raised in an earth-based religious cult in far north Queensland; and Angie, a seventeen year old city girl. Dissatisfied with her life, Angie decides to reinvent herself as Ava Steel and follows Quarter and the cult members back to their home, an abandoned resort in an isolated area of Cape York. In pursuit of his goal to maintain and strengthen his position as leader of the Dirt Circus League, Quarter has birds’ eyes surgically transplanted into his head. Quarter believes he will be able to see through the implanted eyes. As the birds’ optic nerves fuse into his brain, however, he risks becoming something other than human. Ava, meanwhile, learns what life and death mean to the cult while coping with the rapid rise of her abilities as a medical intuitive, which both bind her to, and place her in direct conflict with, Quarter.

Part two, the exegesis, explores representations of the posthuman in young adult fiction. The exegesis traces my manuscript’s development from its initial focus on neuroscience to the broader concerns of posthumanism, and how the mechanics of storytelling drove this change of focus. My creative work initially sought to explore some of the possible impacts of neuroscientific advances on the teenage brain and how these impacts might manifest in the person as they grow into adulthood, and for this I drew on the work of the neuroconstructivists, including Denis Mareschal. As the focus of the creative work evolved to explore the possibilities of living as a posthuman I drew upon the writings of a range of posthuman theorists and literary theorists, including Cary Wolfe, Francis Fukuyama, N. Katherine Hayles, Elaine Graham and Elaine Ostry. Using a posthuman framework, I explore questions of power and belonging in young adult fiction through an original novel that, while commercial in nature, also interrogates the implications and multiple potentialities for posthuman lives.
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Statement of original authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature:  

Date: 11/08/2014
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Part 2: Exegesis

Chapter 1: Introduction

In *Representations of the Posthuman: Monsters, Aliens and Others in Popular Culture* (2002), Elaine Graham writes about storytelling as ‘constitutive, a crucial part of building the worlds in which we live’ (2002, 223). I am a storyteller, and my story *Dirt Circus League* builds a world that explores one possible version of how some people choose to live in a recognisable posthuman world.

*Dirt Circus League: power and belonging in posthuman young adult fiction* is a creative-practice led thesis that comprises two parts. The first, a speculative fiction manuscript, *Dirt Circus League*, explores a search for power and belonging through the posthuman. Part two is an exegesis that traces the manuscript’s development from its initial focus on neuroscience to the broader concerns of posthumanism, and how the mechanics of storytelling drove this change of focus.

My initial research questions were: (A) How can neuroscience be incorporated into young adult fiction in a way that both recognises and challenges the ‘cult of the brain’ while entertaining the target audience? (B) Is it possible to successfully weave neuroscientific elements through a fast-paced, action-driven narrative without bogging it down with scientific description or didacticism?

Through the process of crafting the novel, I discovered that the short answers to these questions are: (part A) by exploring what neuroscience makes possible rather than focusing on the science itself; and (part B) no, not really. However, buried within that second question was the area that was to become the focus of my research: posthumanism. This exegesis will trace that change of focus from neuroscience to posthumanism, and how my original concept for this project changed through the creative writing process.

Essentially I failed to create the neuroscience-centric young adult novel I had originally envisioned because of the very idea that piqued my interest in neuroscience: that, according to the neuroconstructivists, nothing happens in isolation. Neuroscience comes to life in fiction when an element of it is set in a created world (environment) alongside a set of characters.
having experiences. Neurons and neural pathways develop in response to the environment, experiences and genetic structure of a brain to make an individual who they are; similarly, it is the fictional environment and experiences operating within and reacting to the narrative structure that create an original story.

Through my creative work I sought to explore some of the possible impacts of neuroscientific advances on the teenage brain and how these impacts might manifest in the person as they grow into adulthood. However, through the process of researching, writing and rewriting the novel, the focus of the creative work evolved to explore the possibilities of living as a posthuman. As a fiction writer, questions about the posthuman offered greater creative flexibility and allowed more scope to write an original novel that can be read on both a surface level, as pure entertainment, as well as provoking deeper questions about the implications and multiple potentialities for posthuman lives. Although I did not set out to write a posthuman novel, when I searched for patterns and meaning within the manuscript, it was the posthuman framework that best fit the novel’s speculative ethos. These intertwined aspects—my manuscript, the pathway from neuroscience to posthumanism, and the interrelationship between the two—comprise my original contribution to knowledge.

This exegesis will map that journey, starting with my fascination with neuroscience and ending with young adult fiction’s place in exploring a posthuman present and future.

1.1 Project development

1.1.1 Brain trauma, brain plasticity and brain development

Three key texts led me to this research. First was The Boy who was Raised as a Dog (2006) by Bruce Perry and Maia Szalavitz, which I read as part of my Masters' research on resilience in young adult fiction. Perry, a child psychiatrist, overviewed his case studies of children and adolescents who had suffered severe trauma, how the trauma adversely affected their brain development, and how treatment may mitigate or reverse the brain damage. About six months after I finished my Masters I read The Brain that Changes Itself (2007) by psychiatrist Norman Doidge. Doidge's book, which details the stories of people who have recovered from serious injuries or trauma to their brains, opened up for me the idea of brain plasticity as a possible way to resolve the detrimental impacts of trauma on the brain. This in turn led me to discover the third text Neuroconstructivism Volume One: How the Brain Constructs Cognition (2007) by Denis Mareschal, Mark Johnson, Sylvain Sirois, Michael Spratling,
Michael Thomas and Gert Westermann, which posits the theory that, in terms of brain development, nothing develops in isolation. That is, that genes, environment and experiences interact and impact upon the other in the context of each other (context dependence) in a human's developing brain.

The different yet related ideas from these three books led me to think about how trauma affects a human’s developing brain from birth through to late adolescence; how different experiences and environments and genetic makeup might impact that development and perhaps mitigate trauma experienced; and how I might use these ideas to develop characters in my own fiction. This led to initial questions about how neuroscience is and has been reflected in young adult fiction. The interconnectedness of experience, genes and environment within the context of brain development also opened up for me an interest in the idea of interconnectedness within ecosystems and the environment.

1.1.2 Interconnectedness and Gaia Theory

James Lovelock’s Gaia Theory can be summed up by the declaration made at the meeting of global change organisations held in Amsterdam in 2001, which opened with: ‘The Earth System behaves as a single, self-regulating system comprised of physical, chemical, biological and human components’ (Lovelock 2006, 32). I read Lovelock’s book, The Revenge of Gaia (2006), because I had decided to centre my narrative around an earth-based religious cult, and Gaia Theory’s focus on interconnectedness struck a chord with me. This was particularly in light of the neuroconstructivists' central tenet of context dependence: units (brain cell, brain region or human individual) do not develop in isolation; rather, they develop within a context of other developing units (Mareschal et al. 2007, 94). That is, brain cells develop within a brain that develops within a body that develops within an environment, and, at each point of development, the thing that is developing is affected by something else (2007, 94). The human brain cannot be separated from the human body; it functions as a whole just as animals and humans cannot be separated from the earth, and one cannot be divorced from the other. Thus the links between the neuroconstructivists’ theory of human development and Lovelock’s Gaia Theory, which views the earth as one giant, interconnected organism, began to appear (albeit somewhat foggily at first). The world my characters inhabited was filled with interconnecting systems including various environments (the ruins of the abandoned resort, the natural environment, the Meat House), social structures (team rules, league rules, the ‘outside’ world of Dirt Creek) and belief systems (the tenets of the
Conflicts occur when the characters fail to recognise these connections or try to force false connections between the systems.

1.1.3 Interconnections between creative writing and science

David Morley, writing about creative writing and science, states: ‘Scientific concepts are not the story but part of the canvas of setting and the language of science is used quite naturally’ (2012, 159). So it is for me that the neuroscience was fascinating not in and of itself but in the context of the world in which it operated. These two scientific theories—one neuroscientific (neuroconstructivism), the other environmental (Gaia Theory)—fuse together to underscore the core belief explored through the fictional world of the *Dirt Circus League*: that the Earth and all life upon it is inextricably interconnected, and that the future of the Earth depends on a striving for balance within that connection. My manuscript is an expression of one way that these interconnections may play out. As a fiction writer, it is the interconnections between the characters, and the interplay of how their actions impact upon each other physically, emotionally and psychologically, that provide a rich narrative canvas to explore. A scientific technique or practice, no matter how fascinating, is not enough to sustain a story as it is merely one part of a far more complex process. The personalities, behaviours and actions of the two main characters, Ava and Quarter, who are both dependent on each other (whether they like it or not) for survival and growth, reflect this striving for balance. In this way, the final creative product became a story where the neuroscience, although it exists, takes a back seat to the more human, and posthuman, questions of identity, belonging, power and interconnectedness.

1.2 We live in a neuro world

1.2.1 What is neuroscience?

The discipline of neuroscience was created in the early 1960s to bring together a range of scientific areas of research including neurophysiology, neuroanatomy, neurochemistry, psychology, physics and immunology (Abi-Rached and Rose 2010, 18). Since then, it has evolved from a topic of scientific and medical interest to a field that seems to have an impact on almost every aspect of our lives. Simply defined, neuroscience is the study of the nervous system, including its embryology, anatomy, physiology, bio-chemistry and pharmacology (Kolb and Whishaw 2009, 22). However, its reach is far more profound than this short definition suggests. From health to law to education to economics, marketing, leadership,
ethics, religion and philosophy, there is an ever increasing number of fields attaching the prefix 'neuro' and jumping on the twenty-first century's neuroscientific bandwagon.

There are now few aspects of western lives that are not succumbing to what Skolnik-Weisberg et al. term the ‘seductive allure’ that the neurosciences exert upon both the academic and the popular imagination (Slaby 2010, 400). Since 2012, for example, the University of Wisconsin-Madison has offered an integrated double degree program in neuroscience and law, as ‘it is likely that neuroscience will play an increasingly important role in helping to inform legal processes and decision-making’ (Sakai 2011, n.p.). The emerging field of cultural neuroscience seeks to explore the impact of cultural influences on brain development and explain these influences in neuroscientific terms in order to discover, among other things, potentially unique information about cross-cultural differences in behaviour (Losin, Dapretto and Iacoboni 2010, 148). Futurist Zack Lynch has coined the term ‘the neuro revolution’ to describe what he believes is a ‘technoscientific revolution of our understanding of man’ (Slaby 2010, 398), and his book, The Neuro Revolution: How Brain Science is Changing our World (2009), proposes that human beings ‘...sit on the cusp of another overwhelming societal transformation...It is the emerging neurosociety’ (Lynch and Laursen 2009, 10). As Lynch discusses in his book, there are dangers inherent within this ‘emerging neurosociety’. Francis Fukuyama approaches some of these dangers from a posthuman perspective when he writes about neuropharmacology as having the ‘...ability to manipulate, the source of all human behavior, the brain’ (Fukuyama 2002, 19), and he believes this potential has vast political implications. Beyond Fukuyama’s somewhat alarmist view, however, it is clear that, as neuroscience makes its way out of research laboratories and into the mainstream of western culture, the advances that neuroscience promise bear the hallmarks of posthumanism. From microchips that enable people to manoeuvre a prosthesis like a normal limb to pills that alter brain chemistry to enhance brain function to more nightmare scenarios such as the possibility of neuro-warfare described by Lynch, the wide application of neuroscientific-based enhancements sit side by side with the metamorphosis from human to posthuman. From the perspective of Fukuyama, Lynch and others, neuroscience, and the technologies that support it, make some form of posthumanism inevitable.

1.2.2 The desire to know ourselves
Professor Davi Johnson Thornton, author of *Brain Culture: Neuroscience and Popular Media*, argues that North American culture’s fascination with all things ‘neuro’ stems from the human desire to know all about ourselves and thus overcome all the problems and complications of life. In a 2011 interview with Jonah Lehrer, she said:

> It goes back to the idea that the brain is everything...It's the ultimate dream—through science we can fully know all that there is to know about human nature, and then control it perfectly...it's not just about science or medicine, but ultimately about this fascination with revealing the ultimate secrets of human existence. (Lehrer 2011, n.p.)

The human desire to know ourselves completely through science and thus gain control over what seems chaotic and uncontrollable is not new. In the nineteenth century the pseudoscience of phrenology was packaged and sold as a means of social reform and self-improvement in the USA, where its ‘miraculous head readings spread like an epidemic’ (Burrell 2004, 198). Despite its quackery, phrenology’s attraction was its claim to allow humans to solve the puzzle of ourselves, and neuroscience holds the same allure. Although most neuroscientists are guarded about how advances in the various streams of neuroscientific research may be applied to everyday life, the popular media's reporting of neuroscientific discoveries can mean that neuroscientific fact is often clouded by neuroscientific fiction. For example, prior to the 2008 USA presidential election, the *New York Times* published in its editorial section an article titled *This is Your Brain on Politics* outlining the results of neuroscientific research into voters’ intentions. The publication of the research study, which had not been peer-reviewed, was criticised by cognitive neuroscientists, seventeen of whom put their names to a letter published in the *New York Times* several days later, which stated in part:

> As cognitive neuroscientists, we are very excited about the potential use of brain imaging techniques to better understand the psychology of political decisions. But we are distressed by the publication of research in the press that has not undergone peer review, and that uses flawed reasoning to draw unfounded conclusions about topics as important as the presidential election. (Aaron et al. 2007, n.p.)
It is human to want to know as much about the mystery of ourselves as we can, and many aspects of neuroscientific research are based on the search for what makes us who we are. Neuropsychology, for example, operates on the premise that it can ‘develop a science of human behavior based on the function of the human brain’ (Kolb and Whishaw 2009, 2). The ability to look inside the human brain in more or less real time (using functional magnetic resonance imaging) appears to offer us the answers to the secrets locked up inside ourselves, and this is a powerful attraction. However, just as a brain scan is not a picture but rather a complicated composite of algorithms, of educated guesses and data excluded or highlighted, the allure of neuroscience—and the answers it appears to offer us—is no simple thing.

1.2.3 Critics of neuroscience

The encroachment of neuroscientific concepts and ideas into more and more areas of our lives is not without its critics. Critical neuroscience, for example, aims to analyse the impact of neuroscientific discoveries on the wider world and the growing influence of neuroscience into public policy. Even Lynch, while being an avid believer in and enthusiastic supporter of the ‘neuro revolution,’ is nonetheless aware of the political, ethical and moral minefields that neurotechnology brings with it. Lynch discusses developments in lie detection, describing two USA companies who are currently in the process of developing commercially available lie-detection products, and also briefly describes a case in India where a young woman was sentenced to life in prison for murder ‘...based on a brain scan that the judge accepted as proof that she knew damning details of the crime’ (Lynch and Laursen 2009, 23). The brain scan used in the Indian case, known as Brain Electrical Oscillations Signature (BEOS), was specifically referred to by the judge presiding over the case in his notes, where he stated the accused ‘...was further subjected to BEOS Test which also revealed her experiential knowledge of the commission of offence’ (Phansalkar-Joshi 2008, 8). The woman was later released on bail because of the lack of compelling evidence against her; the BEOS test was not mentioned in that brief (Murphy 2009, n.p.).

Philosopher Jan Slaby is one of the founders of Critical Neuroscience, a group of international academics from both scientific and humanities disciplines. In an article published in the journal *Phenomenology and the Cognitive Sciences*, Slaby describes the key questions this group wishes to explore:
Does neuroscience indeed have such wide-ranging effects or are we collectively overestimating its impacts at the expense of other important drivers of social and cultural change? Via what channels is neuroscience interacting with contemporary conceptions of selfhood, identity and wellbeing? (2010, 397)

The existence of the Critical Neuroscience group is itself illustrative of the far-reaching implications of the infiltration of neuroscience into almost every aspect of western life, and the seriousness of the potential impacts this infiltration may bring about. The group is undertaking several projects investigating the various impacts neuroscientific research is having upon a range of policy areas throughout the western world. Their project ‘Engaging the ‘Neurorevolution’” seeks to ‘...probe the extent to which discourses engendering neuroscience do match neuroscience’s real world effects’ (Critical Neuroscience Group 2011, n.p.). Similarly, their Neuropolicies project is examining:

...how current neuroscientific theories are understood and taken up in a number of policy projects and how these target phenomena and classifications get transformed and used in fields outside of science...

(2011, n.p.)

Thus it is no longer a matter of whether neuroscientific discoveries will impact upon the way we live our lives, from education to law to health and domestic and international politics, but rather how significant and wide-ranging these impacts may become. Fiction remains a useful and important space in which to explore these impacts (both positive and negative), particularly for readers in their late teens who are grappling with these changes as they enter the adult world. It is today’s adolescents who will have to grapple with the ethical challenges of living in a posthuman world.

1.3 Posthumanism

Posthumanism explores the notion that human beings are about to change, or already have changed, some intrinsic aspect of our human-ness. It debates the characteristics and qualities that make up our human-ness in order to differentiate what about us will (or has) changed to make us something more than or other than human. To answer the question, “what is a human?” is of course a body of work in itself, and it is not within the scope of this exegesis to
explore this question. However, before embarking upon a discussion of what may constitute a posthuman, it is useful to provide some context around the term “human”. This context is offered only as a starting point for a discussion of ideas around what a posthuman may be, not to set up the human and posthuman as opposites.

1.3.1 What is a human?

Perhaps the most basic starting point for describing humans can be taken from science-fiction writer Terry Bisson’s classic short story, *They’re Made Out of Meat* (1990), where a small group of aliens are discussing the somewhat shocking discovery that the planet Earth is inhabited by ‘sentient creatures’ that are ‘born meat and…die meat’ (Bisson 1990, n.p.):

…”I told you, we probed them. They’re meat all the way through.”

“No brain?”

“Oh, there’s a brain all right. It’s just that the brain is made out of meat! That’s what I’ve been trying to tell you.”

“So ... what does the thinking?”

“You’re not understanding, are you? You’re refusing to deal with what I’m telling you. The brain does the thinking. The meat.” (1990, n.p.)

