ResearchOnline@JCU

This file is part of the following work:

O'Leary, Irene (2023) *Poised to change: dynamic processes and Oryx and Crake by Margaret Atwood, The Curious Incident of the Dog in the Night-time by Mark Haddon and The.PowerBook by Jeanette Winterson.* **PhD Thesis, James Cook University.**

Access to this file is available from:

Poised to change:
dynamic processes and *Oryx and Crake* by Margaret Atwood,
The Curious Incident of the Dog in the Night-time by Mark Haddon
and *The.PowerBook* by Jeanette Winterson

Irene O'Leary

Thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy

College of Arts, Society & Education, James Cook University

Acknowledgements

I am deeply grateful to my principle adviser Dr Claire Hansen for her unflagging encouragement and incisive critical commentary. I thank Dr Roger Osborne for his very helpful comments on an early draft of the thesis. I would also like to acknowledge the assistance of library and administrative staff throughout my external candidature. Invaluable material and emotional support from my partner Paul (technology and internet, running the household, assiduously refilling wine glasses) made researching and writing this thesis possible. Thank you. I am profoundly grateful.

Abstract

Oryx and Crake by Margaret Atwood, *The Curious Incident of the Dog in the Night-time* by Mark Haddon and *The.PowerBook* by Jeanette Winterson shift relentlessly among stylistic, narrative and other literary processes that interact with cascades of cognitive processes involved in reading and interpretation. While the novels have attracted extensive critical commentary, there are no dedicated analyses of this dynamism. Blending aspects of the dynamism asserted by process philosophy, complexity theories and studies of cognition and reading, I propose a process dynamics approach. Process dynamics treats all phenomena as processes and takes dynamic interactions among processes as the object of analysis. I combine my process dynamics approach with textual analyses to show that during reading, literary and cognitive processes incessantly change the conditions that they interactively create. My thesis contributes to both literary theory and literary criticism by presenting an original processual account of dynamic processes and by offering process dynamics readings of the three novels. Addressing processual change broadens the scope of literary studies; my account contributes to this wider literary reach.

Contents

List of Figures and Tables

Introduction

The.PowerBook by Jeanette Winterson (2001) is a story about fiction, love, and love of fiction, about the nature of narrative invention and of the storytelling "I".[1] The novel opens with a flurry of promises regarding change and novelty, a sales pitch for the transformative and liberating power of stories. Stories temptingly offer release from irksome constraints: "you say you want to be transformed… this is an invented world. You can be free" (4). Mephistophelean promises are laced with seductive insinuations of natural laws infringed, of infractions and alterations, an outlaw point of view. The opening hints at dangerous and fleeting knowledge sought, and of the speed and guerrilla intensity at which such a quest must operate: "to avoid discovery I stay on the run. To discover things for myself I stay on the run" (3). However, while intensely desired, transformations may also be traitorous and risk reprisal. The stay of the everyday is cruelly short-term, "just for one night" (3), and is won, as is Scheherazade's, through storytelling. Fiction can bargain for an altered course of events, change the future or claim cocky, illocutionary omnipotence: "I can change the story" (5). As in any Faustian compact there is, however, the small print, a price to pay; loss of control and unpredictable twists as "the story reads me" (209). Stories trigger unforeseeable consequences.

Margaret Atwood's *Oryx and Crake* is a story of the apocalypse. "Snowman wakes before dawn" (2003, 3) in a world from which the entire human population has disappeared, eradicated by an Ebola-like pandemic. As the novel opens, Snowman is the only surviving human, "the last *Homo sapiens*" (224), but he is not alone. He is in the company of

---

[1] Throughout the thesis, references to the three novels are from these editions:
Atwood, Margaret. 2003. *Oryx and Crake*. London: Bloomsbury.
Haddon, Mark. 2003. *The curious incident of the dog in the night-time*. Oxford: David Fickling Books.
Winterson, Jeanette. 2001. *The.PowerBook*. London: Vintage.

genetically modified organisms including the post-*Homo sapiens* Crakers, custom designed to thrive in post-apocalypse, posthuman, circumstances. The novel switches through cautionary tale, speculative fiction, dystopian fiction, story of unrequited loves, transforming through genres. The last man's narration shifts dramatically among stream-of-consciousness, vignettes, memories and snapshots, triggering changing cognitive interactions and unpredictable interpretive impacts. As a character, Snowman lurches narratively back and forth between adulthood, childhood and adolescence, back and forth across the apocalypse. He shapeshifts from clown (162) to Don Juan (191), or rather, the diminutive would-be Jimmy. As wordsmith, he transforms from lowly advertising copywriter into spokesperson for the human race. He is variously a parodic Robinson Crusoe (371) and a monstrous Abominable Snowman, from which his post-apocalyptic name for himself derives (224). As reading continues, Snowman morphs into everyman, leper, last man on earth, Cain the murderer, monster and fool, certainly a reluctant hero. At the close of the novel, "Snowman wakes before dawn" (371) yet again, but to a radical change in circumstances in a cliffhanger that reconfigures his story, *Oryx and Crake*. Snowman the narrator is driven by failures, by searing loneliness, by his ordinariness among the extraordinary, and most of all by obsessive story making.

Mark Haddon's whimsical title *The Curious Incident of the Dog in the Night-time* (2003) alludes to a British murder mystery genre overflowing with Mysterious, Perplexing, Scandalous or Puzzling[2] cases but heralds a rather less pompous rewrite of Arthur Conan Doyle's *The Hound of the Baskervilles*. In *The Curious Incident of the Dog in the Night-time*, fearsome hound is reduced to poodle on a pitchfork, the Baskervilles and their ilk sink

---

[2] I use capitals here as a nostalgic salute to the sensationalism in many crime fiction titles. Haddon's title is itself taken from "The Adventure of Silver Blaze" by Arthur Conan Doyle:
Detective: Is there any other point to which you would wish to draw my attention?
Holmes: To the curious incident of the dog in the night-time. (Doyle 1997, 20)

without trace into the mediocrity of suburbia and murder stalks not the hunting classes but the domestic pets of contemporary working class Swindon. The mystery is solved by the exasperated murderer halfway through the novel but confession does not end the book. In *The Curious Incident of the Dog in the Night-time*, the literary conceit of a neurodiverse teenage detective is a catalyst for inventive strategies. The narrator perturbs conventional expectations: he dislikes fiction (5) and people (59), cannot understand jokes (10), metaphor (20), facial expressions or body language (2), claims to be unable to imagine or to fabricate lies (24), has learned a range of obsessive, antisocial behaviours (59) and has an extraordinary facility for mathematics, paraded frequently throughout the novel. Nonetheless, as the narrator of *The Curious Incident of the Dog in the Night-time* promises, "this is a murder mystery novel" (5) full of puzzles and clues and tracking a detective's painstaking use of logic to construct meaning from unconnected events and information. In first person narration it literally pieces together a subject and a narrative, not finished and fixed, but a work in progress, a project under constant pressure to change here, to adapt there, to respond to social, literary and cognitive encounters. *The Curious Incident of the Dog in the Night-time* is experimental in its crafting of structure, language and subject matter, speaking to an unrequited desire for closure and definitive answers in the narrator's voice, but denying such closure through eclectic and importunate interactions with other storytelling processes.

Oryx and Crake, *The Curious Incident of the Dog in the Night-time* and *The.PowerBook* repeatedly digress, divert and transform and the texts shift constantly among stylistic, narrative and allusive processes. Such continual textual metamorphosis, however, is not the whole story. Reading and interpretation necessarily also involve extratextual cognitive processes. Cascades of subconscious and conscious cognitive processes interact in comprehending, interpreting and responding to a novel's literary processes. During reading, literary and cognitive processes not only require each other but also impact on each other to

convert text into interpretations. The dynamic interchange between page and mind is intimate, intricate and intriguing. This thesis is a response to the literary and cognitive dynamism activated by reading the three novels and is driven by the question: how does this dynamism work?

My interest is not primarily in thematic representations of dynamism in the novels but in the dynamics triggered by reading the texts. These dynamics are more complex and mutable than appears to be commonly recognised in literary studies. The novels have each attracted extensive critical commentary, but this scholarship remains overwhelmingly thematic and does not address the dynamic interplay of text and reading. *The.PowerBook* has generated cybertext (Barnett 2003; Butchard 2015; Cronquist 2005; Savi 2014), queer and lesbian (Detloff 2007; Douglas 2009; Kiliç 2008; McCulloch 2007; Pelle 2012), utopian (Wagner-Lawlor 2009) and theological (McAvan 2020; Mounsey 2014) analyses, or blends of these, among other readings. Scholarly discussion of *Oryx and Crake* includes dystopian and apocalyptic (Bosco 2010; Bouson 2016; Ciobanu 2014; Dillon 2018; Hicks 2016; Mohr 2007), Anthropocene and ecocritical (Bergthaller 2010; Canavan 2012; Caracciolo, Ionescu, and Franso 2019; Chen 2018; Traub 2018; Wright 2019), feminist (Evans 2010; Keck 2018; Martín 2019), biotechnological and biocapitalist (Bouson 2004; Cooke 2006; Defalco 2017; Johnston 2019; Kozioł 2018; McHugh 2010) and other thematic interpretations. The majority of critical commentary on *The Curious Incident of the Dog in the Night-time* treats the text as a study of autism (Freißmann 2008; Muller 2006; Murray 2006; Orlando 2018; Resene 2016; Semino 2014), although there are other thematic readings of the text as a study of teenage rebels (Ciocia 2018), quest heroes (Allen 2020), or superheros (Shaw 2016). This is not a comprehensive list of responses to the novels, but these are the predominant thematic concerns that can be found in various combinations across critical publications to date. Scholarly commentary on the literary composition of the three novels constitutes a much

smaller corpus than thematic criticism, is typically embedded in thematic commentary and rarely involves more than implicit reference, if any, to the dynamics of literary and cognitive interactions. Where pertinent, this commentary is cited in the analytical chapters of this thesis.

In contrast to the critical literature, my treatment of dynamism specifically concerns the dynamic interaction of literary and cognitive processes involved in reading *Oryx and Crake, The Curious Incident of the Dog in the Night-time* and *The.PowerBook*. I argue that interactions among literary and cognitive processes during reading trigger incessant changes to the narrative and interpretative conditions that the processes interactively co-create. I use the terms literary and cognitive to pragmatically differentiate processes; literary processes compose the texts, cognitive processes generate reading and interpretation. However, as I show, both literary and cognitive processes are immensely complex, intensely dynamic and interactive. Addressing the question of how literary and cognitive dynamics work in reading the novels therefore requires a multifaceted approach that examines the literary processes composing the novels, the cognitive processes involved in reading, and the complex and dynamic interactions among these processes that trigger specific impacts on narration and interpretation. In this thesis, I introduce an approach I call "process dynamics" that has the capacity to deal with all three theoretical and analytical needs. While process dynamics is detailed in Chapter 1, at this point I define it as an approach that treats all phenomena as processes and takes dynamic interactions among processes as the object of analysis.

My thesis asserts the importance of the dynamics associated with reading the three novels and proposes a process dynamics approach to articulate this dynamism. I explicitly use the word approach in the sense of "a way of considering or handling something" (OED Online); my thesis is therefore a research-based "theoretical reflection" (Hogan 2018, 92). I am not proposing a method, framework or model that describes how to conduct research, but

prioritising a way of reading and thinking about literary texts that can identify and articulate the particulars of the complex dynamism involved. The aim of this thesis is to exemplify this dynamics-oriented reading and thinking practice.

Careful analysis of three very different novels, *Oryx and Crake, The Curious Incident of the Dog in the Night-time* and *The.PowerBook,* provides evidence for my process dynamics approach. The object of my analysis is dynamic processes, in this case the complex literary and cognitive processes triggered during reading of the three novels. In order to offer a close and detailed analysis of the complexity of dynamics in the novels and the intricate operation of processes, interactions and change, I deploy a quantitatively small but qualitatively rich sample of three novels. The arbitrary nature of my selection rehearses the socioculturally situated eclecticism of readers choosing novels to read for curiosity and pleasure and is an effective first test of the applicability of my approach. As the novels themselves afford more material than can be conveyed within the scope of this thesis, I have highlighted interactions that appear to me illustrative of the processual dynamism I delineate. The aim of my analyses is to demonstrate how cognitive and literary processes interact and how this continually co-creates and reconfigures narration and interpretation. Each thesis chapter analyses a different process dynamics concept through different textual details. In devoting a chapter to each of stylistic, narrative, allusive and creative processes in the novels, my analyses also engage with debates in these literary fields. The analytical coverage in each chapter of a specific process dynamics concept, textual details, a particular literary studies field and selected cognitive modes illustrates the broad reach, inclusivity and plasticity of a process dynamics approach.

Process dynamism draws on a number of key theoretical perspectives, discussed in Chapter 1, including process philosophy, which is "based on the premise that being is dynamic" (Seibt 2020, 1), complexity theory as "a theory of change" (Morrison 2008, 19)

and current scientific and literary research into cognition and reading that characterises mind, body and world interactions as "dynamically changing, noisy, ambiguous" (Barrett 2017, 7). Analytically, I draw on a wide variety of such literary and nonliterary scholarship to identify and describe the specific dynamics operating during reading, acknowledging "a general acceptance that complex matters demand a methodological pluralism" (Richardson and Cilliers 2001, 12).

While the object of my analysis is dynamic interactions among processes, an idealised complete description of the complex and changeable dynamics during reading is neither possible nor desirable. Michael Stubbs agrees that literary critics "can neither describe everything, nor attach definitive meanings to specific formal features'" (Stubbs 2014, 47). I show that during reading, processual dynamics keep changing. Attempting to delineate the process dynamics in play at any moment cannot be the whole story, merely a partial account of an encounter that remains open to change as reading continues and in future contexts. My approach explicitly offers an account of selected interactions over some past duration, acknowledging that the processes and conditions will change again. My approach privileges dynamic processes and interactions, offering an alternative to the fixity that some literary theories may perpetuate: "hypotheses, theories and principles are always focused on highlighting invariants—those structural or behavioural aspects of systems that seem not to change" (Weinbaum 2015, 318). In my account, conceptual borders and boundaries are replaced with encounters of intense processual interactivity.

Critical analysis, as a form of close reading, interacts with and perturbs that which it analyses. In view of the never-ending changeability of literary encounters, the analyses given here do not preclude other interpretations of the three novels. Derek Attridge asserts that "a defining characteristic of literature is that it remains open to reinterpretation" (Attridge 2004, 56). The aim of my analyses is not to "carry any universalist claim" (Alhadeff-Jones 2013,

20) by arriving at a definitive interpretation or hidden deep structure, for, as Jonathan Culler puts it, "such arguments are never settled" (Culler 1997, 65), and fortunately so for future readers and literary critics. The aim, instead, is precisely to investigate the ways provisional and contingent possibilities for interpretation inexhaustibly emerge across readers and over time in what Angus Fletcher claims for poetry but is asserted here also for novels, a "play of perpetual metamorphosis" (177). In a dynamic literary studies environment of incessant change, the ability of narration and interpretation to mutate in new encounters ensures their future.

Chapter outline

The approach I propose in this thesis aims to identify the dynamics in play, to offer conceptual tools for articulating this dynamism and to provide process dynamics readings of the novels. Chapter 1 concerns the theoretical contexts from which process dynamism is drawn and introduces the process dynamics concepts I use throughout the thesis, while Chapters 2, 3, 4 and 5 are studies of the three novels that engage with different process dynamics concepts, namely process, morpharchy, dispersal and creativity.

Chapter 1 Theorising Process Dynamics lays the theoretical groundwork for process dynamism by carefully reviewing the key frameworks that inform my approach: process philosophy, complexity theory, and research into cognition and reading. Process philosophy is pivotal to my approach in its prioritising of process and change. Process philosophy is necessarily dynamic in its explicit premise "that the dynamic nature of being should be the primary focus of any comprehensive philosophical account of reality and our place within it" (Seibt 2020, 1). I employ a process philosophy stance in my emphasis on processes and change over static being. A processual world view assumes complexity. Despite the divergent views identified in surveys of the literature (Alhadeff-Jones 2013; Hetherington 2013), complexity theories across scholarly fields are broadly concerned with conceptualising

mechanisms through which change occurs, allowing precisely a focus on dynamics in action. Complexity thinking offers my approach an emphasis on the mechanics of instability and self-organisation, the latter being the premise that participating processes impact on each other, thereby organising their encounter without other input. My examination of scientific and literary research into cognition and reading also identifies current lines of work that take dynamics into account. I review experimental studies that support my assertions regarding the interaction of cognitive processes with literary processes. From my critical appraisal of process philosophy, complexity theories and studies of cognitive and reading, I derive the approach that I name process dynamics. In the final section of the first chapter, I introduce key process dynamics concepts that are applied through the text analyses in subsequent chapters.

Interacting with analysis of the three novels, each case analysis examines an area of literary theory, namely stylistics, narrative, allusion and creativity, and develops a process dynamic stance regarding associated theoretical issues. The cognitive focus also changes with the chapters from close examination of the roles of microcognition, working memory and experienced time in reading then novels, then broadens to consider cognitive dispersal and creative cognition during reading. The chapter outline below illustrates the analytical scope of each case analysis.

Table 1: Chapter outline

Process dynamics focus	Literary focus	Cognitive focus
2. Processes	stylistics	microcognition
3. Morpharchy	narration	working memory & experienced time
4. Dispersal	allusion	cognitive dispersal
5. Creativity	fictional creations	creative cognition

In Chapter 2: Processes I argue that high densities of stylistic and subconscious microcognitive processes interact and undergo frequent changes during reading. Chapter 3: Morpharchy proposes a new concept related to dynamic change and investigates its operation in transient plays of dominance and significance in narration and fictional time as these interact with working memory and experienced time. In Chapter 4: Dispersal, I argue that literary, real world and interdisciplinary allusions rely on intratextual, extratextual and cognitive dispersal. Chapter 5: Creativity makes two claims: first, that fictional creations are processual and, second, that during reading, cognitive processes interactively generate the fictional creations in the novels.

Conclusion

My process dynamics approach contributes to both literary theory and critical studies of the three novels. Theoretically, process dynamics gives precedence to the dynamism often obscured by a tendency to prioritise stable literary properties, patterns or relations. Instead, I show that all apparent properties and products are subject to persistent and unpredictable changes during their generation and again as they interact in new contexts involving rereading or new readers. My thesis offers original critical readings of *The.PowerBook, The Curious Incident of the Dog in the Night-time* and *Oryx and Crake* that enrich the critical scholarship on the three novels by providing new perspectives on their dynamism, on the literary processes of which they are composed and on the mutability of narration and interpretation that occurs as they are read. By focussing on how dynamic processes work, my thesis also contributes insights on dynamism to literary studies of style, narration and allusion and to literary and nonliterary theories of reading, interpretation and creativity. Through consideration of both dynamism and the three novels, this thesis paves the way for further process dynamics research in literary studies.

Chapter 1: Process dynamics

In this thesis, I present a process dynamics approach and argue that during reading literary and cognitive processes constantly change each other and therefore incessantly change the narrative and interpretive conditions that their interactions create. This chapter outlines the theoretical context for process dynamics through a critical synthesis of concepts from key frameworks: process philosophy, complexity theory and cognition and reading in science and literary studies. These bodies of literature are each more diverse and extensive than can be canvassed in full here. In this chapter, I aim to show why the key concepts I have adopted or modified from these fields are useful in framing a process dynamic perspective on novels and reading. Process philosophy contributes to my process dynamics approach through its prioritising of processes and change while complexity theory helps articulate the mechanics of processual change, specifically through its theorising of imbalances and self-organisation. Studies of reading and cognition offer empirical support for the dynamism I propose. The four broad propositions of process, change, imbalance and self-organisation inform my process dynamism concepts of *encounter, process, interaction, perturbation, morpharchy*, *dispersal* and *creativity,* which I introduce at the end of this chapter and apply through subsequent chapters. Throughout the thesis, my process dynamics concepts help articulate the volatility and changeability that I posit for reading and interpretation of novels.

Process philosophy: process and change

Process philosophy is the framework with most impact on my approach and from which the name process dynamics is derived.[3] Process philosophy offers a strong stance on

---

[3] The term "process dynamics" is also used in applied sciences or in industrial applications but is used for the control of closed systems "to maintain a process at the desired operating conditions, safely and economically, while satisfying environmental and product quality requirements" (Seborg et al. 2016, 1). My thesis does not employ process dynamics in this negative sense of deficit and minimising risk but posits dynamic processes in open environments as valuable and generative.

dynamics in counterargument to substance thinking and so suggests a way to think beyond literary models based on invariant properties. "Special theoretical efforts" (Seibt 2020, 1) are required to shift from a substance to a process view of the world and of literary techniques and novels as dynamic rather than fixed. As philosopher Johanna Seibt observes of substance thinking, "the world of human experience has been presented as an assembly of 'static' entities: substances, attributes, relations, facts, ideas" (2003, vii). Process thinking has a long history in western philosophy, but has been "dominated and overshadowed by substance and atomistic metaphysical frameworks" since around 450 BC (Bickhard 2011, 91), occasioning "an entire tradition in the history of Western metaphysics: the belief that the world is populated with individual things with their own independent sets of determinate properties" (Barad 2007, 19). Karen Barad's use of *tradition* and *belief* here underscore the reach of substance thinking and its power both within and beyond philosophy. Seibt labels this form of unquestioning trust "the myth of substance" (Seibt 2018, 113) and ironically characterises it as irrational in her assessment of the longevity of substance thinking:

> even though we experience our world and ourselves as continuously
> changing, Western metaphysics has long been obsessed with describing
> reality as an assembly of static individuals whose dynamic features are
> either taken to be mere appearances or ontologically secondary and
> derivative. (2020, 1)

In a substance view, a book is a stable, unitary object instantiating an essential "bookness" that conforms with an eternal category, properties such as mass that can be explained in terms of the laws of physics and boundaries that differentiate it from bookshelves or biscuits. Unchanging essence also characterises substance assumptions of a single, authoritative, pure or complete form of the print or digital text of the story, play or poem. In substance models, the content or meaning of the text is also viewed as a fixed product that has been materialised

in printed or digital language. As literary theorist Patricia Waugh points out, substance thinking translates into "the simple notion that language passively reflects a coherent, meaningful and 'objective' world", a notion, she asserts, that is "no longer tenable" in view of the contemporary cultural awareness of the role of language in constructing "our sense of everyday 'reality'" (1984, 3). Regarding fiction, Waugh argues that substance thinking is expressed in

> the forms that correspond to this ordered reality (the wellmade plot, chronological sequence, the authoritative omniscient author, the rational connection between what characters 'do' and what they 'are', the causal connection between 'surface' details and the 'deep', 'scientific laws' of existence). (7)

Waugh contends that novelists have, however, "come to question and reject" such forms based on a substance world view (7) and many literary scholars also question the persistent attachment to substance thinking in literary studies. In genre studies, John Frow argues against "traditional genre theory" and instead advocates a "shift away from an 'Aristotelian' model of taxonomy in which a relationship of hierarchical belonging between a class and its members predominates" (2005, 46). He endorses a more dynamic view of texts as "performances of or allusions to the norms and conventions which form them and which they may, in turn, transform" (48). Andrea Olinger questions depictions of style as fixed and controlled by the author and asserts an associated "neglect [of] style's dynamism and contingency" (2016, 121). In his investigation of narrative time in fiction, Mark Currie decries what he views as "the conspiracy of being and presence which inhabits tense" (2007, 2), a substance perspective on tense I also counter at various points in my thesis with a process dynamics analysis of the mutability of tenses in action. Literary criticism may also perpetuate substance thinking beyond issues of genre and style. Ted Underwood reproaches

literary critics who "try to convert narrative into a timeless structure" (2018, 341), freezing interpretation and denying temporal change. Attridge likewise remonstrates against the idea that in relation to literature "we still talk about 'structure' and 'meaning,' and ask what a work is 'about,' in a manner that suggests a static object, transcending time, permanently available for our inspection" (2004, 59). More broadly, studies into printing and publishing processes (Johns 1998), textual and editorial scholarship (Eggerts 2019), translation (Alves and Jakobsen 2020; Marais and Meylaerts 2019) and the cultural and academic curating of literary value (Koolen et al. 2020; Mack 2010) all challenge substance views of the work as a singular, finished and immutable product. Awareness of dynamism in contrast to substance therefore occurs in literary studies, albeit not, to my knowledge, from a processual perspective. A processual view of dynamics extends literary research with close examination of and new insights into the largely overlooked mechanisms of change in reading and novels. In this thesis, I explicitly argue in favour of dynamic and mutable literary processes and extend my argument extratextually to the cognitive processes that further intensify the complexity and dynamism of reading novels. A preoccupation with essences, edges and stasis, the "dogma of stability" (Schmidt 2011, 224), has given substance thinking enduring power in constructing phenomena as ideal or synchronic and in marginalising or disregarding the experience of "our world and ourselves as continuously changing" (Seibt 2020, 1). Nonetheless, the two thousand year dominance of substance thinking is now subject to process, complexity and dynamic systems alternatives in which the world is neither ideal nor synchronic but "is dynamic through and through" (Dupré and Nicholson 2018, 3). These change-oriented perspectives have rapidly gained in status and influence and suggest ways to reimagine novels as dynamic and mutable during reading.

Process philosophy emphasises becoming and change over static being (Dupré and Nicholson 2018; Seibt 2020). It is concerned with questions about the nature of change, the

mechanisms through which change occurs, types of change and the generation of novelty via change. The difference between substance and process views is fundamental to conceptualising change. Substance philosophy accommodates the idea of change by subordinating it as illusory or accidental, a passing phase at best that leaves the essential thing the same: "the essential elements of existence are given, unchanging and eternal. Actual forms in the world are only copies of these. There is therefore no ontological foundation to change" (Weinbaum 2015, 285). In radical contrast, process philosophy disperses all substance into mutable processes (Dupré 2017, 2). Mark Bickhard outlines the consequences of this substance/process divide for change:

> For a substance or particle metaphysics, *no change* is the metaphysical
> default: any *appearance* of change requires further explanation. For a
> process metaphysics, this default is inverted: *change* is the default and any
> sort of stability or persistence requires explanation. (2017, 182)[4]

My thesis likewise adopts a process philosophy stance and asserts the significance of processes and processual change, taking such processual change as the object of study. In substance metaphysics, basic entities retain their essence in whatever configurations or activities they are entangled; they not only do not change but cannot change. In direct contrast to the substance perspective that considers dynamic features to be secondary, a process view "takes things themselves to be only temporary manifestations of something more fundamental, change, or process" (Dupré 2015, 33); processes not only change but cannot not change.

A processual world view is one of mutable processes flowing through and changing each other, co-creating ever changing conditions. At any timescale, the multiplicity of

---

[4] Throughout the thesis, emphasis in quotes is retained from the source. I signal any added emphasis.

processes endlessly making the world is not complete but is open ended and changeable (Dewey 1929; van Dijk 2020), constantly reconfiguring the "unfinished world" (van Dijk, 8). Regarding stability, process philosophers "do not deny that there are temporally stable and reliably recurrent aspects of reality. But they take such aspects of persistence to be the regular behavior of dynamic organizations that arise due to the continuously ongoing interaction of processes" (Seibt 2020, 1). Persistence in process philosophy inextricably entangles multiple processes and the interactions among them. In this interactive environment some interactions may endure longer than others. In interactions involving processes of different durations and speeds, from the timescales of faster processes, slower processes appear constant. Persistence or stability is, at longer timescales, only temporarily stable. Whether for milliseconds in synapses, minutes in narratives or millennia in geological formations, processes emerge, flourish or fail then vanish at longer timescales as "transient patterns of stability in the surrounding flux, temporary eddies in the continuous flow of process" (Dupré and Nicholson 2018, 13). As film theorist Edward Branigan writes, "thing and thingness amount to a kind of summary or abbreviation of unceasing movement" (2019, 199). In interactions, processes alter each other through disturbances, technically called "perturbations" (Wang 2013, 1), that trigger changes. Any change in processes alters to some degree that which has been persisting; it is then no longer what it was. In such a process view, changeability, not stability, becomes pivotal (Dupré and Nicholson 2018, 13; Prigogine 1997, 26). The physical books in readers' hands or on their screens, for example, have been materially produced through diverse manufacturing processes and remain subject to highly active processes of physical, chemical or digital decay; as novels, books comprise shifting sociocultural processes related to drafting and crafting and to editing, publishing, marketing and academic industries. Novels are textually composed of transitory plays of linguistic, literary, aesthetic and discursive processes. Readers consist of physical, chemical, cognitive and sociocultural

processes interacting in "precarious" (Popova and Cuffari 2018, 2) encounters that alter, disperse or transform incessantly. Reading recruits further cascades of cognitive processes. Books and readers are thus examples of heterogeneous, unpredictable and unending whirls of changing processes. Readers reading novels amplifies such dynamism and complexity; this is the focus of attention in this thesis.

Complexity theory: imbalance and self-organisation

Compared to process philosophy, complexity theory has a generated a much larger body of publications distributed across a greater range of disciplines. There is no single Complexity Theory, but rather a "*corpus* of theories and methods" (Roli 2015, 3), and an identifiable complexity turn (Urry 2005, 1) has inspired debates and research not only in science and mathematics, but also in many other disciplines, including the humanities generally and literary studies specifically. Despite the differing views identified in comprehensive surveys (Alhadeff-Jones 2013; Cilliers 1998; Hetherington 2013; Hooker 2011b; Manson 2001; Morrison 2008), complexity thinking across scholarly fields is concerned with change: "it is well understood and accepted that complex systems are staging a theatre of change and transformation" (Weinbaum 2015, 286). A process view assumes complexity (Dupré and Nicholson 2018; Rescher 2013; Seibt 2020). Complexity theory models of imbalance and self-organisation help to articulate processuality.

Complexity is, by definition, in disequilibrium or flux; instability and change are driven by imbalances. Imbalances occur where interacting processes are not equal. In a reader's complex biology, for example, imbalances in the forms of differing chemical concentrations, uneven spatial distributions, temporal asynchrony, irreversibility, unequal power differentials and discontinuity are all typical of processes interacting and altering each other or generating new processes. Biological reactions cannot be undone and each reaction triggers change. A

human body, once changed, cannot be returned to a previous condition; new conditions replace the old. This thesis posits that novel reading is also subject to imbalances, instability and change. For example, while sequential in whatever order the text is read, reading is not conducted in a smooth linear fashion. Physically, reading is uneven and irregular, accomplished through idiosyncratic eye movements called saccades, fixations and revisits (Faber, Mak, and Willems 2020; Magyari et al. 2020; Schotter, von der Marlsberg, and Leinenger 2018; Weiss 2020). Qualitatively, each eye movement across the text triggers new cognitive processes, new possibilities for meaning and revisions of interpretation, whether minimal or radical. The distribution of imbalances is differential and uneven, depending on the intensity of disturbances. As I show in my analyses, literary and cognitive processes augment, diminish or replace each other, changing their weighting, valence and importance and ushering in new narrative and interpretive conditions. During reading, the known remains unstable and constantly alters and the anticipation of the unknown is also destabilised by constantly changing expectations or speculations, whether these are subsequently realised or not. *Oryx and Crake, The Curious Incident of the Dog in the Night-time* or *The.PowerBook,* once read, cannot be unread and any subsequent rereading, remembering or forgetting contributes to new conditions and generates different interactions. The distribution of imbalances is not fixed but continually shifts, driving yet further reactions and changes.

Driven by imbalances, instability becomes generative: "without instability there is no complexity and no change" (Schmidt 2011, 223). Stability and equilibrium are contingent on the absence of shocks; that is, equilibrium, if instantiated, is "a rare and precarious state" (Prigogine and Stengers 1984, 128). Literary theorist N. Katherine Hayles takes a stronger stance, pointing out that equilibrium "cannot be attained in the real world" (1990, 38) because real world processes are not shielded from each other or from the disturbances generated as a result. For complexity, imbalances are the "default condition" (Clark 1997, 75) and, as for

process dynamics, operate in all processes. Whatever state processes may be in is not stable and changes provide different vantage points for future transitions.

Complexity is distinguished by the propensity of processes to react to and alter each other, resulting in constant reconfiguration. In complexity theories this is termed "self-organisation" (Ashby 1947, 125; Kauffman 1993, xiii); no other input than the processes operating on each other is necessary. However tempting, implying an executive, controlling self or purpose either internal or external to what in science is labelled a system is a misreading of the term's usage: "the system organized itself, but there is no 'self', no agent inside the system doing the organizing" (Kelso 1995, 8). Both process philosophy and my process dynamics approach also work with the idea that nothing other than the action of processes on each other is necessary; whichever processes are interacting are in this sense both necessary and sufficient for self-organisation. For process dynamism in literary encounters, continuous self-organising occurs through literary and cognitive interactions and changes activated by reading. From a process dynamics perspective, the vocabulary of "self-organisation" risks invoking intention and attainment of some ideal state. I retain the term self-organisation under caveat and try to use alternative vocabulary such as "morphing" or "reconfiguring" wherever possible. For process dynamics, neither intention nor final state is necessary; rather, co-creating, morphing or reconfiguring through processual interactions is continual, dispersed unevenly across interacting processes, teleologically indifferent and transient, continually generating new conditions in which new interactions are launched.

Cognitive science of reading

Process philosophy shapes my process dynamics focus on processes and change, and complexity thinking helps frame process dynamics as operating through imbalances and self-organisation. Moving from frameworks informing analysis to objects of analysis involved in

reading novels, cognition and reading offer clear examples of processes, change, imbalance and continual reconfiguration in action. In this thesis, my perspective on the cognition of reading and interpretation is inclusive of "microcognitive" (Clark 1989) processes in subconscious physiological and neural modes, "macrocognitive" processes in consciously experienced reading, thinking and responding modes and "sociocultural cognition" in modes dynamically generating discursive knowledge and situated experience, beliefs and attitudes (Downey and Lende 2012; Frank et al. 2008; Han and Pöppel 2011; Sharifian 2008; Tenenberg and Knobelsdorf 2014). Importantly, microcognition, macrocognition and sociocultural cognition are not isolated; cognition and interpretation involve interaction among modes and across scales. In a world in which cognition is lavishly distributed through volatile neural and non-neural interactions, cognition operates in plays of shifting dominance and significance, with no single process permanently dominating. Imbalances ensure that human cognition is permanently poised to change.

Like cognition generally, reading involves immensely complex and dynamic cognitive processes and interactions at multiple spatial and temporal scales and is thus a useful exemplar of the dynamics in play in cognition. Microdynamic or microscale cognition, or microcognition, refers to rapid, subconscious electrochemical and neural interactions at very small scales operating at times measured in milliseconds. For example, visual recognition of a familiar object such as a printed word seems to occur instantaneously but processing occurs for around 170 milliseconds before visual recognition is achieved (Caplette et al. 2020), with semantic processing taking longer, at around 585 milliseconds (Giari et al. 2020). This processing is so fast that it is not consciously experienced. These well-known delays in the order of milliseconds between microcognitive onset and conscious experience apply to all cognitive processing (Blom et al. 2020, 7510); conscious experience is delayed by the particular microcognitive processing times involved. Microcognitive processes are therefore

conceptually differentiated from consciously experienced macroscales of cognition such as completed word recognition, interpretation or memory retrieval. As there are multiple microcognitive, macrocognitive and intermediate scales (Nani et al. 2019), these "category divisions are convenient and contingent, rather than absolute and natural" (Stockwell 2020, 361). Whether a process is considered to be micro or macrocognitive depends on analytical requirements. For the purposes of analysing the interplay of cognitive processes with literary processes and of differentiating modes of cognition, cognitive processes are crudely divided in this thesis according to whether they are subconscious (microcognitive) or consciously experienced (macrocognitive).

Reading processes have the capacity to interact with and change each other, regardless of scale. For example, reading a word may microcognitively trigger connotations and associations and generate a macroscale emotional reaction; or a macroscale cognitive response to a prior moment in a text may trigger new microscale cognitive processes in a new moment of reading as that new moment arrives. An everyday example may serve to illustrate microdynamics and their involvement in cognitive interactions across scales:

> While writing this article, my attention is absorbed in the content of the ideas I am trying to express, but I am hardly aware of the rapid succession of inner comments, light emotions, evaluations and comparisons that I realize instant after instant to find the right words and evaluate their appropriateness. While reading this sentence, are you aware of the rapid sequence of micro-operations that enable you to go from the words to their meaning, paced by several saccadic eye-movements each second?... This blindness to the dynamics of experience seems to affect most, if not all of our cognitive processes, from the most concrete to the most abstract.
>
> (Petitmengin and Lachaux 2013, 1)

In other words, cognition during reading not only occurs across scales but also has impacts in multiple directions (Orr et al. 2019, 5); micro and macrocognition alter each other. This view of cognition accords with process philosophy and complexity theory, in which processes at all scales are also conceptualised as interactive, changeable and transient (Dupré and Nicholson 2018; Hooker 2011a; Seibt 2020). Taking a process perspective and viewing both written literary techniques and cognitive activities as processes more clearly emphasises their dynamism and changeability than is generally recognised in literary studies. It also recognises their complexity; all processes both comprise and interact with further processes and their interactions constantly change the conditions or situation being co-created.

Reading is a volatile encounter in which processes are temporary and subject to constantly arriving new literary and cognitive disturbances, or perturbations (Asutay et al. 2021; Barrett 2017; Pulvermüller and Fadiga 2010). As reading continues, multiple asynchronous microscale interactions, all subconscious, may involve attending to and subsequently processing incoming information (Caplette et al. 2020), selective attention activity, (Antonov, Chakravarthi, and Anderson 2020), salience detection (Hegarty et al. 2020), prediction (Clark 2016; Hohwy 2020; Kukkonen 2020), retrieval of associative memories (Derner et al. 2020), selective retrieval of specific features of a concept or memory (Zhang et al. 2021) and processing of positive or negative response (Pfeiffer et al. 2020). For example, memory implicates multiple dynamic microcognitive processes, leading to changes:

> On the cognitive-behavioral level, the innocent act of remembering can
> irrevocably alter the contents of established long-term memories, while the
> content of dormant long-term memories that is deemed irrelevant,
> superfluous, or limiting may be pragmatically erased or suppressed. On the
> cellular level, the proteins implementing the molecular alterations
> underpinning memories are in a constant state of flux, with proteins being

turned over, translocated, reconfigured, substituted, and replaced. (Hardt

and Sossin 2020, 1)

Turbulent processes such as these occur anew with every new moment of reading, including

during rereading, and this constant barrage of new interactions interacts with a "considerable

overlap" (Grieben et al. 2020, 777) of perturbations from previous interactions such as those

contributing to working memory or on the fly interpretations. At slightly longer but still

subconscious temporal microscales of cognition, other processes in diverse anatomical and

sociocultural modes also interact with literary processes. Readers subconsciously execute eye

movements in individual patterns (Faber, Mak, and Willems 2020; Magyari et al. 2020;

Sereno et al. 2018; Weiss 2020). Microcognitively, while saccading, fixing and revisiting,

readers skip over chunks that, for them, inspire or demand little cognitive effort (Faber, Mak,

and Willems 2020), but pause at or return to points of difficulty, ambiguity, importance or

surprise (Faber, Mak, and Willems 2020; Joseph et al. 2014; Taylor and Perfetti 2016).

Reading is thus shaped by the unpredictable processes in play for a specific reader at a

specific time. As reading continues, it largely unconsciously (Burke 2015; Hayles 2017)

generates a "neurological tempest" (Keidel et al. 2013, 919) as readers microcognitively

make associations with other ideas and activate individual memory recall processes (Derner

et al. 2020). Purpose for reading is one perturbation among many that triggers "subsets of

features and associations that are relevant to the current task or context" (Zhang et al. 2021,

1). Reading novels is an encounter in which rapid and immensely complex bombardments of

microcognitive processes that Emily Troscianko labels "unexperienceable" (2017, 172)

interact with partially experienceable macroscale processes involved in memory, prediction,

evaluation, speculation, imagination and learning.

Other microcognitive processes related to arousal and response may be simultaneously

involved in reading, leading to macroscale alterations in temperature or heartbeat (Dames

2007; Fiacconi and Owen 2015), or visceral and emotional reactions of variable intensities, perhaps sadness, disgust, amusement, anger (Kissler et al. 2007), or boredom, again in individual patterns and intensities (Hall et al. 2016, 3). Reactions may be visible or audible in, for example, smiles or laughter (Thielemann 2020, 124) or a sharp intake of breath. Reactions to the multisensory stimulation of sight, sound, feel, smell and taste in the physical environment during reading, in handling a physical or digital book or listening to an audiobook and in responding to sensory imagery as it is read, all impact on interpretation (González et al. 2006; Spence 2020). Garret Stewart asserts that "when we read to ourselves, our ears hear nothing but we nonetheless listen to the acoustics of textuality" (1990, 11). The acoustics of reading occurs, for example, "in the throat through subvocalization" (Hayles 2017, 200). Processes interact both within and across modes; motor and neural processes during reading such as "oculomotor coordination and attention" and physiological responses to material being read (Berns et al. 2013, 598) interact with each other. Research into the impact of reading on perceptual and motor cognition demonstrates that "language processing elicits perceptual simulation: readers perceptually simulate the motion, action, odour, and other information described in text during reading" (Zhou and Christianson 2016, 974). While this activation of neural processes while reading or witnessing an action does not necessarily trigger actual bodily movement, action or smell in readers (Wojciehowski and Gallese 2022, 62), imagining movement or smell involves at least some of the same neural processes as executing movement or smelling a particular scent or odour (González et al. 2006, 906). The emotional responses to, for example, events befalling fictional characters, and even physical reactions such as tears "aren't less real than those we experience when engaged with real others; they can, in fact, sometimes be much stronger. This phenomenal quality is accompanied by the activation of part of the same brain circuits that underpin our real-life experiences" (Wojciehowski and Gallese 2022, 62). Reading is also expressed

physiologically in "the viscera through embodied responses, the circulatory system through increases or decreases in blood pressure, the central nervous system through pupil contraction and dilation in response to suspenseful or peaceful passages and a host of other embodied or affective reactions" (Hayles 2017, 200). Georges Letissier labels this cognitive interaction "somatic reading", which he argues "refers to all the bodily effects induced on a subject by the activity of reading —that is, all the physiological responses elicited by printed words on a page" (2020, 95). The diverse cognitive processes activated by reading ensure that reading is inescapably idiosyncratic and physical. Thomas McLaughlin concurs:

> Bodies read. Nerves, muscles, hands, brains—flesh and blood adapted
> precisely to the task of reading; in and through that task connecting to
> language, society, culture, history; in and through that connection producing
> mind, consciousness, textual experience… Yet, all reading bodies are
> unique, differently capable, and differently socialized. Reading practices are
> enacted by specific, idiosyncratic bodies in concrete, complex physical and
> social environments. (2015, 2)

As well as reacting physically, individual readers become immersed in reading to varying extents (Barnes 2018; Jacobs and Willems 2017; Kaakinen and Simola 2020; Thompson et al. 2018) as they "imaginatively (emotionally, viscerally) inhabit a world" in which, "things matter, agitate, exalt, repulse, provide grounds for laughter and grief" (Herman 2002, 16). David Herman asserts, like Letissier and McLaughlin above, the somatic dimensions of reading, emotion and imagination. Emotions and imagination are not properties of a novel or its literary techniques, though they may be depicted, but emerge, where they occur, through readers' cognitive interactions with and responses to literary processes. Immersion is not uniform but destabilised by changing interactions as "an intermittent process, stimulated by multiple immersive features which interact" (Bell et al. 2018, 1). Unconscious processing

interacts with conscious reasoning to trigger continual changes during what Attridge calls the "living-through of the literary" (2004, 3). These writers argue for the "physicality of reading" (McLaughlin 2015, 2) in addition to the psychological and sociocultural cognition more familiar in literary studies. For Elaine Auyoung, this awareness of cognitive interplay represents "a new form of critical attention, approaching the words of a text not as bearers of interpretive meaning but as cues that prompt readers to retrieve their existing embodied knowledge, to rely on their social intelligence, and to exercise their capacities for learning" (Auyoung 2018, 18). My argument extends to dynamic interactions and impacts *among* the different modes and scales of cognition that are only just beginning to be acknowledged in literary studies.

As a corpus, experimental cognitive studies demonstrates the inveterate dynamism of neural processes during reading. Experimental neuroscience is moving away from classical perspectives that attempt to account for cognitive activities exclusively in terms of brain regions dedicated to specific functions such as sight or hearing, a model that "isolates brain regions according to what they do (their functions)" (Hogan 2014, 294). In a recent trend pertinent to reading and interpretation, this zoned territory conception of the brain is being challenged by a dynamic view of dispersed neural activity during cognition: "the very description of brain structure— its 'atlas'—is undergoing radical revision, moving from a bewildering array of Latinate locations, to an interacting set of 'large-scale intrinsic networks'" (Comer and Taggart 2021, 13). In other words, particular anatomical structures in specific parts of the brain are necessary but not sufficient for sight or hearing and cannot produce sight or hearing in isolation. In an important move away from a substantive idea of fixed brain regions toward a processual conception, neural "networks" are considered to be interactive and mutable. For example, surveys of experimental studies on emotion have found that neuroscientific studies that attempt to localise and isolate "the specific neural basis of a

31

mental category and distinguish it from other categories were consistently unable to do so" (Barrett and Satpute 2019, 11; see also Kober et al. 2008, 998). The studies I cite in support of process dynamics instead posit distributed and variable neural activity across neurons and at multiple cognitive scales, activity that continually changes in response to the play of interactions in "the situation at hand" (Barrett and Satpute, 15). Neurocognition operates through imbalances, not least as complex neural processes are asynchronous in that they have different onsets, speeds and durations (Moutoussis 2014). Cognitive processes are continuously subjected to perturbations from interactions among those processes already in play (Guenther, Ghosh, and Tourville 2006, 281), and to further perturbations from to constantly arriving new processes (Adolphs, Mlodinow, and Barrett 2019, R1061; Asutay et al. 2021; Pulvermüller and Fadiga 2010). This dynamic picture is in contrast to neuroanatomical models that map cognitive activity such as language production or emotions onto particular brain areas. Depending on processes in play in a situation, a cognitive process may be performed at different times by shifting or different mixes of neighbouring neurons, temporary "dynamic communities or subnetworks" (Barrett and Satpute 2019, 14) and transitory collocations of interactions in brain regions, rather than being "consistently and specifically localized to a specific swath of brain tissue" (10). Each neuron or "shifting population of neurons that maintain a network over time" (14) is also able to act in a range of cognitive processes (12). Lisa Barret and Ajay Satpute identify "a shift away from the essentialism of classical views towards a more dynamic, contextual and constructionist approach" (15) with a consequent transformation in understanding of cognition. The expanding body of neuroscientific findings regarding microcognitive distribution and dynamism reconfigures macrocognition as intensely dynamic, transitory and mutable. In these newer approaches, cognition is dispersed and subject to imbalances and continual reconfiguration. For literary studies, this entails a new recognition of the mutable nature of

reading and interpretation. A conception of reading and interpretation as live action requires more open engagement with unpredictable interpretative possibilities.

As this thesis offers a conceptual construal of process dynamism in literary texts, it is not within its scope to offer a comprehensive empirical analysis of a specific reader reading. However, in drawing on empirical research on cognition, it is important to understand what experimental science does and does not offer process dynamics. Experimental scientific studies help to demonstrate that the processes involved in reading and interpretation are complex and dynamic. This they do by measuring bursts of altered neural or physiological activity that occur at onset and during reading. These experimental studies are nonetheless limited to measuring the measurable, for example, brain or eye activity or physiological activity such as chemical changes, and inferring interpretive activity from these measures (Hall et al. 2016). As methods for collecting data, electroencephalogram (EEG), functional magnetic resonance imaging (fMRI) or eye tracking studies, for example, are highly constrained by controlled testing conditions (Grieben et al. 2020) and the classical scientific imperative of replicability in the service of determining patterns, rules and laws (Nastase, Goldstein, and Hasson 2020).

Scientific studies of cognition have other limitations and are not sufficient to account fully for the experience of reading novels. Literary scholars Josephine Guy and colleagues detail what they term the "abnormality" (Guy, Conklin, and Sanchez-Davies 2018, 210) of manipulations of text and reader to suit experimental equipment. Paul Dawson reiterates the literary reluctance to accept data about reading literary texts: "the empirical approach remains open to the charge that it does not study real readers so much as lab-rat readers" (Dawson 2013, 230). Calls by literary scholars for studies of "real" readers reading unadulterated texts instead of studies of "an 'idealised' reader or an 'experimental' subject-reader often derived from within the academy and conducted using contrived or amended literary fiction"

(Canning 2017, 172) in fact resonate with recent calls by neuroscientists for "naturalistic" (Jääskeläinen et al. 2021; Hartley and Poeppel 2020; Nastase, Goldstein, and Hasson 2020; Orr et al. 2019; Petitmengin and Lachaux 2013) or "ecologically valid" (Eekhof et al. 2021; Fitz et al. 2020; Willems, Nastase, and Milivojevic 2020) neuroscientific studies that take sociocultural context into account. More importantly, rather than aggregating results and so obscuring detail, neuroscientists are beginning to value idiosyncrasy and to "account for trial-by-trial variability of neural responses at different spatial scales and in different individuals" (Levi-Aharoni, Shriki, and Tishby 2020, 1). While "in our view, this research is to be lauded for the richness of the stimuli, their evocative properties, and the idiosyncratic personal experience elicited in each listener or viewer" (Hartley and Poeppel 2020, 598), neuroscientists Catherine Hartley and David Poeppel also indicate that there is a long way to go to link brain matter directly with thought or emotion: "the insights remain by-and-large correlational, not explanatory" (599). For literary studies, Guy and colleagues assert that empirical studies of reader behaviour are "most robust" when triangulated with qualitative participant questionnaires or discussion (2018, 298) in order to derive readers' reported responses to or interpretations of texts; a method that matches recorded data with reported reception. Even in combination with reports from participants, however, experiments attempt to single out specific processes and interactions and typically do not do justice to the heterogeneity of readers or to the full scale of interactions involved in real time reading and interpreting in real world contexts. Data from empirical studies, whether experimental or collated from questionnaire responses, also tends to be statistically aggregated and to exclude outlier data in an "attempt to eliminate variability, uncertainty, and 'noise' " (van Geert and de Ruiter 2022, 266). Data are homogenised to produce a normative set of reader responses, or as Dawson observes, data analysis "collapses reader responses to a narrative into universal shared mental processes" (2013, 225). In this way, empirical neuroscientific studies may

replicate the sort of idealising demonstrated by models in literary studies of competent or ideal readers, or alternatively, may produce a stereotypical model of a particular group of readers, as can be seen in some studies of autistic readers that do not provide "distinct profiles" of participants (McIntyre et al. 2017, 1089).

Nonetheless, scientific studies of cognition should not be dismissed as irrelevant to literary studies. Participating in an experiment concerning, for example, textual humour (Beckinschtein et al. 2011; Nakamura et al. 2018; Chang et al. 2019; Ku et al. 2017), metaphor (Bambini et al. 2019; Benedek et al. 2014; Mashal et al. 2009) or narrative (Xu et al. 2005; Yarkoni, Speer, and Zacksa 2008) is a particular, if severely constrained, encounter involving literary and cognitive processes in interactions that impact on interpretations. Experimental studies are gradually becoming more sophisticated at differentiating nuances in electrical and chemical interactions and also in coping with a wider diversity of readers (Finn et al. 2020; McIntyre et al. 2017) and more naturalistic (Nastase, Goldstein, and Hasson 2020; Branzi et al. 2020) and socioculturally attuned contexts (Han and Pöppel 2011; Frank et al. 2008; Kronenfeld 2008). The language in the scientific literature is tentative and indicates the provisional nature of findings; in other words, experimental science of this kind is speculative. Despite the methodological limitations of experimental cognitive science, the body of experimental findings affirm the complex and, most importantly for my argument, intensely dynamic interactions occurring during reading. In its attention to the intense activity operating at extremely small timescales, neuroscience in particular offers a radically dynamic perspective. The seething processes and interactions that are masked or eclipsed at consciously experienced timescales become perceptible. This fierce rush of activity is of enormous consequence for literary studies; without it, reading and interpretation do not occur and with it, changes are inevitable. My contention that the interaction of literary and cognitive processes is complex and dynamic takes from neuroscience an appreciation of the

enormous complexity and intense dynamism that drives cognition. For process dynamics, complexity is evident in the numbers and modes of literary and cognitive processes, dynamism in the ceaselessly shifting interactions and impacts among them. In turn, my analytical attention to the interplay of text and cognition offers new dynamics readings not only of three novels but also of the cognitive processes those texts may trigger.

Despite this, neuroscience alone cannot account for reading or interpreting. Neuroscience can only offer accounts of neural activity; the electrical or chemical data collected do not demonstrate readers' interpretations of texts (Fitzpatrick 2012, 183; Armstrong 2020, 3). Interpretations of data in neuroscientific experimental studies in effect build speculative stories about the data they collate. Some neuroscientists are quite adventurous in employing concepts from nonscientific fields. Frameworks from other disciplines that have been used to develop stories about neuroscientific data include Mukařovskýs literary theory of foregrounding (Hartung et al. 2021), Iser's literary reader response theory (Jacobs and Willems 2017), Jakobsen's structuralist literary theory (Jacobs 2015); Theory of Mind (Canal et al. 2019) or simulation theory (Mak and Willems 2019) from psychology; incongruity theory from philosophy (Nakamura et al. 2018; Beckinschtein et al. 2011) or affordance theory following Gibson (Zhang, Lu, and Hodges 2019). Neuroscientists Roel Willems and colleagues explicitly assert the value of narrative (Willems, Nastase, and Milivojevic 2020, 271) and of humanities frameworks (273) for neuroscientific research. A cross-discipline study by literary scholar Christopher Comer and neuroscientist Ashley Taggart assesses the value of neuroscience and literary studies to each other in favour of literary studies: "we would argue that, as of now, literature, and literary understanding, is offering much more to neuroscience than the converse" (Comer and Taggart 2021, 387). My interactive perspective on dynamics asserts the necessity of both

literary and cognitive processes to reading novels and posits constant transfers of dominance and significance among those processes as they interact.

Cognition in literary studies

This thesis also draws on work on cognition in literary studies. The review of cognitive literary studies that follows is of necessity compressed and does not trace all avenues of research in detail but identifies salient findings from cognitive and neurocognitive literary studies. Without denying the importance of consciously experienced macroscale cognition, this thesis emphasises microdynamics, a research strategy intended to help reduce research gaps in literary studies concerning both microcognition and dynamics.