Human beings generally like to think of themselves as being much more than bags of thinking meat, and of our bodies and minds as more than a collection of cells, blood, organs, bones and water. But exactly what we are is a question that we have grappled with for thousands of years. In ancient Greece Aristotle wrote:

…the body is not something predicated of a subject, but rather works as subject and matter…The soul must, then, be substance…Substance is actuality. The soul, therefore, will be the actuality of a body of this kind. (Aristotle 2004, 31)

After the Middle Ages and during the Renaissance, humanism again became a central focus for attention. The Church’s doctrine of authority, which placed an intermediary between God and the individual, was replaced by a belief in the individual having a direct relationship with
God (Hunt 1999, 17). It became an individual’s responsibility to fulfil their God-given potential, and art, architecture and science flourished. The weakening of Church authority opened up a space for the methods which are now seen as scientific—questioning the existing order of things and using observation to test accepted authority—to be applied to all aspects of life (1999, 88). During the seventeenth century, when Rene Descartes was formulating his theory of the separation of mind and brain—an idea of the brain as machine which led to the acceptance of localisationism of brain function—he wrote ‘…no body is a mind; therefore no body can think.’ (Descartes 2004, 52). He argued ‘…whatever can think is a mind’ (2004, 52); if it is the mind that makes humans think, therefore, it could be argued that it is the mind that makes us human (rather than the bag of ‘meat’ we carry our minds around in). This explanation of what makes us human is still widely accepted in western medicine: a human body that has no brain activity but is still physically functioning on life support is considered dead enough to be harvested for organs for live organ transplants. Conversely, the law forbids any medical practitioner from harvesting organs from a human body that is broken to the extent that there is almost no movement or ability to speak (for example, patients suffering from locked-in syndrome), as long as the broken body demonstrates some ability to communicate. If the patient can demonstrate possession of a mind, they are considered human.

Descartes also argued for the human as an individual: ‘I comprehend with my judgement, which is in my mind, objects that I once believed myself to see with my eyes.’(2004, 40). Perhaps it is possible, then, to state that the posthuman begins where the individual ends. That is, it moves beyond the individual entity towards a recognition that the future lies within connectivity, a merging with non-human entities (biological, technological or both). Philosopher Dominique Janicaud argued that ‘...the overcoming of the human is a myth – a myth favourable to the rapid development of science and technology...’ (2002, 54). He wrote that whatever humans do, they remain human because of ‘...this fundamental truth: humanity is the unfathomable overcoming of its limits.’ (2002, 30). Janicaud’s concerns with the validity of posthumanism focus on the concept of overcoming, and he feared that the scientific pursuit of the posthuman may end in the monstrous inhuman (2002, 49). However, there is plenty of evidence to show that the monstrous inhuman already exists, and it has little to do with science and, it could be argued, much to do with humanist ideas (Tony Davies in his 2008 book Humanism discusses Heidegger as a case in point (2008, 129-130)). Indeed, a
merging of the human with the non-human in a way that reflects James Lovelock’s interconnected view of life on planet Earth (see 1.1.2) may be the human species’ best chance for survival in an increasingly uncertain world.

1.3.2 What is a posthuman?

In What is Posthumanism? (2009), Carey Wolfe quotes Garreau's definition of posthumans as ‘beings “whose basic capacities so radically exceed those of present humans as to no longer be unambiguously human by our current standards”’ (2009, xiii). This definition is tempered somewhat by Nick Bostrom, who defines a posthuman as a being that has at least one posthuman capacity, where posthuman capacity means ‘a general central capacity [health, cognition, emotion] greatly exceeding the maximum attainable by any current human being without recourse to new technological means’ (Bostrom 2013, 28-29). Conversely, in Our Posthuman Future (2002), Francis Fukuyama describes posthumanism as a ‘potential moral chasm’ (2002, 17) and focuses on the dangers of biotechnology, in particular the use of neuropharmalogical drugs and genetic screening, while in the opening pages of How We Became Posthuman (1999) N. Katherine Hayles states:

> Whether or not interventions have been made on the body, new models of subjectivity emerging from such fields as cognitive science and artificial life imply that even a biologically unaltered Homo sapiens counts as posthuman. The defining characteristics involve the construction of subjectivity, not the presence of nonbiological components. (1999, 4)

Just as there is debate about what exactly it is that makes us human, there is no accepted standard definition of a posthuman. The concept most common to all definitions is that the posthuman is something other or more than human, encompassing but not limited to various combinations and permutations of cyborg, superhuman, genetically superior human, and animal/human fusion. That is, the posthuman is usually viewed as physically (though not necessarily morally or ethically) superior to human in some aspect.

For my purposes, I am framing my definition for a fiction-writing perspective: for a young adult novel within the speculative fiction genre where it is accepted that one or more characters will be identified as other than human, or as possessing one or more ‘superhuman’ abilities (that is, a skill or ability that no human, at birth, has the potential to develop
naturally). Therefore, for the purposes of my creative practice-led research, I define the posthuman as someone who has altered their human body in such a way as to attain skills or abilities other than those they were born with. The alteration of their body must not merely enhance an existing skill or ability; rather it must create one that had not existed before. These alterations need not only be technological in nature but, as in Quarter's case, include a biological change made possible through technology. Like other definitions of posthumanism, my definition is problematic. If, for example, a person loses a limb in an accident and replaces the lost limb with a prosthetic one that can feel, such as the prosthetic arms currently being trialled (D'Orazio 2013, n.p.) is the person then posthuman? Hayles writes about how Gregory Bateson puzzled his graduate students with the question about whether a blind man's cane is part of the man. This question aimed to create a shift in his students' thinking (1999, 84). Hayles explains, ‘… cybernetic systems are constituted by flows of information. In this viewpoint, cane and man join in a single system, for the cane funnels to the man essential information about his environment…’ (1999, 84). Under this definition, both the man with the cane and the woman with the advanced prosthetic arm are posthuman, although the cane and the prosthetic arm do not give abilities beyond those of the average human.

1.3.3 The posthuman in young adult fiction

However posthumanism is defined, its potential impacts are enormous. Elaine Ostry's article “‘Is He Still Human? Are you?’: Young Adult Fiction in the Posthuman Age” (2004) discusses the idea that adolescents are already living and growing up in a posthuman world, and so are the most likely to be affected by it. Ostry’s view is that exploring the ramifications of the posthuman is important to young adults as ‘Through literature, young adults can become aware of, and participate in, the debates surrounding biotechnology’ (2004, 223). Ostry's view of the importance of exploring current and near-future issues through fiction echoes the position expressed in Elaine Graham's book Representations of the post/human: Monsters, Aliens and Others in Popular Culture (2002). Graham discusses the place of storytelling in navigating the posthuman future and states:

It is a reminder that ‘the stories we live by’ can be important critical tools in the task of articulating what it means to be human in a digital and biotechnological age.’ (2002, 17)
For adolescents maturing into adulthood at a time when the posthuman is emerging in various forms (technological and/or biological), fictional stories are an important tool for assessing, analysing and exploring ways of being in a posthuman world (Ostry 2004, 223). A proportion of the young adults of the 2020s and beyond will be given choices about their families, their health, and the way they live never offered before. Stories that explore the possibilities of posthuman life provide a means to navigate posthumanity’s inherent ethical challenges, facing up to the ‘what ifs’ of issues ranging from genetic selection to lengthened life span and everything in between.

Daniel T O'Hara's discussion of Graham's book in his article ‘Neither Gods nor Monsters: An Untimely Critique of the “Post/Human” Imagination’ (2003), interrogates another aspect of posthuman that is reflected in the themes of my novel when he writes about the idea of ‘impossible infinite self-enhancement’:

That insatiable modern will-to-will indeed will, no must, not rest, cannot rest because its only aim is an impossible infinite self-enhancement. But what if the universe is as perfect as it can be already at every moment, and what if any change, however tiny, however carefully done, means everything is abolished as it is, and so all begins to swing wildly out of kilter...wobbling ever more crazily toward an absolute chaos... (2003, 121)

These ideas tie in with the criticism of neuroscience, expressed in Johnson Thornton's 2011 book Brain Culture and in some of the writings coming out of the Critical Neuroscience group, that certain sections of the neurorevolution push humans (or whatever we are becoming) to aim for an essentially unachievable goal of perfection. The notion also relates to Quarter, who, although he may not realise it consciously, pursues physical superiority and perfection in his reach for power over others.

It is today's young adults who are the ones that must deal with a posthuman reality, whether that be Fukuyama's bleak view of Aldous Huxley's nightmare come true, or another future where the struggle to retain whatever it is that makes us human must be balanced against new technologies that promise to make us into someone’s idea of perfection.

1.4 Olaf Stapledon
This exegesis focuses on writers who have used neuroscientific elements to explore the possibilities of posthumanism through fiction aimed at young adults, and these writers’ novels will be analysed in depth in chapter three. However, it also draws on the writings and philosophies of one of the first writers to thoroughly explore a posthuman future through fiction, Olaf Stapledon, an English author who died more than a decade before the term ‘neuroscience’ was coined and almost three decades before the emergence of the term ‘posthuman’.

Stapledon’s goal was to write modern myths that explored the possible future evolutionary changes for the human species over a time span of millions of years. Stapledon strove to stretch his mind to consider all that humans had the potential to become; to see humans live better lives, more humanely. This goal must be considered in the context of the tumultuous time in which he wrote most of his work: the 1930s, a grim period for people living in the United Kingdom and Europe. In his writing he did not use the terms ‘posthuman’ and ‘posthumanism’ (he used the terms ‘superman’ and ‘superhumanism’) nonetheless, Stapledon was writing about what today is termed posthumanism, and his fictional creations, particularly in Last and First Men (1930), cover a fascinating breadth of the myriad of forms humans may come to embody. Many of the concepts he wrote about have been explored in science and speculative fiction in the latter half of the twentieth century, and continue to be explored now, including in the three novels I will analyse in my case studies.

Stapledon saw a clear role for fiction in exploring science and the future of scientific progress. He defined three kinds of literature: literature of escape, which he saw as dangerous because it had the potential to distract from unpleasant realities; literature of current needs, which included propaganda and comment; and literature of creative imagination, which he believed ‘welcomes reality and explores it’ (1937b, n.p.). He saw the literature of creative imagination as the most important because of its potential to reveal new aspects of reality and to create new human capacity.

Stapledon also believed fiction had a particular function within a scientific culture, which was to speculate in terms of what was possible within the culture itself, as well as criticise the culture by correcting what he termed the ‘specialist’s fallacy’ (1937b, n.p.). He saw a special place for fiction in ‘stressing the higher human capacities which sciences cannot yet tackle and therefore fails (sic) to notice’ (1937b, n.p.); that is, fiction's most important role was to
stretch the limits of scientific knowledge with a view to exploring the greatest possibilities of human potential (1937b, n.p.). Through fiction, Stapledon believed writers had a responsibility to create a blueprint for the possible future evolutions of human beings (1937b, n.p.).

Stapledon was avidly interested in science and recognised its potential for both positive and negative impacts upon the future of humanity. In his notes for a lecture titled Science and Fiction (1947), he described his aim as a fiction writer as being ‘to write modern myths’ (1947, n.p.) and to explore within the ‘scientifically plausible’ realm what future possibilities might unfold for humanity (1947, n.p.). His novel Last and First Men describes eighteen separate evolutions of humankind from the ‘first men’ (Stapledon's near contemporaries) to the millions of years distant ‘last men’, describing a range of fantastical human-types including gold-obsessed monkey like creatures, giant brains housed in buildings and tended by their less intelligent (but mobile) predecessors, telepathic humans, giant humans and flying humans. Throughout the novel the various forms of humans repeat a similar cycle: they strive to better themselves physically and psychologically, reach a certain point, then their civilisation implodes and a new species emerges. The vast array of human types that Stapledon invents encapsulate almost every type of posthuman imaginable; many posthuman type characters that have appeared in fiction since his death show similarities to those he created (both Arthur C. Clarke and Stephen Baxter, among others, acknowledge Stapledon as a major influence on their writing).

Stapledon's fiction exemplifies and amplifies Graham's notion of storytelling as ‘constitutive, a crucial part of building the worlds in which we live.’ (Graham 2002, 23). While his Martian invasion is off the mark, his other creations, such as his visions of genetic selective breeding and super-intelligent brains housed in something other than human bodies, continue to offer fiction readers and fiction writers a lens through which to interpret current and future technology and the ways it may be implemented in our world.

1.5 Project methodology and scope

For this practice-led research project I used qualitative methods where the process of writing a young adult fiction manuscript was informed by current literature pertaining to neuroscience, posthumanism and trends in contemporary young adult fiction. The research uses three key complementary qualitative research methodologies: critical and textual
analysis, self-reflective analysis and creative practice, and each of these modes took a lead role at different phases of the research.

My primary method of addressing the research question was through the practice of writing a young adult novel. At the start of this project, my aim was to have the novel incorporate neuroscientific themes in a way not currently addressed in published young adult fiction. As part of my writing process I created several in-depth character profiles with details about the characters’ families, early influences and major life events. The writing of these character profiles, which was based on the tenets of neuroconstructivist theory, informed the direction of the manuscript. However, the creative writing process both directed the research and was directed by the research, and the intertwined processes of writing and research led me towards posthumanism via neuroscience. Similarly, the process of choosing young adult novels for my textual analysis began by seeking out novels that had some connection to neuroscience; however, the novels I chose were also open to the possibility of a posthuman reading.

At the start of my project I was interested in exploring what I thought might be considered as ‘young adult neurofiction’ and I searched for young adult fiction that either referred to or drew upon some element of neuroscience. I read widely across the full spectrum of young adult fiction, including contemporary young adult fiction, science fiction and speculative fiction, searching for novels that used neuroscience either explicitly or implicitly as a plot device, or where some neuroscientific element impacted upon or altered the functioning of the characters’ brain in a physical sense. (I excluded from my reading novels that might be read by young adults, but were not written as young adult novels, such as William Gibson’s *Neuromancer* (1984) and Neal Stephenson’s *Snow Crash* (1992)). David Klass’s 2007 contemporary young adult novel *Dark Angel*, used neuroscientific explanations to discuss the role of trauma in violent behaviour. Other contemporary novels such as Ron Koertge’s *Strays* (2008), Gail Giles’ *Right Behind You* (2008) and Belinda Jeffrey’s *Brown Skin Blue* (2009) looked at issues around the impacts of childhood and adolescent trauma on teenage behaviour. I also sought out young adult novels within the realm of science fiction and speculative fiction that featured neuroscientific ideas or neuroscience. Brian Falkner’s *Brain Jack* (2009) and Scott Westerfeld’s *Uglies* (2005) both featured plots with neuroscientific elements. Bernard Beckett’s *Genesis* (2008) explored the broader theme of consciousness and artificial intelligence while Kathy Reich’s *Seizure* (2011) included some neuroscientific
elements alongside genetics. However, it was neuroscience from a perspective of the impacts of experience, genetics and environment on the human brain, rather than artificial intelligence and humans as victims of out-of-control technology, that held the most appeal for me. As my research deepened, I became interested in how we approach neuroscience, the questions we ask of it, and how the answers to those questions relate back to who and what and why humans are the way we are. I initially read the three novels that became my case studies for my exegetical research—Peter Dickinson's *Eva* (1988); Brian Caswell’s *A Cage of Butterflies* (1992); and Kevin Brooks’ *iBoy* (2010)—because their plots contained some neuroscience. However, as my researched evolved, it became clear that each of these young adult novels offered much more than neuroscientific plot devices, and could also be viewed through a posthuman framework.

### 1.6 Key terms

**Speculative fiction**

There is no widely accepted definition of speculative fiction, and there is often fierce debate about the borders between speculative fiction and science fiction. As Kim Wilkins writes in the *Cambridge Companion to Creative Writing* (2012), there is an ‘inability to define the limits of the genre.’ (Wilkins 2012, 40). However, she provides the loose definition that speculative fiction is writing ‘…distinguished by the use of the fantastic mode…’ (2012, 39).

Margaret Atwood is more firm in her definition of speculative fiction. In her introduction to *In Other Worlds* (2011), Atwood writes:

> What I mean by “science fiction” is those books that descend from H. G. Wells’s *The War of the Worlds*, which treats of an invasion by tentacled, blood-sucking Martians shot to Earth in metal canisters—things that could not possibly happen—whereas, for me, “speculative fiction” means plots that descend from Jules Verne's books about submarines and balloon travel and such-things that really could happen but just hadn't completely happened when the authors wrote the books. (2011, 6)
Atwood’s definition echoes Stapledon’s view of his role as writer to explore within the ‘scientifically plausible’ (1947, n.p.) realm what future possibilities might unfold for humanity.

Therefore, for this exegesis, speculative fiction is defined as writing that includes some supernatural or futuristic element, which does not currently exist, or is not accepted as existing, in the contemporary world, but has the potential to be a plausible part of future life on Earth.

**Posthuman**

There is no widely accepted definition of a posthuman. For my purposes, I have framed my definition for a fiction-writing perspective, in particular, for a young adult novel within the speculative fiction genre where it is accepted that one or more characters will be identified as other than human, or as possessing one or more skills or abilities beyond the accepted scope with which the average human is born. Therefore, for the purposes of this thesis, I define the posthuman as someone who has altered their human body in such a way as to attain skills or abilities other than those they were born with. The alteration of their body must not merely enhance an existing skill or ability; rather it must create one that had not existed before. These alterations need not only be technological in nature but may include a biological change made possible through technology.

### 1.7 Exegesis outline

This thesis consists of two parts: an exegesis and a novel. The novel, *Dirt Circus League*, is contained in part one. Part two, the exegesis, comprises five chapters.

This first chapter has provided an introduction to my research development and given an overview of the various research elements that influenced the creative project. This includes: an outline of my project’s development; an overview of initial research into neuroscience and how this led towards my research into posthumanism; the influence of science fiction writer Olaf Stapledon; and key definitions, project scope and methodology.

Chapter two, the literature review, examines academic articles and books in neuroscience and in posthumanism. It looks at recent and current trends in various fields of neuroscientific study, with a focus on the broader impacts of neuroscientific discoveries on western culture,
and the possible implications of those impacts. It also looks at the various interpretations of posthumanism and how these ideas are explored in literary criticism.

Chapter three analyses three texts, each a young adult novel that incorporates some elements of neuroscience, through a posthuman framework: Peter Dickinson’s *Eva* (1988); Brian Caswell’s *A Cage of Butterflies* (1992); and Kevin Brooks’ *iBoy* (2010). The analysis of these texts will be placed within the broader context of Olaf Stapledon’s visions for the possible future evolutions of human beings, particularly those expressed in his novel *Last and First Men*.

Chapter four reflects on my creative writing process and how the research influenced, and was influenced by, the creative work. In particular, it examines how my initial research guided my characters’ development, and how both my research and my goals for my creative practice interacted to influence the choices I made in plot direction, structure and narrative.