Dynamism is implied in the second of two major trends in cognitive literary studies:

> The first is the "classical" approach, which stresses abstraction and rules or recurrent patterns. The second, referred to as "situated cognition", stresses the ongoing processes of interaction with the world. Simplifying, we might say that the former focuses on constancy, while the latter emphasizes contingency and change. (Hogan 2014, 296)

The classical approach seeks the fixity of laws, imposing universal descriptions and invariable properties on cognition. In contrast to the "classical" approach, a "situated" vision of impacts on cognition from distributed sources informs much of recent theoretical and empirical cognitive literary studies. As encapsulated in currently influential 4EA (Feiten 2020) models of cognition, cognition is *embodied* via neural, sensorimotor and other physiological processes, *embedded* or specifically situated in a biosociocultural environment, *enactive* in its responses to and capacity to act on the world, *extended* though interactions with environmental, social and cultural processes (Shipp and Vallée-Tourangeau 2019; Newen, De Bruin, and Gallagher 2018) and *affective* in emotional responses or mood

(Colombetti 2014). Literary studies of issues such as empathy (Fernandez-Quintanilla 2020; Keen 2007), real readers reading (Canning 2017; Martinez and Herman 2020), experientiality (Caracciolo 2014; Gavins 2007) or affect (Hogan 2011; Hogan, Irish, and Hogan 2022) recognise the individually situated knowledge and experience that is involved in reading. As part of the growing push in cognitive studies across science and humanities fields for more naturalistic research into environmental and sociocultural factors (Grieben et al. 2020; Nastase, Goldstein, and Hasson 2020; Orr et al. 2019; Petitmengin and Lachaux 2013), literary reader response research is beginning to reinforce the necessity of working with, rather than suppressing, dynamic real time interactions among text, reader and reader's lived world (Canning 2017; Fernandez-Quintanilla 2020; Gavins 2007; Martinez and Herman 2020; Peplow and Carter 2014). Nonetheless, as Carolina Fernandez-Quintanilla concludes, "the interplay between textual and reader factors needs further research" (2020, 141). In this thesis, I take up this challenge by repositioning the concepts of text and reader as processual and investigating the complex dynamism of interactions among diverse literary and cognitive processes during novel reading.

While cognitive literary studies is now an established area of research into the role of cognition in reading and responding to literary texts, newer lines of research at the intersection of literary studies and neuroscience are emerging in both science and literary studies. These include, for example, neuroscientific studies that specifically attend to literary texts or literary concepts in order to examine the neural processes involved in literary aesthetics (Hartung et al. 2021), fiction (Hartung et al. 2017; Jacobs and Willems 2017), metaphor (Hartung et al. 2020; Jacobs and Kinder 2018), pronouns (Hartung et al. 2016), narrative (Willems, Nastase, and Milivojevic 2020; Magyari et al. 2020; Jacobs 2015; Song et al. 2021) and direct and indirect speech in silent reading (Yao and Scheepers 2018; Yao 2021). As a collection, these and related studies provide evidence of the different neural

processes and interactions involved in reading literary texts. These scientific studies adopt literary frameworks and concepts but do not engage in textual analysis along with their focus on neural processes and so do not offer a rich portrait of literary experience; nor are they designed to do so. In contrast, I use close textual analysis in conjunction with evidence from cognitive studies, a method which, I hope, yields rich visualisations of the dynamism that drives literary experience of reading novels.

In literary studies, work is emerging with a dedicated focus on neurocognition but in this small body of neurocognitive literary studies there is as yet little output focussing on the compositional specifics of particular texts or the neurocognitive processes involved in reading those specifics. My thesis begins to address this shortfall. Typical of a literary field establishing itself, some neurocognitive literary studies are concerned at least in part with legitimation, "the rich possibilities that open when nonconscious cognition is taken into account" (Hayles 2017, 1), or of each field in the other (Armstrong 2020; Comer and Taggart 2021). Other studies identify recently emerging neurocognitive cultural studies (Vernay 2021) or neurocognitive literary studies trends (Vernay 2022) or contribute to work on neuroaesthetics (Armstrong 2013; Burke 2015; Jacobs and Willems 2017; Miall 2009; Pearce et al. 2016) across the arts. Of recent publications, some (Armstrong 2013, 2020; Comer and Taggart 2021; Hayles 2017) extensively cite scientific research, as I do throughout this thesis; my aim is to work with current neuroscience research, which "has now accumulated insights about mental life that we did not possess a decade ago" (Comer and Taggart 2021, 13). Those neurocognitive literary studies that include analysis of texts typically focus on representations of neurocognition in the texts, discussing the narratives about neurocognition that the texts present (Comer and Taggart 2021; Hayles 2017; Vernay 2022). In her explicit focus on microcognition that is "inaccessible to conscious introspection but nevertheless essential for consciousness to function" (Hayles 2017, 1), Hayles draws in part on experimental

neuroscience to reiterate that "cognition is a process" (25). Where her study concerns literary processes, Hayles limits her literary discussion to fictional representations of the entanglement of microcognition and technology, offering thematic analyses of Tom McCarthy's *Remainder*, Peter Watt's *Blindsight* and Colson Whitehead's *The Intuitionist*. Comer and Taggart (2021) similarly include textual analysis of Ian McEwan's *Saturday: A Novel* and E.L. Doctorow's *Andrew's Brain* but again, the analysis is thematic, tracing the depiction of neurocognition in fictional characters. Important as thematic analyses are in positioning novels in an "age of neuroawareness" (Vernay 2022, 1), I suggest that there is also room for a different line of inquiry; close inspection of the literary and microcognitive interactions during reading that co-create narration and interpretation.

Paul Armstrong's two theoretical studies, on neuroscience and aesthetics (2013) and the neuroscience of narrative (2020), take an explicit stance on the productive interplay of neuroscience and literature. Armstrong's work concerns "the correlations between our lived, embodied experiences as tellers and followers of stories and the neurobiological processes that underlie and constrain these interactions" (Armstrong 2020, 2). Over the two monographs, Armstrong aligns neuroscientific and literary findings to argue for an overarching binary model for both fields of "harmony and dissonance" (2013, ix; 2020, 1). The binary model is posited for cognition in the brain's "need for pattern, synthesis, and constancy and its need for flexibility, adaptability, and openness to change" (Armstrong 2013, ix; 2020, 11). The model is also proposed for narrative, in which "the imbalances of discordant concordance in narrative are inherently dynamic" (2020, 141-142). Armstrong's (2020) study compellingly threads findings from neuroscience research through theoretical discussions of narrative temporality, figuration and the social powers of narrative. His 2020 study provides a significant counterbalance to literary research that only looks for patterns and persistence, thereby obscuring or minimising the dynamics pervading narrative and

cognition. I also draw extensively on neuroscientific research that "can tell us much about the brain-body-world interactions that generate stories" (Armstrong 2020, 4) but my findings weight change more heavily than pattern formation, differing from Armstrong's model. My analyses find that pattern formation in literary or cognitive processes is more vulnerable to disturbances and change than persistence. To reiterate processual views that inform my approach, change is the "default" (Bickhard 2017, 182), instability is generative (Schmidt 2011, 223) and processes emerge, flourish or fail then vanish at longer timescales in a processual world (Dupré and Nicholson 2018, 13). While Armstrong's study asserts shifting tensions between "equilibrium and disequilibrium" (2020, 59) in both narrative and cognition, I find that reading novels triggers cascades of turbulent, transient and unpredictable literary and cognitive interactions. Apparent equilibrium dissolves into dynamic processes in which disequilibrium is not eliminated but instead triggers further disequilibrium; this disequilibrium in turn permits further interaction and change. Disequilibrium drives both infinitesimal and radical changes and in this sense enables the *play* of harmony and dissonance. My interest is in the play itself. Here, I suggest, disequilibrium dominates.

Summarising my findings on cognition and reading, cognitive literary studies currently largely focus on readers, especially on their sociocultural situatedness, and draws mainly on cognitive psychology to treat the reader as subject and to examine reader responses such as affect, empathy or immersion. Situated knowledge and experience, or sociocultural cognition, is crucial for reading prose fiction but is not the only mode of cognitive interactivity involved. This thesis highlights a different set of microcognitive processes that as yet receive limited attention in literary studies. Neuroscientific studies of reading provide empirical evidence for cognitive dynamism during reading and interpretation, the unending cascades of processes and interactions that occur as reading continues and interpretations alter. Drawing

on this work, I shift attention from reader to reading processes. In doing so, I arrive at an understanding of reading novels as intensely complex, dynamic and changeable.

The literature reviewed above shows that studies in situated, embodied cognition demonstrate increasing affinity with process philosophy (Bickhard 2008), shifting "further into the direction of a process-based philosophy" in their focus on interactions among mind, body and world processes (Seibt 2020, 33). Research employing complexity theories is now widespread in literary studies many forms that do "metaphorical, theoretical and empirical work" (Urry 2005, 2) but complexity literary studies are yet to explicitly employ a perspective informed by process philosophy My theoretical approach to process dynamics draws on current work on dynamics in process philosophy, complexity theories and cognitive sciences and so attends to the astonishing and largely unsung diversity of literary and cognitive processes brought into encounters with each other, the constantly shifting plays of dominance, valence and significance among them as reading occurs and the unpredictable variability of narrative and interpretation that is generated. In its articulation of process, change, imbalance and self-organisation, my process dynamics approach offers new insights into the real time dynamics of novel reading.

Key process dynamics concepts

In this chapter section, I first indicate the significance of dynamic vocabulary choices for my argument, then introduce the key process dynamics concepts of encounter, process, interaction, perturbation, morpharchy, dispersal and creativity.

Approaches to dynamics in the physical sciences, cognitive science, social sciences and humanities are heavily imbued with technical terms such as relations, networks, assemblages, ensembles, arrays, matrices, folds, meshes, systems, rhizomes, knots and nodes, elements and components. In all cases, these are spatial metaphors. Metaphors do important conceptual

work, not least in that "when metaphors bring *x* and *y* together, they raise possibilities, open up new perceptions, generate enquiry" (Sell 2000, 250). Nonetheless, it is difficult to sustain a sense of dynamics and change with the use of spatial metaphors as they are often based on fixed identities and essential properties. Conceptually, spatial metaphors use the source domain "space" to understand something that is not spatial (de Joode 2019, 47). Of relevance specifically to the argument in this thesis, spatial metaphors are limited in their ability to conceive of nonspatial transience or change. Antony Galton argues that "no purely spatial metaphor can capture the transience of time. All metaphors for temporal transience take some kind of change as their source" (Galton 2011, 695). The metaphor of transience "time flies", for example, suggests both process and change as well as a qualitative sense of loss, anxiety or warning, depending on context, or perhaps reassurance that an undesirable situation will pass. In this thesis, I try to replace spatial metaphors with more relevant dynamic metaphors.

A further limitation of spatial metaphors is that they tend to transmit a passive sense of quantifiable multiplicity, intricacy and unbroken linkages among "established points or nodes" (Rickert 2013, 122). In his discussion of rhetoric, for example, Rickert struggles to escape the restrictions of spatial metaphors. Spatial vocabulary such as he uses in "everything is intertwined and involved with everything else" (120) does not obligate change, so, like many other writers, he qualifies or explains in order to add a dynamic dimension to such expressions: "twisting, changing, and co-adapting: nothing is stable" (120). Writing about complex systems and narrative, Richard Walsh sidesteps from a substance to a potentially processual approach in order to introduce a dynamic dimension: "a system is something. All the interesting questions, though, have to do with what this something does" (Walsh 2018, 50). Yanna Popova explicitly rejects the fixity of spatial conceptions of narrative "expressed by a static configuration of relationships between units" (Popova 2016, 492) for their inability to address change. I approach the question of change by focussing on what literary and

cognitive processes do in interaction. In order to do so, I minimise spatial language, using it where appropriate, and privilege a vocabulary of transience and mutability. My choice of vocabulary brings into focus movement, shifts and changes that are often obscured in literary studies. This language of dynamism helps to construe dynamism as actively wrought through profuse plays of transformations among heterogeneous processes interacting in ever-changing encounters. The concepts I present next help articulate how these dynamics work and allow a more precise description of the process dynamics utilised in this thesis. I begin with the process dynamics term **encounter** and then introduce the terms **processes, interactions, perturbations**, **morpharchy, dispersal** and **creativity**. I further contextualise and apply these concepts in subsequent chapters of the thesis.

Encounters

I use "encounter" rather than "excerpt" or "passage" or "quote" because excerpts, passages and quotes refer to text only and exclude cognition. Building on process, change, imbalance and self-organisation, my process dynamics term "encounter" refers to change over time as the expected and unexpected, material and abstract, interact and impact on each other. While complexity refers theoretically to the transformative interplay among multiple heterogeneous processes, my use of the term "encounter" nominates the complex play of processes involved in specific occurrences, for example reading a novel, watching a film, conducting a scientific experiment, holding a conversation, being ill, performing a dance, or attending a protest rally. Encounters may occur in the absence of language, such as dancing or making music and in the absence of the human, for example chemical or environmental interactions. For reading, encounter applies at all temporal scales, including each of the sittings that may comprise reading a novel or each of the narrative moments that may comprise a sitting, as all temporal spans that may be nominated are themselves complex and dynamic encounters. In this thesis, encounter is preferred to complexity terms such as

"system" or "network". Encounter concentrates attention on occasions of live action in ways that system and network, as spatial models, do not. For example, labelling a film, experiment, conversation or novel a system or network may limit description to a snapshot that fixes relationships spatially and synchronically at the expense of dynamics over time. An encounter is live action created by specific processes that dynamically interact with and change each other. As an encounter, any moment of reading is live action created by specific literary and cognitive processes interacting and changing each other. In this thesis, I argue that literary and cognitive processes are brought into proximity by reading and that they alter each other and thereby change the conditions of the encounter; borders and barriers dissolve into moments of intense processual dynamics. Literary and cognitive interactions continually change during an encounter. In other words, an encounter constantly changes over the time it occurs.

As for any study, analysing an encounter is limited methodologically for particular purposes, selecting processes and interactions deemed salient to that purpose. Encounter is used in this thesis to draw attention to a specific interaction or interactions of some selected duration with attention being directed for practical purposes, such as examining the dynamic operation of style or narration or subconscious or conscious cognitive processes. Designating an instance of reading an encounter delimits the analysis.

I use "encounter" to emphasise the dynamic, contingent, often serendipitous, ephemeral and unpredictable character of interactions among literary and cognitive processes during reading. Encounter in this sense includes the "emergence within the reader's set of assumptions, routines, and expectations of an element of foreignness, something unanticipated, not immediately graspable, at a tangent to ingrained habits of thought and feeling" (Attridge 2010, 83). Encounter therefore also evokes the accidental or unexpected as

sentence after sentence unfolds for readers through interactions. In encounters, interaction and changes are unpredictable.

Processes

Encounters are comprised of interacting processes; each encounter is co-created by its own specific processes. Processes are dynamic and mutable, involving the change, imbalance and reconfiguration identified in my discussion of process philosophy and complexity theory. A process is broadly defined as "the course of becoming as opposed to static being" (OED Online). In a processual view, processes occur over some duration, involve doing and, most importantly, undergo changes; a process "depends on change for its occurrence" (Dupré and Nicholson 2018, 12). Processes are dynamic in at least three ways. First, any process identified or named is already complex. A term such as past simple verb is a shorthand abbreviation for complex, shifting plays of semantics, times, aspects and conventions that are specific to the particular context in which it occurs. Second, processes are dynamic because they are not isolated but operate through shifting interactivity with indefinite and varying numbers and modes of other processes. In a process dynamics approach, the style, narration, allusions and fictional creations I investigate in the chapters to follow, for example, are co-created by diverse processes that interact with each other over some duration. Third, processes are dynamic because of their capacity to change and to trigger changes in other processes. During reading, a process such as a verb or an allusion interacts with, triggers changes in and is changed by other literary and cognitive processes involved in the encounter.

In my process dynamic view, processes involved in encounters are continuously altered. "Process" bestows a semantic shift to interaction and change, enabling close inspection of the dynamism that may otherwise be analytically diminished or overlooked in literary or linguistics categories. Reading a novel activates an incessant swirl of literary and cognitive processes interacting, changing and displacing each other. Even iterations of a

process introduce alterations because the process intervenes in and contributes to new conditions. Even the end of words, the end of the text, does not herald the end of change, as memory and interpretation of these literary processes in this text interact in other encounters, for example daydreaming, talking or writing about the text or reading other texts. Any remembering or forgetting of the text are themselves created by complex and mutable processes. Mutable processes interactively generate reading and interpretation of novels.

Interactions

Drawing on the four key ideas of process, change, imbalance and self-organisation, the term "interaction" enables thinking beyond space-centric notions of connections, networks or relationships between compartmentalised phenomena. Interaction is the capacity for processes to co-create or self-organise encounters by accessing and acting on each other. Interactions are differential, varying in diversity, scale, timing, direction of influence and transformational impact. Interaction among diverse literary and cognitive processes might involve contact between two or more processes, for example in the qualitative play of juxtaposed tense and semantics interacting on each other to create a verb in context, or it might include some nonspatial sociocultural cognitive process such as recognition. During reading, absence of awareness or recognition may preclude access and interaction; recognition or its lack has a direct impact on the narration and interpretation. An intertextual reference in a text, for example, may not be activated or brought into interaction unless a reader is familiar with the cultural use of intertextual references to create literary effects or familiar with an intertextual allusion itself. Interactions that occur for one reader may not for another reader; interactions may or may not be activated or, better, are idiosyncratically activated during reading. Once recognised and however idiosyncratically comprehended, a literary process such as an intertextual reference or use of vocabulary or grammar triggers interactions that impact on interpretation and narrative. As reading continues, an interaction

qualitatively reconfigures the narration preceding or following it, or both. During reading, interactions among literary and cognitive processes generate temporary interpretations of the narration, but these are quickly altered, whether amplified, dampened or replaced, by the arrival of the next processes and next interactions. It is through their self-organising interactivity that literary and cognitive processes trigger change.

Literary, social, cultural and cognitive processes are activated, performed and reconfigured in particular ways during interactions. Such unpredictable interactions are vulnerable to scrambling and possibilities for novel and unanticipated changes proliferate, customising interpretation. While literary, social, cultural and cognitive constructs have been intensively studied individually in literary studies, their interactions are still not well understood. My thesis contributes an account of interactivity broadly and of stylistic, narrative, allusive, dispersed and creative interactivity in reading novels specifically.

Perturbations

Interactions are vulnerable and transient due to perturbations. Technically, a perturbation is a specific disturbance that changes an interaction (Wang, 2013: 1680). My process dynamics concept of perturbations focusses on the destabilising and reconfiguring of interactions. This approach posits that literary and cognitive processes act as destabilising perturbations when they are brought into interactions by reading; there are no boundaries preventing such perturbations. During reading, perturbations impact on each other in complex ways, generating qualitative shifts in narration and interpretation that trigger yet more perturbations. In other words, processual self-organising is continually subjected to impacts and reconfiguring via cascades of new perturbations.

For process dynamics, the term perturbation is neutral. However, individual perturbations differ in mode, whether linguistic, narrative, cognitive, sociocultural or other,

and also differ in perceived valence during reading, whether interpreted as minimally, moderately or maximally positive or negative. Perturbations also have different weighting; in encounters, individual perturbations may have narrative impacts from infinitesimal nuances to major plot twists or cognitive impacts from tenuous intimation to "aha" moment (Kounios and Beeman 2009; Qiu et al. 2010; Shen et al. 2018) of epiphany. Perturbations differ in extent, perhaps affecting some or all of the multiple interactions in an encounter and they differ in degree of impact: "some perturbations provoke small cascades of change, others trigger complete avalanches" (Lewin 1992, 62). Perturbations may trigger changes retrospectively, for example affirming or rejecting a previous interpretation; immediately, as narrative information is released; prospectively, perhaps setting up expectations; or in multiples of these, perhaps as information may trigger one or more immediate and long-term revisions and expectations. Reading, narration and interpretation, I contend, are inundated with destabilising and reconfiguring perturbations as cognitive and literary processes encounter each other.

Morpharchy

Process, change, imbalance and self-organisation are all implicated in the process dynamics concept for which I invent the term "morpharchy". Morpharchy refers to changes in significance and dominance. I argue that during reading, interactions are in disequilibrium, not only in terms of the eclectic welter of processes involved, grammatical, semantic, rhetorical or discursive, for example, and changing numbers of interactions among them, but also in terms of changing significance of interactions. Some interactions may be interpreted as more or less relevant, explanatory, or surprising than others until new circumstances alter this transient narrative and interpretive self-organising and reconfiguring. Cognitively, reader attention may switch to specific or simply the next arriving process, narrative moments become significant or recede, degrees of immersion alter or falter, interpretations impinge or

49

fade. As processes are not coterminous, shifts of dominance occur while processes interact during reading. This is perhaps most obvious as new processes are drawn into encounter and temporarily dominate, demanding cognitive processing and interpretation, then are displaced by yet more new literary and cognitive processes as reading continues. I introduce the term "morpharchy", in the sense of morphing or changing, for these incessant alterations in dominance, significance, weighting, salience or valence.

Both "morphing" and "metamorphosing" usefully suggest the sort of non-simultaneous, differential changes in dominance that morpharchy addresses. Morphing refers to manipulating distinct parts of a computer image at separate times and in imperceptible stages to achieve a new image (OED Online). At each stage, something new dominates temporarily. In biology and geology, metamorphosing likewise indicates asynchronous and spatially irregular transformations over time. It is argued in this thesis that literary and cognitive processes in encounter operate at different times, scales and rates of change; these asynchronous interactions generate shifting dominance or significance. In response to cascades of literary and cognitive processes acting as perturbations, narrative significance shifts in ceaseless morpharchic transferrals of dominance and revisions of significance that constantly trigger new interpretive possibilities.

In contrast to morpharchy, the more familiar term hierarchy designates a specific, layered and fixed set of relationships, of which one level is deemed superordinate, while one or more other subordinate levels diminish in status relative to those levels ranked above them. A different proposition to hierarchy is "nonhierarchical" (Jeungst 2020, 891) heterarchy, according to which "entities of all kinds exist and yet stand in no ontological priority with respect to one another" (Epstein 2018, 29). Heterarchy appears at first glance to demonstrate similarities with morpharchy. Heterarchy distributes authority or significance across participating entities (Becker 2020; Heinze 2015), for example in situations requiring

cooperation (Jeungst 2020), and includes the possibility of any entity being dynamically ranked and re-ranked in different situations, including hierarchically (Crumley 2015). Nonetheless, heterarchy is usually used to describe spatially conceived social structures or organisations and focuses on spatial relationships such as nested relationships or horizontal peer to peer or meshed relationships (Cumming 2016). While heterarchy recognises that "power relations change over time" (Crumley 2015, 6), the focus is on synchronic snapshots of structures, for example mapping "constellations" of "local heterarchies" (Heinze 2015, 85-86). The pieces may be moved around but the focus is on the resulting fixtures. In contrast to both hierarchy and heterarchy, morpharchy focusses on changeability itself. Morpharchy subsumes hierarchy or heterarchy as temporary possibilities that are altered or replaced by subsequent perturbations.

In my process dynamics approach, morpharchy has the capacity to articulate constant imbalances and changing self-organising. Literary and cognitive interactions incessantly reorganise each other morpharchically in terms of salience and dominance, transforming or replacing each other, or generating new processes altogether, irreversibly changing meaning and setting up new conditions. As reading continues, the play of morpharchic transferrals of dominance continues. In their roles as perturbations, processes act morpharchically by inducing changes in dominance and significance in interactions. For example, sentences remain susceptible to further morpharchic perturbations in the form of the next sentences, or perhaps rereading, which drive interpretation and narration through yet other minor or radical transitions. Interpretive significance shifts. Acknowledging the perpetual metamorphosis of novels during reading, morpharchy designates constantly changing plays of dominance and significance among literary and cognitive processes as interactions and reading continue.

Dispersal

Process philosophy metaphysically disperses all substances into mutable processes. Process dynamics takes this processual stance. An encounter is dispersed across the processes, interactions and perturbations that co-create it. Literary processes, for example, may be dispersed across different grammatical, rhetorical, narrative or aesthetic modes, while cognitive processes may disperse through, for instance, attention, memory or emotion modes. A process can also operate in multiple modes; for example, a word may simultaneously disperse over grammatical, semantic, rhetorical and attentional, mnemonic or response modes. Dispersal of processes, interactions, perturbations and changes is not equally dense but is asynchronous, differential and unbalanced. For example, literary and cognitive processes are temporally dispersed, being introduced at different times, acting as destabilising perturbations that change the encounter. Perturbations dispersed through the reading that co-creates *The.PowerBook*, *The Curious Incident of the Dog in the Night-time* and *Oryx and Crake* continually reconfigure interpretive conditions. Dispersal ensures morpharchically shifting imbalances and change.

Creativity

Self-organising interactions among dynamic processes in encounters have the capacity to create, make or do something new, generating a new instance even if there may be prior similar instances. In open environments, each new instance must be created in its own right and occurs in new circumstances involving processes and interactions specific to that encounter. From a process dynamics perspective, reading a novel is a creative process. During reading, fictional worlds, fictional events, fictional narration or fictional characters imaginatively and idiosyncratically morph into new creations through interaction with cognitive processes during reading. Reading is typically primed through training and experience to rehearse and alter individual sociocultural repertoires and tastes; what readers

do with that sociocultural cognition in interactions with literary processes is neither fixed nor predictable. Literary and cognitive interactions form a 'literally unwritten story' (Belsey 2002, 74) as each interaction disperses idiosyncratically across other cognitive and literary processes. On this account, reading produces something that did not previously exist. New instances of fictional creations are generated and are immediately subject to further literary and cognitive perturbations as reading continues. In a process dynamics view, creation is not closed and finished; creations are dynamically subject to changes. In encounters, interactions among processes ensure continual creating and recreating.

Conclusion

In light of the key concepts of encounter, processes, interactions, perturbations, morpharchy, dispersal and creativity, process dynamics can be more precisely described as an approach that treats all phenomena as encounters co-created by diverse processes and takes processual interactions, perturbations, morpharchy, dispersal and creativity as the object of analysis. Process dynamics is an inclusive approach that allows a better understanding of the dynamic between literature and reading. If there are only interacting processes, as I argue, then it is in principle possible to study any combination of interacting processes. This gives process dynamism immense scope. In practice it is not possible to study all processes involved in an encounter because the processes keep changing in numbers and diversity; no analytical method or equipment can address this seething activity comprehensively. The strength of process dynamics is that it allows a focus on the dynamics and mutability of whichever interacting processes are selected for study. This makes process dynamism elastic in its potential cross-disciplinary reach and suggests a rich, if unpredictable, future. In the literary process dynamics of interest in this thesis, dispersed literary and cognitive processes in diverse modes interact and perturb each other morpharchically during reading encounters. Narrative and interpretive conditions generated by these dynamics undergo constant changes.

Chapter 2: Processes, interactions and perturbations

To read *Oryx and Crake, The Curious Incident of the Dog in the Night-time* and *The.PowerBook* is to be plunged into cascades of literary processes that trigger cognitive tumult. In articulating this intense dynamism, the specific aim of this chapter is to demonstrate the concept of processes and the interactions and perturbations through which processes operate. I do this by focussing on stylistics and microcognition in narrative moments; I briefly discuss all three before presenting my textual analyses. Stylistics refers generically to "the study and analysis of texts" (Burke 2018, 1) that "engages closely with the language in which the literary work appears" (Stockwell and Whitely 2014, 1). While the three novels of interest in this thesis comprise incessant stylistic changes, this stylistic dynamism has attracted little attention in the critical literature; likewise, the impacts of reading processes on interpretation of stylistics in the novels has not been investigated. Process dynamics can help articulate the complex, transitory, changeable and idiosyncratic nature of stylistic and cognitive interactions. In order to depict the intensity, speed and frequency of changes during reading, the object of analysis in this chapter is the interaction of fast subconscious microcognition with stylistic processes in brief narrative moments from each of the three novels. My analysis of a narrative moment from *The.PowerBook* concerns the interactions of microcognitive processes with stylistic processes of grammar, intertextuality and metafiction as a single sentence unfolds. The second analysis, a moment from *Oryx and Crake*, turns to different stylistic processes of voice, speech and perspective over four sentences as they interact with microcognition. The third analysis of a half-page chapter from *The Curious Incident of the Dog in the Night-time* concerns the dynamics of comedy and microcognition. The aim of the three analyses is to demonstrate the diversity of processes and the ways in which literary and cognitive processes impact on each other both within and across sentences. In the moments from *Oryx and Crake, The Curious Incident of*

the Dog in the Night-time and *The.PowerBook*, interactions, narrative possibilities and interpretations constantly shift and diverge during reading.

Narrative moments

Before considering whole texts and global canons, Hogan's 2011 study on emotion focusses on small pieces of text that he calls "incidents", in his view "key emotional moments" on which are built events, episodes and stories and associated emotional responses (Hogan 2011, 32-33). Rather than Hogan's identification of key emotional moments in narratives, my term "moment" refers to any brief, transient encounter during reading, key or otherwise; all narrative moments trigger cognitive interactions. Recalling that encounter nominates the complex play of processes involved in specific occurrences such as reading a novel, conducting an experiment or holding a conversation, a narrative moment is one kind of encounter. As encounters, all narrative moments involve duration, some volume of text and specific plays of literary and cognitive processes. Lived moments of reading are highly charged dynamically with multiple conscious and subconscious cognitive and literary interactions and changes. I contend that narrative moments are intensely complex and dynamic and that their role in narration and interpretation is pivotal.

Microcognition

Microcognition refers to rapid subconscious neural interactions at very small scales operating over times measured in milliseconds. Microcognition enacts the processual complexity asserted in this thesis in its shifting interplay among changing numbers, durations, scales and modes of processes that alter each other and the conditions they co-create. For novels, changes in narrative and interpretive conditions occur as stylistic and microcognitive processes interact and perturb each other. Every stylistic or cognitive process acts as a perturbation making some change to the ongoing interactions. The diversity and complexity

of interactions that occur while reading a single sentence may seem overwhelming, but the empirical studies that I cite argue that readers typically, continuously and largely subconsciously perform such intense cognitive work. Analysing the large volume of cognitive and literary interactions and changes in reading is a daunting task; I have selected brief narrative moments for analysis in order to illustrate the ways incessant narrative and interpretive changes can operate during reading. In contrast to the extreme and imperceptible speed of cognitive interactions, written portrayals such as mine or those in the scientific literature necessarily convert this speed to far slower descriptions in words for the purposes of visibility and close inspection. My analysis attends to a large volume of cognitive and interpretive detail generated idiosyncratically by readers "in the instantaneous flash of understanding we experience as we read" (Frow 2005, 131). The analysis therefore brings into focus processes that are usually outside everyday cognitive experiences of reading. While microcognitive processes alone are not sufficient for reading or interpreting the texts, they are necessary and, I argue, have impacts on the reading experience and interpretation of the text being read.

My textual analysis is conventional in using evidence in the texts, engaging with stylistic and narrative theories and positing interpretations, but novel in simultaneously working with a process perspective and deploying empirical findings related to the microcognitive dynamics of reading. My microdynamics focus highlights the processes, interactions and perturbations involved in reading the three narrative moments.

The.PowerBook

The.PowerBook is a novel in part concerning storytelling, narrative invention and fiction. The narrative moment analysed here is selected from comments on the changing dynamics of stories that appear throughout the novel: "I can change the story" (Winterson 2001, 5) "the story reads me" (209), "you are the story" (243) and "you can change the story"

(243). I focus on the dynamics in a single sentence from the beginning of the novel: "I can change the story" (5).

The first person pronoun "I" is a dynamic and changeable process. Grammatically, "I" is a referring or pointing expression, technically labelled deictic (Carter and McCarthy 2006, 178). All deictic terms "lack specific semantic content" unless in a specific context (Williams 2021, 1); in context, they have the special "capacity to select items in discourse" (Dolcini 2016, 322). In this role of drawing attention to some specific object or occurrence in a specific context, "I" denotes a subject referring to self. Grammatically, however, "I" is a highly dynamic singular personal pronoun capable of taking on unlimited referents, human and otherwise. The "chameleonic" referent for "I" (Dolcini 2016, 323) may also "shift from context to context" (Dolcini 2016, 322), shifting that occurs extravagantly throughout *The.PowerBook*. At the opening of the novel, the *I* of *I can change the story* is poised to change, backstory withheld, this story anticipated.[5] By the time the sentence *I can change the story* is reached on the third page of the sparsely printed text of the novel, *I* has shifted across contexts and referents numerous times, in every case to an unspecified referent. With the possible exception of immediate repetitions, it is also unclear if any of these initial instances of *I* refers to any other. In *I can change the story*, no referent and no antecedent is specified for *I*. This unresolved and referentless shapeshifting of *I* features throughout the novel.

I is immediately perturbed by diverse microcognitive processes of different onsets, speeds and durations. The unspecified *I* with no referent in *I can change the story* is an ambiguous pronoun, with a "number of potential referents" (Vogelzang, Hendriks, and van Rijn 2016, 877), making resolution difficult and delayed or, as in *I can change the story*,

---

[5] I use italics when discussing the words in the narrative moments to differentiate them from the same words in, for example, their use in discussions of grammar or in quotes from other sources.

impossible. As neuroscientific studies affirm, microcognitive perturbations typically between 50-750 milliseconds in duration attempt pronoun disambiguation (Vogelzang, Hendriks, and van Rijn 2016, 882). Being ambiguous, *I* is continuously altered and is intensely charged with shifting possible meanings; as occurs throughout *The.PowerBook*, the deployment of *I* generates ambiguity and volatility in the narration. Interpreting pronouns involves dynamic and "effortful" cognitive processing of linguistic, discourse and contextual processes that "interact in a complex manner" (Vogelzang, Hendriks, and van Rijn, 876). Interactions occur among, for example, grammar and syntax, salience, prominence or absence of referents, gender information about referents, "interference of prominent competitor" referents (876) and idiosyncratic "private" shifts of attention that "influence both transitory biases" and "final interpretation" during pronoun resolution (Arnold and Lao 2015, 848). Salience or prominence in English can be induced in antecedent pronoun referents by positioning the antecedent referent at the beginning of a sentence or by ensuring that the referent is the topic of the sentence or sentence fragment. Nonetheless, interpretation of pronouns is subject to variable sensitivity to this induced salience in readers (Burmester et al. 2018, 798) and to dynamic updating "based on linguistic input as well as the whole situation" (785) during reading, updating that depends on a constant influx of linguistic and other perturbations. Relying on an antecedent does not disambiguate *I* in *The.PowerBook* because *I* only ever refers to yet another unspecified antecedent *I*; conventional methods of referring and inducing salience falter. As a literary process in *The.PowerBook*, the relentless shapeshifting and ambiguity of *I* continually perturbs reading and interpretation.

The *I* of *I can change the story* heralds persistent pronoun ambiguity and cognitive impacts in the novel. Widening the focus briefly beyond the sentence, in the short first chapter of *The.PowerBook*, nouns or noun phrases occur as the subjects of verbs in only a few cases. These nouns, however, also remain indeterminate: "the story is" (4), "the clock

ticks" (4), "people arrive" (3) and "the alphabet of my DNA shapes" (4). The nouns leave the referents open to microcognitive processes that generate speculation: which *story, clock* or *people,* whose *DNA*? Less informative even than such indeterminate nouns, pronouns conventionally refer to and substitute for items with lexical content elsewhere in the text. On only two occasions in the first chapter of *The.PowerBook* do the pronouns have clear antecedent referents: "It says—*Freedom just for one night*" (3), in which *it* refers retrospectively to the "email" of the previous two sentences and "so it is" (4), in which *it* refers retrospectively to "a story*"*, itself indefinite, in the previous sentence. In contrast to conventional use of pronouns, those that populate *The.PowerBook* frequently are not allocated referents; they do not act referentially but flicker among possible referents inferred during reading that morpharchically foreground various interpretive possibilities in quick succession and typically remain open to conjecture.

Further referential instability perturbs the chapter in other narrative moments. While the pronouns *I* and *you* predominate, the first chapter also involves third person pronouns, "we", "they", "it", indefinite pronouns "everyone", "anyone" and existential pronouns "it" and "there". As existential subjects, *it* and *there* are indefinite and do not refer to any object or entity; instead, they interact by asserting the existence of and directing attention through the verb, "it is", "there is*"*, to the content in the predicate, "It's night" (3), "there is always a new beginning" (4). The indefinite pronouns *everyone* and *anyone* are open and general but "everyone knows" interacts with "they say that Jack the Ripper used to come here" in the same paragraph and with the context to suggest neighbourhood gossip: "everyone knows that something strange goes on inside" (3). *Everyone* and *anyone* also interact intertextually with popular conventions of gothic or fairytale narratives in which *something strange goes on*. *Anyone* as a process is involved in complex grammatical, semantic and intertextual interactions that generate the sinister "did anyone see you arrive?" (4) The question

retrospectively augments *something strange,* and this impact is perturbed yet again and intensified by the intrusion of imagery evoking the mediaeval violence of fairytales, "suits of armour", "severed heads" (3). In all other occurrences of pronouns in the chapter there is no clear referent for the pronouns; they are undecidable. While some readers may assume *I* is a fixed character or narrator in *The.PowerBook*, a shift to a process dynamics perspective offers an alternative perspective. The narration metamorphoses unshackled through characters and objects just as it morphs through disparate fictional worlds and times. Unrestricted by definite referents, pronouns in *The.PowerBook* behave dynamically and morpharchically, perturbing cognition and unsettling interpretation.

Returning to the narrative moment *I can change the story*, reading and interpreting *I* is continuously subjected to perturbations from interactions among microcognitive processes already in play (Guenther, Ghosh, and Tourville 2006, 282) and is also subject to constantly arriving new literary and cognitive perturbations (Asutay et al., 159; Barrett 2017, 6; Pulvermüller and Fadiga 2010, 351). Triggered by the stylistic positioning of *I* as storyteller, microcognitive processing of "multiple semantic alternatives" (MacGregor et al., 419) is further perturbed by other narrative processes as *I* takes on literary roles of narrator, narrated narrator and character. Perturbed thus by both literary and cognitive processes, *I* exceeds the grammar of first-person deixis as reader attention and interpretations shift to narrative processes and the moment switches from grammatical into narrative mode.

Also subject to the introduction of intertextual perturbations, *I* exceeds the boundaries of the novel *The.PowerBook* by alluding to other narrators, particularly those called "I". The significance of this change depends on a reader's idiosyncratic experience of narrators narrating; interactions that occur for one reader may not for another reader. Once recognised, a stylistic process such as deployment of *I* as narrator triggers microcognitive "novelty detection and memory retrieval" (Derner et al. 2020, 8) and selective retrieval of relevant

features of a concept or memory (Zhang et al. 2021, 1). As Zhang and colleagues point out, "we know many features and associations for any given concept, yet only a subset of this information will be relevant at any given time" (1). The extensive body of neuroscientific literature they cite affirms that context "influences the extent to which particular conceptual features are activated" (1). In other words, cognition is not a matter of holistic retrieval of a memory as a unitary block, but subconscious retrieval of specific aspects of a remembered experience, not everything, and subjection of those particular aspects to interaction with the newly encountered processes. Moreover, multiple features of a memory are not stored together but are cognitively "highly distributed" across, for example, "vision, audition and motor" processes (2), any of which may perturb reading and interpretation. Retrieval necessarily activates multiple interacting heterogeneous processes; the selected features are microcognitively constructed anew every time they are invoked and both construction and context are different each time. In a process dynamics view, perturbations and changes ensue. The particular memories and associations of a narrating "I" that are retrieved are peculiar to each reader and idiosyncratically impact on narration and interpretation.

As readers access memories and associations, this changes interpretation of the sentence *I can change the story*. Memory is "malleable and interactive" (Hogan 2014, 295), involving dynamic microcognitive changes (Hardt and Sossin 2020, 1). This stylistic and microcognitive play of *I* through encounters that are both internal and external to the book in *I can change the story*, is made possible by the interaction of grammar and vocabulary with other stylistic processes of narrative voice, intertextuality and metafiction. As these diverse literary processes in *I can change the story* interact with microcognitive processes, the narrative and interpretive conditions are repeatedly perturbed and interpretations of *I* continually change. Readers may justifiably hesitate in interpreting *I*.

Perturbations also harry and change the narrative import of the modal verb phrase *can change* in *I can change the story*. As grammatical processes, modal auxiliaries interact with surrounding language and wider contextual and discursive processes to generate "attitude towards, or point of view about, a state of the world" (Carter and McCarthy, 638). Grammatically, "can" conventionally denotes ability or permission or logical possibility. *Can change* proclaims ability and logical possibility and grants permission. The beginning of the novel offers little context for the *I can change the story* moment; microcognitive perturbations trigger conjecture and a desire for answers, "particularly challenging if disambiguating context is absent or delayed" (MacGregor et al., 403). *I, can* and *change* impact microcognitively and stylistically on each other to generate narrative and interpretive uncertainty; for example, what gives *I* the ability to change things and will it happen? Semantically, "can" also carries connotations of volition, control and power, particularly as "can" does not assume that an action will be carried out. The ability to do something does not automatically entail the opportunity, agency or desire to do it; stylistically, *can* holds things in abeyance, refers to potential action. As a perturbation, *can* microcognitively triggers a moment of suspense and stylistically generates a narrative hook that only continued reading may, perhaps, settle.

Alongside these perturbations relating to modality, *can change* is further destabilised by aural possibilities. In silent reading, sound is typically subaudible and subvocal (Fodor 2002; Hayles 2017, 200; Slowiaczek and Clifton 1980). As novelist Toni Morrison more lyrically observes, "the sound of the novel, sometimes cacophonous, sometimes harmonious, must be an inner ear sound or a sound just beyond hearing, infusing the text with a musical emphasis that words can do sometimes even better than music can" (1988, 160). In "subvocal rehearsal" (Wessel 2018, 200), a range of possible rhythms and pitches for *can change* perturb and change interpretation through the subauditory textual acoustics (Stewart 1990,

11): simple declaration, bellicose assertion of power, warning, querulous protest and joyous liberation as possible meanings perturb and reconfigure each other in a not entirely subliminal auditory torrent. Interpretations of *can change* are repeatedly subjected to new auditory, microcognitive and stylistic perturbations that generate nuanced or complete revisions.

An important point to note is that literary and cognitive changes vary in intensity, valence and dominance as they interact during reading. For example, *the* as it is positioned in *I can change the story* undergoes a play of shifting dominance among the transitory interpretations generated. The conventional role of the definite article "the" is to specify a particular instance of something and to indicate that it is already known as part of a shared world (Carter and McCarthy, 365). In *I can change the story*, lack of information stylistically contravenes this convention. Microcognitive perturbations relating to ambiguity resolution generate possible interpretations that shift in cognitive foregrounding and dominance: *I can change the story* blatantly ignores a requirement for background knowledge, or perhaps withholds this knowledge, or simply rhetorically draws an imaginary reader into a fictional world by feigning shared knowledge. Microcognitively, fixing on a particular interpretation "can only be confirmed when disambiguating information is presented" (MacGregor et al., 422). No such information is offered in the narrative moment from *The.PowerBook* and the associated speculation acts as a delaying tactic that microcognitively demands attention and defers gratification. Typical of words in contexts, changing interpretations of *the* collide and vie for attention.

The unknown *story* in *I can change the story* undergoes yet other cascades of stylistic and microcognitive perturbations as it is brought into interaction, generating new interpretations that microcognitively encroach or interrupt or fade in "a constant stream of evocative input" that "dynamically evolves over time" (Asutay et al., 159). For example, *I*

can change the story promises a story as a good narrator conventionally should, but *I* stylistically wrests from any other "author" the authority to change the story, proposing thus to overturn an ontology relegating *I* to a position of narrated narrator, to reclaim history from the perspective of this *I*, to rewrite narration at will*,* untrustworthy capriciousness and revolutionary manifesto both. Subconscious microcognitive processes act on each other as changeable and conflicting perturbations (Barrett 2017, 7) to generate such contradictory interpretations. With changing interpretations, valence morpharchically switches back and forth between negative and positive as dominance transfers from one transient interpretation of *story* to another. Demands on microcognitive processes in disambiguating attempts (MacGregor et al. 2020, 403) increase with this play of dominance among interpretations of the narration, not least because they are contradictory, conflicting or counterintuitive. *Story* further signals a metafictional emphasis in its overt preoccupation with the crafting of stories. *I can change the story* refers metafictionally to story making, the written format of the sentence calling attention to the act of drafting, significant in a text putatively exploring the possibilities of digital interactivity; among other meanings, Power Book refers to electronic texts generally and a model of computer specifically. In interaction with the verb, *story* abruptly shifts to the construction of stories; that is, stories can be changed. *Story* is subject to further morpharchic transferrals of dominance among microcognitive processes as readers move through different microcognitive stages involved in comprehension, memory retrieval and interpretation. Any meanings stylistically triggered by *story* swirl cognitively in and out of conscious thought on a wash of electrochemical pulses in durations of milliseconds. In terms of narration and interpretation, *story* remains relentlessly changeable.

Located near the beginning of *The.PowerBook,* the sentence *I can change the story* does not settle, but prompts speculation, questions, guessing, uncertainty—what *I*, which *story*? The sentence hovers in a critical moment; that is, it is primed to transform again as the

text continues and new perturbations arrive. The process dynamics of interacting stylistic and microcognitive processes generate idiosyncratic plays of significance in ceaseless transferrals of dominance among interpretive possibilities, creating unique and transient versions of the sentence *I can change the story*. *I can change the story* is poised to change; and change it does, spectacularly.

Oryx and Crake

From spectacular to catastrophic change, my second analysis turns to *Oryx and Crake*. This analysis extends over four sentences and investigates the specific dynamics of a different narrative moment halfway through a different novel. Here, I turn to presentations of speech and thought, to "constant micro-shifts of focalization" (McHale 2008, 17) across characters and narrators and to switches in and out of the fictional world. Snowman, the narrator of *Oryx and Crake*, is situated in a fictional world from which the human population has been all but eradicated by a pandemic. He has every reason to assume that he is the only surviving human (Atwood 2003, 344), although he is not alone; he is in the company of the post-*Homo sapiens* Crakers. Snowman struggles to survive in his drastically altered conditions and in this post-apocalypse moment, a Craker woman brings him food.

The narrative moment from *Oryx and Crake* stages contact between two fictional creations, the characters Snowman and an unnamed Craker woman, and begins with direct speech:

> "This is the one fish chosen for you tonight," says the woman holding it; the Empress Josephine, or else Madame Curie or Sojourner Truth, she's in the shade so he can't tell which. "This is the fish Oryx gives you."
>
> Oh good, thinks Snowman. Catch of the Day. (101)

Visual stimuli, in this case printed words, microcognitively interact with attention processes (Pulvermüller and Fadiga, 358); in the text, the quotation marks direct attention to a specific character, *the woman*, and trigger microcognitive processing related to sound and inner speech. Empirical studies suggest that just as readers construct visual images during silent reading, they also generate non-linguistic "auditory imagery" (Alexander and Nygaard 2008, 447), although different microcognitive processes are involved. Readers subvocally construct the prosody of speech to varying degrees, including rhythms (Kruikova and Mani 2016, 2), stresses (Ashby and Clifton 2005, B96), volume, pace, pitch and accent (Alexander and Nygaard 2008, 2). Reader surveys indicate that readers hear the voices of characters to different extents, some reporting being able to hear accent, gender and emotional tone, others reporting that they hear only their own or a vague voice or no voice during silent reading (Alderson-Day, Bernini, and Fernyhough 2017, 106; Vilhauer 2016, 44; 2017, 272). Details about non-linguistic characteristics such as pace or volume are absent from the text, so hearing the voices is generated by individual readers based on personal experience of different voices, cultural practices (Mori and Ishii 2018, 6) and auditory image ability (Alexander and Nygaard 2008, 457; Mori and Ishii 2018, 6). Auditory imagery in silent reading idiosyncratically triggers changes in interpretation of and responses to narrative, in this particular narrative moment responses to the two characters, Snowman and the Craker woman.

Whether a voice is heard distinctly or otherwise or as pleasing or not, direct and indirect speech are microcognitively processed differently. In silent reading, the immediacy of direct speech as demonstration triggers more perceptual processes and greater neural activity than does the observer description of indirect speech (Yao 2021; Yao and Scheepers 2011, 2018). Direct speech is perceived as more "vivid" (Clark and Gerrig 1990, 794; Yao 2021, 1) and potentially more likely to trigger immersion or "engross readers in the

character's world" (Clark and Gerrig 1990, 794). As a literary process, direct speech in novels is crafted and deployed (Stockwell, 3) for different discursive, rhetorical and aesthetic impacts; the direct speech that opens the narrative moment, *This is the one fish chosen for you tonight*, is formal and has a sacramental tone. Grammatically a neutral determiner, *this* stylistically pinpoints an object as co-located in close proximity with the two characters in the fictional world. *This* then undergoes cascades of microcognitive perturbations from the subsequent words that narratively transform *this* into an act of offering, possibly also triggering a visual image of hands extended to present *this* fish. The sacramental transformation of *this* is augmented by *chosen,* itself perturbed and intensified in microcognitive interaction with *one.* Blessing and grace typically attend a chosen one in religious contexts. Further perturbations arrive as the sentence unfolds, in this case stylistically and microcognitively augmenting and imparting nuance to devotional imagery with implied ritual in *tonight* and, for readers with the cultural or religious background knowledge, drawing sociocognitive associations related to Christ into interaction through the symbolism of *fish. The* interacts with *one* to suggest consecration of the offering as *the one*, which in turn alludes to the consumption of the eucharist in Christian rites. This religious imagery perturbs the post-religion environment of the fictional world, from which "symbolic thinking of any kind" has been banned (Atwood 2003, 361), rendering the prohibition vulnerable. Direct address to *you* as recipient of the offering positions Snowman as high in status and possible interpretations alternate between Snowman as divine intermediary or leader, an inexplicable "separate order of being" (101) to the Crakers. Direct speech such as *you* may be used to construct the thoughts or emotions of a speaker. Here, however, the formal register of the direct speech prevents any such psychological access; the Craker woman's speech enacts a depersonalised ritual rather than presenting psychological characteristics. In Snowman's account, which is the only account made available to readers

until subsequent books in Atwood's Maddaddam trilogy, *the woman* remains an undifferentiated object of ethnographic observation.[6]

As in stylistics generally, I employ the idea of switches but do so in order to investigate the complex interactions among stylistic and microcognitive switches that generate interpretation through radical dynamism and frequent changes. Switching stylistically from the woman's direct speech to reporting, *says the woman holding it,* also transfers temporary narrative dominance microcognitively from the more perceptually powerful quote (Yao and Scheepers 2011, 447; 2018, 248) to reporting. However, in *says the woman*, it is unclear who is reporting, Snowman as narrator or some other observer narrator internal or external to the fictional world. This uncertainty triggers increased neural activity and longer processing duration (MacGregor et al. 2020, 403) as microcognitive attempts at resolution demand attention, resources and time. The switch begins input of conflicting imagery in a rush of stylistic perturbations that lampoon the sacred with satire.

The Craker woman's two ritualised spoken lines are interposed with presentation of Snowman's thought, in which the woman and the ritual are now trivialised and derided through blistering sarcasm. The perturbations from conflicting information activate microcognitive processes updating and changing interpretations, initiating new narrative conditions. Readers familiar with the novel know that Snowman has invented the creation myths in which the Crakers now believe, so to him their faith is farcical. The weekly *one fish* is no biblical miracle but mocks Snowman and his impending starvation: "idiot, he thinks, I should have made it three a day" (101). Neither is Snowman a chosen one deserving of reverence or a miracle; his status is reduced to burden. As the one human cruelly chosen to survive the pandemic, Snowman is also depicted as a character who suffers attacks of terror,

---

[6] The trilogy comprises *Oryx and Crake* (2003), *The Year of the Flood* (2009), and *MaddAddam* (2013).

remorse and rage, often stylistically delivered through contradictory black humour. In the shared fictional world, interaction and shifts between the paradisical Craker experience of the world, oblivious to the apocalypse, and Snowman's experience of exile, terrible knowledge and guilt drives microcognitive perturbations related to semantic processing, triggering repeated interpretive changes among the sacramental, traumatic and absurd. The play of such potential interpretations and their revisions is complex and unpredictable, driven by cascades of dynamic microcognitive processes, perturbations and interactions and remains open to new perturbations that play further on the imbalances between the characters' speeches.

Such intense dynamism typically pervades stylistic switches in *Oryx and Crake*. The sentence switches stylistically from reporting to free indirect mode, *says the woman holding it; the Empress Josephine, or else Madame Curie or Sojourner Truth, she's in the shade so he can't tell which*. This is ambiguously either a continuation of the unspecified reporter listing names, *the Empress Josephine, or else Madame Curie or Sojourner Truth* or alternatively presents the character Snowman's interior monologue. In this case *he* projects an alternative observer narrator and interpretation may also microcognitively switch between competing temporal modes as a reader's working memory of the moment perturbs and is perturbed by present tense interior monologue that competes with yet another perspective, that of Snowman's reported memory of the monologue. As for *I* in *The.PowerBook,* microcognitive reactions to perspectival perturbations are complex and idiosyncratic: "readers can differentially adopt perspectives when encountering a pronoun, and this pattern manifests with both single-sentences and relatively extended narratives" (Brunyé et al. 2016, 1603). In the narrative moment from *Oryx and Crake*, microcognitive and stylistic switches related to pronouns and perspectives contribute cascades of perturbations and shifts in their weighting and dominance that continuously alter the interpretive impact of *Snowman* and *he*.

Bare direct speech without a reporting expression follows, *this is the fish Oryx gives you*. The logical inference is that the woman continues her interrupted offertory rite, in turn perturbing by interrupting Snowman's ruminations, the shift of attention morpharchically reasserting her momentary narrative dominance. This interaction stylistically generates an absurd contrapuntal repartee between unlike registers, the formality of the woman's voice and the sarcasm of Snowman's, microcognitively shifting attention and affective response back and forth with it. Readers may respond to the complicated stylistic play of dominance between the characters with polarised and shifting cognitive reactions and interpretations; perhaps admiration of the irreverent verbal skills and absurdist humour assigned to the character Snowman or sympathy for the woman as a figure of grace and as the target of Snowman's jokes. The ways that readers might interpret and respond to Snowman, as for any fictional character "is an open question and a highly individual one that may change from moment to moment, and from one textual micro-expression of emotion to the next" (Wojciehowski and Gallese 2022, 64). Perturbed interpretation bubbles between the perspective switching changes in the moment. Readers might settle on a choice or dwell in the uncertainty.

The narrative moment ends with three more stylistic switches *Oh good, thinks Snowman. Catch of the Day.* The deliberately misplaced "comical jubilance" (Traub 2018, 93) of direct thought presentation in the interjection *Oh good* is displaced by the phrase *thinks Snowman*, again reported by an apparently omniscient narrator or Snowman pretending to be so by referring to himself in the third person. Finally, there is another switch back to sardonic direct thought presentation, *Catch of the Day*. However, microcognitive plays of interactions and dominance among the perceptually more and less potent modes of direct and indirect speech (Yao and Scheepers 2011, 447) are made more complex by other incoming perturbations during reading.

Present simple verbs *says, is* and *thinks* for both direct speech and reporting microcognitively activate a play of conventional stylistic uses of present simple. *Is* generates a sense of authentic witnessing through the use of present simple for fact or truth; while *says* and *thinks* suggest live storytelling through the use of present simple to denote the present coinciding with the time of reporting. However, these conventional uses of present simple are repeatedly perturbed by microcognitive and stylistic shifts of attention across characters and narrators. The use of present simple tense locks both "he" and "she" into the same location and time; that is, the same moment in the fictional world. In contrast, the use of present simple *says* in *says the woman holding it* and *thinks* in *thinks Snowman* oscillates across the boundary between disparate modes of narration, that of Snowman narrating in a form of derisive stream of consciousness and that of a separate observer narrator punctuating stream of consciousness with apparently omniscient reporting phrases. The moment's relentless grammatical and microcognitive switching acts as a powerful driver of narrative and interpretive imbalances.