In chapter five, the conclusion, I bring together the various threads that interconnect to underpin the themes of my creative work.
Chapter 2: Literature review

Through the course of my study my research has undergone two distinct phases. Initially my focus was on neuroscience, whereby I read widely on the topic from both a scientific and cultural perspective. Then my research lens moved towards posthumanism, where I began with a broad overview of the various definitions of what constitutes the posthuman, and then how these were exemplified and analysed within fiction, in particular, young adult speculative fiction.

In this chapter I trace this research journey and explore the literature from neuroscience, posthumanism and literary criticism that influenced and inspired my creative work. In doing so, I argue that fiction has a useful place in exploring possible posthuman futures, in particular, in young adult fiction, where the target audiences are the ones who will be grappling with the realities of life in a posthuman world, with its challenging ethical ambiguities and its potential impacts upon individual and societal power. I further explore the role of the writer in exposing these challenges in chapter four. As I have stated, in the first phase of my research my focus was on neuroscience, a topic I became interested in after reading books related to brain plasticity and its relationship to brain development. In particular, I was fascinated by the research into how trauma could influence brain development from birth through to adolescence and early adulthood.

2.1 Neuroscience

Neuroscience is in our news reports, in magazines, in self-help books and in Hollywood movies. Its terminology has moved from the medical realm to everyday language. The following overview of brain science from Descartes to present day frames how neuroscience has increased in influence and moved from scientific discourse into public discourse.

2.1.1 The myth of the fixed brain

Up until the late twentieth century, it was widely believed that the human brain was fixed; that once damaged, it could not recover. This idea of the fixed brain was based on Descartes’ seventeenth century theory of the separation of mind and brain. Descartes wrote, ‘...whatever can think is a mind; but since body and mind are in reality distinct, no body is a mind; therefore no body can think’ (Descartes 2004, 42). Extrapolating from this idea, he proposed
that the body operated like a machine; with the immaterial mind deciding what movements the body should make (Kolb and Whishaw 2009, 6).

Descartes’ idea of the brain as machine led to the acceptance of localisationism, the theory that the brain was made up of parts, each performing a specific, fixed function (Doidge 2007, 13). This distinct categorisation persisted for many years, supported by the nineteenth century work of physicians such as Jean-Baptiste Bouillaud and Paul Broca. Broca’s work on localisation of function dominated the accepted thinking around brain science up until the late twentieth century (Kolb and Whishaw 2009, 12). From the 1990s, however, advances in medical technology such as functional magnetic resonance imaging (fMRI), enabled neuroscientists to overturn many of the accepted ‘truths’ about the human brain. For example, fMRI studies of adolescents in the late 1990s and early 2000s demonstrated that the human brain did not stop growing at around age twelve, as had been the accepted thinking, but that during adolescence the brain underwent massive change (Gogate et al. 2001, 283-284). Furthermore, in the 2000s the notion of the fixed brain was finally overturned, largely by the work of neuroscientists such as Paul Bach-y-Rita and others who rejected the theory of localisation (Doidge 2007, 25).

2.1.2 What is neuroscience?

The term ‘neuroscience’ was first coined by Francis O. Schmitt in February 1962 when he convened a meeting of eminent international scientists and ‘...proposed that to create a basis for the effective pursuit of...understanding the mind/brain, it would be necessary to create an organization dedicated to that goal...’ (Adelman and Smith 1998, 10). Schmitt recommended the U.S.-based organisation be named the Neurosciences Research Program (1998, 10). Abi-Rached and Rose argue that the Neurosciences Research Program, along with other similar research programs in Britain and France, signalled a break in the history of brain sciences in that its interdisciplinary approach brought together several scientific disciplines to create a new way of seeing they call the ‘neuromolecular gaze’(Abi-Rached and Rose 2010, 11). Furthermore, Abi-Rached and Rose posit that the neurosciences are ‘...a kind of hybrid of hybrids, held together by a common name, some common institutional projects, a “sense of common purpose”’ (2010, 12).
2.1.3 A new way of seeing: the neurosciences and the ‘neuromolecular gaze’

Increasingly, these rapid advances in the neurosciences in the twenty-first century have led to the encroachment of neurosciences into a wide variety of fields, from economics to law to education, replacing Descartes’ mind-body split with the brain-mind split. Under the neuromolecular gaze, the ‘…neurosciences hold the key to the management of all manner of human activities and experiences, from psychiatric illness to economic behaviour, from human sociality to spirituality and ethics’ (Abi-Rached and Rose 2010, 32). Vreko echoed this view of the increasing impact of neuroscience in his introduction to a special issue of History of the Human Sciences. He suggested the key theme shared by the collected articles was ‘...that the facts, theories and practices that emerge from brain research are always cultural and historical products, with particular political and economic trajectories...’ (Vreko 2010, 4). The implications of the culture of neuroscience will be further discussed below. First, however, it is useful to consider the field of critical neuroscience, as it offers a broader critical analysis of the impact of the increasing influence of neuroscience across other disciplines.

2.1.4 Critical neuroscience

Critical neuroscience is a research field that has emerged in response to the increasing influence of neuroscience across a broad range of research fields. In his 2010 paper, “Steps towards a Critical Neuroscience”, Slaby defines critical neuroscience as ‘…an approach that attempts to raise awareness of and to better understand, explain, contextualize, and, where called for, critique [neuroscientific] developments’ (2010, 399). In particular, he says the aim of critical neuroscience is to build competencies required to deal with some of the concerns raised by recent neuroscientific discoveries and theories, including the push towards the use of brain-based technologies that are not yet fully tested (2010, 398-9). These concerns are not unfounded. Research by Simon Cohn comparing the ways scientists and patients attribute meaning to brain scan images found most research scientists who participated in the study had little or no understanding of what value patients placed on their brain scans (Cohn 2010, 67). Cohn concludes: ‘The science of brain-imaging technology is advancing far more rapidly than our understanding of its consequences and patients’ attitudes towards it’ (2010, 82).

The ‘over-simplified neuroscientific representations’ (2010, 82) can be seen in the infiltration of neuroscientific vocabularies into public discussions and everyday conversation.
Commenting on the popular brain training programs of neuroscientist Daniel Amen, Davi Johnson Thornton states, ‘Neuroscience is held out as a language to express everyday experiences, as in “it’s a low serotonin day,” or “her PFC [prefrontal cortex] is clearly overactive”’ (Johnson Thornton 2011, 79). Critical neuroscience therefore promises to provide a valuable framework in which to take a step back and analyse the increasing influence of neuroscientific theories and discoveries from a broader perspective.

2.1.5 Critical and cultural neuroscience

The emergence of cultural neuroscience is of particular interest to critical neuroscience. Vrecko writes, ‘…notions of what it means to be particular kinds of persons, populations and political subjects are increasingly bound up with the meanings, explanations and theories of contemporary neuroscience’ (2010, 2). The emerging research field of cultural neuroscience exemplifies this idea. Chiao and Harada have broadly defined cultural neuroscience as a field that focuses on the bidirectional interaction between cultural experience and the brain (Chiao and Harada 2008, 60). Since around 2008, however, research papers arguing about what cultural neuroscience is or what it might be have begun to appear in a number of journals, and the Asian Journal of Social Psychology published a special issue on the topic of cultural neuroscience in 2010. Kitayama and Tompson analysed three articles from the special issue, and proposed some interesting ideas about the possible integration of cultural psychology and neuroscience:

…recurrent behaviours that are patterned by culture can plausibly trigger a cascade of neuro physiological events that eventually cause significant differences in the expression of certain key genes, which could, in turn, play important roles in forming relevant brain-processing pathways. (Kitayama and Tompson 2010, 99)

Kitayama and Tompson’s speculation that cultural patterns of behaviour may influence gene expression illustrates Vrecko’s view that what it means to be a particular person or group is becoming enmeshed in the culture of neuroscience within the academic sphere. This view of neuroscience as a cultural product that permeates current western thinking is shared by Johnson Thornton. In Brain Culture: neuroscience and popular media (2011), she argues the language of neuroscience is pervasive throughout Northern American culture and is a
‘…powerful vocabulary through which citizens today express their anxieties, articulate their hopes and dreams, and rationalize their disappointments’ (2011, 150).

The popularity of neuroscience-based books and the appearance of neuroscientific terminology in newspaper and magazine articles aimed at a general reader have, as Johnson Thornton describes, led to the incorporation of the language of neuroscience into everyday conversation. Slaby points to the possible implications of this phenomenon when he frames the impact of the neurosciences within Ian Hacking’s arguments around looping and classification. Slaby cites attention deficit hyperactive disorder (ADHD) as an example of how a person, once they have been ‘classified’ with this label, changes to fit in response to associated treatments and behavioural regimes. He writes, ‘…the children’s self-understanding very likely changes too, as they find themselves in the focus of new practices directed specifically at them’ (2010, 401). Slaby’s application of classification and looping within the context of neuroscientific influences on western culture links in with Johnson Thornton’s view that ‘…the ways we understand the brain directly feed into and enable the ways we organize and practice our social, political and economic worlds’ (2011, 63). Thus, in contrast to the emerging field of cultural neuroscience, which seeks to find neurological answers to culturally defined behaviours, the culture of neuroscience has the potential to influence the behaviours of people and organisations, and thus their culture, by framing their experiences within neuroscientific language.

2.1.6 Neuroconstructivism

First coined around the early 1990s, neuroconstructivism takes a multi-disciplinary approach—using neuroimaging techniques, computational modelling and cognitive studies—to understand how a human develops from conception through to adulthood. It uses the terms ‘embrainment’ and ‘embodiment’ to describe the idea that no part of us, not even a single brain cell, develops in isolation (Mareschal et al. 2007, 50).

The core principle of neuroconstructivism is context dependence: units (brain cell, brain region or human individual) do not develop in isolation but develop within a context of other developing units (2007, 101). Development of cognitive abilities from the foetus through infancy, childhood and adolescence are ‘...coupled to [the child’s] changing environment as mediated by both the child’s physical development and the evolving social context in which they find themselves’ (2007, 74). As such, the neuroconstructivist framework moves beyond
the nature versus nurture debate to incorporate genetics, environment, experiences and physicality in a holistic view of neuropsychological development. By incorporating experiences and environment, it also incorporates culture. Neuroconstructivism can thus be seen as both a scientific/medical framework and as existing within the parameters of a cultural construct.

Neuroconstructivism is accepted as a useful framework for studying neural and behavioural development and for investigating solutions to developmental disorders. Elizabeth Karmiloff-Smith sees a direct connection between a neuroconstructivist approach to human development, including impaired development, and brain plasticity. She argues that all development—human or non-human; typical or atypical—is fundamentally characterised by plasticity for learning (Karmiloff-Smith 2009a, 61).

2.1.7 Brain plasticity

Neuroplasticity—the ability of the human brain to change itself—disproves localisation theory, the predominant brain theory up until the late twentieth century, by demonstrating how the brain is able to adapt and thus recover from injury or developmental problems in both children and adults. Research psychiatrist Norman Doidge’s book, The Brain that Changes Itself (2007), details several case studies where people who have suffered brain injuries or were born with severe developmental problems have either fully or partially recovered. For example, patient Michelle was born with only the right hemisphere of her brain. In terms of localisation theory, Michelle should not be able to talk (as speech is located in the left side of the brain). However, not only can Michelle speak fairly normally, she also has a part-time job, can read and has hobbies (2007, 259-60).

It is important to note that it was not discovered that Michelle was missing the left hemisphere of her brain until she was three and a half years old (2007, 265). If the discovery had been made much earlier, it is possible her parents may have been told that she would never thrive. Michelle may have been institutionalised or her parents may not have watched for and encouraged her development as they did. Karmiloff-Smith suggests that parents making unconscious assumptions about what their atypically developing child may or may not be capable of doing ‘...may lead parents to provide...a less richly varied environment’ (2009a, 60). These changes in the child’s environment ‘...are likely to compound over time, such that the environment of the atypically developing child may increasingly differ from that
of the typically developing child’ (2009a, 60). Thus, although the brain’s plasticity—its ability to change itself—is accepted, what is yet to be fully explored is how our genes, our environment and our experiences, including cultural experiences, interplay and intersect to create the people we become.

2.1.8 Child and adolescent brain development

Until the late twentieth century it was believed the human brain reached maturity at about twelve years of age. However, it is now accepted that although the brain does not grow much more in size from the age of about six, it continues to develop and mature right up until the twenties. This development does not change the number of nerve cells but rather the number of connections between them (Gogate et al. 2001, 283).

The brain has both grey matter and white matter. Grey matter comprises neurons (brain cells), which transmit messages from one cell to the next using neurotransmitters via connections called synapses. Synaptic connections create chains of neuron to neuron networks that facilitate all the brain’s functions, including thought, feeling, motion, sensation and perception (Perry and Szalavitz 2006, 22). White matter is made up of fatty myelin sheaths and works ‘…like insulation on a wire [to] make nerve-signal transmissions faster and more efficient’ (Wallis and Dell 2004, n.p.).

Neuroscientist Jay Giedd began studying healthy adolescents’ brains using fMRI in the 1990s. His research has shown that the grey matter, which thickens in childhood, thins during adolescence. The thinning occurs ‘…in a wave that begins at the back of the brain and reaches the front by early adulthood’ (Powell 2006, 866). While the grey matter is thinning during adolescence, the white matter is thickening (Wallis and Dell 2004, n.p.). Much of the brain’s white matter is in the corpus callosum (CC), which is one of the two main connections between the brain’s hemispheres (Kolb and Whishaw 2009, 3). Changes occur from the back to the front, with development in the prefrontal cortex, which is the brain’s centre of reasoning and problem solving, occurring last (Wallis and Dell 2004, n.p.). The prefrontal cortex, particularly the medial prefrontal cortex and the parietotemporal cortex, that undergo this massive change form parts of the ‘social brain’, which are the brain regions most involved in understanding other people (Choudhury, Charman and Blakemore 2008, 143). Furthermore, a review of the research studying aspects of teenage brain development
suggests that development that occurs during adolescence may facilitate sociocultural learning (2008, 142).

2.1.9 Culture and the adolescent brain

Suparna Choudhury, a member of the Critical Neuroscience Group, has a particular interest in the intersections between neuroscience, culture and adolescent brain development. Choudhury’s review of historical and ethnographical research about adolescence concludes that ‘…the duration and characterisation of adolescence are culturally contingent’ (2010, 165). She further states that cultural neuroscience must incorporate insights from across disciplines ‘…to investigate the way…behavioural phenomena are connected across many levels—neural processes, cognitive phenomena, culturally shaped behaviours and expressions’ (2010, 165). The growing influence of neuroscientific language, as described by Johnson Thornton, coupled with the concerns of the critical neuroscience movement around brain-based technologies in fields not traditionally associated with neuroscience (such as law) and the emerging field of cultural neuroscience, all have the potential to impact upon how adolescence is viewed from cultural, legal and educational perspectives.

2.1.10 From neuroscience to posthumanism

In part one of The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future (2013), Max More writes:

The high level of interest in philosophy and neuroscience among transhumanists has led to a wide acknowledgment that the simple Cartesian view of the mind or self as a unitary, indivisible, and transparent entity is unsupportable. As we store more of our memories externally and create avatars, it is also becoming increasingly apparent that the boundaries of the self are unclear and may not be limited to the location of a single body. (2013, 7)

More thus adopts the neuroscientific view of distributed cognition and extends it further towards notions of the posthuman through the opening up of boundaries of self beyond a single human body. A discussion of the literature around posthumanism and its relationship to culture, particularly the role of literature in examining possible posthuman futures, follows. It will give further context to the posthuman framework adopted in this exegesis.
2.2 Posthumanism: an introduction

In *The New Human in Literature: Posthuman Visions of Changes in Body, Mind and Society after 1900* (2013), Mads Thomsen notes that one of the first to use the term ‘posthuman’ was Hassan in his 1977 article ‘Prometheus as Performer’, which discussed his ‘visions of radical human evolution’ (2013, 58), although others, such as Cary Wolfe, argue that the idea, if not the term, has its genesis in the Macy conferences of the 1940s and ‘50s (2009, xii). However, the definition of what constitutes the posthuman continues to be discussed without the broad acceptance of a single definition. Rather, as discussed in the introduction, various definitions offered by Wolfe, Nick Bostrom, N. Katherine Hayles and Francis Fukuyama each focus on a different aspect of the posthuman and the conditions that differentiate the human from the posthuman. In this section, I will give an overview of the writings from each of these key thinkers in the posthuman space and then move towards the implications of their arguments in a broader cultural sense, and in particular through speculative fiction.

2.2.1 Posthuman interconnectedness and otherness

In his introduction to *What is Posthumanism?* (2009), Cary Wolfe analyses the terms posthuman and posthumanism (and transhuman/transhumanism). He draws upon theorists including Michel Foucault, Jacques Derrida and Jean-Francois Lyotard to embark upon a thorough examination of the terms’ multiple meanings and all they imply for human and non-human animals sharing the planet. Wolfe proffers several definitions from other current thinkers before stating that the posthuman:

...forces us to attend to the specificity of the human [by acknowledging it is]...fundamentally a prosthetic creature that has coevolved with various forms of technicity and materiality, forms that are radically ‘not-human’ and yet have nevertheless made the human what it is. (2009, xxv)

Wolfe believes the ‘prostheticity’ of humans has ‘profound ethical implications for our relations to nonhuman forms of life’ (2009, xxvi) and much of his book is devoted to this discussion. He differentiates himself from N. Katherine Hayles’ use of the term posthuman, which he states:
Wolfe’s differentiation between his view and Hayles is largely due to his focus on the ethical treatment of non-human animals, whereas Hayles’ book, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature and Informatics* (1999) takes a different perspective. It unravels the complex relationships between patterns of information, memory, consciousness and the human body to explore the shift from seeing the human body as where the human starts and ends to the possibility of a human-type consciousness (thought, decision-making, emotion) residing outside the human body. Hayles looks at thinkers such as Weiner and his work at the Macy Conferences of the 1940s/50s and beyond; and Maturana (in particular his writings on autopoietic theory), among others to tease out the various components that might be considered to contribute to posthumanity.