Stylistically, not only is the female character's speech interrupted it is also further perturbed by being repeatedly marginalised in switches to the character Snowman's perspective. This occurs through the stylistic dominance of his monologue in terms of number of words allocated, the depiction of her vague and diminished identity, *she's in the shade* and through delivery of Snowman's mental punchline, *Catch of the Day*. Three names reaching beyond the text to the world readers ontologically inhabit are offered for the woman character, *Empress Josephine, or else Madame Curie or Sojourner Truth*, names with histories and distinction that are perturbed by being parodied and diminished because "it had amused Crake to name his Crakers after eminent historical figures" (Atwood 2003, 100). These names are "whimsical, satirical, or condescending in intent", like those that were

71

historically imposed (Inscoe 2006, 1) on otherwise undifferentiable, *he can't tell which*, slave women.

The final phrase, *Catch of the Day*, is rendered sarcastic by inserting capital letters. The punctuation is an unexpected visual distortion, which microcognitively triggers detection of something unexpected or "surprising". Surprise microcognitively initially inhibits "ongoing motor and cognitive processes" (Wessel 2018, 208) momentarily at around 300 milliseconds (207) after detection and then redirects attention and working memory to processing the unexpected (208). *Catch of the Day* ironically re-enacts the verbal deceptions for which Snowman was once employed in an advertising agency, part of his self-proclaimed "lifetime of deviousness" (Atwood 2003, 353). Any sense of shame is immediately perturbed and replaced by black humour, as *Catch of the Day* puts an unseemly spin on trauma and starvation. Dominance microcognitively transfers among competing interpretive changes for *Catch of the Day*: plentiful supply meeting market demand, arcadian recreational pleasure and macho bragging. The catchphrase momentarily reframes the entire moment as cleverly stage-managed by Snowman: *Oryx and Crake* is, after all, his story. Snowman is, here and throughout the novel, a character self-consciously deploying literary techniques to construct himself as character in his own story, as clever, for example, or as trauma victim. Snowman is nonetheless also a fictional narrated narrator and character; these multiple ontologies and modes of narration are perturbations that hold narration and characterisation poised precariously in a state of shifting imbalances and changes.

This solipsistic and ontologically transgressive moment from *Oryx and Crake* is one of many generated by interacting stylistic and microcognitive processes through which characterisation and narration pulsate in and out of significance through the novel during reading, endlessly erratic. In the space of four sentences, it is possible to construe six stylistic switches in and out of the fictional present. Stylistic shifts also rapidly occur among five

character and narrator perspectives, each projecting a different point of view (Hartung et al. 2016, 1; Wales 2014, 38), each allocated a different amount of detail. Interpretations are cognitively transitory and vulnerable to new perturbations. Shifting dominance across characters and narrators, internal and external points of view and formal and informal registers continually perturbs the storytelling attributed to Snowman, interrupting and supplanting it with equally transient interpretive alternatives.

The Curious Incident of the Dog in the Night-time

While change in *The Curious Incident of the Dog in the Night-time* can be spectacular or catastrophic, it is also frequently comedic. My third analysis broadens the focus to the stylistics generating humour in a short chapter of *The Curious Incident of the Dog in the Night-time*. Humour is given short shrift in Chapter 13, a half-page chapter dedicated exclusively to warning readers of the absence of humour in the novel. The chapter reads in full:

> This will not be a funny book. I cannot tell jokes because I do not understand them. Here is a joke, as an example. It is one of Father's.
>
> **His face was drawn but the curtains were real**.
>
> I know why this is meant to be funny. I asked. It is because drawn has three meanings, and they are **1)** drawn with a pencil, **2)** exhausted and **3)** pulled across a window, and meaning **1** refers to both the face and the curtains, meaning **2** refers only to the face, and meaning **3** refers only to the curtains.
>
> If I try to say the joke to myself, making the word mean the three different things at the same time, it is like hearing three different pieces of music at the same time which is uncomfortable and confusing and not nice

like white noise. It is like three people trying to talk to you at the same time about different things.

And that is why there are no jokes in this book. (10)

Chapter 13 begins *This will not be a funny book* and ends *there are no jokes in this book*. Christopher, as author of his story, has decreed; however, Christopher is neither in control of the book nor of its often outrageous humour. Comic and cognitive interactions during reading of the chapter trigger incessant microcognitive and interpretive changes.

Christopher's proclamation of a joke-free zone, *this will not be a funny book*, is instantly contradicted with *here is a joke*. As unintentional comedy, "stimulus that is not meant to be funny that accidentally elicits humor appreciation" (Warren, Barsky, and McGraw 2021, 43), the volte-face generates humour through incursion of a joke into the joke-free zone and by positioning Christopher as unaware of this comedic twist, in contrast to readers who may be aware of the humour. Further comic twists and unintentional comedy arise from the joke being used to justify banning jokes from the novel and from Christopher's analysis of the joke. As Christopher retells one of his father's jokes, *his face was drawn but the curtains were real*, the joke rudely intrudes typographically, its foregrounding in bold print literally displacing Christopher and his edict on the page and, at least momentarily, blocking Christopher out of reader attention as the joke demands to be processed microcognitively to arrive at a consciously experienced interpretation. While explaining a joke is often considered to lessen or prevent amusement (Warren, Barsky, and McGraw 2021, 56), and oblivious to his own comic dethroning, Christopher analyses the joke in terms of the way puns function technically through linguistic outsourcing and ambiguity, *drawn has three meanings*, and through cognitive processing of incompatible meanings, *making the word mean the three different things at the same time*.

As a comic process, the pun is a temporary flow of interactions, a dynamic encounter of comic and cognitive processes. Interpretation of a pun changes through interactions that operate as sudden and surprising perturbations. Psychological and neuroscientific studies based on the currently dominant incongruity theory (Morreall 2016) agree that without incongruity to trigger surprise and change, a pun does not exist. A pun has two major technical moves, the setup and the punchline. The setup primes expectations, the punchline violates those expectations, abruptly shifting interpretation to an unforeseen alternative. According to the flourishing literature in neuroscience on humour, a pun typically activates two major cascades of microcognitive processes, one relating to comprehension and another to appreciation (Campbell et al. 2015). A number of studies (Ku et al. 2017; Tian et al. 2017) further parse this two part process into four stages. Comprehension includes incongruity detection and incongruity resolution; and appreciation accompanies "an insight moment" (Tian et al. 2017, 1). Even though "different people think vastly different things are humorous" (Warren, Barsky, and McGraw 2021), the pun in Chapter 13 has the capacity to trigger these microcognitive processes and elicit some degree of "benign appraisal" (Warren, Barsky, and McGraw 2021, 51), amusement, or perhaps cringing.

Linguistically, the priming of *his face was drawn*, its apparent reference to haggard facial features, microdynamically triggers speculation about who is haggard or why. The next word *but* suggests that a sharp but logically coherent contrast to haggard features will follow. *The curtains* is the next somewhat unexpected noun phrase, which, once processed, further constrains expectation. Cognitively, prediction processing (Clark 2016; Kukkonen 2020) triggered linguistically by *but* primes expectations that some other part of anatomy will be the opposite of drawn.

This setup is perturbed by violation or "prediction error" as the word *curtains* arrives, "prediction errors are new observations that contradict the established predictions and force

you to revise them" (Kukkonen 2020, 2). Interpretations involving anatomy are morpharchically foregrounded then relinquished. Interpretive sampling continues; curtains can be drawn closed or open and *but* primes expectations that the curtains are the opposite of drawn. Microcognitive and linguistic perturbations intensify as *real* is introduced. Incongruity detection is in play; *real* is perceived not to relate to *face* or *curtains* but instead to *drawn*. Like most puns that act as a form of linguistic play, Christopher's example, stylistically "violates one language norm while conforming to a second norm" (Warren, Barsky, and McGraw 2021, 52). Resolving the incongruity in this pun requires microcognitively back-chaining and changing the meaning of *drawn* to sketched. In the process, an alternative meaning of *drawn*, pulled, may be sampled and rejected. Other semantic possibilities for *drawn* such as attracted or unsheathed may flicker briefly into the mix of possible meanings but be discarded. The final word *real* as perturbation activates a microcognitive trial and error "search" of known vocabulary for salient meanings and a decision on the best fit (Koleva, Mon-Williams, and Klepousniotou 2019, 173; Chang et al. 2019, 141). Most importantly for my argument, as comprehension of the pun is perturbed repeatedly during reading and cognitive processing, interpretation also undergoes repeated alterations and revisions. Perturbations drive the comic effect of the pun and the associated microcognitive dynamics that generate conscious interpretation. The multiplicity of mostly subconscious microdynamics involved in, for example, surveying possible meanings or resolving incongruity occur at different rates of very high speeds, at times running simultaneously to other processes and at times interrupting, augmenting, dampening or replacing other microcognitive processes. Changing synaptic interactions, each with its specific repertoire of kinetics and transmission, flare temporarily through various regions of the brain as processing the pun continues. Relentless change dominates in microcognitive processing and conscious interpretation.

The other major cascade of microcognitive processes relates to joke appreciation (whether positive or negative), the consciously experienced "aha" moment of insight (Kounios and Beeman 2009; Qiu et al. 2010; Tik et al. 2018), "the moment at which people 'get' a joke." (Chang et al. 2019, 134). Unlike those readers of the text who may experience some degree of amusement in response, Christopher does not get the joke despite having successfully learned about its logic; *I know why this is meant to be funny. I asked*. Here, *I asked* abruptly perturbs the pun with another comic technique, unintentional comedy verging on absurdity, forcing a microcognitive shift of attention away from Christopher's voice to situational comedy based on missing rather than getting jokes, perhaps inducing a touch of schadenfreude, empathy or pity in readers. Telling a joke does not require understanding it. Appreciating a joke does.

"Visually seductive" (Fitzpatrick 2012, 182) brain scan data indicate the presence and necessity of widespread and frenetic electrical and chemical interactions during cognitive processing of humour. Nonetheless, these data do not account for the complex processing that converts diffuse electrochemical pulses interacting with brain tissues into interpretations, emotions or physical reactions such as laughing or smiling wryly; nor do they account for "great differences in processing of verbal humor among different readers" (Ku et al. 2017, 50). Neuroscientist Susan Fitzpatrick acknowledges "the difficulty of constructing explanations that cross levels of analysis from brain function to cognitive functions to behavior" (Fitzpatrick 2012, 183). Brain imaging is therefore typically triangulated with other methods such as subjective participant rating of "funniness" (Campbell et al. 2015, 2; Ku et al. 2017, 49) in order to infer effects including comprehension and amusement. This use of subjective ratings recognises that a pun cannot be explained purely by microcognition but entangles multiple other macrocognitive and sociocultural processes (Canal et al. 2019, 44; Ku et al. 2017, 50). Appreciating a joke requires, for example, relevant linguistic, cognitive,

social and cultural experience. Chapter 13 in *The Curious Incident of the Dog in the Night-time* plays on this potential disparity between the character who does not get the joke and those readers who do.

While brain scan data may register neural activity, they cannot reveal such contextual features as the narrative environment in which a joke is embedded or a reader's prior experience of puns, perturbations that play idiosyncratically into microcognitive interactions and into interpretation. For those readers with the cognitive, linguistic and cultural backgrounds allowing them to both comprehend and to appreciate the pun, perhaps for its linguistic contortions if not its humour, it is precisely the impact of diverse perturbations during an encounter that generates comic and interpretive change. During reading, the humorous moment from *The Curious Incident of the Dog in the Night-time* is subject to unpredictable comic and interpretive morphing. The humour of Chapter 13 and beyond in the novel does not rely on readers accepting Christopher's statements at face value. Instead, humour emerges through the interaction of statements assigned to Christopher in his role as narrator, such as *this will not be a funny book*, with narration that is largely comic and which is in turn further transformed by readers drawing on individual sociocultural cognition beyond the text relating to humour and humorous novels, and to social customs such as cringeworthy jokes told by fathers.

Moving beyond Chapter 13, an extensive miscellany of comic processes is deployed throughout *The Curious Incident of the Dog in the Night-time*. As Olivier Couder writes: "humour, for instance, impacts characterization, influences plot development, interacts with the narrative setting, and thus significantly affects how we interpret a literary text" (Couder 2019, 3). Christopher's inability to read social cues and his pedantry are repeatedly foregrounded: as Dennis Lim observes, "Christopher's pedantry provides much deadpan humour" (Lim 2003, 3). The humour derives in part from the incompatibility of the narrator's

displays of learning with the social situations in which the displays are delivered, the social misstep changing erudition into comic social gaffe. Christopher remains unaware of his frequent social and linguistic faux pas. As fictional creation, Christopher is constructed through stylistic processes that show him cognitively processing pieces of information one after the other in digital mode and depict him in the novel as usually incapable of the analogical, associative cognition required for a great many experiences, including humour. Unintentional humour nonetheless ricochets back at the expense of his interlocutors as Christopher pedantically perturbs their figurative language by drilling logical holes into their claims; the claims Christopher refutes are comically reframed as irrational, equivocal or nonsensical.

The text also teems with farcical, ironic or absurd situations. The next chapter in *The Curious Incident of the Dog in the Night-time* following the declaration of freedom from jokes, for example, begins by perturbing expectations:

> The policeman looked at me for a while without speaking. Then he said, 'I
> am arresting you for assaulting a police officer.'
>
> This made me feel a lot calmer because it is what policemen say on
> television and in films. (11)

Familiarity calms Christopher, but at a more distant situational scale its fictional source is portrayed as ludicrous. Frequent collisions occur between the changeable everyday world that Christopher struggles to comprehend and his naïve trust in facts and virtual reality, both of which for Christopher are authoritative because stable: mathematics and police behave in predictable ways. Christopher applies this tenet of predictability to the society in which he lives: comic tension ensues in a fictional world of misrule and slapstick.

Christopher's time in gaol (16-17) is depicted in a series of comic sketches, reported through the unconventional technique of foregrounding details normally technically backgrounded or absent because they do not advance the narrative. Charlotte Moore finds "Christopher's compulsive noting of mundane facts provides comedy… especially in his dealings with the police and his special-needs classmates" (Moore 2003, 1). In a Chaplinesque scene, Christopher lists the contents of his pockets in bullet points and catalogues the mathematical pleasures of the "perfect cube" of the police cell (Haddon, 16-17). Comic processes constantly perturb and redirect the humour, incongruity triggering repeated revisions of interpretations.

Humour in *The Curious Incident of the Dog in the Night-time* is complex, dynamic and changeable; it is not read or understood in isolation but is composed of comic techniques such as puns, jokes, situation comedy or absurdity interacting with other literary processes. Humour also further interacts with social and cultural discourses beyond the text and this encounter among diverse modes during reading ensures that interpretations change time and again. As a complex cognitive activity, reading the humour in *The Curious Incident of the Dog in the Night-time* is not reducible to stylistics, microcognition, comprehension, emotion or aesthetic experience, nor to sociocultural processes relating to humour or novels. Processes in all these modes interact in ways specific to each reader in a riotous and often very funny play of perturbations and impacts.

Conclusion

This chapter presents an analysis of the stylistic and microcognitive dynamics in brief narrative moments in *The.PowerBook. Oryx and Crake* and *The Curious Incident of the Dog in the Night-time.* The analysis demonstrates that in each case, reading the narrative moments from the three novels triggers high densities of stylistic and microcognitive interactions and perturbations leading to frequent narrative and interpretive changes. The processes and their

dynamics are different in each encounter. Changes occur in the narrative moment from *The.PowerBook* through stylistic perturbations activated by grammar, semantics, intertextuality, and metafiction and through microcognitive perturbations from processes related to ambiguity, semantic alternatives, novelty detection, memory retrieval and subvocal rehearsal in silent reading. In the narrative moment from *Oryx and Crake*, stylistic switches across speech and thought presentations, voice and perspective and a change in typography interact with microcognitive processes related to auditory imagery, conflicting information, transfers of attention and dominance and processing of the unexpected. Analysis of the narrative moment from *The Curious Incident of the Dog in the Night-time* demonstrates continual perturbations and impacts among stylistic, comic and microcognitive processes involved in reading humour. The microdynamics of incongruity recognition and resolution and the aha moment are involved in the narrative moment, and the novel more generally is constantly perturbed by a play of comic techniques such as unintentional comedy, situational comedy and absurdity.

The process dynamics in the narrative moment in *The.PowerBook* differ from those in *Oryx and Crake* and *The Curious Incident of the Dog in the Night-time*. Even microcognitive processes that are repeatedly activated, such as word recognition, salience detection or semantic processing, are triggered in response to different stylistic details and different narrative contexts. This specificity of interactions and changes applies not only to different narrative moments in the different novels but also to different narrative moments throughout each novel as reading continues. This chapter provides a microcognitive footing for the remaining analytical chapters in this thesis. Given the importance of microcognitive interactions in reading, this chapter offers a new analytical focus on microdynamics, contributes to emerging work in literary studies "initiated by the explicit recognition of the unconscious" (Hayles, 2017: 208) and opens the way for further investigations of

microdynamics in other novels and across genres. The chapter also presents naturalistic and literary readings of neuroscience. Addressing microdynamic interactions is crucial in accounting for the changes that continuously transform fictional narratives and interpretations in idiosyncratic reading experiences.

Chapter 3: Morpharchy

In a striking example, the narration in *The.PowerBook* is at one point given its own fictional voice and anthropomorphically speaks for itself: "I can slip under the door of a palace, or between the dirt and floor of a hovel, and never be seen. A golden thread, a moment's talk, a spill of coffee, a pepper seed" (11). *I* temporarily transforms here from multiple fictional characters in multiple fictional worlds into narration, presenting the narration itself as another fictional character, reiterating an earlier claim, "I am the story" (5). The narrative moment portrays an impossibly sentient narration. Reading the *I can slip under the door* narrative moment triggers intense and morpharchic cascades of changing microcognitive interactions related to, among others, detecting the unexpected, deploying working memory, imagining impossibility and recruiting long term memories. Literary and cognitive processes wax and wane in dominance and significance; for example, *I* may initially be interpreted as a character with real world characteristics, but this interpretation is immediately perturbed and replaced by a new interpretation as capacities not available to real world persons are declared. Through changing processes, *a golden flow*, *a moment's talk*, narration repeatedly morphs into diverse fictional creations, objects, *a spill of coffee, a pepper seed*, stories full of wonder, *slip under the door, never be seen*, fictional worlds, *a palace, a hovel*, a shapeshifting *I*. Through morpharchic interaction of the impossible with the possible, these literary processes naming fictional objects and actions perturb *I can* with fantasy.

The analysis in this chapter turns to the concept of morpharchy, a key process dynamics concepts introduced in Chapter 1. The first part of this chapter canvasses theoretical issues associated with morpharchy and working memory. The subsequent two parts of the chapter

each address an important dynamic: first, morpharchic narration and second, morpharchic time.

An important process dynamics concept in articulating incessant change, morpharchy designates shifting dominance in interactions and mutable significance, for example through alterations in salience, valence or weighting, any of which change interpretations during reading. Listing alone, *a golden thread, a moment's talk, a spill of coffee, a pepper seed*, shifts transitory dominance from one item to the next as items are temporarily foregrounded by their sequencing and by the attention, salience detection and working memory processes each attracts in passing. During its millisecond instant of dominance each item triggers associations, affect and memories that change the significance of the moment and its interpretation. With its suggestion of great wealth or magic, a *golden thread* is no ordinary thread. However, this particular thread is misplaced, isolated, carrying traces of another context, perhaps costly embroidery or a flying carpet, but is loosed from that context, poised to change in this new context. A *moment's talk* is a brief disturbance in some quiet interlude but also hints at a surreptitious, hurried exchange that may not be innocent. Domesticity and the exotic compete in the vocabulary of *a spill of coffee, a pepper seed;* coffee and spices allude to an ancient eastern origin but here also speak to accident, oversight, the inadvertent. Each of these rapid fire interpretations gains dominance then is backgrounded, as sequencing morpharchically triggers multiple interpretive changes.

Morpharchy is not just about transfers of dominance but also changes in significance. The list, *a golden thread, a moment's talk, a spill of coffee, a pepper seed,* cedes significance to the earlier assertion of invisibility, *never be seen*; interpretations of *a golden thread, a moment's talk, a spill of coffee, a pepper seed* are impacted by the claim to supernatural ability. An otherwise everyday list undergoes further morpharchic changes in significance; the narration not only speaks for itself and can become invisible but also shapeshifts into

objects such as these, a powerful and, during reading, potentially disorienting capability. Everyday objects are transformed, a new significance bestowed. The narrative moment switches from first person metacognitive consciousness, *I can slip under the door of a palace,* to observer mode, recording visual, *a golden thread, a spill of coffee, a pepper seed,* and auditory, *a moment's talk,* perceptions. Cognitive processing hovers uncertainly between the sentence *I can slip under the door of a palace, or between the dirt and floor of a hovel, and never be seen,* and the sentence fragment, *a golden thread, a moment's talk, a spill of coffee, a pepper seed.* As so often in *The.PowerBook,* the sentence fragment is unclear who is looking or hearing, perhaps the *I* of the previous sentence, narration omnisciently cataloguing its own shapeshifting capabilities, or perhaps some new unidentified observer. The words trigger cognitive processes eliciting imaginary looking and listening in readers but in the absence of a grammatical subject in the sentence fragment, the narration offers no definitive clues for a seeing or hearing subject in the fictional world. Interpretive possibilities flicker and no resolution is offered; the narration abandons the encounter in a narrative and cognitive wrench, "I became a spy" (11). The *I can slip under the door* narrative moment is supplanted and significance transfers to this new story.

Working memory

From a process dynamics perspective, morpharchic transfers of dominance and significance can be viewed as occurring in cognitive as well as literary processes, for example in the complex working memory involved in reading, interpreting and responding to the *I can slip under the door* narrative moment. Working memory is theorised in the scientific literature as the dynamic microcognitive capacity to "hold a limited amount of information temporarily in a heightened state of availability for use in ongoing information processing" (Cowan, Morey, and Naveh-Bejamin 2021, 45). The narrative moment from *The.PowerBook* holds a small but morpharchically shifting volume of information that has some as yet

unpredictable significance for the unfolding narrative. While "it is tempting, after all, to posit the existence of a metaphorical container that resides in the nervous system and whose sole purpose is to temporarily hold information for later use" (Buschbaum and D'Esposito 2019, 135), working memory is "not a unitary entity" (Oberauer 2019, 1). Working memory is not stored in a dedicated brain region; it "consists of a set of processes and mechanisms and is not a fixed 'place' or 'box' in the cognitive architecture" (Miyake and Shah 1999, 450). Involving multiple shifting interactions in response to a stimulus (Fitz et al. 2020), working memory occurs over short durations of "one or two seconds" (Logie, Belletier, and Doherty 2021, 390). Bradley Postle emphasises the dynamism of working memory poised "in an accessible state—in the absence of relevant sensory input—to transform when necessary" (2021, 334). Working memory continues reacting to input over milliseconds although the initial input itself does not continue and working memory then alters in response to further incoming perturbations: "neuron populations do not maintain whatever pattern of activity was initiated by a sensory input. The population code evolves and changes with time, additional inputs and task demands" (Lundqvist, Herman, and Miller 2018, 7014). Operating through dynamic interactions, working memory "contents can be overwritten" (Buschbaum and D'Esposito 2019, 136), as happens with the *I can slip* moment in *The.PowerBook*. While working memory may be limited in capacity, it is not limited in terms of diversity of information that can be processed: "if the brain can represent it, the brain can also demonstrate working memory for it" (Postle 2021, 29), just as the *I can slip under the door* moment presents a rich variety of conceptual and multisensory perturbations.

In processing new information, working memory necessarily recruits multiscale cognitive processes related to individual long term memory and sociocultural experience (Kim, Oines, and Miyake 2017, 406); the *I can slip under the door* moment morpharchically recruits knowledge and experiential associations relating to the various items listed.

Neuroscience conceives of working memories as interacting with other memory processes such as long term semantic (meaning making), episodic (autobiographical) and procedural (skills repertoires) memory (Chai, Hamid, and Abdullah 2018, 2), any of which typically perturbs and reconfigures the working memory involved in narrative comprehension (Song et al. 2021, 8972). Verbal working memory, for example, is involves complex interactions among language input during reading, prior language experience, the "nature of the information that is to be remembered, and the mental processes afforded by the task that is being performed" (Postle 2021, 29). The working memory tasks to be performed in reading narrative moments relate to the interpretations of cascades of newly arriving perturbations, a task that is constantly repeated as reading continues. Information rich working memory requires diverse modes of cognitive processes interacting across brain regions; transformation of working memories is continuous and morpharchic. Neural processes recruited to working memory are subject to new perturbations, entailing a morpharchic switch in distribution of energy and processes. Perturbations "interfere with one another" (Postle 2021, 45), particularly as reading continues: "narrative comprehension involves a constant interplay of the accumulation of incoming events" (Song et al. 2021, 8972). Interactions, and therefore the interpretations that those interactions generate, are changed as new perturbations arrive. Applying a process dynamic point of view to working memory in reading novels, working memory enacts a morpharchic play of processes as narration continues and working memory alters under the influx of perturbations and changes in dominance and significance. Morpharchic imbalances and instability in working memory and narration impel prolific interpretative changes.

Morpharchic narration

The mutability of narration is necessary; in a banal sense, if the narration did not change, no story would be told. While change is necessary to all narratives, the specific

literary and cognitive changes that must be lived through during reading are subject to real time perturbations and impacts that are not predictable. During reading, literary details particular to the novel and real-time experience and interpretation of those details matter. From a process dynamic perspective, narration irreversibly changes in ways specific to the literary and cognitive processes involved in the reading encounter; it does so again and differently as reading continues and with each rereading. This chapter next presents examples of morpharchic narration, including world shifts, perspective shifts and shifts between allusion and metacognition.

Morpharchic world shifting in narration

During reading, interactions among literary processes in *Oryx and Crake, The Curious Incident of the Dog in the Night-time* and *The.PowerBook* disperse narration into shifts across worlds, times, allusions, metatextual commentary, narrators, characters, genres, events and descriptions. Such switching or shifting is a ubiquitous and powerful driver of narrative change in prose fiction. Literary mode-shifting generates differing valences, weights and intensities. Cognitive mode-shifting during reading through, for example, comprehension, working memories and responses, likewise generates transfers of dominance and significance in a turbulent, "choppy stream of consciousness" (Arstila and Lloyd 2014, 159). Perceiving narrative switches requires that the literary processes to which microcognitive attention is diverted be seen as different. For example, the morpharchic switch from the real world to the fictional world is typically held to occur across philosophically and experientially different modes. Morpharchic switches among fictional worlds and between fictional and real worlds in *The.PowerBook, The Curious Incident of the Dog in the Night-time* and *Oryx and Crake* also play on this perception of separation for effects. The novels do this by rehearsing the separation, at times explicitly, "I said that I wanted to write about something real" (Haddon 2003, 6), and by perturbing it; the *I* in this quote from *The Curious Incident of the Dog in the*

Night-time is fictional and inhabits a fictional world that includes a fictional *something real*, the death of a fictional dog.

Preserving a philosophical divide between real and fictional, narrative theory conventionally considers that:

> every language-based fictional narrative involves at least two levels: a real-world level, on which an author communicates with a reader, and a primary fictional level, on which a narrator communicates with a narratee within an imaginary world. Whenever a narrative generates another narrative it adds another level to the narrative stack. This process is commonly known as *framing* or *embedding.* (Ryan 2006, 204)

A perception of separation between real and fictional "levels" immediately introduces the possibility of jumps, called metalepsis in narrative theory, across the ontological gap separating these levels. Following Gérard Genette, literary narrative theory tends to view metalepsis as transgression of a "shifting but sacred frontier between two worlds, the world in which one tells, the world of which one tells" (1980, 236). Transgression occurs in an assumed hierarchy in which the world of readers and authors is privileged, as Ryan reiterates in the quote above, followed by a subordinate "primary fictional level", followed by any further subordinated fictional worlds embedded in or alongside the primary fictional world. In narrative theory, this hierarchy is conceptualised and transgressed spatially; for example, in "ontological metaleptic jumps as (1) *vertical* interactions either between the actual world and a storyworld or between nested storyworlds, or as (2) *horizontal* transmigrations between storyworlds" (Bell and Alber 2012, 166).

The process dynamics concept of morpharchy that I propose offers an alternative picture of world switches in narration, one that moves beyond a spatially conceived fixed

hierarchy of worlds that limits worlds to separate blocks accessed in prose fiction via hierarchically determined metaleptic jumps. For process dynamics, in contrast, worlds are composed of disparate processes and focussing on the processes rather than worlds challenges the idea of separate, hierarchically disposed worlds. There is some agreement for this contention: "the border separating real and imaginary worlds appears much less sharp and clear when viewed from a neuroscientific perspective" as multisensory neural processes are activated for both reading and lived experience "regardless of its real or fictional character" (Wojciehowski and Gallese 2022, 63). At any time, a selection of processes from one or more worlds may be drawn into encounter, interact, perturb each other and change rather than retain their status as real or fictional.

The Curious Incident of the Dog in the Night-time

While reading *The Curious Incident of the Dog in the Night-time,* the depiction of the eponymous fictional dog may recruit into working memory various sociocultural processes conceptualised in the real world as breed, body type, size, fur and skin colour:

> Wellington was a poodle. Not one of the small poodles that have hairstyles,
>
> but a big poodle. It had curly black fur, but when you got close you could
>
> see that the skin underneath the fur was a very pale yellow, like chicken.
>
> (Haddon 2003, 1).

Each detail dominates momentarily, gaining attention and triggering working memory processes at the specific instant in the narration in which they are listed. As they accumulate, the details also accrue significance and valence; big poodles are preferable to small poodles. However, these real world characteristics are used as literary processes to create a fictional dog's corpse, "I stroked Wellington and wondered who had killed him" (1) and real world breed, body type, size, fur and skin colour are converted into fictional processes in a fictional world. Working memory must accommodate this morpharchic switch from real to fictional.

The fictional dead dog is, at a slightly later moment, incongruously converted again, this time into murder victim in a separate fictional murder mystery world, "I am writing a murder mystery novel" (5); working memory is morpharchically perturbed by this new shift from fictional world to fictional story in the fictional world. The narration also shifts to yet another world of metafictional commentary, "it was usually people who were killed in murder mystery novels" (6), an explicit statement attributed to the fictional narrator's teacher as reported by the fictional narrator. As a rhetorical and amusing narrative move, the transformation of a dead dog into murder victim contravenes extratextual genre conventions. This is acknowledged and countered in the fictional world: "I said that I wanted to write about something real and… I did not know any people who had been killed… I also said that I cared about dogs" (6). In morpharchic interactions, real world processes change, through these instants of narrative transition, into fictional world processes then into processes composing a different fictional murder mystery world and yet again into processes composing another world of metafictional commentary. Working memory processing of the dog also transforms morpharchically as real world details, fictional creations, metafiction and the overturn of literary convention unfold. Each of these literary and cognitive transformations in significance has its morpharchic moment of attention but no hierarchy is preserved. Turbulent cascades of narrative and interpretive processes may include transitory hierarchies or heterarchies but these are vulnerable to volatile conditions that ensure changes, as working memory and interpretations of the dog veer through real, fictional and metafictional versions. While narrative switching in a novel may draw attention to and generate effects from the disparity in the particular worlds in an encounter, disparity does not necessitate hierarchy. In narrative theory, the concept of metalepsis offers movement *between* fictional and real worlds that nonetheless retain their separation and remain otherwise untouched in terms of status. In contrast, the process dynamics concept of morpharchy

91

focusses on processes constructing a particular real or fictional world that are foregrounded as temporarily primary. Shifts among processes composing different worlds do not necessitate a hierarchy or metalepsis. They are simply different processes that are drawn into encounter and subsequently change in status and significance in relation to each other. They are not permanently hierarchic but are morpharchic. Cognitive processing triggers changes in working memory relating to whichever real world and fictional processes are involved; no worlds are immune. Any conceptions of real world poodles activated in readers may in turn be modified by the comic depiction of the dog in *The Curious Incident of the Dog in the Night-time*, a cartoon corpse which "looked as if it was running on its side" and appears to be "chasing a cat in a dream" (1). From this interactive process dynamics perspective, the real and fictional are neither ranked nor discrete: the real and the fictional interact with and change each other.

The.PowerBook

A different performance of morpharchy opens *The.PowerBook*. The narrative theory outlined above (Ryan 2006, 204), would suggest that the first framing story in *The.PowerBook* acts as a *primary* fictional world upon which successive *embedded* stories depend at what are conceptualised as subordinate levels of fictionality. Ryan's *stack* image in "whenever a narrative generates another narrative it adds another level to the narrative stack" (Ryan 2006, 204) invokes a singular, static, orderly and immutable plan in which every world has its place, an example of the "fixed hierarchies" that Brian Richardson also challenges: "Chinese box type models should always be viewed with suspicion or rejected outright since they can never do justice to the playful, transgressive, and hybridizing tendencies of narrative fiction" (Richardson 2006, 139). Instead, on close inspection, the first story in *The.PowerBook* is itself subject to repeated morpharchic switches in dominance among multiple fictional worlds. Literary processes construct the unidentified world of the opening

92

sentences, "to avoid discovery I stay on the run. To discover things for myself I stay on the run" (3), switch to constructing the world of a fictional email "there's an email for me" (3) and switch again to constructing a fictional shop (3). Each minimally suggested world in turn interrupts, seizes attention, perturbs and "overwrites" (Buschbaum and D'Esposito 2019, 136) working memories and diverts the narration, as if three possible beginnings for the novel. All three of these potential initial fictional worlds reappear and change through *The.PowerBook.* None of these fictional worlds at the beginning of *The.PowerBook* is primary except temporarily in terms of attention and working memory; they do not ground the novel or position any fictional world hierarchically. The initial runner, email and shop microstories and their fictional worlds have their transitory literary and cognitive primacy swiftly superseded by each other and then by multiple other stories as the narration continues.

All the fictional worlds in the first chapter are morpharchically supplanted by the story that begins in the second chapter of the novel, the tale of Ali the tulip smuggler: "I want to start with a tulip. In the sixteenth century the first tulip was imported to Holland from Turkey" (Winterson 2001, 9). The authority of this storyteller, *I want to start with a tulip*; the switch to historical fact, *in the sixteenth century*; and the temporary certainties of the fictional worlds of the previous chapter from which this new tulip story is apparently projected by the same storytelling *I*, are all undone. This is achieved simply through the repetition of *I*: "I want to start with a tulip. In the sixteenth century the first tulip was imported to Holland from Turkey. I know—I carried it myself" (9). The *I* who is narrating a story set four centuries ago suddenly and surprisingly claims to be, equally authoritatively, the eyewitness and protagonist of the tulip story, morpharchically reconfiguring or even invalidating immediate working memories and longer term interpretations of *I*. The distinction between a narrating and an experiencing *I* is also unexpectedly obliterated. Surprise has a strong but temporary effect on immediate cognitive processing: "surprising events are distracting—that is, they can

disrupt ongoing cognitive processes such as working memory" (Wessel 2018, 199).

Morpharchically, surprise then also confers immediate weighting and has impacts on long term memory: "extensive research has backed this intuition that we are more likely to remember surprising moments than mundane ones" because "one consequence of surprise may be increased arousal" (Ben-Yakov, Smith, and Henson 2021, 1). Surprising metamorphoses of *I* may induce some degree of cognitive dissonance, the perception of contradictory information, that repeatedly impacts on reading and response.

The status of this newly introduced *I* in the narrative moment *in the sixteenth century the first tulip was imported to Holland from Turkey. I know—I carried it myself* is in turn perturbed literarily by further intertextual switches in and out of other fictional and nonfictional worlds, including history, morpharchically altering the significance of *I* with each semantic and interpretive shift. Ogier Ghiselin De Busbecq is historically accredited with importing the first tulip bulbs to Europe (Halsall 1998). Reworking the history of tulips in de Busbecq's account, the *I* of *The.PowerBook* inserts itself abruptly into history in a way which conventionally signals impossibility in the lived worlds of readers. In terms of morpharchy, *I* shifts through competing positive and negative valence. The narrating *I* fashions incommensurate narrated worlds, historical and fictional, in distanced centuries. In a negatively valenced Genettian reading, this *I* is out of place, aberrant, lying or transgressive. In another negative reading, *I* may appear to be an unreliable, even untrustworthy narrator. More open to acceptance, *I* may be considered "one of the unusual narrators and consciousnesses of contemporary fiction" (Richardson 2006, 2). Alternatively, positive valencing may displace transgression and unreliability with a celebration of transformation. *I* displays a propensity for metamorphosis which then extends across fictional worlds in *The.PowerBook*, retrospectively to the initial stories and subsequently to the other eyewitness accounts throughout the novel. Mutable and ambiguous, *I* may trigger a range of positive and

negative responses during reading. These morpharchic and perhaps initially surprising or disorienting changes in worlds, working memory, significance and valencing cascade nonhierarchically through *The.PowerBook;* no narrator, set of cognitive conditions or world takes permanent precedence.

Morpharchic perspective shifting in narration

As well as world switches, perspective shifts have immediate impact on working memory. These include switches through multiple vantage points in or outside the fictional world and among first person experience or observer positioning in relation to characters and narrators. As part of the narration, each of the three novels constructs a main narrative voice, Snowman in *Oryx and Crake*, Christopher in *The Curious Incident of the Dog in the Night-time* and the shapeshifting *I* in *The.PowerBook.* Snowman inhabits disparate pre- and post-apocalypse worlds as a fictional autobiographical narrator of a story, *Oryx and Crake*, narrating himself into the novel's fictional world as a character. In *The.PowerBook, I* is a fictional writer metafictionally reporting on the making of stories in which *I* metamorphoses into multiple different and frequently autobiographical narrators and characters in multiple fictional worlds. Christopher is a fictional author metafictionally describing the making of his story, *The Curious Incident of the Dog in the Night-time,* in which he appears as autobiographical narrator narrating himself as character in the fictional world that he creates for a school writing project. However, these voices are constantly perturbed and altered by insistent switching of perspectives, taxing working memory. All three assert themselves to be the creators of the texts readers are reading yet this status is also perturbed by concurrent status as fictional creations. All three are narrating the stories told in the novels and are simultaneously narrated narrators. All three assert autobiographical status for the stories they narrate yet their testimonies are also fictional. All three as fictional authors construct themselves as characters yet are also characters constructed by Haddon, Winterson or

95

Atwood. These fictional protagonists are not well served by narrative typologies that assert "foundational oppositions, those between homo- and heterodiegesis, first and third person narration" (Richardson 2006, 139). Rather, all three protagonists are constructed through morpharchic narration and working memory interactions and perturbations. Swirling and transforming perspectives shape these encounters.

As Marisa Bortolussi and colleagues argue, the widespread assumption of "a" perspective in a fictional character is too simplistic; it requires a fictional character to have no inconsistencies and to endure unchanging (2018, 178). The assumption of a coherent singular perspective also ignores cognitive input during reading: it "seems to presume that [a perspective] is consistently aligned with a character, so that it can be identified independently of the dynamics of the reader's processing over the course of the text" (Bortolussi, Dixon, and Linden 2018, 178). In a contention that resonates with my approach, Bortolussi and colleagues assert that during reading, interpreting characters' or narrators' points of view is also more likely to be "piecemeal rather than holistic, dynamic rather than consistent, effortful rather than automatic, and reactive, in the sense that [interpretations] are a function of the reader's online processing as it interacts with narrative technique" (178). Working memories of fictional perspectives and any alignment with or rejection of particular perspectives are perturbed by reader "knowledge, biases, motivation, attention, and inferences" (180). Conceptualising perspectives as coherent obscures the complexity of many fictional instances and understates the morpharchic interplay of literary and cognitive impacts in the generation of perspectives.

The Curious Incident of the Dog in the Night-time

All three novels create perspectives and shift morpharchically among them; a narrative moment from *The Curious Incident of the Dog in the Night-time* may serve to illustrate the

morpharchic shifts of perspective in and out of ostensibly monologic narration that apparently presents a unified narrator perspective:

> And when I looked at /it [the cloud] /for a long time /I could see/ it moving very slowly and /it was like an alien spaceship hundreds of kilometres long,/ like in **Dune** or **Blake's 7** or **Close Encounters of the Third Kind**, /except that it wasn't made of solid material, /it was made of droplets of condensed water vapour,/ which is what clouds are made of. (Haddon 2003, 86)

The soliloquy switches into disparate perspectives, indicated by slashes I have inserted into the quote, perspectives that punctuate and change the narration and working memory; bold and italic fonts are retained from the novel. The narration moves morpharchically between, for example, observing and experiencing. The narrator Christopher metacognitively observes the character Christopher observing, *when I looked*, *I could see*, and reasoning, *it was like*, differentiating this perspective from the sensory perceptions attributed to the character watching the cloud *moving very slowly*, and the presentation of thought allocated to the character, *alien spaceship, Dune or Blake's 7 or Close Encounters of the Third Kind*, *wasn't made of solid material*, *made of droplets of condensed water vapour*. Primacy shifts temporarily to an influx of intertextual perturbations related to films, *Dune or Blake's 7 or Close Encounters of the Third Kind;* these cinematic allusions also interact with scientific allusions, *solid material*, *droplets of condensed water vapour*. Perspective metamorphoses morpharchically through visual perception, association, memory, scientific discourse and address to an imaginary interlocutor, *which is what clouds are made of*. Dominance transfers and significance alters with each alteration.

The morpharchic construction of perspective in the cloud moment from *The Curious Incident of the Dog in the Night-time* further perturbs and is perturbed by a reader's fictional

working memory as the narrative moment dramatises the construction of working memory. Working memory as live action is not passive recollection: "the 'copy' theory of memory— bits of information that are stored and can then be looked up" (Brown 2019, 33). Instead of depicting passive recall, the processes that contribute to working memory in the cloud moment alter during the encounter. Shifts across different cognitive modes of observing, experiencing, reasoning, remembering and alluding demonstrate the diversity of processes recruited by the narrator to build working memory during the narrative moment. Working memory and long term memory both transform: "memory is often conceived as a dynamic process that involves substantial transformations" through "imaginative reconstruction or construction" (Liu et al. 2021, 1). Only part of this working memory activity is direct response to perception, in this case fictional visual perception of a cloud. Rather, working memory is depicted in shifts among multiple cognitive modes and perspectives. These include long term fictional popular cultural memories that draw on real world movies, *Dune or Blake's 7 or Close Encounters of the Third Kind* and discursive knowledge, *made of droplets of condensed water vapour.* Fictional working memory configures the lived moment that the fictional narrator is portrayed as actively constructing. Construction occurs through switches among perspectives and cognitive modes rather than passively recall. The fictional narrative moment in this way thematically enacts real world cognitive "constructing" (Liu et al. 2021, 1) or "sculpting" (Brown 2019, 28) of memory and world. Readers cognitively constructing working memory and interpretation of this narrative moment will creatively imbue the narrative moment with individual knowledge and experience, perhaps seeing a different image in the hand drawn picture of the cloud that accompanies the text, perhaps activating their own long term cinematic or scientific memories. Reading this narrative moment, morpharchy in processes composing literary perspectives drives creative memory construction in readers as it does in the fictional narrator. With these switches in perspective,

the narration undergoes repeated alterations in meaning as well as changes in tone, for example from dreamy to didactic. Significance alters morpharchically as the processes introduced by perspective switches impinge and fade. Changes in modes, semantics, dominance, significance, valence and weighting create the memory in and of the narrative moment.

Morpharchic shifting between allusion and metacognition in narration

As well as world and perspective switching, morpharchy also characterises other modes of switching in the three novels.

Oryx and Crake

The beginning of the second chapter of *Oryx and Crake*, for example, demonstrates morpharchic transformations through switches across allusive and metacognitive modes:

> "Now I'm all alone," he says out loud. "All, all alone. Alone on a wide,
>
> wide sea." One more scrap from the burning scrapbook in his head.
>
> Revision: seashore.
>
> He feels the need to hear a human voice—a fully human voice like his own.
>
> Sometimes he laughs like a hyena or roars like a lion—his idea of a hyena,
>
> his idea of a lion. He used to watch old DVDs of such creatures when he
>
> was a child. (Atwood 2003, 10)

The first sentence shifts from the fictional world of spoken monologue, *Now I'm all alone*, to metacognitive comment, *he says out loud*, to the separate world of Samuel Taylor Coleridge's "The Rime of the Ancient Mariner", "Alone, alone, all, all alone/ Alone on a wide, wide sea!" (Coleridge 1963, 179). For readers with knowledge of Coleridge's poem, or of the quote itself, *all, all alone/ Alone on a wide, wide sea* is an allusive *scrap,* a perturbation

that cedes precedence to both the initial spoken *Now I'm all alone* and the metacognitive comment *he says out loud*. Perturbing working memory during reading, the allusion impacts on these speech and metacognition processes and is itself ironically altered in the new post-apocalypse context. The allusion to the Mariner interacts with other literary processes in *Oryx and Crake* to co-create the character Snowman's traumatised mental state, augmenting images in *Oryx and Crake* with images of another importunate "grey-beard loon" who is also "in agony" (Coleridge 1963, 173, 179). As fictional characters, Snowman and the Mariner are both sole survivors of a catastrophe and are both depicted as obsessively driven to tell their stories. In contrast to the Mariner, Snowman the character has no other human interlocutor; he talks to himself. As narrator of *Oryx and Crake*, Snowman performs self-consciously and satirically for an absent audience, "for the edification of a world that no longer existed" (346). Intertextuality is not a simple one way interaction; the encounter with Snowman also disturbs and alters Coleridge's Mariner with, for example, a present-day awareness of post-trauma syndromes and shades the Mariner's experience with an apocalyptic tinge beyond its own hallucinatory force. Reading "The Rime of the Ancient Mariner" in the future may trigger memories of Snowman. Morpharchic shifts inflect interpretations of both the poem and the novel.

Complex interactions among grammar, vocabulary, imagery and perspective in *he says out loud* and *he feels the need to hear a human voice,* also shift the narration morpharchically into and out of metacognitive observer mode, *he says, he feels, he laughs* or *roars.* The auditory and visual imagery used to create Snowman's loneliness and grief displaces his language at times of extreme stress with nonverbal hysteria and howling*, he laughs* or *roars*. This imagery of anguish is then sharpened in contrast to and morpharchically disoriented by another unpredictable shift to a momentarily lucid memory, *he used to watch old DVDs*, a sociocultural perturbation for readers who know what a DVD is, introduced through

simultaneous shifts out of the fictional present to the temporally separate pre-apocalypse world of the novel and real worlds containing *old DVDs*. In a process dynamics view, morpharchic changes in significance mean that any intratextual and extratextual worlds involved in a narrative moment are impacted. Snowman's random memory of *DVDs* appears to be triggered by word association and *his idea of a hyena, his idea of a lion* are memories of films of *such creatures.* The intrusion of *DVDs* narratively populates the older history of the pre-apocalypse fictional world with hyenas and lions and highlights their more recent pre-apocalypse fictional extinction. Like Snowman, readers may idiosyncratically recruit long term memories of hyenas or lions into working memory and react to the obsolescence of *DVDs* and extinction of *such creatures* depending on their lived experience. Such lived experience is cognitively altered by positive or negative response of some intensity to the extinction of hyenas or obsolescence of DVDs and individual weighting of that loss as important or not. During reading, morpharchic interactions are specific to unfolding narrative moments, literarily altering narration and cognitively reconfiguring readers' working memories through perturbations triggered by the text.

During reading, separate worlds, allusions, metacognitive declarations and perspectives impact on each other morpharchically. Changes in attention, weighting, significance and valence accompany these interactions. While a "fictional character cannot literally communicate with his or her author [or reader], and an author [or reader] cannot step into the fictional world" (Bell and Alber 2012, 167), fictional and real world processes do interact. In reading *Oryx and Crake, The Curious Incident of the Dog in the Night-time* and *The.PowerBook*, morpharchic movement through literary and cognitive processes is relentless, at times almost imperceptible, as in the narrative moment constructing Christopher's daydreaming, at other times intrusive, as in the unapologetic world shifting *I* from *The.PowerBook* or ludic, as in the play of allusion and metacognition in *Oryx and*

Crake. The process dynamics concept of morpharchy does not automatically accord any process, world or point of view *a priori* or enduring primacy over any others but allows constant shifts in primacy and significance. Morpharchy is necessarily implicated in transformations in narration, working memory and interpretation.

Morpharchic time

In this chapter section, I turn from narration and working memory to fictional and experienced time. Morpharchy is also involved in the generation of fictional and experienced time during reading. While sensory perceptions such as vision or hearing have physical sources and facilitating organs such as eyes or ears, time has no specific source or dedicated organ (García-Pérez and Alcalá-Quintana 2018, 263). Nonetheless, "temporal awareness is a ubiquitous feature of conscious life" and manifests through complex interactions as "the experience of temporal properties of events and processes: their order, duration, time of occurrence, context among simultaneous events and events before and after, and more" (Arstila and Lloyd 2014, x). The processes constituting events change as they interact; as narrator Christopher in *The Curious Incident of the Dog in the Night-time* observes*,* "time is only the relationship between the way different things change" (193). From sundials to atomic clocks, time is measured objectively through change, for example, changes in the position of the sun or in atomic radiation. A sense of time is likewise generated by interactions among diverse processes including those related to sensory input, attention, emotions and memories: "we do not perceive time as such but changes or events" (Le Poidevin 2019, 2). To measure time quantitatively or to experience time qualitatively requires change.

Quantifiable clock time is altered by qualitative subjective time: "no date line, no meridian, no gas-burnt stars, no transit of planets, not the orbit of the earth nor the sun's red

galaxy, tell time here. Love is the keeper of the clocks" (Winterson 2001, 244). Asserting that different processes are involved in objective and subjective time is not limited to Winterson's novel but has also been observed in literary studies:

> we experience some events intensely even though they might last only
> seconds or minutes, while we remember other, less interesting events as
> torturous longueurs even though in clock time they were much shorter than
> we imagined. Thus our emotions, the relative intensity of different
> experiences, our individual perceptions, and especially our memories create
> time. (Blazek 2020, 59).

Every reading moment is lived, and such moments are elastic and changeable, not dictated by clock time. This is demonstrated, for example, in subjective perception of time, which "varies considerably from moment to moment" (Terhune et al. 2017, 1864), perhaps with intensity of emotion (Droit-Volet 2014, 477), positive or negative valence (Zhang, Lu, and Hodges 2019, 2) or immersion (Im and Varma 2018, 296). This psychological "chronoception" (García-Pérez and Alcalá-Quintana 2018, 263) or subjective experience of time (Block, Grondin, and Zakay 2018) has also been called the "dynamic present" (Dempsey 2014) or the "moving now" (Currie 2009, 318) in philosophy and literary studies. While it is possible to record time during reading in minutes or hours, this gives little insight into the complexity, dynamics or lived experience of time, neither fictional times presented in a novel nor experiences of time during reading. Rather, the qualitative changes that create both fictional time and experienced time during reading operate morpharchically.

Mark Currie follows other philosophical and literary scholars in asserting that fiction and mind are both free "to roam in time" (2007, 19, 21), a claim also made in *The.PowerBook*: "I can't take my body through space and time but I can send my mind and

use the stories" (53). In narration and cognition, roaming in time can extend to a propensity to invent and play with time. *The.PowerBook, The Curious Incident of the Dog in the Night-time* and *Oryx and Crake* each play morpharchically with tenses and with transformations in fictional time, which interacts with cognitive experience of time. I argue that morpharchic shifts and transformations shape both the generation of fictional time and the experience of time during reading.

During reading, neither fictional time nor experienced time exists in isolation but is co-created by interacting literary and cognitive processes. In a process dynamics view, reading a novel involves morpharchic interactions among a number of coinciding times: the changing experience of time spent reading, the experience of time in relation to immersion or response, and the multiple time zones in narrative moments composing narration of the story. Unfolding narrative moments each have their own multiple temporalities that interact morpharchically to generate the constantly moving and changing present of narration. Physical eye movements back and forth across text interact with microcognition and sociocultural cognition to reconfigure both working memories of time in the novel and subjective experiences of the present during reading. Temporal changes occur whether narration moves from past to future or in multiple trajectories. Typically, in either chronological or convoluted narration, perturbations are morpharchically triggered by newly arriving fictional times and fictional points of temporal orientation. In the novels, time is not temporally homogeneous. In stark contrast to the older idea of the moving now as "the notion of a present moment that moves along a timeline, steadily and evenly, into the future, turning tomorrow into today" (Currie 2009, 318), reading triggers disparate modes of the present. Morpharchy manifests in the ways diverse times interact as world creating processes and felt time.

Morpharchic tense in narration

Tense is viewed as "the main marker of temporality in Indo-European languages" (Jaszczolt 2009, 82) and "plays a key role in linguistic and narrative theories investigating how narrative works" (Prudente 2018, 7). While tense is most commonly construed as marking past, present or future time, it is mutable in that allowing multiple perspectives on time. Tense operates from the point of view of a designated but constantly moving and changing present, a present that pragmatically "simply picks out the time at which it is used" (Bourne and Caddick Bourne 2016, 30). Past and future are deemed so in relation to an explicitly signalled or implied present.

While narrative past tenses may indicate "a real past in historical novels" (Fludernik 2003, 123), for example, the Case of the Cottingley Fairies in *The Curious Incident of the Dog in the Night-time* (111), the climber Mallory in *The.PowerBook* (147) or choreographer Martha Graham in *Oryx and Crake* (186), past tenses in fiction more frequently indicate an imaginary temporal setting. Signalling the imaginative, fictional status of the narrative in this way is not inherent in the tenses but is a culturally driven and frequently deployed narrative convention. The interplay of past tenses in narrative modes may be so intertextually familiar to readers as to automatically trigger identification of fiction, even without exposure to other clues such as packaging of the novel. However, novels may be written predominantly in past tenses, the conventional choice used in *The Curious Incident of the Dog in the Night-time*, or present tenses (Gebauer 2021), or in strategically interspersed past and present tenses, as in *Oryx and Crake* and *The.PowerBook.* No necessary or inherent pastness of past tenses or presentness in present tenses determines narrative temporality; tense selection and use rehearses, or contests, convention. As Monika Fludernik points out, the assumption that narration should always be in past tenses because the events are anterior to their narration is invalid: "on the contrary, the deployment of tense options in narrative texts is a fairly

complex matter which depends not merely on real-life precedent but also on literary peculiarities and generic expectations" (2003, 121). Mark Currie agrees: "we need to acknowledge a more general mismatch between verb forms and temporal reference at the level of the sentence and… narrative discourse" (2013, 1). As literary processes, tenses trigger a variety of possibilities depending on the specific context in which they appear: a tense "never fulfils a specific function on its own, but invariably achieves its effects only in combination with other narrative strategies" (Gebauer 2021, 252). From a process dynamics perspective, I construe tense as diverse grammatical, semantic and rhetorical processes interacting with other narrative and cognitive processes during reading and as being subject to morpharchic shifts and changes. Tense is a dynamic literary resource.

In fiction and otherwise, verb tenses can invoke multiple temporalities but are not limited to conceptualising time; they do much more. Specific modes of each tense, the particular senses each verb tense can conventionally express, depend on the context in which a verb tense occurs. Present simple can refer to fact rather than time, "Wellington is a dog"; permanent or long term state of affairs, "Christopher lives in Swindon"; response at the moment of speaking, "It tastes bitter"; habit, routine or schedule "The train leaves at 9"; future plan, "We leave for Japan next week"; or narrative event, "Snowman wakes before dawn" (Atwood 2003, 3). Past simple can indicate that something is completed, "I wrote a book"; refer to past or historical fact, "In the sixteenth century tulips were exported from Turkey"; or to narrative events, "He threw the empty bottle". All other verb tenses are similarly multimodal (Table 2).