In her introduction she posits posthumanity as being beyond any form of physical change in the body when she states that the defining characteristics of posthumanism ‘involve the construction of subjectivity, not the presence of nonbiological components’ (Hayles 1999, 4). In chapter 10 ‘The semiotics of virtuality: mapping the posthuman’ she expands upon this definition, stating:

…the posthuman, although still a nascent concept, is already so complex that it involves a range of cultural and technical sites, including nanotechnology, microbiology, virtual reality, artificial life, neurophysiology, artificial intelligence, and cognitive science, among others. (1999, 247)

In the chapter, Hayles looks at the posthuman in four novels: *Blood Music*, *Snow Crash*, *Galatea 2.2* and *Terminal Games*, and argues that each of the books poses a different question about the posthuman. *Blood Music*, she writes, asks “What if humans were taken over by their component parts, functioning now as conscious entities themselves?” *Terminal Games* asks the complementary question, “What if humans were made to function as if they
were components of another entity’’ (1999, 251); *Galatea 2.2* asks: ‘‘What if a computer behaved like a person?’’ (1999, 251) while *Snow Crash* asks the complementary question ‘‘What if people were made to behave as if they were computers?’’ (1999, 251). Thus she frames the posthuman concerns in adult science fiction as relating to philosophical questions of what it is that makes us human. In contrast, in young adult science fiction the questions raised more often relate to the individual’s identity (a common theme in young adult fiction) rather than human consciousness. This idea is explored in greater detail when I discuss Ostry’s analysis of young adult science fiction through a posthuman framework (see section 2.2.3).

My own creative work explores posthuman questions that are somewhat different to both those posed above by Hayles as well as those suggested by Ostry. For my protagonist, Quarter, his posthumanism is not machine or computer chip or any variation of these things, rather it is the incorporation of animal tissue (including nerve tissue) into his body and brain; this frames his posthuman form as neither mechanical nor virtual but organic. Quarter co-opts animal sense/function using technology to increase his power, which is a concept Hayles explores in her paper ‘Unfinished Work: From Cyborg to Cognisphere’ (2006) where she writes, ‘Now, as in the past, the human, the animal, and the technological are joined in shifting configurations of value.’ (2006, 160). Hayles unpacks the binding interrelationships that exist between humans, animals and machines:

> Indeed, given the technologies of genetic engineering, implants and bio-silicon hybrids created from a variety of life forms ranging from cockroaches to lampreys, it is clear that humans, animals and intelligent machines are more tightly bound together than ever in their cultural, social, biological and technological evolutions. (2006, 162)

She also extends Donna Haraway’s ideas on relationality between humans and companion species to include technology. Writing about the ‘dynamic co-evolutionary spiral’ (2006, 164), Hayles explains:

> Cultural beliefs and practices are part of this co-evolutionary dynamic because they influence what tools are made and how those tools are used, which in turn affects who we are as biological organisms, which then feeds back into the co-evolutionary spiral. (2006, 164)
Further, Hayles’ ideas on this ‘co-evolutionary dynamic’ can be seen to reflect James Lovelock’s Gaia Theory in a way that connects the posthuman to the Earth’s overriding impetus to survive at all costs. She writes:

No longer bound in a binary with the goddess but rather emblem and instantiation of dynamic cognitive flows between human, animal and machine, the cognisphere, like the world itself, is not binary but multiple, not a split creature but a co-evolving and densely interconnected complex system. (2006, 164)

The character of Quarter in *Dirt Circus League* is thus not characterised by the binary; rather, his posthumanism more easily resides in the multiple, as part of a ‘co-evolving and densely interconnected complex system’ (2006, 164). However, Quarter’s rationale for his transformation, which he chooses for himself, is not to become more interconnected but instead to raise himself above others in terms of power and prestige. He does not wish to co-evolve so much as to place himself ahead, searching for physical advantages that enable him to dominate others. In this way, he could be framed more in terms of Wolfe’s discussion, in that Quarter represents a melding of the human and non-human animal into something other. However, his unethical treatment of the birds (in that he chooses to co-opt the power of the birds and ignore their suffering, something for which he later pays) moves him more towards the apocalyptic posthuman envisioned by Francis Fukuyama, albeit in a way Fukuyama does not envision.

### 2.2.2 An apocalyptic view

Hayles writes:

Although some current versions of the posthuman point toward the antihuman and the apocalyptic, we can craft others that will be conducive to the long-range survival of humans and of the other life-forms, biological and artificial, with whom we share the planet and ourselves. (1999, 291)

In contrast, Francis Fukuyama’s book *Our Posthuman Future: Consequences of the Biotechnology Revolution* (2002) takes the apocalyptic view, arguing that ‘Huxley was right…the most significant threat posed by contemporary biotechnology is the possibility that
it will alter human nature and thereby move us into a “posthuman” stage of history’ (2002, 7). Fukuyama identifies three distinct components of biotechnology that will impact upon the future of humankind and push it into the realms of the posthuman: genetic selection, neuropharmacology, and the prolongation of life, and states that advances in these fields:

...will challenge dearly held notions of human equality and the capacity for moral choice; they will give societies new techniques for controlling the behaviour of their citizens; they will change our understanding of human personality and identity; they will upend existing social hierarchies...and affect the nature of global politics. (2002, 82)

Fukuyama’s view of a posthuman society is a bleak one; however, he sees it as inevitable and thus considers it vital to critically analyse the ethical implications of such a society, and consider how the ‘potential moral chasm’ (2002, 17) he posits may be mitigated or avoided. Fukuyama’s core question for the future of humanity is ‘What is it that we want to protect for any future advances in biotechnology?’ (2002, 172). He believes that biotechnology already does, and will continue to, frame a:

constant trade-off… we can cure this disease, or prolong this person's life, or make this child more tractable, at the expense of some ineffable human quality like genius, or ambition, or sheer diversity. (2002, 172)

Fukuyama’s warnings of the potential implications of a posthuman future are particularly relevant to today’s young adults as they are the ones who will inherit this future. It is vital, therefore, that young adults have opportunities to learn about, analyse and discuss possible posthuman futures.

2.2.3 Living in a posthuman world

Ostry uses Fukuyama’s posthuman theories to frame her discussion of posthuman perspectives in young adult literature in her article “‘Is He Still Human? Are You?’: Young Adult Science Fiction in the Posthuman Age’ (2004). Ostry’s article discusses the idea that adolescents are already living in a posthuman world, growing up in it, and so are the most likely to be affected by it. She uses Fukuyama’s three main categories of posthuman—neuropharmacology, prolongation of life, and genetic engineering—as a framework to
discuss several young adult novels, including *Eva* by Peter Dickinson, which I discuss in detail in chapter three. Ostry analyses these young adult texts within a posthuman framework, with a focus on the common young adult theme of identity whereby the protagonists ‘act as a detective to uncover the mystery of his or her identity’ (2004, 224).

Ostry's view is that exploring the ramifications of the posthuman is important to young adults as ‘Through literature, young adults can become aware of, and participate in, the debates surrounding biotechnology’ (2004, 223). For adolescents maturing into adulthood at a time when the posthuman is emerging in various forms (technological and/or biological), fiction is an important tool for assessing, analysing and exploring ways of being in a posthuman world. A proportion of the young adults of the 2020s and beyond will be given choices about their families, their health, and the way they live never offered before. However, Ostry argues that in the young adult books she has analysed the authors tend to downplay the complexities of the posthuman debate and instead offer reassurance. She writes:

> Biotechnology can both benefit and destroy: this doubleness complicates debate. Yet most writers for young adults simplify the argument in favor of making an ideological point about the fixed quality of human nature and values. The message that these books give to their young readers is a reassuring one; human values and human nature will prevail no matter what changes the human body endures.

(2004, 242-243)

Ostry writes that despite the posthuman subject matter of these novels, they ultimately ‘play it safe’ (2004, 243) and show ‘the posthuman body as comfortingly familiar’ (2004, 243). In this way, although the novels that Ostry critiques have the potential to provide a means to navigate posthumanity’s inherent ethical challenges, such as facing up to the *what ifs* of genetic selection, lengthened life span, enhanced brain function and many other possibilities, they ultimately fail to meet this challenge. Thus there is scope for young adult novels to more thoroughly explore the potentially positive and negative realities of a posthuman life, without falling into didacticism.

### 2.2.4 Literary exploration and reflection of posthuman life

Ostry’s view of fiction as an important tool for reflecting upon the issues that will arise in our posthuman future is supported by other writers including Elaine Graham and Mads Thomsen.
Thomsen’s book *The New Human in Literature: Posthuman Visions of Changes in Body, Mind and Society after 1900* (2013) explores his argument that ‘…literature, particularly fiction, contributes to creating a richer and more complex idea of the contexts and issues arising from the idea of a posthuman’ (2013, 2). However, the focus of his study is on adult literary fiction, whereas in *Representations of the post/human: Monsters, Aliens and Others in Popular Culture* (2002) Graham argues:

…that some of the most definitive and authoritative representations of human identity in a digital and biotechnological age are to be found within two key discourses: Western technoscience (such as the Human Genome Project) and popular culture (such as science fiction). (2002, 2)

Thomsen takes a broad approach to the posthuman and alongside it coins the term ‘new human’. He differentiates the two by classifying posthuman as ‘a break with the human species at a genetic level’ (2013, 2), whereas ‘the new human also covers [the] idea of changes in human mindset and culture’ (2013, 2). Thomsen’s broader definition is likely a reflection of his writing being more recent; whereas Graham, writing in 2002, draws upon Halberstam and Livingstone’s 1995 definition of the:

“posthuman condition”…a world in which humans are mixtures of machine and organism, where nature has been modified (enculturated), which in turn have become assimilated into 'nature' as a functioning component of organic bodies. (Halberstam and Livingstone cited in Graham 2002, 10-11)

Despite a difference in approach, each of these writers, along with Ostry, confirms the role of fiction as a place where the ideas and challenges posed by the posthuman can play out in a form that enables readers a safe space to confront the complex issues of living in a posthuman world. While Thomsen notes the Bildungsroman as possibly the most relevant genre when he writes of literature’s ‘…extraordinary capacity to link the individual with the collective, in a transformation of the past and a vision of the future’ (2013, 11), Graham argues:

…literature which dwells upon the fantastic, which summons up alternative universes, which imagines things differently, is engaging in a…process of challenging the fixity of the status quo. (2002, 40)
The possibility of genetic selection of particular traits for creating ‘designer babies’ along with drugs to enhance brain function, implants within the brain to counteract neurological disease and other advances are the realities of the posthuman now, and these will multiply and extend in the future. As Thomsen argues, all literature has an important place in understanding and navigating the posthuman life that confronts us (in particular he argues literary works have ‘…evident potential in exploring how the use of cultural memory influences the shaping of visions of the future’ (2013, 12)). However, it is speculative fiction (including science fiction) that, as Graham states, provides the ‘devices by which new worlds can be imagined’ (2002, 234).

2.2.5 Navigating the emerging posthuman struggle

Graham’s view of the importance of storytelling in navigating the posthuman future (whereby she states: ‘It is a reminder that ‘the stories we live by’ can be important critical tools in the task of articulating what it means to be human in a digital and biotechnological age’ (2002, 17)), is echoed in Clare Bradförd, Kerry Mallon, John Stephens, and Robyn McCallum’s discussion of young adult fiction and posthumanism in ‘The Struggle to be Human in a Posthuman World’ (2008). Bradford et al. align with Hayles’ view of the posthuman as ‘“an amalgam, a collection of heterogenous components, a material-informational entity whose boundaries undergo continuous construction and reconstruction” (Hayles cited in Bradford et al. 2008, 158). Their book chapter notes that Hayles has identified that defining and articulating notions of agency within a posthuman context is a key problem (2008, 158), and they explore this notion of agency and the posthuman ‘in the context of underlying fears about technology and science “taking over” and human beings “losing control” through either abdication of responsibility or irresponsible uses of science and technology’ (2008, 158). This notion of loss of control is explored further in the case studies section, particularly in the section on iBoy in chapter three of this exegesis, where that novel’s protagonist struggles with the ethical implications of his accidental posthuman status, and the power over others it affords him. Nonetheless, despite the concerns about a possible loss of control and its implications for humans living in a posthuman world, Bradford et al. are open to positive outcomes for a posthuman future.

Bradford et al. see promise in Hayles’ vision of humans becoming a part of a posthuman future which creates the possibility for ‘…new relationships between human and machine, biology and technology’ (2008, 181). They write: ‘… rethinking and reconceptualization of
what being human means’ entails within it the possibility of ‘…leading to visions of a transformed human world…’ (2008, 180). Bradford et al. support Hayles’ suggestion that the posthuman enables us to see ‘…the human as “part of a distributed system” in which “human functionality expands because the parameters of the cognitive system it inhabits expands” (Hayles cited in Bradford et al. 2008, 158). This is a concept explored in Brian Caswell’s A Cage of Butterflies (see section 3.2), where the characters of the Babies’ shared mind is a form of distributed cognition that enables them to share experiences and knowledge between themselves in a form unknown to humans, as well as communicate telepathically with humans when they so choose. Quarter, too, could be seen to be part of a distributed cognitive system, albeit one that spans animal and human. However, this form of distributed cognition is not one that falls within Bradford et al.’s parameters of the posthuman in fiction, as their focus is confined to stories about robotics and artificial intelligence; genetic engineering, and cybernetics; and virtual reality narratives (2008, 160). As I argue in chapter four of this exegesis, Quarter’s posthuman status is equally valid as the three categories Bradford et al. describe. However, his posthuman-ness is framed by a desire to increase his own power over others rather than the more optimistic power-sharing suggested by a world transformed by new ways of thinking about humans as part of an expanded cognitive system.

The young adult texts analysed by Bradford et al. do not necessarily posit a rosy posthuman future; they identify that M.T. Anderson’s Feed and Richard Harland’s Ferren and the Angel, for example, are both set in posthuman dystopias. Nonetheless, Bradford et al.’s conclusion adopts an optimistic view. They write:

The attempts to define a future version of humanity we find in such texts accords better with an alternative view that the posthuman does not necessitate either an evolution or devolution of the human. Rather it means that difference and identity are being redistributed. (2008, 181)

In this view they differ somewhat from Ostry, who, as previously discussed, criticised the young adult texts in her discussion for failing to adequately address the complexities of a posthuman future ‘in favor of making an ideological point about the fixed quality of human nature and values’ (Ostry 2004, 242-3). Ostry believed that the young adult novels discussed in her analysis opted for a reassuring message over one that fully explored the possible
consequences of a posthuman future, and so opted for a cautionary tale rather than ‘complicating the biotechnological debate’ (2004, 243). However, Bradford et al.’s conclusion suggests that debates about the implications of living posthuman lives can be successfully undertaken in young adult fiction. Their view is supported in the following chapter, where I analyse three young adult novels from within a posthuman framework. Through close textual analysis, I will demonstrate how each of the novels can offer adolescent readers insights into the possibilities and challenges of life as a posthuman.
Chapter 3: Case studies

Although some current versions of the posthuman point toward the antihuman and the apocalyptic, we can craft others that will be conducive to the long-range survival of humans and of the other life-forms, biological and artificial, with whom we share the planet and ourselves. (Hayles 1999, 291)

Fiction aimed at young adult readers often attempts to help the target audience come to terms with finding a sense of identity, and navigating a way to live that makes sense to them, in a period of life characterised by intense emotions, rapid change and emerging independence. In a posthuman world, these issues still exist, and will potentially intensify under the added stresses of living in an age of rapidly advancing technology. As Ostry has argued, young adult texts that tackle posthuman themes have the potential to inform teens about these issues and their potential implications (2004, 223). Furthermore, she argues, the adolescent body is at the interface of boundaries (human/animal, human/machine) that as humans we find uncomfortable to cross (2004, 231). This is because ‘the act of becoming’ is for the adolescent (2004, 231)—experiencing the changing body during puberty—an uncomfortable one and thus the posthuman, in examining bodies that are altered to be other than human, provides a space for young adults to examine themselves in the process of transformation.

Medical fields other than neuroscience, particularly genetics, are more often drawn upon to support plots within teen fiction, particularly speculative fiction. Nevertheless there are many novels for young adults that incorporate neuroscientific elements with varying degrees of complexity. These young adult novels use neuroscientific terms and theories to either drive the plot or provide some explanation for an event in the novel. Neuroscience is, therefore, seen as a useful narrative device in the context of broader posthuman themes. For example, Scott Westerfeld’s *Uglies* series describes various forms of posthumans, including characters subjected to medically applied brain lesions that render them docile and vacuous; others given lesions to create superpowers and a range of forms in between these two extremes. The various posthuman forms operate as a structure for the political control of the future society depicted, and in particular control of economic resources.
Young adult speculative fiction provides insights into the possibilities and ethical issues around posthumanism beyond cyborgs. The three case studies I’ve chosen, Brian Caswell’s *A Cage of Butterflies*, Kevin Brooks’ *iBoy* and Peter Dickinson’s *Eva*, each explore a different form of posthumanism that offer insights into the issues for young adults living in a posthuman world. While Westerfeld’s *Uglies* series depicts a dystopian society, as the quote by Hayles at the start of this chapter posits, a posthuman society is not necessarily post-apocalyptic or dystopian. Of the three texts I will analyse in depth in this section, *A Cage of Butterflies* (1992) and *iBoy* (2010) are set in contemporary society (neither dystopian nor utopian) while the third, *Eva* (1988), is set in a future world which although somewhat bleak, is not without hope. Just as the mid-twentieth century science fiction writer, Olaf Stapledon, predicted in his mythical future history of humankind across several millennia, *Last and First Men* (1930), a mixture of dystopian and utopian societies is a likely outcome for a posthuman future. Thus, each of the case studies discussed offers a different perspective of living a posthuman life.

I originally chose these three young adult novels because of their use of neuroscience as a plot device, and the three novels represent two distinct eras in terms of neuroscientific discovery. *A Cage of Butterflies* and *Eva* were written and published before the spread of neuroscience into popular culture while *iBoy* was written and published when the ‘cult of the brain’ was building towards its early twenty-first century peak. This has some impact on the plot development—clearly *iBoy* is a novel that could only have been written since the advent of the smart phone—nevertheless, as the oeuvre of Stapledon shows, the posthuman concerns explored through the novels have been an area of interest for fiction writers since before World War II.