Table 2: Verb tenses

Verb tense	mode: to express	Examples *
Present simple	fact permanent situation response at the moment of speaking habit/routine/schedule/timetable future plan events in stories	The dog is dead. Christopher lives in Swindon. It tastes bitter. The train leaves at 9. I leave for Japan next week. He wakes before dawn.
Present continuous	activity over time in the present temporary action/situation temporary habit/repeated action future plan for circumstances/situation or background in stories	I am reading a novel. They are living in London. He's swimming three times a week. We are meeting at the café tomorrow. She's sitting at her computer.
Present perfect	change experience sequencing recent event with consequences (to emphasise consequences, implied or explicitly mentioned)	The unemployment rate has increased. Have you tried mango? The pandemic has caused panic. The flies have got in.
Present perfect continuous	to emphasise the ongoing nature of an activity across time periods past and present	He has been walking all day.
Past simple	completed/finished event historical/past fact for events in stories	The dog was dead. Archaeologists found new evidence in 2011. Snowman walked fearfully towards the dome.
Past continuous	to show (temporary) action over time in the past for circumstances/situation or background in stories	The archaeologists were digging here yesterday. The wind was howling and the clouds were racing across the dark sky.
Past perfect	to show that a past event happened before another past event (to emphasise sequence)	The plane had left before my connecting flight arrived. The computer monitor had dimmed. (implied subsequent event)
Past perfect continuous	to show an ongoing action in the past before another past event, either explicit or implicit (to emphasise action across past time periods until interrupted)	I had been hugging the dog for 4 minutes when I heard screaming We had been working quietly. (implied second event interrupts)
Future simple	prediction expected or prearranged future spontaneous future plan	Climate change will cause a rise in sea levels. They will release the figures in May. Wait, I'll come with you!
Future continuous	future temporary activity or action (to emphasise the action)	I don't know what they will be doing; I will be celebrating!
Future perfect	to show that an event or activity will be completed by a point of time in the future (perfect= emphasis on end/product)	We will have attended five conferences by this time next year.
Future perfect continuous	to emphasise an ongoing action up to a point of time in the future (perfect continuous= emphasis on action across time periods)	At 5 o'clock, I will have been reading for three hours.

*Note: As referencing makes the table unwieldy, none of the examples are direct quotes from the three novels.

Knowing that a tense choice grammatically allows both expression of time and mode and is liable to change across contexts is not the same as noticing the changes generated by that tense choice in action in a specific context. Verb tenses also indicate one or more of completion or incompletion, permanence or transitoriness, activity or product, foregrounding, sequencing or contextualising of events, or consequences, experience or prediction, as expressed through the verb tense deployed in a particular context. The dynamics of tense in narration may further involve modality through auxiliary terms such as *can, could, may, might, will, would, should, must* to express "point of view about whether something is real or true, or whether it is the subject of speculation rather than definite knowledge" (Carter and McCarthy 2006, 638). Jaszczolt asserts "a very intimate connection between time and modality" (45). Present and past simple tenses, for example, do not need modal auxiliaries in order to assert an absolute degree of belief or high degree of certainty on the part of a character or narrator that a proposition is true, "the dog is/was dead". Other modal verbs, for example "the dog may/ could/ should/ must be dead", are "capable of expressing almost infinite gradations of certainty, probability, and commitment" (Currie 2013, 2), depending on context. Scaling up from verbs to fiction, fiction can be viewed as a form of modality that triggers distinct temporal dimensions of the imaginary, the hypothetical, the desired or the impossible. Times and modalities are brought into proximity during reading and perturb each other morpharchically, generating shifting meanings, significance and dominance. The complexity and dynamism of tense is in part triggered by the diverse permutations of semantics, aspect and modes that are possible for a verb tense; this dynamism is intensified in encounters with other literary and cognitive processes.

Oryx and Crake

From a process dynamics perspective, a single verb tense can combine or slip morpharchically among possible times and modes, depending on the encounter. This has

implications for interpretation; if a verb tense has not only multiple but also shifting meanings, working memory may ricochet among possibilities, in some cases without resolution. As dynamic processes, verbs interact with surrounding language and this accords verbs the ability to trigger multiple impacts. The multifaceted and versatile character of tense necessitates cognitive work: "tense patterns, in their variability and complexity, require interpretative effort" (Fludernik 2003, 131). In the first sentence of *Oryx and Crake,* "Snowman wakes before dawn" (3), the present simple *wakes* morpharchically skitters through multiple modes, transferring attention and cognitive processing of significance as it does. Present tense in *Snowman wakes before dawn* bestows temporal immediacy and close focus on the event. It indicates an event in the present, converts fictional *wakes* into an atemporal fictional fact and suggests a routine. In this sentence, the meaning of the verb prevents *wakes* expressing present simple for permanence; *wakes* is a finite action with duration but not permanence. Semantically, the verb indicates an action in the process of changing and poised for further change; waking designates a change in a state of affairs from sleeping to consciousness but most importantly is a precursor to something else. *Wakes* morpharchically shifts attention to the immediate future, to what might happen next; as an updated "once upon a time", *wakes* in this context signals the beginning of a story. Part of the opening sentence of a novel, *wakes* also signals fiction; that is, *wakes* is a fictional event and a fictional fact in the fictional narrative present, activating a temporal shift to an imaginary time. Contextually, *wakes* begins the narration and the story *in medias res,* which morpharchically triggers speculation about the event and the character. The verb also synchronises narration with the story; in this sentence, narration and story are presented as unfolding simultaneously in the real time of reading. This intense interpretive mutability in the single word *wakes* is driven by morpharchic switches through present simple modes but also through morpharchy in microcognitive processes circulating subliminally through

109

working memory and drawing on long term episodic or autobiographical memories associated with waking. In milliseconds, morpharchic interactions alter the experience of reading and interpretations of *wakes*. Literary processes related to the present simple mode and semantic content of the verb and cognitive processes perturb each other and deliver fleeting interpretations.

The sentence "Snowman wakes before dawn" recurs at the end of *Oryx and Crake* (371). Present simple *wakes* in this second instance confirms repetition if not habit and reasserts the narrative present in the alternating present and past of the narration in the novel. The second instance idiosyncratically activates memories and affect related to the first occurrence of the sentence but also of other narrative moments in the novel so far. By this late stage of the story, present simple *wakes* does suggest the permanence or inescapability of living in the fictional posthuman world, with the attendant endless "desolation" (Gebauer 2021, 157) suffered by Snowman. For a brief moment, this second *wakes* also potentially packages the novel *Oryx and Crake* as a framed dream, "he would so like to believe he is still asleep" (371) but the traumatic fictional reality, a waking nightmare, immediately impinges once again. Finally, the verb *wakes* in this second rendition of the sentence, as in the first, also hints at impending change; waking is a prelude to something else. The various working memories of *wakes* are triggered by cognitive interactions that draw sensory, semantic and sociocultural processes into the encounter and that shift morpharchically. The interaction of literary and cognitive processes in reading *wakes* in the two narrative moments in *Oryx and Crake* demonstrates the intense morpharchic changes that can impact on tense.

The temporal play that surrounds the verb at the end of the novel intensifies as reading continues:

Snowman wakes before dawn. He lies unmoving listening to the tide

coming in, wish-wash, wish-wash, the rhythm of heartbeat. He would so

like to believe he is still asleep. (371)

The present simple verbs for events in the fictional universe, *wakes, lies*, are perturbed by a second sentence switch to a separate temporality of reverie, its quietude tinged with hints of delirium *he lies unmoving listening to the tide coming in, wish-wash, wish-wash, the rhythm of heartbeat*. In the third sentence, the modal double verb *would (so) like/ to believe* also switches to temporally discontinuous metacognitive commentary. The internal adverb of longing and sinister portent, *so*, is a tiny perturbation that nonetheless morpharchically assumes temporary primacy and significance. Narrating of the fictional world and of reverie is halted and morpharchically displaced with commentary on Snowman's cognitive processing. Metacognitive narration, *would so like to believe,* is in turn superseded morpharchically by another shift of tense back to present simple *is* in *is still asleep*, generating a switch to either or both internal monologue in a character or presentation of thought by a narrator, in this case depicting Snowman's desire for oblivion.

The temporal play through the sentence is complicated by third person narration, which pits apparently extradiegetic narration against the immediacy of present tense narration of events, internal monologue and the modal narration of metacognitive commentary. This interplay of person and tenses is distributed across narrating voices as performed by an apparently extradiegetic narrator referring to Snowman as character, *Snowman*, *he*, displaying the omniscience of access to a character's internal mental states, *he would so like to believe.* This narration is perturbed by also being attributable to Snowman as narrator reporting his own thoughts, and it involves yet more morpharchy through the free indirect discourse of *wish-wash, wish-wash, the rhythm of heartbeat* that slips in and out of the character Snowman's sensory perception, *wish-wash*, and his or a narrator's interpretation of the sound,

the rhythm of heartbeat. Dynamic temporal and narrative morphing operate in the play of tenses in the three sentences as narration flits across narrators and character and through separate temporal dimensions.

The barrage of present simple and modal verbs continue through the first and last chapters of *Oryx and Crake*. Verbs carry the moving present of intricately voiced narration morpharchically through a step by step, almost neurotic, recitation of physical routine and discomfort in the fictional world. In both chapters, Snowman's morning ritual is repeatedly disrupted by and disrupts internal monologue, metacognitive commentary and suggestions of attempts to avoid some unnamed ordeal. In the opening chapter, as Snowman comes to consciousness in the early morning, the narration is interrupted by a panic attack as he suddenly remembers the brutal cessation of mortal time in the alliterative negation of "nobody nowhere knows what time it is" (3). The sentence dramatises the now of narration as it is interrupted by the intruding now of harrowing memory. In the first chapter, Snowman melodramatically declaims out loud a little later during his morning routine, "now I'm all alone" (10), because, as he has seen for himself, nobody else is left alive. The premise that Snowman is the last man is sustained until shockingly, morpharchically, overturned in the final suspenseful pages of the novel.

From a process dynamics perspective, verb tenses in *Oryx and Crake* undergo multiple morpharchic shifts that trigger, to appropriate a phrase from a discussion of a poem, " an explosive cocktail of responses" (Cave 2016, 38). These morpharchic cascades of changing interactions and interpretations are neither discernible nor available in static taxonomies such as Table 2 above, which do not capture the complexity or the dynamism of literary and cognitive encounters during reading. For Fludernik, the polysemy of tenses ultimately allows "the use of tense as free play" (2003, 132). The analysis in this chapter regarding verb tenses extends the idea of tense polysemy, in other words the possibility of multiple meanings as

112

suggested in Table 2, to tense dynamics, the morpharchic play of changes triggered among processual interactions in a specific encounter. Narration involves verbs interacting morpharchically in transfers of dominance and significance through the immediate syntactic context, other surrounding verb tenses, working memory of the novel and culturally saturated discourses brought into play by long term memory processes.

The Curious Incident of the Dog in the Night-time

The first very short chapter of *The Curious Incident of the Dog in the Night-time* (Haddon 2003, 1) provides another concise sample of multiple verb tenses dynamically colliding and morphing. With a total of 38 shifts in tense and modality, the 21 sentences comprising the one-page chapter interact to generate changing times and narration within or across sentences. These verb changes repeatedly interrupt each other, morpharchically transferring focus among the temporal conditions that discriminate narrative events from narrative circumstances and metacognitive commentary. This morpharchic play of tenses is the focus of the detailed analysis of the chapter that follows.

The chapter privileges a play of past tenses, conventionally indicating that the events are temporally anterior and the narration is a retelling and shifting the story into the realms of imagination. The intertextual *midnight* in the first sentence, "It was 7 minutes after midnight" may also morpharchically refocus expectations from fiction to more specific gothic or murder mystery even as the sentence nominates a single instant of quantitative clock time. The chapter employs a conventional antiphon between past simple, active or passive, foregrounding part of the narration as narrative event, *was killed, walked, knelt, stroked,* and morpharchically shifting back and forth to past continuous to differentiate other parts of the narration as narrative circumstances, *was lying, was not running.* As a process for segregating figure and ground, the interaction between these tenses discriminates temporally between event and background situation in the story. The past simple verb tense can also impact on

contextual interactions in its modes as atemporal fictional fact or history. The literary processes creating the fictional world are subject to impacts from past simple verbs immediately pertinent to the crime, *its eyes were closed,* and those of the assumed longer term histories of the dog, *Mrs Shears* and the neighbourhood. While these verbs all have the same fictional status and the same fictional historical verity, *were closed*, *belonged, was* and *lived* trigger a morpharchic encounter among overlapping but separate durations of different lengths, significance ebbing from the narrative moment of finding the dog to separate implied stories about the histories of the dog, its death, the neighbourhood, *Mrs Shears* and the narrator, stories unfolding in subsequent chapters of *The Curious Incident of the Dog in the Night-time*. An abrupt morpharchic switch brings reader speculation back to the dog as significance and temporal focus revert to the corpse, *its eyes were closed*.

1) It was 7 minutes after midnight. The dog was lying on the grass in the middle of the lawn in front of Mrs Shears' house. Its eyes were closed.

The three sentences in (1) create a fictional world, that of the fictional dog. The precise recording of objective clock time signals that the temporality of the fictional world is similar in form to that of the world in which reading takes place but the temporal status of the fictional world, as signalled by past tenses, remains distinct from that of the world in which reading the fiction occurs; they are different timescales that coincide temporally and temporarily during reading and cognitive processing. As processes, the verb tenses in (1) interact, generating three separate timeframes and transferring narration through these times. The moving present of the narration contracts from a temporally unrestricted declaration of historical fact, *was*, in a stative sentence concerning the subject *It*. This grammatically existential and atemporal subject and verb combination, *it was,* is immediately perturbed by a specific moment of time in the fictional world, the predicate that is the content of the fact, *7*

minutes after midnight. This content, excising and labelling a discrete digital moment of time, itself spills from the atemporal truth of *it was* into the temporality of the fictional universe of the dog, a fictional world consolidated by the circumstantial past continuous, *was lying* in the next sentence. The narration then zooms in to the past simple timeframe of *were closed,* a specific contextual detail, and its attendant, albeit unspecified, duration in the fictional world. The dog's closed eyes have a particular duration that coincides with the narrative moment in (1) but is not coterminous with the narrative moment. The closed eyes are possibly co-extensive with its putative death, which extends beyond the narrative moment, but are not coterminous with, for example, the dog's assumed fictional existence or with the duration of other events in the fictional world. This telescoping of *was, was lying* and *were closed* creates a series of morpharchic displacements in time, from the atemporal to the fictional world to a subset of time in the fictional world. From a process dynamics perspective the tense shifts in *The Curious Incident of the Dog in the Night-time* not only generate narrative and interpretive changes but also morpharchically perturb and change the subjective experience of time passing, for example through diversion to working memory, long term sociocultural memories and speculation, as they unfold during reading.

Different durations coincide, overlap or succeed one another in (1), their interpretive weighting increasing or diminishing as they do so. The past continuous *was lying* of crime scene circumstances or past simple *were closed* of historical fact about the fictional victim involve diverse time spans longer than more transitory past simple events, for example those later in the chapter such as *went, walked, knelt, stroked*; such diverse durations are brought into encounter over the course of the chapter. Durations associated with tenses in (1) morpharchically collide with each other and with subjective time during reading to dynamically construct provisional and unstable interpretations of the narrator, dog and fictional world.

2) It looked as if it was running on its side, the way dogs run when they think they are chasing a cat in a dream.

Tense shifts are conventionally used in fiction not only to signal shifts in foregrounding but also in voice, temporality, ontology or a mix of these. The initial simile in (2), *it looked as if it was running on its side,* introduces another narrative, again told in past simple and past continuous tenses, but these narrative tenses now morpharchically shift from the fictional world of the dog to metacognition, turning narration into a narrative about cognition, shifting from the time of the fictional world into a different temporal zone of meditative commentary. In the sentence, the verbs visually conjure a sequence of storyboard images to create a narrator's memory of running dogs, possibly triggering similar memories in readers and thereby embroiling disparate narrative and subjectively experienced presents as reading continues. Shifting between narration and cognition occurs again in processes triggering memories, interpretation and potentially amused response in a reader imagining a dog running on an empirically impossible horizontal plane, in a cartoon-like manner. Contemporaneity shifts with tense shifts, in this case back and forth between fictional and readerly time. This narrative moment is a meditative digression with its own time zone, slowing and perturbing the narration in the first narrative moment with a contemplative narrating voice but then perturbing this voice in turn with another shift to fact as posited by the narrator. Present simple indicates fact unchanged over time, deployed in this case to claim that dogs *run* and *think. Think* is augmented by the narrator's proposition that dogs dream about chasing cats, which may again bring into play intertextual cartoon thought bubbles for those readers familiar with such images. With the use of the present simple tense, the focus of the narration shifts from the fictional dog *it* to all *dogs*, boosted semantically as it interacts with the generic third person pronoun, *they. Dogs* in the present simple perturbs the fictional world timeframe by referring simultaneously to dogs as understood by the narrator, whether

the narrator is part of the fictional universe or occupies some other as yet undisclosed spatiotemporal alternative. Present simple for fact also erupts out of the fictional world and the narrator's mind, morpharchically claiming authority and significance by asserting that the contentions about dogs running, thinking and dreaming are universally and atemporally true of dogs in all worlds, including readers' worlds.

3) But the dog was not running or asleep. The dog was dead. There was a garden fork sticking out of the dog.

This narrative moment abruptly shifts back to the narrative tenses of the fictional world of the dead dog by way of negation, *was not running or asleep.* The next two sentences in harsh past simple morpharchically replace the cute and amusing tone of the previous narrative moment with two grisly narrative events. The first, *the dog was dead*, introduces a potential cognitive frisson of shock that may interact retrospectively with *midnight* in the first narrative moment and in working memory to strengthen the murder mystery interpretation. The next sentence intensifies this impact on interpretation with its unadorned statement of mutilation, *there was a garden fork sticking out of the dog*. The temporal status of *garden fork* nonetheless pulsates between the fictional moment of time and a reader's subjective time; macabre detail collides with the potential humour and incongruity as a garden fork compromises the conventional solemnity of murder weapons.

4) The points of the fork must have gone all the way through to the ground because the fork had not fallen over. I decided that the dog was probably killed with the fork because I could not see any other wounds in the dog and I do not think you would stick a garden fork into a dog after it had died for some other reason like cancer, for example, or a road accident. But I could not be certain about this.

Here, (4) employs metacognitive commentary that shifts attention and significance again, in this case from the fictional world of gruesome facts, *points of the fork, wounds,* to the narrator's fictional cognitive processes, *decided, think,* and of imagining, *cancer, road accident*. Metacognitive commentary attributes cognitive processes to a character or narrator by implication, *must have gone*, or by explicit statement, as in the narrator's self-reporting of his own cognitive processes, *I decided, I could not see, I do not think, I could not be certain*. The modal verb *must have gone through* creates imagined thought processes that forensically reconstruct the cause of the injury to the dog. *Must have* indicates a claim with a high degree of certainty and probability; this is then augmented by evidence that begins with *because*. The past perfect *had not fallen over* switches briefly, and comically, back to empirical evidence in the fictional world. The past perfect is a sequencing tense that temporally situates a past event before a more recent past event; in this case, the fork had not fallen over before the time of hypothesising about the injury, information that is processed in milliseconds in working memory. The past perfect also perturbs the divergent metacognitive time-world of hypothesising by morpharchically oscillating between it and the fictional time-world of a narrator-character viewing the dog's corpse.

The next sentence of this narrative moment swerves suddenly into first person narration, *I decided that the dog was probably killed with the fork*. The ambiguous status of the narrator as omniscient or as a disinterested observer is overturned by the verb of cognition *I decided*. This morpharchic interpretive upset triggered by the sudden intrusion of first person narration is heightened by the modal clause *because I could not see any other wounds in the dog.* The modal verb of sensory perception *could not see,* thrusts the narrating voice unceremoniously into the fictional world of the dog's corpse, the world in which the seeing occurs. Cognitively, the nature and significance of the narrative voice alters as it

118

metamorphoses into a character temporally entangled in the fictional world and time of the dog.

The first person narration in narrative moment (4) next veers comically back to the narrator's thought processes again, its modality and temporality at a more general scale, hypothesising about human behaviour, *and I do not think you would stick a garden fork into a dog after it had died.* The final incongruous sentence of this metacognitive narrative moment is again modal, *But I could not be certain about this*, generating a degree of scientific but comically misdirected caution regarding the hypotheses related to *cancer* and *road accident.* This final sentence in (4), *But I could not be certain about this,* morpharchically alters the narrating voice further not just temporally with current uncertainty, but also by discounting omniscience and introducing naivety and narratorial fallibility. Subjective time may dilate in processing the collision between third and first person narration, and the deposing of omniscience.

5) I went through Mrs Shears' gate, closing it behind me. I walked onto her lawn and knelt beside the dog. I put my hand on the muzzle of the dog. It was still warm.

The following moment of narration, (5), literarily and literally saccades back to the fictional world of the dog, reporting in first person a chronological series of narrative events in past simple, *went, walked, knelt, put.* The sequence of events is portrayed as discrete instants of time. Despite the appearance of unskilled creative writing that breaks down movement toward an object into apparently irrelevant steps, attention, significance and time are fleetingly held in suspense before moving from one stage with its own narrative present to the next, spatially, cognitively and temporally approaching and halting at a past simple finding of recent death, *was still warm.* The tactile displacement of movement transfers

119

significance to forensic detail. Subjective time for readers may stretch as conjecture about timing complicates cognition; the detective has arrived not long after the killing but the narration offers no further information.

6) The dog was called Wellington. It belonged to Mrs Shears who was our friend. She lived on the opposite side of the road, two houses to the left. Wellington was a poodle. Not one of the small poodles that have hairstyles, but a big poodle. It had curly black fur, but when you got close you could see that the skin underneath the fur was a very pale yellow, like chicken.

The narration swerves away from considering the dog's death. The penultimate narrative moment of the chapter, (6), instead gives significance to historical time and details, using mainly past simple but including an entertaining but inconsequential sentence fragment, *not one of the small poodles that have hairstyles*. Here, as elsewhere in the novel, details are reported somewhat indiscriminately and unconventionally, morpharchically perturbing the nascent detective story, a genre in which details are conventionally gathered as potential evidence of criminal activity or intent. The subjects of the verbs in (6) also move from the dog to its owner, *Mrs Shears,* to an elided subject that focusses attention on a generic comment on the breed, *not one of those small poodles,* and back to the dog, *it had curly black fur*. Time shifts include the immediate present of the dog's corpse, the overlapping historical past of neighbourhood facts and atemporal fact, *that have hairstyles*. This morpharchic trajectory through multiple subjects, immediate and more distance times and overlapping but not co-extensive durations is further complicated by a jump from narrative events to narration of background with *our friend* and *opposite* again implicating the narrator much more intimately in the narration than as a disinterested observer. The narrative moment also contains one modal clause *you could see* that shifts yet again to a generalised *you,*

120

representing human cognitive ability, even as the narration zooms in to peer closely at a colour detail, *yellow, like chicken,* again conspicuous in its apparent irrelevance to matters forensic. In readerly hindsight, (6) presages the conduct of the detective story to follow with its comedy, the narrator's atypical attention to detail, his ability to logically identify clues but inability to interpret them in order to solve the crime, and his self-reflexive metacognitive commentary. It also introduces the temporal style of the novel with its morpharchic temporal shifts and collisions.

7) I stroked Wellington and wondered who had killed him, and why.

The final sentence of the chapter moves briefly back to the fictional world with the past simple *stroked*, then shifts to metacognitive commentary, *wondered who had killed him, and why*. The verb triggers a collision between the temporally distinct fictional and metacognitive perspectives; past perfect *had killed* sequences a time of death before two more recent past events, the time of contact with the body of the dog and the time of wondering. In this context, *stroked* and *wondered* may or may not have similar durations and be co-extensive. The narrative moment demonstrates a morpharchic play of times among an earlier indistinct time of death, a more recent distinct past moment involving touch and a separate more recent past of musing in the narrator. The moving, changing present of reading the narrative moment delivers a retrospective narrative moment. The disparate temporalities of narration, fictional world and cognitive processing collide, in this case increasing the importance and weighting of narrator and reader speculation and uncertainty about *who* and *why*, a clever manoeuvre for the beginning of a murder mystery novel.

Transforming time

While morpharchic plays of tense create temporal dynamism, fictional time is also morpharchic and mutable in other ways. Transformation occurs through interacting literary

and cognitive processes that compress, dilate or suspend fictional time or accelerate, slow or still fictional time and may repeatedly alter associated experienced time during reading.

The Curious Incident of the Dog in the Night-time

Morpharchy operates throughout *The Curious Incident of the Dog in the Night-time* among the diverse processes making and changing fictional and experienced time. This can be seen, for example, in time shifts across processes generating genres. Two of the many genres interacting in *The Curious Incident of the Dog in the Night*-time are the murder mystery or detective genre operating sporadically in the first half of the novel and the thriller of the second half. Currie, following Genette, argues that detective fiction unfolds by "working forwards from the crime through the events of the investigation, and in the process working backwards to reconstruct events which lead up to the crime" (2007, 36). In Currie's view, a thriller differs from mystery in that "the narrative coincides with the action" (87). Apparent chronological forward or backward order in *The Curious Incident of the Dog in the Night-time*, however, is constantly perturbed by other genres and modes of time and both the detective and thriller narratives in *The Curious Incident of the Dog in the Night-time* are more dynamic than Currie's depiction might imply. Despite obsessive tracking of calendar and clock time, "the next morning" (Haddon, 31), "on the second third and fourth days, which were Thursday, Friday and Saturday" (129), "it was 1:12 a.m." (21), time in *The Curious Incident of the Dog in the Night-time* does not unfold at a fixed rate or proceed in a simple manner either to or from the past. Time and narration morpharchically change through different tempos forwards, backwards or away from the crime signalled in the opening chapter; and in and out of the crime world as the detective story and thriller are repeatedly halted and perturbed by flashbacks, descriptions, explanations, nonfiction passages, graphics and metacognitive commentary, all temporally dissimilar to each other. Reading is frequently perturbed by fictional time that diverges sharply both within chapters and across consecutive

chapters as diverse, often nonfiction, genres disrupt the narration. Fictional time also changes

velocities as different volumes of detail accelerate or slow the narration to differing degrees.

Narration sometimes leaps across elided swathes of time: "five days later" (69) or

decelerates, as is particularly evident in Christopher's long, highly detailed and painful train

trip to London. Fictional time narrating the train journey is slowed and distended as every

step and misstep is recounted, a deceleration amplified and negatively valenced by visceral

symptoms of distress in the fictional narrator: "I felt sick and I started groaning really loudly"

(216). Reader experience of time may similarly slow as narrative moments depicting

confusion and fear overtake and supplant each other during the train journey, demonstrating

morpharchic changes of "significant time or time made to signify" (Fludernik 2003, 130),

interrupting and unsettling the narration and colliding with the narrator's attempts to institute

logic and chronology in his story and his life.