### 3.1 *A Cage of Butterflies*

Bradford et al. suggest there are three thematic groups that young adult texts using posthuman ideas broadly fall into. These are stories about robotics and artificial intelligence; those about genetic engineering, and cybernetics; and a smaller group about virtual reality narratives (2008, 160). However, the posthumans in Caswell’s *A Cage of Butterflies* cannot be classified under any of these broad themes. Rather, I classify them as accidental posthumans, whereby the characters’ posthuman abilities have come about through accident rather than design.
Caswell’s *A Cage of Butterflies* is young adult speculative fiction where potentially scientifically plausible events occur in a contemporary, real world setting. The action takes place in a research facility with two distinct areas. The first, known as ‘the farm’, is a boarding school for a group of gifted teens; the second is a secure research laboratory where a group of seven-year-olds, known as the Babies, are studied. The Babies live full-time at the research lab, where they are supposedly undergoing treatment for severe autism. The teens are unaware of the existence of the Babies until the Babies make contact with one of the teens telepathically.

The term posthuman is not used in *A Cage of Butterflies*. Nonetheless the Babies’ shared mind, the result of a medical accident of unknown origin, gives them unique characteristics that are posthuman in nature, with links both to past fictional representations and current and future neuroscientific endeavours. As Greg, one of the gifted teens who narrates the story, describes it:

…in a real sense, they [the Babies] weren’t five separate minds at all, but one. Like a network. Five terminals feeding one memory. What one learned, they all knew. (Caswell 1992, 60–61)

Later in the novel Greg says ‘They Shared; they were part of each other in a way none of us could ever hope to be’ (1992, 107). The Babies’ shared mind echoes the telepathy of several of Stapledon’s fictional posthuman species who had telepathic abilities that they used to research and share knowledge. Although there is no accepted scientific evidence of telepathy naturally occurring in humans, neuroscientific research into brain-computer interfaces is well-developed and thus some form of telepathy is likely to be an integral part of a posthuman future. For example, in 2013, neuroscientists at Harvard conducted a successful experiment whereby ‘…human subjects were able to make a rat move its tail just by thinking about it’ (Newitz 2013, n.p.).

In the novel, Caswell explains the Babies’ shared mind in neuroscientific terms as stemming from an anomaly in their brain structure, ‘an outgrowth of the thalamus’ (Caswell 1992, 73), whereby the fissure that normally separates the right and left hemispheres of the human brain is, in the Babies, filled in with extra tissue that links the hemispheres. This extra tissue gives them the ability to share thoughts, ideas, experiences and emotions with each other. Caswell uses neuroscientific terminology sparingly to explain the Babies’ condition, limiting the
technical explanation to a short paragraph of notes discovered by Susan, a trusted adult working at the facility, during a discussion between Susan and Mikki, one of the teens. Mikki says:

“Well, we’ve all heard of so-called telepathics - mind readers - but if you take away the showmen and the frauds, what you have are a few individuals with faint glimmerings of insight…Not much more than what you might call a sixth sense…But if it is a sixth sense, if we all have the beginnings of it, so faint it’s hardly noticeable, how do we receive?…it has to be some part of the brain, so why not the thalamus?” (1992, 74)

Mikki and Susan’s discussion about how the Babies communicate telepathically—and how all humans must have this potential—positions the Babies as posthumans as a result of a medical accident. They are a further evolution of human, particularly as their shared mind supports, along with telepathy, the ability to amplify the inherent personal characteristics (both good and bad) of people who are in close physical proximity to them. The Babies, with their fully developed sixth sense, use the posthuman skill of telepathy to communicate with each other instead of verbal speech. Furthermore, they are able to extend their telepathic ability to help develop it in others so that they can communicate outside their small group. However, while as a group the Babies are geniuses, as individuals separated from one another they are unable to communicate and live locked in their own minds. Thus, their young age, along with their particular form of posthumanity, means they are especially vulnerable as well as potentially powerful.

In contrast, while the teens living at the farm are intellectually gifted, their talents are considered to be within the normal range of human abilities, and so at the start of the novel they are not posthuman. Through their interactions with the Babies, however, they are able to develop posthuman abilities (albeit in a limited way compared to the Babies). The Babies reach out to the teens telepathically, using ‘mind-speech’ (1992, 43) to contact first one, then all of the teens. Although the skill takes time to develop, and some learn it faster than others, eventually all the teens (and the two adults that support them) are able to understand the Babies’ telepathic communication and converse with them. Thus the teens and adults, in developing the skill to communicate telepathically through developing natural attributes inherent in their brain structure, move from the human towards the posthuman.
3.1.1 Belonging

Both the gifted teens and the Babies in *A Cage of Butterflies* are placed as *other* in relation to everyday human life. For the gifted teens, their otherness relates to them not wanting to be noticed and treated as special; they want to blend in with other kids. Several of them worked hard in the outside world to hide their special talents, as one of the gifted teens explains:

> It doesn’t take long to discover what being different means. So they learn to blend in early. Like Chris. He’d fake enough mistakes to keep him near the middle of the class…He even scored a few detentions and one letter home. But they got him in the end. (1992, 10)

For the Babies, blending in is impossible, and a normal life with their biological families is out of reach because life without other Babies separates them from their shared mind. Greg, one of the novel’s narrators explains:

> …since the Change, they had been cut off from the love which kept most of us sane. No matter how much — or how little — their families might have loved them, the Shield had deflected that love as effectively as it kept out the Noise. (1992, 107)

Furthermore, the condition isolates them physically, emotionally and psychologically to the extent that survival without the others in their group is precarious: at least a dozen other children who developed the condition did not survive, and thus it is implied that the Babies’ physical survival depends on their ability to be with others like them. Susan explains that separation for the Babies ‘…was unthinkable. A living death. A nightmare existence.’ (1992, 128), after one of the Babies, Myriam, tells her that without each other ‘We would rather be dead.’ (1992, 127).

The only true belonging the Babies can have is with each other. However, as posthumans in a human world their survival also depends on others who understand them and are willing to support them. Furthermore, their survival depends on avoiding exploitation, which is a key threat to their survival in the novel. The head scientist, Larsen, who runs the research facility, conducts experiments on the Babies in an effort to discover the exact nature of their telepathic gift; he is keen to exploit their value in the commercial market, particularly in weapons and espionage, as well as bolster his prestige in the scientific community. He recognises their power, and has the ability and status to co-opt their power and use it to his
own advantage as the Babies’ parents have signed over care of their children to Dr Larsen and Raecorp International, the multinational company that owns and funds the research institute. The Babies are therefore the property of Raecorp International; it is the company’s right to make decisions about who has access to the Babies, when, and for what reason. As Dr Larsen comes closer to discovering the Babies’ secrets, the issue of the Babies’ rights to determine how they live and how their gifts are used and commodified is explored. As Susan explains:

“They’re not just kids anymore, they’re an enigma. A question to be solved…it’s their [the scientists’] job to destroy people’s peace and quiet, if that’s what it takes to find the answers.” (1992, 87)

The question of Raecorp’s ownership of the Babies echoes Fukuyama’s concerns about a posthuman future in which human genetic and other biological material becomes corporate property when he writes, ‘What will happen to political rights once we are able to, in effect, breed some people with saddles on their backs, and others with boots and spurs?’ (Fukuyama 2002, 10). Once parts of a human biology can be commodified, problems of rights and access follow. However, in A Cage of Butterflies, the ethics of power and ownership are more concerned with the rights of the Babies to live their lives as they choose rather than the implications of corporate ownership of specific biological materials. The Babies are unable to fight for themselves. Although they possess what in popular culture terms is regarded as a super-power, the Babies are not superheroes; their posthuman telepathy, while commercially valuable, does not override their defencelessness as young children. To escape the company’s control over their lives, and use their power to their own advantage, the Babies must forge new connections and find an alternative way to belong to someone or something outside their unique group. Their otherness is distinct from the otherness of the gifted teens; nonetheless, the Babies perceive the teens as natural allies, and take the risk of revealing their posthuman otherness to them through opening up the telepathic communication between the two groups. Through forging a new group, and identifying and nurturing the teens’ own latent posthuman-ness, the Babies transform a need to belong into a tool for survival and ultimately empowerment.

3.1.2 Power

Unlike the Babies, the gifted teens living at the facility are free to come and go. Yet they are still to a degree commodities owned by Raecorp, which funds the research work the teens
participate in at the facility. Greg, one of the teen narrators, expresses their sense of powerlessness, as children and to a lesser degree as commodities owned by Raecorp, early in the novel: ‘And wasn’t that really how most kids felt? Powerless? At the mercy of forces beyond their ability to control. Waiting for something to happen…’ (Caswell 1992, 16). The teens’ ability to wield power at the facility is limited to what they can collectively achieve with their intellectual talents, and it is the plight of the Babies that spurs the teens into action, bonding them closely as a group, focusing their power, and ultimately, moving them towards a posthuman existence.

The rapid brain changes experienced during adolescence, with its ‘use it or lose it’ period of white matter growth and pruning of grey matter, could be seen as an optimal time for developing a posthuman trait such as telepathy. The brain is quite plastic during this time, and new neural pathways are laid down when skills are regularly practiced. Within the fictional world of *A Cage of Butterflies*, it is Katie, the teen within the group who has a gift for languages, whom the Babies first contact through telepathy. Communication with Katie is a testing of both the reach of their telepathic skill—it takes some time for the Babies to make themselves properly understood—and of the risks of forming new connections outside their shared mind.

There is always the possibility of rejection of their otherness, along with the risk of exploitation. Indeed, the Babies only attempt to extend their telepathic communications to the other teens once the danger of Larsen discovering and exploiting their secret intensifies. Thus the Babies’ posthuman traits simultaneously contribute to both their powerlessness and their strength; and it is their decision to nurture the telepathic skills of others that provides them with a means for escape. In their ability to gain strength from their own group, and further strengthen their position through bonding with an outside group, the Babies can be seen as a representation of Hayles’ idea of the posthuman subject as ‘an amalgam, a collection of heterogeneous components, a material-informational entity whose boundaries undergo continuous construction and reconstruction.’ (Hayles 1999, 3).

For their part, the teens welcome the Babies’ gift and choose to accept the change from human to posthuman rather than reject it, thus also choosing to become part of the ‘amalgam’. Already positioned as other, the gifted teens perceive the benefits of posthumanity in helping them succeed in the world on their own terms rather than feeling marginalised within it.
3.1.3 Stapledon’s posthuman future

Olaf Stapledon, writing about the function of literature in a scientific culture, stated that literature had a role to play in criticising science, and in particular that it ‘must stress the higher human capacities which sciences cannot yet tackle (and therefore fails [sic] to notice)’ (1937b, n.p.). Living in the difficult times before and during the Second World War, he also devoted much of his writing and thinking to ideas about the notion of ‘Superhumanism’ (1934a, n.p.) that is, exploring ways to be a better human. Stapledon was a socialist and humanist, and his lecture notes demonstrate his struggle to find the words to express what he searched for; however, they can be summed up as a striving for human potential to become something more than what it is. He writes ‘I live better, more humanly through keeping sensitive to the Superhuman’ (1934a, n.p.).

Caswell’s Babies demonstrate a form of the superhuman or posthuman that I believe Stapledon struggled to express when Ian, one of the Babies, shows Erik, an adult orderly, how he can look inside the mind of Brady, a Raecorp company representative. Erik is shocked by what Ian shows him:

Looking into Brady’s mind, I realised…To Brady, the Babies didn’t exist. Not as human beings. They had no rights, no feelings;…Their only purpose was to create profit, to aid to his rise to power. To serve the Corporation. (Caswell 1992, 133)

However, Erik is even more shocked by Ian’s ability to empathise with Brady; to understand his enemy and ‘turn the other cheek’ (1992, 134). Ian tells Erik he understands that Brady must be stopped, but that Brady cannot help what he is. Erik realises the Babies’ special abilities—telepathic communication, amplifying others’ emotions, seeing into others’ minds—means they have a deep level of empathy that also precludes them from ever using their abilities to harm others. Thus the Babies achieve the kind of telepathy that Stapledon imagined as the ultimate evolution of humankind; psychologically and emotionally evolved posthumans who were true pacifists.

3.1.4 Posthuman outsiders

The Babies’ posthumanity emanates from their physically different brain structure. In addition to giving them the ability to communicate telepathically, their shared mind also enables them to reach a higher degree of empathy with other human beings and accept them
without judgement. In this way they embody Stapledon’s vision of a fully evolved superhuman. However, the Babies’ posthuman abilities make them equally vulnerable and powerful in a still too-human world. Although they have the power to enter another person’s mind, including the ability to make real that person’s greatest fears, their deep empathetic nature means they are incapable of intentionally causing harm to others.

By the novel’s conclusion, the Babies, the gifted teens and the two trusted adults have found a way to live in the human world. However, the solution is only made possible by the non-pacifist actions of the teens and adults, who must destroy property to achieve their goal (although they don’t physically harm other people). The Babies remain protected by their more normal allies, living out of the sight of society, while the adults and gifted teens run a successful company using their combined talents. The company’s profits are used, in part, to ‘fund projects which help other . . . Outsiders. The ones who don’t seem to fit in anywhere’ (Caswell 1992, 164). Thus the tensions of living as other in the world are successfully navigated but not resolved. Their posthuman power contributes to the financial success of the group, and the Babies are able to live together as a group enjoying physical, emotional and psychological security without having to hide their posthuman otherness. Nevertheless, although they have found a place to belong, their posthuman otherness means they will always live as outsiders.

3.2 iBoy

It’s my head, my brain, and it makes me what I am — but I don’t have a clue how it works. (Brooks 2010, 39)

Tom, the narrator of Kevin Brooks’ iBoy, does not describe himself as a posthuman. Tom wants nothing more than to be ordinary; however, after an assault in which shards of a shattered iPhone become embedded in his brain, he develops universal access to all data available through the information superhighway. As Tom describes it:

I could hear phone calls, I could read emails and texts, I could hack into databases… I could access everything. All from inside my head. I was connected. (2010, 40)

Like the Babies, Tom is an example of an accidental posthuman. He is confused and distressed, rather than exhilarated, by his new-found powers. He switches between accepting
and rejecting the part of him he refers to as iBoy, preferring to see iBoy as something other than him, right up until the final pages when he contemplates suicide. Brooks pushes his protagonist to the edge of psychological safety before a final acceptance that it is possible to move forward, accept iBoy and live as a posthuman in a human world.

Bradford et al. state:

…posthumanism raises questions about human responsibility, especially in the context of underlying fears about technology and science ‘taking over’ and human beings ‘losing control’ through either abdication of responsibility or irresponsible uses of science and technology. (2008, 158)

Brooks situates his protagonist in an environment of limited choices and opportunities dominated by poverty and criminal culture, which gives him the scope to explore the ethical dilemmas of being a teenage posthuman in a human world, and ‘losing control’ where his actions have adult consequences. Tom lives in a run-down block of council flats with his grandmother in an impoverished part of London, known as Crow Town, where gangs rule the schools and the streets. The story opens with Tom’s assault, and when he wakes up in hospital, he soon discovers that his close friend Lucy has been gang raped by some of the same gang that assaulted him. This plot sets up power—who has it and who lacks it—as a key theme in iBoy, and possessing the power to punish others is one of Tom’s prime motivators. However, as Bradford et al. posit, access to this technological power creates problems of responsibility and control. Tom becomes bewildered and overwhelmed by the choices his connectedness affords him, and, as events in the novel unfold, he is confronted with the often violent consequences of the use and abuse of his powers.

3.2.1 Belonging and acceptance

Crow Town is a place taxi drivers refuse to enter, a place where police rarely bother to investigate crime because no one talks, a place ruled by the gangs who deal drugs. Children as young as ten are recruited into the gangs, finding within them a way to navigate and live with a skewed sense of security in an essentially lawless world. Tom has so far refused to join this world; however, being iBoy gives him the opportunity to live in Crow Town as other while retaining agency over his own actions. Therefore, his search for belonging is not so much about finding a way to belong in Crow Town as to reconcile the two different parts of
himself: the Tom that existed before the accident, and iBoy. He searches for a way to incorporate his human-ness (as an awkward teenage boy with little life experience) and his posthuman-ness, which gives him physical powers and skills that raise complex ethical dilemmas.

Tom vacillates between accepting and rejecting iBoy throughout the novel: ‘But, like it or not, I wasn’t the normal Tom Harvey any more. I was iBoy’ (Brooks 2010, 107); ‘My iPowers, my abilities, my knowing… none of it was me. It was iBoy. And I wasn’t iBoy — I was Tom Harvey…’ (2010, 230-231); ‘I had to be iBoy to stand any chance of saving Lucy…. I was iBoy, and we weren’t there…’ (2010, 266). His interior struggle is expressed in his outer world through his relationship with Lucy, a childhood friend for whom he is developing romantic feelings. His relationship with Lucy is complicated by her status as victim of the gang rape—a crime Tom wants to avenge—and by his online relationship with her under the guise of iBoy. Tom juggles his real-world relationship with Lucy with the online relationship, and this struggle between the online and real world aspects of the relationship is mirrored by his struggle to reconcile the two aspects of himself that now must co-exist. Tom must find a way to accept his new posthuman self or risk destroying himself and those he loves.

Brooks expresses Tom’s disconnection from himself when he changes from first person to third person point of view for a section of a single chapter. The rest of the novel is written from first person, with Tom as narrator, and the discord of changing the point of view underscores Tom’s interior divisions between the ‘old Tom’ and iBoy. By placing iBoy as other, separate from himself, Tom attempts to navigate the ethical challenges his new powers force him to confront. He describes ‘iBoy at night, patrolling Crow Town with his iSkin on. He’s breaking up drug deals and fights’ (2010, 166); iBoy also plants evidence on gang members, then calls the police to report them (2010, 166). Tom is referred to in the third person, ‘It’s really confusing for Tom, flipping from iBoy to himself all the time’ (2010, 167). Attributing the actions to iBoy enables Tom to avoid taking responsibility as he struggles to come to terms with his posthuman self. However, he is unable to continue the separation of his two selves and is forced to confront the consequences of his iBoy actions in the novel’s climax: a violent confrontation between Tom and Howard Ellman, the drug lord who rules Crow Town.
Ellman and his henchmen have kidnapped Lucy and lured Tom into a known black spot, where access to the internet and mobile signal is weak to non-existent. Ellman knows Tom can only access his iBoy powers where access to a wireless signal exists, and plans to kill both Tom and Lucy. Faced with this life or death situation, Tom must finally choose whether or not to accept iBoy and integrate him as part of his new posthuman self. The language changes as Tom moves from rejection of iBoy towards acceptance and integration. First he uses *my* instead of *it*: ‘My iBrain knew things.’ (2010, 270). Then he uses *I*: ‘I had to look deep inside myself and use everything I had - my iSenses, my iKnowledge, my iPowers, my self…’ (2010, 271); then *we*: ‘We were reaching out now — iBoy and me — we were reaching out into cyberspace…’ (2010, 272), and ‘I had to close my eyes and rejoin iBoy, and together we had to give all the phones a final huge surge of power… we opened our eyes and let it all go.’ (2010, 274). Once Tom accepts iBoy into himself, he is able to access enough power to destroy Ellman and the others, and escape to safety with Lucy.

The novel’s final scene underscores Tom’s new sense of belonging and acceptance. Although he is still not sure exactly how to navigate the world as iBoy, he rejects suicide and finds comfort in his relationship with Lucy:

> And I leaned back and lay down beside her, and she took my hand in hers, and we just lay there together in a dream of silence, gazing up at the stars. (2010, 290)

Thus, although Tom is aware that his posthuman abilities mean his life may ‘become a freak show’ (2010, 285), through accepting this new self as his new reality, and sharing that reality with Lucy, he has found a way forward to belong in the world as a posthuman being.

### 3.2.2 Power

Tom’s search for belonging is interconnected with his difficulty in navigating the complex ethical challenges that are raised when he uses his unique access to information and data against others. The harsh reality of the world in which he lives means that kids take and use power where they can to survive. The issue of how brutally power operates in Crow Town is first revealed in a conversation between Tom and Davey, Tom’s former best friend. Davey admits to Tom that he was at the gang rape, and that it was he who threw the phone at Tom’s head. Tom struggles to understand how someone who was once his friend could behave so callously, and asks Davey why he didn’t try to stop the others. Davey responds:
“They would have beaten me up, wouldn’t they? Same as they beat up Ben, worse probably. When they tell you to do something, you fucking do it.” (2010, 94)

Later in the scene, Tom questions Davey again about Lucy’s rape and the reasons behind it:

Davey shrugged again. “Nothing really… I mean, it’s just all about respect and stuff. Power. You know…?... “You can’t show any weakness, all right? If you want to be something, be respected, you can’t take any shit… it’s like a power thing. They do it because they can…because they know they’ll get away with it.” (2010, 98)

Ellman, Crow Town’s drug lord, expresses similar thoughts on power when Tom questions him in the lead up to the scene in the wireless black spot:

“It’s all about power,” he said. “Everything…the whole fucking world, it’s all about power. If you’ve got it, you survive. If you haven’t, you don’t. Simple as that. Power is the law. It rules the fucking world. You understand? ...The only law down here, the only means of acquiring and establishing and maintaining your power, is violence.” (2010, 258-9)

Tom is able to use his connectedness to have power over others; however, wielding power makes him uneasy. After his first deliberate outing as iBoy, where he uses the electrical currents that run through his body to throw a gang member against a wall, Tom reflects: ‘I didn’t want to think about what I’d just done. Was it right? Was it wrong?’ (2010, 66). Soon after, the consequences of using his power against others have serious repercussions when he uses his iPowers to send a fake text between gang members. The fake text causes an argument between the teenaged gang members, which turns violent:

I tried telling myself that it was no big deal, that people get stabbed around here all the time... But the words in my head sounded empty. They were the kind of words Davey would use — it’s just the way it is, it’s just what they do. (2010, 103)

Tom struggles with the power he has to punish the gang members. He is unwilling to use violence as a form of power in the same way as the gang members and, conflicted by the gulf
between his new abilities and his normal self, he does not know how to integrate his two selves:

…there was something inside me — a part of me that I wasn’t even sure I liked — that made me feel that it was my duty, my obligation, to make the most of those abilities... but how about telling me what that something was? No, it was no help at all for that. And neither was my iBrain. Deciding what to do was a job for my normal brain. (2010, 107-8)

Tom is a posthuman by accident rather than design; however, Brooks makes his protagonist solely responsible for what he decides to do with his new found powers. Tom does not seek the counsel of, nor does he confide in, any adults. Rather than being taken over by the technology, he has full agency to explore both his powers and the implications of using them, and is forced to continually reflect upon the impacts of using his connected brain through his normal brain. He perceives and rejects ‘…the whole knight in shining armour/superhero thing — putting wrongs to right…’ (2010, 170), finding it embarrassing and uncomfortable, yet still feels compelled to act in the face of impending violence and crime. He knows, as one person, he cannot stop all the wrongdoing and violence in the world, no matter what his powers; yet he feels he cannot do nothing. In being forced to confront the dichotomy between his human and posthuman selves he must balance his desire to avenge Lucy and keep them both safe while separating himself from the culture of violence and secrecy he detests, and come to terms with what he can and cannot control.

3.2.3 Stapledon and posthuman ethics

As a fiction writer, one of Stapledon’s chief concerns was to explore the full potential of the human being. He recognised the transition from human to posthuman was fraught with difficulties, and in Last and First Men he created a series of fantastical evolutions of humankind to examine both the best and worst aspects of human potential. His lecture notes identified several hypothetical examples of what a world with superhumans might look like, including ‘a world of many abject slaves and a few splendidly fulfilled’ (1934a, n.p.); ‘a brotherhood of equal supermen’ (1934a, n.p.); subordinates ‘fulfilling their powers’ (1934a, n.p.) alongside superhumans ‘attaining humanity’ (1934a, n.p.). He played with these ideas in Last and First Men, endowing some of his creations with superior intelligence but a lack of empathy, and others with physical prowess but lacking emotional and psychological
development. Stapledon’s fiction was not prescient of the technological revolution that began to take place some thirty or more years after his death. Nonetheless he perceived the struggles inherent in humans grappling with the ethical implications of a transformation in physical and mental powers. In this way, Tom’s struggle to integrate his posthuman self reflects an aspect of the posthuman concerns Stapledon explored so thoroughly, eighty years before.

3.2.4 iBoy and the ethics of power

Ethical use of power is a core theme in Brooks’ *iBoy*. The novel gives its protagonist agency to explore how his technologically enhanced brain can impact upon his life, and the lives of his family, friends and wider community, for better or worse. In this way, *iBoy* reflects some of Fukuyama’s concerns—for example when he describes posthumanism as a ‘potential moral chasm’ (Fukuyama 2002, 17)—in its exploration of some of the moral and ethical challenges that humans must face as posthuman beings. The violent incident that erupts between gang members after Tom uses his iPowers to send a fake text causes him to reflect:

...having access to vast amounts of information hadn’t suddenly turned me into a philosophical genius. ...I began to understand that the concept of right and wrong isn’t as clear cut as I’d thought. When it comes to morality, there aren’t any natural rules. (Brooks 2010, 109)

Similarly, Fukuyama argues:

When the [genetic] lottery is replaced by choice, we open up a new avenue along which human beings can compete, one that threatens to increase the disparity between the top and bottom of the social hierarchy. (Fukuyama 2002, 157)

Tom’s posthuman gifts, although not genetic, give him an advantage over other humans in both physical and psychic skills, and he has the ability to use these skills to favour his own wants and desires. Yet Brooks offers no easy answers to these ethical challenges. Tom, as iBoy, must work through these issues as best he can, the same as any teenager struggling with the seesawing ride between childhood and adulthood that marks the adolescent years.

Bradford et al. promote a somewhat optimistic view of posthumanism when they describe it as pointing ‘…towards renewal as it (re)conceives of a subjectivity utterly entwined with technology.’ (Bradford et al. 2008, 156), and Tom’s ultimate acceptance of his iSelf moves
towards that positive view. However, his character also demonstrates that being ‘utterly entwined with technology’ does not automatically provide access to the psychological and emotional maturity needed to cope with such power, and in many ways, Tom remains fully human. Thus, Tom’s transition illustrates that negotiating the evolution from human to posthuman is fraught with difficulties. Therefore, teenagers growing up in the first few decades of the twenty-first century will need access to as many resources as possible, including speculative fiction, to support them in navigating the journey.

3.3 Eva

In Simians, Cyborgs and Women: the Reinvention of Nature Donna Haraway wrote:

By the late twentieth century in United States scientific culture, the boundary between human and animal is thoroughly breached… language, tool use, social behaviour, mental events, nothing really convincingly settles the separation of human and animal. (1991, 277-8)

Peter Dickinson’s young adult speculative fiction novel, Eva (1988), the tale of a teenage girl whose ‘neuron memory’ (1988, 20) is transplanted into the body of a chimp, encapsulates the thorough breaching of the animal/human boundary. Her adjustment from living as a human to living as a chimp with her human brain and consciousness occurs quickly: within six months of her transformation. By the novel’s conclusion, Eva has become not a human living in a chimp’s body so much as a chimp with both human and chimp consciousness. It is Eva’s ability to synthesise her human-ness and her chimp-ness into something other that makes her posthuman. Like Tom and the Babies, Eva does not fit into the three categories of fictional posthumans described by Bradford et al. (2008, 160), however, neither can she be accurately described as an accidental posthuman. Although a car accident led to the operation to transplant her human consciousness into the body of a chimp, it is more accurate to define neuroscience, rather than genetics, robotics/cybernetics or informational technology, as the key cause of her posthuman-ness.

3.3.1 Belonging and identity

Eva wakes up in hospital after an extended induced coma. She doesn’t remember the car accident that put her into hospital, and is unable to move any part of her body except for her eyes. However, her mother tells her ‘You aren’t really paralyzed.’ (Dickinson 1988, 6), and that the doctors are ‘…going to start letting you move your left hand in a day or two…’
Six days after she first woke up, Eva realises something is drastically wrong, and demands to see a mirror.

Eva stared at the face in the mirror. She’d recognized it at once, but couldn’t give it a name. Then it came. Carefully she pressed the keys. She used the tone control to sound cheerful. “Hi Kelly,” said her voice.

Kelly was — had been — a young female chimpanzee. (1988, 17)

Eva has grown up around chimps—her father is a Director of Primate Zoology—and recognises Kelly as one of the young female chimpanzees she played with in the university’s Chimp Pool. The concept of neuron memory is described briefly to give a somewhat plausible neuroscientific explanation of how Eva’s transformation into Kelly has occurred (1988, 20); however, as in each of the novels analysed in this section, it is the implications of the use of neuroscientific technology, rather than the neuroscience itself, that drives the novel’s narrative, plot and key themes, including that of belonging.

Before her accident, Eva was a pretty, smart, talented teenage girl who clearly belonged to the human world. Post-accident and post-neuron memory transplant, she is still Eva somewhere inside Kelly’s body; however, Eva wonders ‘…what had happened to Kelly, to the real Kelly, the one who used to live in this furry skin. Where was she now?’ (1988, 22).

Dickinson’s novel explores the notion of belonging from the perspective of Eva’s dual identity, and her struggle to incorporate human and chimp aspects into her new, posthuman self.

Eva is confronted with these dual aspects of herself when she watches herself, as Eva, on a television documentary that reveals her existence to the outside world for the first time:

Eva stared. Me, she thought. Me. Though she was used by now to looking at her own image in a mirror and accepting it as herself, the chimp in the zone was like a stranger. (1988, 59)

She perceives a struggle inside herself as the former human-part of Eva rebels against what she sees on the documentary but rejects that and ‘…will[s] a Yes with her conscious mind’ (1988, 60). As the novel progresses Eva continues to say ‘yes’ to her chimp self, however, this is increasingly at the expense of saying ‘no’ to her human self. Her television appearance thrusts her and her family unwillingly into an international media frenzy. The increasing pressure on Eva from the interest of human strangers is partly what causes Eva to align...
herself more and more with the chimp world; however, it is not the sole reason. As she has from the start, Eva still feels the presence of Kelly within her, and to accept herself as the new Eva successfully she must also accept the ongoing presence of Kelly. This, along with her outward appearance as chimp and not human, progressively pushes Eva towards choosing to identify and live as a chimp rather than with her human family. This is not something her parents and medical staff have anticipated, and it is not until Eva finds a human ally who supports her view, a young man named Grog, that she is able to live with her chosen group.

Like Tom in *iBoy*, Eva is a one-of-a-kind posthuman. Two other attempts to implant chimpanzee brains into human bodies fail; both recipient humans die and the research program into chimp-human transplant is abandoned. Nevertheless, Eva offers important insights into human-ness, animal-ness and the possibilities for a posthuman future, and, unlike Tom, Eva’s progression towards acceptance of her posthuman self is more or less linear. This linear progression is underscored by the chapter titles, each of which refers to the number of days since she woke up from her coma, from the first chapter’s title, ‘Day One’, through to the final chapter, ‘Year Twenty-Four, Month Forgotten, Day Forgotten’. However, Eva’s transformation is not without difficulty. In a scene about one third through the book (‘month six, day two’) she is on a break at school, seated between her friends who are discussing boys. As the conversation flows around her, Eva feels increasingly isolated from her human companions, and the crowds of schoolchildren that surround them. The pressure of the sheer amount of people around her makes her feel ‘stifled’ (1988, 76) and she feels the ‘ghost’ (1988, 77) of her former human self (which she usually blocks with medication) fade into the background while Kelly’s presence within her is felt more keenly. Eva describes the feeling as ‘…not what the human part of her felt about being chimp but what the chimp felt about being human’ (1988, 76) and then is overwhelmed by a form of grief:

> She shrank into herself and as she did so became aware of a different ghost. It had no body, only a voice, the ghost of a cry but so strong and near in her mind that every hair on her body stood out. … Where was Kelly? Lost...lost...lost.... (1988, 77)

Eva realises that Kelly ‘…is still rooted deep into the body into which the human Eva has been grafted.’ (1988, 79) and that she, Eva, has ‘…invited [Kelly] back across the shadowy border between mind and brain.’ (1988, 79). Once she comes to this understanding of the integration of herself into Kelly and vice versa, she makes the decision that she wants to
spend time with the chimps at the university research centre’s Chimp Pool. Eva initially believes that she has found a balance between her two selves, chimp and human, and that ‘She needed human company as much as chimp company.’ (1988, 126). However, when she is confronted with another human-into-chimp transplant, one that has caused intense pain and anguish for the human recipient and results in his death, she changes her mind. Eva sees a choice must be made: she can attempt to balance both selves and remain subject to further testing as an object of scientific and popular interest, or she can choose to create a new life for herself as a chimp. Thus, in contrast to Tom’s back and forth vacillation between acceptance and rejection of his posthuman self, once Eva recognises the existence of her dual self she takes deliberate steps towards acceptance, even though she knows it is against her parents’ wishes. Furthermore, once she rejects the possibility of living as a human outright, she actively seeks support to enable her to achieve her goal of living with a group of chimps in a natural environment.

As Ostry states, ‘Characters have to work out where their self resides…’ (2004, 231), and therefore:

Eva only survives mentally and emotionally because she understands that she cannot separate her human mind from her new chimp body.

She actively works to meld the two together. (2004, 231)

Thus, Eva makes a conscious choice to integrate her chimp and human selves, living as a chimp while using her human intellect and skills to improve the lives of her chosen chimp community.

3.3.2 Power and ownership

Similar to Caswell’s Babies, corporate ownership of Eva, and her legal status—including whether she is human or other— informs the exploration of power within Dickinson’s novel. The issue of ownership comes to light after the documentary on Eva is first shown. The documentary causes a media sensation, with incessant phone calls and reporters banging on the door of the family’s apartment, and a corporate lawyer accompanies Eva’s father back to their flat to discuss the situation. Eva listens to the lawyer discuss rights contracts with her parents, then asks: ‘Do you know who I belong to?’ (Dickinson 1988, 69). Eva’s mother’s initial response, ‘She isn’t property!’ (1988, 70), is problematic as the lawyer points out:
“Well, I would agree that if the case were to go to court, Eva could eventually be confirmed as a human being — that is to say not belonging to anyone, but with her parents having the same rights and responsibilities while she remains a minor. Even a point like that raises problems. How old is she? The human Eva is thirteen, but the body she is using is less than six.” (1988, 70)

The issue of ownership in Eva echoes Fukuyama’s concerns about how posthumanism may cause a shift in power further towards the wealthy at the expense of the middle and lower socio-economic classes, (Fukuyama posits that biotechnology could the lead to the ‘emergence of a genetic overclass’ (2002, 157)). However, in Eva, the concern is not so much about private ownership of superior genetic material as corporate ownership of an individual. Eva faces the dual issue of being a child, and as such the legal responsibility of her parents, and of being at least partially owned by the company that provided Kelly’s body, as well as SMI, the company that offers her media protection in return for exclusive rights. Eva is annoyed by her father’s failure to ensure the details about ownership of Kelly’s body had been clarified, and determines that ‘Whatever he says, I’m going to see that I own me.’ (Dickinson 1988, 71). She and her family soon discover, however, that she is a valuable commodity. She is required to appear in advertisements, and wear a company logo (a butterfly) on her trademark yellow overalls. While she is able to tolerate these demands upon her to a degree, she has little power in the relationship: if she does not fulfil her contract, funding to the Chimp Pool will be cut; this will affect both her family life and the lives of the chimps living in the Pool, with whom she is establishing relationships. Once she makes the decision to pursue a life living with other chimps in a natural environment, however, she takes steps to change the balance of power in her favour.

Eva’s first act towards reclaiming her power as an individual is to force her parents to agree to let her spend time in the Chimp Pool. She uses her physical strength as a chimp to assert her will, smashing a mug and plates, and ripping down a blind, and then:

He [Dad] turned. He had a stun gun in his hand…As he raised it Eva snatched up a cushion and flung it at the gun…Before he could steady his arm she was on him…she was far too strong. She wrenched the gun from his fingers… (1988, 85)
Eva recognises that her father had the gun close by because he expected her to act in a physically aggressive way. However, this does not shock her as she is already well on the way to accepting her chimp self. Thus, she perceives her chimp aggressiveness as a legitimate part of who she now is, and a viable and acceptable way to assert her power. Her aggressiveness is also displayed publicly, in defiance of her corporate owners, during a press conference. Eva has argued that while part of her is glad she is still alive, she believes the doctors had no right to kill Kelly, claiming they stole Kelly’s body from her. Eva becomes frustrated when she feels her view is ignored, and again chooses chimp behaviour to press her point:

Deliberately, she let her inward urges loose. Her hands gripped the hem of her bib and dragged it up until she could nick the point of a corner tooth into the cloth...Using all her strength, she ripped the overalls apart right down to the crotch, and let go. The yellow cloth crumpled around her ankles. (1988, 145)

The ripping of the cloth symbolises her desire to break from the human world and its demands. As a child, her voice is ignored; however, as a human in a chimp body she has the physical power and presence to assert herself. Eva’s final act in claiming her power as an individual and as a protector of chimps is to live with other chimps in a natural environment without any humans. She achieves this with the support of her ally Georgio ‘Grog’ Kennedy. Eva and a group of chimps from the Pool are flown to an isolated, uninhabited island under the pretext of undertaking filming for a series of commercials and animal documentaries. However, the aim of the trip is to enable Eva and the chimps to live independently on the island without human interference. Eva leads the chimps to an inaccessible (by humans) section of the island, and lives out the rest of her life with the initial group and their descendants, including her own children and grandchildren. Once she had made the decision to live as a chimp, she understood that this would entail all aspects of chimp life, including mating: ‘You couldn’t choose some of this life and not all of it.’ (1988, 192). Nonetheless, even in her final years of life, Eva continued to use human skills and thinking for her own benefit, and to pass down through the group. She reads her father’s book on chimpanzee diseases to self-diagnose after a minor stroke; and she has passed on various human skills including knot-making, building fires and planting trees. In the time before her death, she reflects upon her lasting human impact on the chimp group:
Not one human gene would be there. Only, faintly, but in all of them, changed by them and changing them, the threads of human knowledge. (1988, 219)

Thus, by the novel’s conclusion, she has successfully integrated her human and chimp selves into the form of a powerful, posthuman other.

3.3.3 Stapledon’s ‘animal’ posthumans

Stapledon’s *Last and First Men* describes various outcomes of human and animal interbreeding, all of which are unsuccessful. One descendant group of the First Men, which he describes as ‘subhuman…more baboon-like than human.’ (Stapledon 1930, 120) are notable for their complicated caste system, which is based on their advanced sense of smell. Again Fukuyama’s fears of a posthuman future as being one dominated by caste and class distinctions is brought to mind; however, caste or class differences between chimps based on their skill levels is not discussed in Dickinson’s *Eva*. Rather than the human and animal fusion leading to social problems, it is presented as a positive way forward for the future survival of the ape species on Earth in yet another incarnation of Hayles’ ‘amalgam’ (1999, 3). As Dickinson’s novel ends with the titular character’s death, it is not known how the chimps survive without her influence. However, the sense of optimism in the novel’s conclusion suggests that the addition of human skills to the chimps’ skill set will only prove to be an asset.

3.3.4 Posthuman or post-chimp?

In the final chapter (in which Eva dies, twenty-five years after her operation) humans are struggling to find a way to live on the Earth: civilisation is breaking down and many are choosing suicide in preference to a life without hope. Some humans, however, have invested their future hopes in the chimpanzees. In a final visit to the island, a human friend tells Eva:

“A lot of nutty little sects have sprung up, and we’ve had a bit of trouble in the trust from a group who call themselves Kennedyites, after old Grog. Their idea is that chimps are the human future. They call you the Inheritors.” (Dickinson 1988, 215)

Conversely, when Eva dies, she still has hope for the future of chimpanzees. There is evidence that her human skills that have already been passed on from chimp to chimp (through her children, grandchildren and other chimps) will continue to be passed on and
improved. In this way, Eva exemplifies Hayles’ position, quoted in the introduction to this chapter, that the posthuman can support the long-term survival of a variety of human and other life forms (1999, 291). Eva has created and lived a meaningful life in a future world. She does not merely reject humans and embrace chimpanzees, rather, she incorporates aspects of both and in doing so becomes a version of what it might mean to be posthuman. It could be argued that Eva is perhaps post-chimp rather than posthuman. However, it is her human intelligence and consciousness that affords her the agency to make a choice as to how she wants to live her life. As such, she is neither chimp nor human but a posthuman.

3.4 Posthuman by accident; posthuman by choice

Each of the case studies discussed has presented a different posthuman form living reasonably successful and fulfilling lives with a hopeful outlook for their futures. Nevertheless, each of the posthuman characters has obstacles to overcome, many of which relate to typical teenage concerns including finding a sense of belonging and seeking out ways to establish and appropriately use power. Each of the key protagonists—the Babies, Tom and Eva—find ways to be active agents in making choices that impact the way they live their lives. However, each of them also becomes posthuman not by choice but through the actions, deliberate or accidental, of others. In contrast, the posthuman character in my creative practice, Quarter, makes a conscious choice to transform himself from human to posthuman by undergoing, of his own free will, the operation to implant birds’ eyes into his skull and his neural pathways. Thus, while the posthuman children and teens in the case studies had to find a way to incorporate their posthuman-ness into their lives, often against the wishes of their families and others, Quarter chooses his posthuman form in order to impose his will and power upon others. This concept will be explored in depth in the next chapter of this exegesis, the reflection.
Chapter 4: Critical reflection

This chapter examines how my research and my creative practice interacted to influence the choices I made in character development and plot direction, structure and narrative to produce a piece of fiction that offers an original perspective on posthuman themes. Sub-sections 4.1 and 4.2 each reflect upon key aspects of my creative process: character development; and plot, setting and structural decisions. Sub-sections 4.3, 4.4 and 4.5 move from a broader examination of my writing processes to draw out my original contribution to research in terms of how Quarter’s representation of posthuman-ness differs from other posthuman characters in young adult fiction. In particular, it discusses how he chooses his posthuman form in order to impose his will and power upon others.

4.1 Neuroscience and young adult fiction

In my initial research question my aim was to make neuroscience the key theme of my creative practice; however, in terms of good storytelling, neuroscience on its own is not particularly interesting. What makes it fascinating is how we approach it, the questions we seek of it, and how they relate back to who and what and why humans are the way we are. Neuroscience, through neurophilosophy is one way to search for answers to the big questions: What is the meaning of life? Why are we here? What does it mean to be a human? From questions about humanity, neuroscience can therefore also lead into questions about what it might be that makes us posthuman.

When philosophy professor Alva Noe writes and speaks on the topic ‘you are not your brain,’ his topic is consciousness, and the controversial area of debate within the ever-expanding field of neuroscience where scientists and philosophers argue over where consciousness resides. Olaf Stapledon provides an interesting image through which to examine this question of ‘Are we our brains?’ in Last and First Men when humans create a superbrain, described here:

…the dauntless experimenters succeeded at last in creating an organism which consisted of a brain twelve feet across, and a body most of which was reduced to a mere vestige upon the under-surface of the brain. The only parts of the body which were allowed to attain the natural size were the arms and hands. (1930, 182)
This creation died, but in the novel scientists and researchers continued to develop the species until they created ‘fourth men’. This human species, which cannot move and communicates telepathically, lived in ‘…a large circular brain turret…divided with many partitions, radiating from a central space, and covered everywhere with pigeon holes.’ (1930, 184).

These fourth men are indeed their brains, and nothing but their brains. However, they are doomed to extinction because despite their incredible intelligence the superbrains are helpless; they cannot move and so are reliant on more normal human beings (the third men) to operate the machinery that keeps the superbrains alive. I see Stapledon’s fourth men as a metaphor for the inability of neuroscience to be, in and of itself, the main theme of a young adult novel. Just as we will not find out the meaning of life through a brain scan; the topic of neuroscience, as fascinating as it is, cannot hold together a young adult novel (or perhaps any novel) on its own because it is only fascinating in the context of what humans study and use it for. However, it took several drafts of the manuscript for me to see this clearly, and to abandon neuroscience as a key motif and turn to posthumanism.

4.1.1 Why neuroscience?

As I noted in chapter one, my interest in the neuroscientific perspective emerged from reading books such as Doidge’s The Brain that Changes Itself and Perry and Szalavitz’s The Boy who was Raised as a Dog, both which emphasised the role of brain development and brain plasticity in the development of the individual. Mareschal et al.’s 2007 book on neuroconstructivism further cemented my interest in creating and developing characters, particularly Quarter, from a neuroscientific, rather than psychological, perspective. The question of why I attempted to pursue neuroscience as a topic for fiction has its genesis in the character of Quarter.

Quarter first appeared during a writing session (I call it my pre-draft phase) that was a precursor to the first full draft of Dirt Circus League, as follows (see Appendix 1 for the full extract):

Quarter, like the rest of his group, has chosen to enhance his body with extra body parts. In the small stretch of skin between the end of his thick, straight eyebrows and his shaven hair line, right across the temple, he has had sewn in three hawk eyes.
From the moment Quarter appeared on the page as a fierce warrior with birds eyes twitching in the side of his head, I was intrigued. I wanted to know how the birds’ eyes got into his head, and how he was able to see out of them. I saw this at the time as a neuroscientific problem: for the birds’ eyes to work as eyes, they needed to be somehow wired into his brain. Therefore, extrapolating neuroscientific knowledge about brain plasticity and brain development during adolescence provided plausible explanations for how the birds’ eyes could work in a nineteen year old human, and this concept appealed to me as a useful storyline to pursue as the core neuroscientific aspect of my creative practice. In this way, the connection between neuroscience and the birds’ eye implants was a specific choice I made as a writer. Thus in the early days of my research enquiries, it was the neuroscience which held appeal for me, rather than posthumanism, even though the characters that appear in this section of the pre-draft, with internal and external organs grafted from animals, can be defined as something other than human.

Through the creative-practice led process, however, it emerged that although the implanted birds’ eyes were a useful anchor in terms of plot, and worked well as a point of difference that made Quarter stand out as a character, it was not the technical, neuroscientific aspect of his birds’ eyes that make him a complex and interesting character. Rather, it was the reasons he made the choice to use neuroscientific technology in that particular way. As my creative-practice led research deepened, those reasons began to align themselves less with neuroscience and more with ideas of the posthuman. I found that, in terms of creating a commercial novel that combined fast-paced action without sacrificing depth and complexity, neuroscience could only be a part of the whole.

Nonetheless, the character profiles I created for Ava, Quarter, Klee, Briony and Priya were structured around the neuroconstructivists’ idea that environment, experience and genetics continually impact on the development of the human brain from conception and throughout childhood and adolescence. I created a template for each character profile that included basic information such as physical appearance, age, likes and dislikes. In addition, I took into account the ideas of neuroconstructivism and wrote a backstory for each of these characters, which included information about their parents and grandparents, as well as significant events in childhood that impacted on their development.

4.1.2 A neuroconstructivist approach to creating characters
The character profiles worked well as a reference point during the manuscript's development, and I referred back to them, added to them and subtracted from them at various times during the novel’s early drafts. Creating and using the profiles made me think more deeply about each of the characters’ personalities, interests, beliefs and behaviours, and I believe each of the characters is more well-rounded and stronger for the process. In each of the character profiles I included details about genetic traits that could be inherited as well as detailing specific traumas the character had suffered in early childhood (before the age of seven) and the environment (physical and familial) in which they were raised. For the characters of Ava and Quarter, I began to develop the profiles after I had decided on the basic setting, plot and narrative for the story. I knew that Quarter had the birds’ eyes implanted into his head, and that Ava was a medical intuitive. The in-depth profiles, however, provided a structure for me to discover what had happened in their lives up until the time the story starts to make them who they are.

While everything in the profiles is invented, from Quarter’s father’s death from a motorcycle accident when Quarter was three months old to Ava’s step-father’s violence and mental breakdown, I ensured that the characters’ actions, reactions and behaviours in the novel could be traced back to the details of their backstories. Some of these backstory details were necessitated by internal logic—Ava could not believably fight in the league without a martial arts background—others were more subtle. For example, Quarter’s pursuit of power no matter what the cost is linked to several events in his childhood, including witnessing the brutal beating of his mother at the hands of the cult leader and the cult leader’s response to Quarter’s first win in a fight, at age five. Ava’s aversion to violence sits uneasily alongside her ability to fight to attack as well as defend because she witnessed domestic violence at a young age. These events are not mentioned within the narrative. However, for Quarter and Ava to make sense to me, for their actions and behaviours to ring true to me as an author and correspondingly for my readers, they had to make sense from a physical, psychological and emotional perspective.

In hindsight, there is nothing specifically neuroscientific about the way I created my characters. I was not able to create models of them with working brains to have their brains scanned (although this scenario may not be ruled out for writers of the future). Nevertheless, the theories of neuroconstructivism, and the scientific facts of brain plasticity and adolescent brain development, provided me with a set of rules from which I developed a structure to
create the characters as three-dimensional personalities. A neuroconstructivist framework may not have been the final deciding factor in making these characters who they are; however, for me it was a useful and logical framework that enabled me to structure the characters’ backstories and made them come alive.

One of my key aims when I set out to write *Dirt Circus League* was to have characters that reflected, both implicitly and explicitly, my research into neuroscience; however, the needs of the story took over. As such, although neuroscience did have an impact on how my characters developed, it did not play the role in character development that I had originally envisioned.

4.2 Creative choices and structural decisions

My creative writing practice evolves from the collision of often disparate ideas; some of these ideas influence major themes within the narrative while others provide snippets that contribute to the smaller details. Each of these forms of ideas is equally important in creating the story’s internal logic and believability: while major themes provide depth to the world of a story, the small details focus on the specifics (such as weather conditions, landscape, food, living quarters, wildlife) that make the story’s world more solid and real for the reader.

I made two key decisions as a writer quite early in the writing process of *Dirt Circus League* that shaped the novel’s narrative and plot: choice of location and choice of viewpoint. Location and setting are inextricably intertwined in my creative process for writing a speculative fiction manuscript, and I spent some time considering different options for *Dirt Circus League*. However, once I made the decision for the setting, the choice of location became clearer. In contrast, the choice of viewpoint for telling this story was instinctive, although it required refinement as the manuscript evolved through several drafts. Posthuman elements were not prime considerations when these decisions were initially made; rather, they solidified my authorial decisions as the manuscript matured.

4.2.1 Setting, location and the rejection of a dystopia

When I was exploring my initial ideas for the manuscript that was to become *Dirt Circus League* the characters lived in a dystopian post-apocalyptic future, which was set, at various times, in a high security gated community, on an island prison and in the Australian desert. However, I rejected a dystopian setting for my novel because there were already many dystopian novels for teens being published, including the *Hunger Games* series, the *Uglies* series and the *Chaos Walking* trilogy. Instead, I looked for a way to have the teens in my
narrative bound by geographical constraints alongside the ability to leave that boundary and live in the contemporary world. Unlike the teenage characters in dystopian novels who must live in a society where the rules are imposed upon them by adult/outside forces, the Dirt Circus Leaguers have created their own system that they choose to live within. In this way, the setting of an insulated world within a wider contemporary world enabled me to explore different perspectives on choice, power, and how teenagers might choose to live their lives. Furthermore, this setting gave the characters more agency to explore how they choose to belong, and how they choose to wield power, and thus offers a different perspective on the themes of power and belonging than those offered in dystopian teen novels. For example, in Westerfeld’s dystopian young adult novel Uglies, the teens who undergo the operation to make themselves ‘pretty’ do so as they must have the operation to live in their society. The teens are also unaware that the surgery includes a neurosurgery to make them compliant. In contrast, it is Quarter’s choice to have the surgery to implant the birds’ eyes, and he makes this choice in order to make himself more powerful within the league, as well as potentially in the wider world.

The early scenes I wrote which were set in the Australian outback and desert provided both isolation and survival difficulties. However, having made the firm choice of a near-contemporary rather than dystopian setting, the desert landscape did not quite evoke the sense of claustrophobia I wanted to capture. Thus, I turned to the dark heaviness of a tropical rainforest. Cape York was an ideal location for my purposes. The Cape is difficult to get to, is isolated from the outside world during the wet season and the region’s overbearing summer heat and humidity create a close, heavy atmosphere which reflects both the madness and the constrictions of the Dirt Circus League’s cult. Cape York covers a massive area, approximately fifteen million hectares (more than twice the size of Tasmania), and comprises diverse landscapes including rainforest, open woodlands and grasslands. Rather than choose a specific place within the Cape, I invented a town (Dirt Creek) and an abandoned resort (The Barracks), which enabled me to create my own fictional landscape that places various aspects of the Cape York terrain side by side. This created landscape reflects the realities of both the diversity of Cape York’s landscape, and its isolation, while enabling me to manipulate the landscape to suit the novel’s needs.

The idea of a human-less world is explored in Alan Weisman’s The World Without Us (2007) where the author examines various places where humans have left and nature has taken over,
as well as imagining future scenarios where this may occur. Weisman’s descriptions of how nature can reclaim land after humans have moved on inspired me to add specific details of the Cape York landscape into my narrative. For example, I drew on my personal experience of living in far north Queensland to describe particular animals and insects (such as the green tree frogs) that inhabit the Barracks, and combined that with how I imagined the frogs would overtake the former resort’s lobby and fountain. While Weisman’s book did not provide thematic input, it inspired me to create specific details about how nature would overtake an abandoned resort. In turn, these specific details help create authenticity in the setting and location that draws the young adult reader into the novel’s world.

Choosing the right setting and location was also important because a high degree of isolation was necessary for the story’s internal logic. Angie/Ava had to be removed from her home and placed in a situation where leaving was not an easy option. It had to be physically difficult (if not impossible) for her to escape so her decision to stay is based on the short-term need to survive rather than the desire for adventure (that is, it would not make sense for her to stay once she realises the leaguers practice ritual murder). Furthermore, the isolation was important for the internal logic of a religious cult made up entirely of adolescents to make sense. The isolation reinforces their suspicion of outsiders, and their desire to stay together as a group. In this way, the setting and location constrain the characters’ movements as well as their view of the world. Thus, the setting and location support the story’s internal logic of the religious cult and Ava’s decision to live among the cult members. This in turn supports and reflects the narrative theme of belonging, which is expressed through the characters’ actions and behaviours, and is discussed further in section 4.4.2.

4.2.2 Third person point of view

In the past I have written my longer fiction in first person. It works especially well for young adult fiction, and suited my writing style. When I began writing the pre-draft that became Dirt Circus League, however, I began writing in the third person. This was an instinctive decision, and it was unusual because at that point I was only ‘talking’ to one character, Ava. However, it proved to be the right choice because once I started the first draft of the manuscript I wanted to include the perspectives of the dual protagonists, Ava and Quarter, as well as the key characters of Klee and Surgeon. In earlier versions of the manuscript I also included a variety of voices of minor characters including Priya, Briony, Jonq, and a few others. The inclusion of so many voices was a result of my inexperience of writing in the
third person. I wrote as if every character who appeared had an equal right to have their inner voice heard, and became somewhat over-enthusiastic in jumping into telling the viewpoint of almost every character in the novel.

I received feedback on the manuscript advising that the multiple voices caused confusion for the reader and diluted the strength of the narrative. It was suggested I reduce the viewpoint voices to a maximum of four (Surgeon, Klee, Ava, Quarter), and preferably restrict the voices to two (Ava and Quarter). I re-read the manuscript to assess which, if any, characters’ inner voices I could do without. I decided Surgeon, although an important character, could remain effective without her inner voice being heard. For example, when rewriting key scenes, such as the one where Herman dies in her treatment room, removing Surgeon’s inner commentary and relying on a combination of her spoken dialogue and Ava’s responses to that strengthened the scene because it laid bare Surgeon’s psychopathic tendencies. Her interest in Herman’s death is purely rational and scientific; in contrast to Ava, Surgeon does not experience sadness in response to the passing of life. By removing Surgeon’s internal dialogue in this scene, and having her verbalise her delight in feeling a body pass from life into death, the extent of Surgeon’s psychopathy is underscored.

I made the decision to keep Klee’s voice, however, as he is a key counterpoint to Quarter. Klee represents the fundamentalist edge of the Dirt Circus League, the one who is a stickler for the rules. In terms of the Dirt Circus League’s beliefs, Quarter has committed a severe transgression by implanting the birds’ eyes, and has done so to give himself both a physical advantage for fighting and as a display of power. Klee recognises this and acts as an important antagonist as he, too, strives for power within the league. The competition for power, and the struggle between keeping the status quo in the league and making changes to how it operates, adds an extra layer of tension to the narrative. Ava, as the protagonist, must deal with two unpredictable characters who swing between supporters and attackers at various stages throughout the story. Thus, all three characters require a voice in the story as their internal struggles play out against the drama and action of the narrative.

4.3 From neuroscience to posthumanism via Lovelock

In earlier sections of this exegesis I briefly examined the role of James Lovelock’s *The Revenge of Gaia*, which I read in the early stages of my research. Although I found it a fascinating book I was not drawn to pursue the environmentalism or eco-criticism as possible
research paths. Nevertheless, Lovelock’s ideas fermented in the background while I launched into my neuroscience research phase and tried to learn as much I could about how the brain worked as well as reading about recent discoveries in neuroscientific research; the so-called neurorevolution; neuroscience in culture and the western psyche; and more. Periods of intense research into neuroscience were interspersed with work on my manuscript, and I worked on research and creative practice concurrently as I thought this approach would support my original intention to write a young adult novel that incorporated neuroscience both implicitly and explicitly within all aspects of the novel: plot, narrative, and structure. As I stated in the opening paragraphs of this exegesis, I failed to achieve this goal; however, in failing I discovered that neuroscience alone was not my true interest. Rather, the more fascinating story was to be found in the implications of neuroscientific discoveries, and in particular, the potential of neuro-medical innovations to permanently change expectations around the limits of human ability, and the limits of human-ness itself. That is, I was drawn to explore how neuroscientific discoveries were leading to the creation/evolution of posthumans in my lifetime. Furthermore, when I began to question myself about the key themes underlying Dirt Circus League, I found myself returning to questions around how a posthuman existence relates to the basic lesson offered up by Lovelock’s Revenge of Gaia: that everything in and of the earth is connected.

According to Gaia Theory, the planet is a single living, breathing organism affected by imbalance. Lovelock explains:

…it occurred to me in 1981 that Gaia was the whole system – organisms and material environment coupled together – and it was this huge Earth system that evolved self-regulation, not for life or the biosphere alone. (2006, 30)

If I accepted this as truth for the perspective of the fictional world I created in Dirt Circus League, then it followed that neuroscience could only ever be one small part of the story. Neuroscience is incapable of providing a definitive answer about what it is to be a human (or posthuman) because, if we are interconnected with the entire organism that is Planet Earth, it follows that we are much more than our brains (as I discussed briefly in 4.1). Therefore, Dirt Circus League could never be just about neuroscience because it would then fail to provide any depth or insight about the world in which it was set, a world in which worship of Gaia was the central belief system that governed all actions. In this way, Lovelock’s work opened
up a way for me to explore ideas about posthumanity within my creative practice. He provided the ‘big picture’ about humans as an organism not merely living on the Earth but intimately connected to it through our flesh, our blood, our cells, from the micro organisms that live in our gut to the manner in which our bodies expel waste products. Thus, while his theory of interconnectedness reflects Mareschal et al.’s theories of interdependence in brain development (neuroconstructivism), it is through Lovelock’s work that I was able to step back from the narrow perspective of neuroscience and incorporate a broader view of how my characters lived in and interacted with their world.

4.4 Is Quarter posthuman?

There is a journey involved in becoming posthuman, and at times it may be difficult to reconcile where a human crosses over to the posthuman, where the human ends and the posthuman starts. Stapledon’s posthuman vision, expressed in Last and First Men, explored the gamut of possibilities of posthuman forms; each one was, however, an evolutionary journey. Some within Stapledon’s fictional world chose to pursue aspects of that evolution through genetic selection or other means while others were victims of circumstance; however, the cyclical nature of his narrative proposed an ongoing striving towards a state of physical, psychological and spiritual perfection for individuals and society. Stapledon’s fiction thus provided a holistic view of the future of posthumanity, with much to-ing and fro-ing between the different states, while the case studies analysed in chapter three of this exegesis examined particular aspects of possible posthuman futures. Furthermore, for each of the posthuman characters in Eva, iBoy and A Cage of Butterflies, there were periods of psychological separation and integration of their posthuman aspects before acceptance of their posthuman selves, even if the physical aspects of their posthuman-ness was already fixed.

There are two key contrasts between the characters in the case studies in chapter three and Dirt Circus League’s protagonist, Quarter. Firstly, Quarter has made a deliberate choice to be posthuman, whereas each of the case studies had their posthuman state imposed upon them by either accident or someone else’s decision. Secondly, Quarter does not reflect on whether he is human, posthuman or other. While Eva and Tom (and to a lesser extent the Babies) must go through a process whereby they accept or reject their posthuman-ness and reflect upon how they can make their way in the world within the posthuman form that has been thrust upon them, Quarter accepts his posthuman status as natural. I will now examine these
two key differences in detail, and link Quarter’s choices with his concomitant desires for power over others, and for others to belong to him.

4.4.1 Quarter and power

As I have discussed previously, the idea for a character with birds’ eye implants appeared before any thoughts of how these implants may represent posthumanism; and throughout Dirt Circus League’s narrative Quarter does not think about himself in posthuman terms. Rather, the key driver for each action Quarter takes in the narrative is his search for power. From a physical perspective, Quarter believes the birds’ eyes will give him close to three-sixty degree vision, which will be an advantage in the league’s fights. Undergoing and surviving the neurosurgical procedure also places him as physically superior to other members of the league, including the other team leaders, in terms of his ability to endure such an operation and to have the discipline required to enable him to develop vision through the birds’ eyes. The narrative does detail a physical aspect to his acceptance/rejection of the birds’ eyes which has a human psychological basis. Quarter descends into madness as his brain and body attempt to reject the birds’ optic nerves, and he is only saved from madness through Ava’s interventions as a medical intuitive and psychic healer. However, although he recognises Ava’s role in enabling him to retrieve blocked memories that are causing his mind and body to reject the transplants, once he is able to see out of the birds’ eyes successfully he ignores the psychological causes of his madness. His focus is solely on how to use the extra power he has gained through bird sight to increase his power over others both inside, and eventually outside, the Dirt Circus League.

In the final chapter of Dirt Circus League, Ava perceives the amoral animal nature within Quarter, and rejects him. However Quarter does not feel slighted by this, and indeed considers Ava to be the one person he does not feel he needs to subjugate to his power. He has seen her power in action, and respects it; he does not see it as a threat to his own. Indeed, her acceptance or rejection of him does not alter his view of them as kindred spirits. Nonetheless, he considers himself superior to her, as he does to all others, because in Quarter’s view, his ability to integrate bird sight has made him a god. In this way he has made a deliberate and conscious choice to cross the threshold from human to posthuman, and does not look back. In terms of belonging, then, Quarter does not strive to belong to a community with others. Instead, his aim is to create a community that will worship and serve him.
4.4.2 Quarter and belonging

Quarter’s striving for power is interlinked with his concept of what it means to belong, which differs from how other characters in the Dirt Circus League, and characters in the three case studies, view the concept. Whereas Ava, the leaguers, and the protagonists from iBoy, A Cage of Butterflies and Eva desire to find a place where they belong with and alongside others, Quarter wants others to belong to him.

The Dirt Circus League itself is set up with two distinct layers of belonging. All the leaguers share the same beliefs and the same distrust and dislike of outsiders, and see themselves as a discrete group. Within the league’s structure, however, are five distinct teams. These teams operate both as a way to structure their fights, and as a second, more intimate form of belonging. Although the leaguers form relationships outside their own team, they wear their team’s signifier with pride and an individual’s loyalty to their own team is strong. This is reinforced as leaguers only train within their own teams, and each team has its own sleeping quarters and living space that an opposing team member can only visit by invitation. The only league member who has ever changed teams is Quarter. He has done so twice: in the backstory, where he breaks away from the Reapers to form the Grafters as a fifth team; and at the end of the manuscript, where he creates his own sixth team as a precursor to abandoning the team system within the league and creating a single Dirt Circus League answerable only to him.

The leaguers see all non-leaguers as other and find meaning and purpose in belonging to their own small community. Quarter is the exception to this rule; he seeks to become other in order to place himself above, and in control of, the group. This is why he is able to ignore any psychological or spiritual change he undergoes as a result of incorporating non-human materials into his physical body. The extra powers afforded him by his new status as posthuman do not cause him to reflect on any moral or ethical issues about the use of power, as iBoy’s Tom does; nor does he care what others think about his status as something other than human, as does Eva. Unlike Tom, Eva, the Babies and their teen supporters, Quarter does not struggle with his status as other; he revels in it. Therefore, Quarter does not strive to belong in a group with others, rather, his desire is that others will want to belong to him because they fear and/or admire him.

4.5 The posthuman perspective
I did not set out to write a posthuman novel; however, I believe that is what I have produced through the processes of writing, research and reflection. My decision to pursue the posthuman perspective evolved naturally from my interest in neuroscience, and in this section I have detailed the journey from neuroscience to posthumanism as well as analysed the role of other key texts in contributing to authorial decisions about plot, setting, character development and structure. Although posthumanism is a relatively recent term, the idea of creatures who are something other than human is as old as storytelling itself. I drew inspiration for *Dirt Circus League* from early science fiction, including Mary Shelley’s *Frankenstein* (1831) and H.G. Wells’ *The Island of Dr Moreau* (1896); however it is Stapledon’s *Last and First Men*, and his personal writings on what humans might evolve into, that provide a solid context and framework from which I can view the product of my creative practice.

As a storyteller writing and working within the decades between the two World Wars, Stapledon was a passionate believer in the importance of fiction in exploring possible futures for humankind that offered some hope. In notes for a lecture he delivered on Science and Literature he wrote of a:

- Literature of creative imagination [that]
- Welcomes reality, and explores it
- Epitomises reality in symbols
- Reveals essential patterns
- Enhances sensibility and understanding
  
  i.e. reveals new aspects of reality
- And creates new human capacity (1937b n.p.)

In *Dirt Circus League*, I tackle one small aspect of a possible posthuman future; however, through the process of creative practice and reflection I have attempted to make a contribution towards what Stapledon regarded as humans’ ‘real business on earth…knowledge and creativity’ (1937b, n.p.).
Chapter 5: Conclusion

This research journey started with neuroscience, however, just as axons and dendrites branch out from the neuron, each seeking to join the other through the synapses and so form connections, my research reached out for connections that eventually steered me towards the posthuman. In the pathways connecting the two I uncovered the ideas and themes underpinning my creative work and found that at the core of *Dirt Circus League* is a striving for balance between power and belonging. These themes are reflected within Quarter’s experience of co-opting both the technological and the organic to recreate himself in a posthuman form. In turn, the character of Quarter reflects the need for human beings to adapt and evolve alongside the Earth to ensure their survival on a planet facing enormous environmental challenges.

As a writer of speculative fiction aimed at the young adult market, the commercial viability of my creative work was an important factor when determining the direction of the narrative. After the second full draft of the novel it was becoming clear that neuroscience would not be an overriding concern within the novel’s themes. Although neuroscience was always at the back of my mind when I worked on the manuscript, and elements of it exist in the manuscript’s final version, the mechanics of the human brain are too dry a topic to explore in technical detail in a novel aimed at the young adult market. Furthermore, the rapid changes in science and technology which have thrust us unwittingly into a posthuman present are of greater concern to young adults who must navigate the ethical challenges that such changes raise, rather than the advances in scientific research that lead to their existence.

The role of literature in supporting and guiding readers through the change from human to posthuman has been examined by theorists with varying views of what posthuman/posthumanism means. Hayles, Thomsen, Graham and others have focused their examination on fiction aimed at the adult market. Although the novels these critics discuss are often read by young adults, particularly those in the later teenage years, I agree with Ostry’s view that literature aimed at the young adult market offers its readers a way to become aware of and participate in the debates raised by advances in biotechnology (2004, 223). This is because young adult fiction enables its target audience to comprehend and connect with the issues on a more personal level, as these novels feature characters of similar age dealing with issues specific to that age group. However, in *Dirt Circus League*, I
deliberately removed issues relating to parental control, or control of another authority relevant to teenagers, such as school or church. The organisation of the leaguers’ micro-society is bound by the rules of their religious cult; however, these rules have been made within, and are enforced by, their own group, which as a form of control is more aligned with adolescent peer pressure. The absence of other power structures within the narrative places a spotlight on the power that Quarter wants to hold over the leaguers—and ultimately intends to extend beyond the confines of the current group to new recruits—and the method he chooses to achieve it.

Quarter, and his choice to become something other than human, has been the focus of this exegesis. However, although the length of the exegesis did not allow the space to explore it, the character of Ava can also be viewed as a possible posthuman. Indeed, Ava and Quarter represent two different sides of posthuman possibilities: pursuit of posthuman abilities through medical and technological interventions; and, the posthuman as the next natural evolution of human beings after homo sapiens.

Ava’s natural ability as a medical intuitive must be nurtured in order for her skill to develop. Like Quarter, Ava must actively practise her skills in order for them to work efficiently and effectively. Although the likely source of her psychic ability is explained in the manuscript as genetic (her grandmother also had psychic gifts), Ava has largely ignored it until she arrives at the Barracks with the members of the Dirt Circus League. It is the physical, psychological and cultural environment of the Barracks, alongside the experiences she undergoes there, that combine to bring her latent psychic talents to the fore.

Thus, on the surface of things, it may be interpreted that Ava represents belonging/natural and Quarter represents power/unnatural. However, their mutual interdependence means it is not useful to separate what each represents from the other. It is Quarter’s sickness from the transplanted eyes that drives Ava to use her natural psychic abilities, which she has been avoiding, to save him. Quarter would not be able to survive, let alone actually see out of the birds’ eyes, without Ava forcing him to confront the trauma of his past, and release those memories. Their attraction to each other, which each of them initially perceives as physical, is a deeper connection bound by their emerging posthuman aspects. It is not the technology Quarter uses that makes him posthuman. The technology is an enabler. However, it is Ava’s abilities that push Quarter through his human boundaries to enable him to enter into a posthuman state. Therefore, Ava is an integral part of Quarter’s posthuman experience.
I have already started work on a second manuscript featuring Quarter, Ava and the Dirt Circus League, which I envisage will work more as a stand-alone novel rather than as a sequel. In it I intend to further explore the themes of a posthuman present/future, and how the pathways of natural evolution sit alongside and intermingle with technological and surgical interventions on the human body. Through the narrative, relationships between human and posthuman characters will create a platform to investigate possible new solutions for coping with the demands of rapid and radical environmental, social and economic change. The solutions explored within the novel will encompass positive and negative implications and impacts. Ethical boundaries and social and cultural norms will be stretched and crossed as human becomes posthuman through technology, evolution or possibly both.

The developing posthuman world will be for many years a human/posthuman hybrid. This developing world will encompass not only scientific and technological elements, such as cyborgs and genetic selection, but also naturally occurring evolutionary changes, and each of these elements will continually influence the other. I believe that to successfully navigate a posthuman world, it is vital to embrace the basic neuroconstructivist tenet: *nothing happens in isolation*. For, as academic, literary critic and posthuman thinker N. Katherine Hayles states:

> But the posthuman does not really mean the end of humanity. It signals instead the end of a certain conception of the human, a conception that may have applied, at best, to that fraction of humanity who had the wealth, power, and leisure to conceptualize themselves as autonomous beings exercising their will through individual agency and choice. (1999, 286)

Change brings both destruction and renewal. The emerging posthuman world will be, like the world we now inhabit, one that requires adaption of old ways as well as new ways of thinking and being. There is, however, one constant: storytelling. Just as storytellers have helped us make sense of our human past, they can help us cope with our human/posthuman present, and uncover ways to live in our posthuman future.
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Appendix 1: excerpt from ‘pre-draft’

Quarter, their leader, sneered as the undergrounders approached the battle lines. He didn’t doubt the ability of his team to grind the undergrounders into the desert dust but the moments before the battle began always made his sheep’s heart bleat just a little faster. He flexed his finger joints back and forward, spinning his thumbs like small whirlpools. He knew the sight of his mutant joints freaked the undergrounders out every time, even though they were all show. Having joints that could move freely in all directions was not as useful as it first seemed. Mainly because it could make you lazy in a way that led to decrepitation of both body and mind. … Quarter, like the rest of his group, has chosen to enhance his body with extra body parts. In the small stretch of skin between the end of his thick, straight eyebrows and his shaven hair line, right across the temple, he has had sewn in three hawk eyes. The hawk eyes line up like jewels on both sides of his head. They have fully grafted now, and he has perfect hawk sight out of five of them. The sixth one, the one closest to his eyebrow on the left side of his face, failed to graft correctly and instead of a yellow iris and black pupil it is a pearly grey colour. Quarter considered having the failed eye graft removed but lack of symmetry is considered bad luck in his clan group, so he puts up with the blind eye, finding that, although he cannot use the hawk’s sight from it, it gives him a certain cache among challengers. The blind eye frightens them in a way none can explain. Quarter chose his hawk eyes carefully. As a leader of the Hybers he had more choice in his grafts than most: you have to earn the right to graft; starting off with more decorative grafts and, as your experience and skill grows, graduating to grafting animal body parts that, if the surgery is performed correctly, will give you the skill or power that body part gave to its animal owner.