Throughout the novel, narration morpharchically transfers dominance and significance

between the past of imaginative narrative recount and intimate present, frequently used for

metacognitive commentary. However, two passages in *The Curious Incident of the Dog in the

Night-time*, Chapter 71 (56-58) and the last few paragraphs of the novel (267-268), suddenly

disrupt narration with a number of future tenses of prediction and plan, "I am going to take A

level physics and get an A grade", "I am going to go to university", "I will get a First Class

Honours Degree and I will become a scientist" (267-268). Significantly for the narrator's

turbulent trajectory as a character negotiating a neurotypical society he initially perceives as

incomprehensible and frightening, *will* and *am going to* morpharchically assert volition,

intention, desire, and plan. This decisive switch to positive valencing gains further

significance. The final moment of the novel is a statement of agency and control, using the

modal *can* for capacity and marshalling evidence in the form of completed achievements:

And I know I can do this because I went to London on my own, and because

I solved the mystery of Who Killed Wellington? And I found my mother

and I was brave and I wrote a book and that means I can do anything. (268)

Loose ends are neatly tied up, lessons are learned and a new dispensation is, at least

temporarily, in place, one pleasing to the narrator; a happy ending as the final morpharchic

twist in the plot. For both fictional and experienced time, the anticipated future, the end of the

story, has arrived in the present and morpharchically takes precedence. However, this final

narrative moment is prospective; the evidence is used to make a case for a future that extends

beyond the narrative just completed. The particular future envisioned is one based on causal

logic, *because*, an agent in control of parameters, *I know I can do this,* and determined,

specifically by past success, *that means I can do anything*. The narrator imagines a future

from which the literary and cognitive collisions that morpharchically hound *The Curious

Incident of the Dog in the Night-time* are, naïvely, banished.

Oryx and Crake

Oryx and Crake sets up a powerful interplay of past and present, temporally and

structurally separated by an apocalypse. Temporally, the fictional apocalypse is quick, a

pandemic that is over in matter of weeks (337), killing most humans and leaving only a few

dying infected sufferers (352). The pandemic is retold by invoking a separate spatial and

temporal viewpoint, a sheltered time zone concurrent with the pandemic. The catastrophic

events are presented to the narrator and readers as online simulation, viewed safely from an

airlocked facility: "for the first two weeks he followed world events on the Net" (340), until

"finally there is nothing more to watch" (344). This godlike panoptic perspective offers no

power; the narrator cannot alter events. While the disease rages in its own time, the narrator

simply watches, uninvolved, shocked, sealed in a timeless limbo: "he grazed, slept, sat for

long hours doing nothing" (340). The progress of the pandemic is marked by temporal

expressions, "the first bulletin came in at nine forty-five" (324), "by midnight" (325), "towards dawn" (327), "in the second week" (342), "on the second Friday of March" (348) but these precise temporal expressions nominate unconnected instants in time. As temporal markers they are fleeting and buried, easily missed during reading while attention is focussed on descriptions of traumatic events. There are no analogic expressions, connecting these temporal markers, for example there is no date from which to measure *the second Friday in March*, and calendar and clock times remain temporally unanchored. Qualitatively, instants of time are stripped of connections to each other. In a discussion of literature and trauma, Wendy O'Brien describes the warping of time reported by trauma victims by analogy: "instead of music, you would hear a series of random notes played staccato. There would be no reverberations, no links" (2007, 213). Flickering morpharchically between the specific and the uncertain, in *Oryx and Crake*, fictional time is morpharchically overcome by anguish.

While the apocalypse is very short in duration, its significance is immense; it eliminates humanity (343, 344). The enormity of the apocalypse warps both fictional time and significance; it is all consuming. Among the literary processes that compose the time of the apocalypse, metacognitive commentary portrays morpharchically warping time and out of body experiences: "he was in shock. That must have been why he couldn't take it in. The whole thing seemed like a movie" (342). Time warps into psychedelic and elided timespans, "he smoked up Crake's stash of skunkweed in no time flat; he managed to miss about three days of horror that way" (343). An intolerable present is presented through morpharchic switches from denial to crazed irrationality, "he'd begun talking to himself out loud, a bad sign. 'It isn't happening'" (343). As a narrative climax, the apocalypse warps time further; the pandemic is only one of three coinciding catastrophes for the narrator. All three catastrophes occur in suspended climactic time between pre- and post-apocalypse but have serious and negative psychological impacts on Jimmy/Snowman both immediately and in the

future that becomes the narrative present. As the pandemic begins, Oryx, Jimmy and the reader learn that Crake used Oryx to distribute the disease in pill form, to her distress: "it was in those pills I was giving away, the ones I was selling" (325). Crake's betrayal of Oryx, Jimmy and humanity is on so grand a scale that fictional time distorts, stuttering to a halt. Literary processes depicting tension, "all the hairs on his arms were standing up" (328), are pitted morpharchically against the narrator's sluggish cognitive processes: "his brain was slow on logic tonight. There was something wrong with what Crake had just said, but he couldn't pinpoint it" (328). The third coincident catastrophe, the murders of Oryx and Crake, perturbs the narration immediately and the magnitude of this event is underscored by warping fictional time again. Time changes into "a slow motion sequence" (326) of actions in decreasing temporal increments to a narrative moment in which time has stopped, "Jimmy watched, frozen in disbelief" (329), then morpharchically, shockingly, switches to lightning fast microcognitively-driven reflex action: "He [Crake] slit her throat. Jimmy shot him" (329). Time is linguistically and cognitively compressed into a fraction of a second that microcognitively precedes and overrides conscious experience: "we understand more than we know" (328). The narration in *Oryx and Crake* is suspended at this point, diverting morpharchically in the next chapter to the future, that is to a narrative moment in the post-apocalypse present. Experienced time shaped by some individual degree of immersion (Bell et al. 2018) is abruptly halted and attention shifted to a new temporal encounter. This morpharchic switch to another time abandons description of the murders but allows their impact to percolate through cognitive responses and interpretations whether reading stops or continues. The murders also leave Jimmy as the only uninfected human and launch him into the unique temporal interval of the Last Man. While the three catastrophes, the pandemic, the revelation and the murders, begin at close but different points in time in the narration, and have different durations, their impacts continue into the future of the post-apocalyptic

narrative present. Snowman is depicted with symptoms of trauma and the behaviour allocated to him is often unhinged; in the post-apocalyptic now, he frequently hears the voices of the dead (11, 344), hallucinates (345) and talks aloud to himself, "Oh Snowman, why are you talking to no one?" (97). This is the psychological state of affairs from which the past, the apocalypse, is narrated; it is apocalypse remembered. In other words, in a fictional temporal paradox, the future of psychological pain and instability creates the past that creates the future.

The narration hovers around the apocalypse temporally and structurally. As the two temporal lines, pre- and post-apocalypse, spiral around each other in approaching the narrative climax, they each morpharchically seize dominance and significance, and fictional time transforms at each shift back and forth between past and present. Each shift is also to a different past or present than those previous; the past differs from itself as does the present. Driven out of the airlocked Paradice dome with the small band of Crakers before the power fails and traps them all (345), Snowman's post-apocalypse story begins a short time after the pandemic has run its course and encompasses a vague but relatively brief period of time, perhaps weeks or months. In contrast, the pre-apocalypse timeline records Snowman's backstory from early childhood to the pandemic that occurs in what appears to be his and Crake's implied middle age, at the height of Crake's "life's work" (302). Temporally, both timelines unfold in chronological spates of different durations, split timelines reaching the climactic apocalypse together near the end of the novel. Snowman's autobiography arrives at the pandemic as his post-apocalypse journey returns to the Paradice facility in search of food, where memories of the recent apocalypse overwhelm the narration.

Nonetheless, neither of the two timelines is homogenous. Different temporal processes perturb each other and the narration in both the past and the present. Analysis of an example from each timeline may serve to illustrate this dynamic transforming of time. The narrator's

"earliest complete memory was of a huge bonfire" (15), of watching a spectacle. The framing

signals a memory at a specific point of time and of a particular duration in the past. Bonfire in

the sense of a festive community occasion, however, is a misnomer:

> The bonfire was an enormous pile of cows and sheep and pigs. Their legs
>
> stuck out stiff and straight; gasoline had been poured onto them; the flames
>
> shot up and out, yellow and white and red and orange, and a smell of
>
> charred flesh filled the air… he thought he could see the animals looking at
>
> him reproachfully out of their burning eyes. In some way all of this—the
>
> bonfire, the charred small, but most of all the lit-up, suffering animals—was
>
> his fault, because he'd done nothing to rescue them. At the same time he
>
> found the bonfire a beautiful sight—luminous like a Christmas tree, but a
>
> Christmas tree on fire. He hoped there might be an explosion, as on
>
> television. (16-18)

The image reaches beyond the confines of the pre-apocalypse fictional time in which the

bonfire occurred. This is a remembered bonfire, recounted from the temporal viewpoint of

the older narrator. Temporally, immediate sensory perceptions, *stiff and straight, yellow and*

white and red and orange, smell, and memories of prior experiences, *Christmas tree,* are

attributed to the five year old. Cognitive responses are articulated on behalf of the five year

old child, *he thought he could see, In some way all of this*, *because.* While the child may well

have sophisticated responses, *animals looking at him reproachfully, he'd done nothing to*

rescue them, the capacity to self-reflexively explain those responses seems anachronistic.

Past and present time warps as details and explanations interact. Further interacting

unnervingly with childish wonder and glee, the bonfire also reaches temporally beyond the

narrative moment with its inquisition, plague or holocaust overtones of burning effigies, *stiff*

and straight, and bodies, *charred flesh*. Fictional time morphs as these temporally disparate

images and associations impact on each other. Temporal shifts morpharchically contribute to interpretations; for example, that already the child suffers guilt, already he has failed by watching and not acting, already his overwhelming pleasure in looking outweighs reservations, already he is a discerning connoisseur of visual images, virtual reality and death, learned watching television. For the five year old child, this narrative moment temporally foreshadows a long history of spectacular gazing, betrayal and guilt. Time has shifted from the future of the previous three chapters into flashback, diverting narration in one of many such morpharchic temporal pivots, but time has also warped into a prophetic mode.

In this foreshadowed narrative present, time continues to alter morpharchically. For example, in recounting Snowman's morning routine in the opening chapter of the novel, quotidian experiences of time and temporally distinct internal monologue repeatedly intrude morpharchically on each other. Narration repeatedly shifts to and from environmental detail; it slows or freezes as it is fitfully interrupted by Snowman's thoughts: "strange how that colour still seems tender" (3) or "surprising what a sharp sting they [ants] can give" (4). A narrative moment describing Snowman's struggle to remember details from a half-forgotten book of advice for colonists slows and halts the narration as Snowman is left standing stock still with "his mouth open" (5). Metacognitive commentary, "it causes a jolt of terror to run through him" (3), "trying to remember the rest of the sentence" (5), interacts with monologue to linguistically dramatise Snowman's psychological fragility through morpharchic shifts among fictional times.

During reading, working memory and reader experience of time are incessantly perturbed by morpharchic switches in times and changes in the weighting and valence of times. In *Oryx and Crake*, fictional time is cyclic in the sense that every day seems to offer the same beginning, the same purgatorial wastes of an empty world, depicted for example, in the identical paragraphs with which the first and last chapters of the book begin, the first and

last days of Snowman's story, detailing the routines with which he fills his daily awakening (3, 371). Human time has stopped in the narrative present and no longer has direction or teleological impetus; there is "no arrow of time, and thus no hope of salvation" (Latour 2004, 189). The current mundane present is expanding infinitely until Snowman is "screaming with boredom" (350); time, like the past, like everything familiar, is lost; time escapes control or measurement and the "zero hour" (3, 374) cannot be clocked because human time no longer has meaning. Snowman is unable to keep track of passing weeks (37); and time is accelerating in the sense of running out (40), played out in the urgent push for survival "crudely put, he's slowly starving to death" (149). Fictional and experienced time are again poised to change in the intense, painful moment of dramatic suspense at the end of the novel, another *zero hour* promising to warp morpharchically in some new manner in the alien, disorienting new fictional world, beyond the singularity of human time stopped by cataclysm. In *Oryx and Crake*, morpharchic time transforms radically.

The.PowerBook

Time in *The.PowerBook* is also intensely morpharchic and mutable. Diverse modes of time constantly disrupt each other and ensure continuing temporal imbalance and change. Throughout the novel, literary processes generate morpharchic transfers in temporal succession, rates, scales and durations, qualitatively transforming fictional and experienced time in interaction with cognition during reading. Successions of times in *The.PowerBook* typically occur in turbulent cascades, whether switches among disparate times of different fictional worlds or within a fictional world. In the first chapter, for example, present simple for fact or immediacy occurs most frequently, at almost 60% of verbs, synchronising the experience of time with fictional time. However, any experienced time or sense of immersion in the fictional world and the unfolding story is abruptly, repeatedly and morpharchically disrupted by infinitives for purpose: "to avoid discovery" (3), "to be transformed" (4) and

imperatives for instruction or command: "undress" (4), "take off" (4), "begin" (5). Verbs, infinitives and imperatives are further perturbed by modal verb phrases that signal shifts into a separate fictional world set in an indeterminate past invoked by the grammatical third conditional in which something is impossible or counterfactual because it did not happen: "you would have found yourself alone" (3). At other points in the same chapter of the novel, narration slips into modals relating to metacognition: "I have to tell myself" (4), or metafictional commentary: "I can change the story" (5). Throughout *The.PowerBook* the moving present of a fictional purveyor of stories, "It's night. I'm sitting at my screen" (3), is subject to temporal intrusions by, and intrudes on, fictional email or online chat, bespoke stories, intertextual allusions and various kinds of commentary. Shifts in fictional times are not always clearly assigned; for example, the clock and time of *"the clock ticks but only in time"* (4) may pull multiple times into a dynamic encounter, the fictional time of the shop world housing the clock, the separate time of narration, the nonfictional intertextual times of metaphysics or physics, the extratextual times of readers' worlds and readers' subjective experiences of time while reading. This restless morpharchic shifting of temporal foregrounding, attentional diverging and changing interpretive significance prevents the ultimate privileging of any specific time. In *The.PowerBook*, there is neither temporal ground nor seamless segue. Temporal succession in *The.PowerBook* triggers morpharchic plays of disjunctions and imbalances, constantly generates and reconfigures temporal instability and enables rapidly changing possibilities for interpretation.

Fictional time in *The.PowerBook* is also subject to multiple, asynchronous durations. Durations may succeed each other, as in succession of different durations as different stories in their own fictional times are narrated through the novel; or durations may coincide. A narrative moment in a later chapter demonstrates morpharchic transfers of weighting and significance among multiple overlapping durations:

> In an old part of the city like this, time collapses the picture.
>
> Here I am, tightrope walking the twenty-first century, slim as a year, and the old tall houses are two hundred years old and set on streets that wind back four hundred years, set on cart tracks that served medieval monks… The archaeologists were digging here yesterday. They uncovered a stone sarcophagus shielding a decorated lead coffin.
>
> It had been there for one thousand eight hundred years. (166-167)

Different durations coincide but are not co-extensive. The one year old *twenty-first century* is morpharchically perturbed and reduced to *slim* significance by its encounter with other durations *two hundred years, four hundred years*, and an ancient time that is bestowed a sentence of its own and significance heightened to awe, *It had been there for one thousand eight hundred years*. These durations coincide with the duration of narrating them, that of the fictional narrating *I* and that of cognition while reading. Fictional and experienced time interact, perturb and change each other, qualitatively altering the narration and interpretation. Multiple literary and cognitive durations change side by side at different rates. The lifespan of a monk or archaeologist is not the same as that of an inorganic sarcophagus, yet all change over time; they play parts in changing processes and disperse at decomposition, to be taken up in other sets of processes and times. Reading *The.PowerBook* is an encounter of diverse and precarious fictional and experienced durations that co-construct volatile temporal dynamics.

Fictional time in *The.PowerBook* changes at different rates. Changes in temporal velocity may be triggered by word volumes, imagery or vocabulary that slows or increases the speed of time. Time may accelerate through summary or commentary, "one life is not enough" (209). A single chapter of *The.PowerBook* can cram and rush events or compress a

whole lifespan and even beyond into death, as in the short story of Paolo and Francesca (123-129). Deceleration or pausing occurs when narration is slowed by dwelling at a point in time; description of some extent and detail or sheer number of sentences can trigger temporal or narrative braking or delay. Narration may slow down and stretch out a single day, as in the myriad changes of pace tracing the lovers' path and conversations over the twenty-eight page account of one day in Paris (31-59). A lifespan might extend temporally across multiple chapters, as in the Orlando-like longevity bestowed by the splitting of *I* stories. Encountering such frequent temporal changes may increase cognition time and so delay experienced time reading the narration. Abridged narration may span long periods of time: "it may flit quickly across decades of dullness" (Mani 2010, 23) or elision of time may be signalled, "day came" (Winterson 2001, 150), or inferred as absent intervening narrative, "my father had long been at war" (124). Experienced time and reading pace may slow down as readers "actively contribute their own voice and subjective interpretation to texts rife with narrative gaps and a range of potential implicit meanings" (Barnes 2018, 127). Alternatively, experienced time and reading may still and a pause ensue to allow contemplation of "for instance, a new way of looking at the (over)familiar, or to consider several narrative perspectives of different characters at once. Stillness is not reflection itself, but a precondition for reflection" (Koopman and Hakemulder 2015, 81). Experienced time is context dependent, morpharchic and mutable. Times change at different rates from each other and from themselves over the course of the *The.PowerBook*. Readers add to this activity, reading at different speeds and with differing levels of care, skipping lightly over some parts, savouring, rereading or stopping at others as they go. *The.PowerBook's* disparate historical periods, varying durations and velocities and multiple time scales drive interacting fictional and experienced times into morpharchically volatile and continually metamorphosing encounters.

Conclusion

My analyses in this chapter find that morpharchic transfers of dominance and significance occur in working memory as it perturbs and responds to cascades of literary shifts across fictional worlds in *The.PowerBook*, perspectives in *The Curious Incident of the Dog in the Night-time* and allusions and metacognitive commentary in *Oryx and Crake.* For process dynamics, both working memory and narration are interactive, morpharchic and changeable. Fictional and experienced time are also generated by morpharchically interacting processes. Activated in specific interactions between fictional and experienced time, tenses and temporal rates, successions, durations and temporal vantage points perturb and change each other morpharchically the three novels. The concept of morpharchy enables articulation of plays of imbalances that trigger temporal complexity and dynamism. Morpharchy helps to reimagine time as other than story versus narration in a fixed temporal dichotomy, as exclusively executing linear logic or as constrained by linguistic categories such as tense. In a process dynamics account, fictional and experienced times are radically interactive, dynamic and mutable.

The concept of morpharchy pushes beyond familiar metaphors in narrative theory of relationships and hierarchies by recognising the constantly moving and changing power of diverse processes as they continuously reconfigure narration and interpretation. As a dynamic construct, morpharchy instead designates shifting and mutable dominance, significance, valence and weighting, any changes in which qualitatively alter narration and interpretation. Reading novels is a morpharchic undertaking that involves vast numbers of changing processes and interactions. Morpharchy is pivotal to articulation of the dynamics induced by reading.

Chapter 4: Dispersal

The Curious Incident of the Dog in the Night-time offers an arresting sketch of dispersal and metamorphosis:

> But Mother was cremated. This means that she was put into a coffin and burned and ground up and turned into ash and smoke. I do not know what happens to the ash and I couldn't ask at the crematorium because I didn't go to the funeral. But the smoke goes out of the chimney and into the air and sometimes I look up into the sky and I think that there are molecules of Mother up there, or in clouds over Africa or the Antarctic, or coming down as rain in the rain forests in Brazil, or in snow somewhere. (Haddon 2003, 43-44)

The boy's voice is disconcertingly depicted as devoid of the emotion typically expected at the loss of a mother. Instead, the narrating voice and the narrative moment concentrate on processes; cremation converts flesh and bones into ash and smoke, smoke containing disaggregated molecules is released to the air where the molecules contribute to clouds, rain or snow that in turn impact on environments. The moment speaks to movement and change, the mutability and dispersal among dynamic processes in action; a body is ultimately physically dispersed in altered form across ecosystems. The narrative moment likewise includes diverse referents drawn from dispersed discourses, altered in interaction with other literary processes and dispersed again through cognitive processes. Allusions to everyday referents include *mother, funeral, cremation*, *ash* and *smoke* and real world geography *Africa*, *Asia*, *Brazil*. The narrative moment draws scientific allusions into the encounter; to chemistry, *molecules,* laboratory methods, *burned, ground up,* precipitation, *coming down as rain, in snow,* and ecology, *rain forests*. The dissimilar allusions perturb each other in the

new context and trigger idiosyncratic interpretive, aesthetic and affective processing during reading; referents are recruited, transformed and dispersed again. In the new context, interactions between referents, *mother, smoke* and *molecules* among them, trigger associated memories and interpretive possibilities. The discursive and experiential dispersal of the referents is crucial to the particular interpretations that emerge during reading as an unusual miscellany of disparate referents and associations collide. Depending on individual knowledge and experience of mothers, cremations and molecules, interpretations may shift morpharchically through negative valencing as disrespectful, confronting or offensive or, alternatively, recognise or appreciate the breaking of taboos regarding family deaths. The referents themselves are not unusual but their coincidence is uncommon; interaction transforms both referents and any memories or affect associated with those referents. The transformed referents are perturbations that further disperse through working memory and long term memory processes. Cognitively, long term memories including content and affect may impact on future interactions such as remembering or rereading.

Oryx and Crake, The Curious Incident of the Dog in the Night-time and *The.PowerBook* each demonstrate a radical propensity to change narratively and interpretively during reading, not only through processes, interactions, perturbations and morpharchy but also through dispersal, the focus of this chapter. In this chapter, I argue that allusions rely on dispersal. I first consider the concept of dispersal and its role in cognition and then argue for a process dynamics position on alluding before analysing literary, real world and interdisciplinary allusions in the three novels.

My process dynamics concept of dispersal involves diversity, interaction and change. An encounter is not unitary and is not a singular temporal block but actively disperses across the processes, interactions and perturbations that co-create the encounter. Semantically, dispersal involves moving and changing: "the action of dispersing or scattering abroad; the

condition or state of being dispersed; scattering, distribution, circulation" and "the action of diffusing or spreading" (OED Online). Importantly, dispersal emphasises dynamic becoming rather than substantial being. Reading allusions recruits literary and cognitive processes that are already circulating through other contexts, including literary and sociocultural discourses and everyday environments. Cognitive processes incessantly disperse through neural interactions and are already primed for action as any specific encounter begins. Regarding reading an allusion, the specific processes involved morph and diffuse through interpretations. I use dispersal in preference to an analogous term from complexity theory, "distributed" (Clark 1989), which is inherited from information systems models in complexity theory (Shannon 1948; Shannon and Weaver 1949). These models reinstate hierarchies of wholes and parts and treat complex systems as information that is distributed over so-called "lower-level elements" (Johnston 2001, 224). Without denying that processes are distributed, I wish to avoid both connotations of permanent hierarchical distribution and the risk of viewing processes in encounters as fixed in their distribution. Instead, I use "dispersal" or "processual dispersal" to emphasise the shifting and morphing of interactions in real time encounters during reading. Mutable and morpharchic, not hierarchic, literary and cognitive processes are the focus of my investigation. The specific processes co-creating an encounter are unevenly dispersed across different modes, times of arrival and interactive durations and disperse again in changed forms. Literary processes such as allusions, for example, are dispersed across diverse and asynchronous grammatical, rhetorical, narrative or aesthetic modes, and are conceptually dispersed intratextually and extratextually. Cognitive processes disperse through, for instance, attention, memory or emotion modes while processing an allusion. Asynchronous, shifting, morpharchic interactions respond to and trigger changes. The dispersal of imbalances is not fixed but continually shifts, driving

137

further reactions and changes For allusions, I posit dispersal through changing and morpharchic literary and cognitive interactions.

Dispersed cognition

Cognitive activity during reading disperses through processes, interactions and perturbations across modes and times for the duration of an encounter, repeatedly perturbing processing of allusions. Dispersed and variable neural activity across neurons and at multiple cognitive scales continually changes in response to the play of interactions in an encounter. The authoritative memory recall of allusions by the ideal or competent reader that is assumed in many literary critical studies is, I suggest, perturbed by the dispersal, transience and mutability of cognitive interactions. Allusions prompt memory recall of referents. Each instance of memory recall is generated anew through interactions that disperse electrochemically through neurons. Initially, this occurs as processes "pass through multiple stages of transformation to achieve successful long-term memory formation" and subsequently, as memories are reconstructed through further, different interactions at recall (Liu et al. 2021). In the case of reading allusions, selective recall disperses across multiple features of a memory (Hardt and Sossin 2020; Rezayat et al. 2022; Schwering and MacDonald 2020) that are not stored together but are cognitively dispersed across, for example, vision, sound or motor processes (Zhang et al. 2021, 2) and sociocultural cognition (Tenenberg and Knobelsdorf 2014). Interactions among any of these may perturb reading and interpretation. Dispersal, recontextualization and transformation of memory processes indicates that "memories change every time we remember them" (Lifanov, Linde-Domingo, and Wimber 2021, 5), including during processing of allusions. Reading an allusion changes the very memories and associations that it recruits, dispersing those reconfigured memories through further interpretive interactions. During reading, allusions not only disperse through literary and cognitive interactions, but require this dispersal for interpretation to occur. My

process dynamics concept of dispersal is an attempt to promote imagery that better fits the evidence of dynamic literary and cognitive interactions.

Alluding

In *The.PowerBook, The Curious Incident of the Dog in the Night-time* and *Oryx and Crake*, allusions are abstractions, verbal or visual shorthand for dispersed interactions that perturb and change each other. Primed by the literary and cognitive interactions already involved in an encounter, transformations begin at the moment of bringing a referent into play, converting the referent into a dynamic perturbation among other literary, cognitive and sociocultural perturbations.

Alluding is socioculturally ubiquitous and highly dispersed through spoken and written contexts; all novels allude explicitly or implicitly to ideas, images, phrases, literary conventions, material objects, events, sociocultural discourses or other referents. The *Oxford English Dictionary* charts a change in the definition and use of allude from "make an oblique or indirect reference to, to refer indirectly or in passing to", to a broader and more inclusive meaning and usage: "to refer in any manner to" (OED Online). This generalist definition of "refer in any manner to" fits with the study of both explicit and indirect alluding in this thesis. The *OED* definition also accords with a process dynamic view in that it leaves open the referent and its source; allusions are not restricted to referents in literary sources but are expanded beyond the traditional literary confines of referring "to a prior, specific literary work" (Savage 2018, 143). Such narrow scope does not account for cases alluding to nonliterary referents or multiple prior literary works or referents so culturally diffused that a source is untraceable; nor can it account for cognitive processing of allusions. Dispersed across different modes, alluding in *The.PowerBook, The Curious Incident of the Dog in the Night-time* and *Oryx and Crake* may be explicit or implicit, verbatim or rephrased, and be

offered with or without crediting a source. The analyses that follow show that allusions may be delivered in different modes, assume a range of functions or roles and interact in diverse ways. My concept of dispersal recognises a broader and more inclusive range of interactions operating in allusions than in some more familiar approaches in literary studies. In critically examining first author centred, then text centred and finally reader centred approaches to allusion in the critical literature, I aim to clarify my concept of dispersal and positions my process dynamics stance on allusion.

The author centred stance on allusion asserts that "the meaning of a literary work is determined by the intention of its author" (Klausen 2017, 72). Intention, however, is a fraught concept as no direct evidence is available as proof of intention, even in living authors. Intent can only be asserted by an author or audience, faithfully or not, or inferred through circumstantial evidence: "intentions may be postulated and intelligently disputed" (Eggerts 2019, 5). Instead, the rhetorical *attribution* of intention to an author, should this occur, acts as a perturbation in reading and interpretation, whether for a casual reader, academic scholar or editor. Authorial intention as the determiner of meaning has faced widespread challenges in literary studies over many decades: "courtesy of the powerful post-structuralist movement in the 1980s, previously fashionable author-concepts could no longer be unproblematically asserted" (Eggerts 2019, 4). Despite this, hierarchical authorial intention views are still influential in some studies of allusion: "the conventional conception prevalent in contemporary scientific discourse[7] is that the author is the only creator of an allusion, whereas the addressee can only understand the author's idea/intention 'correctly' or 'incorrectly'" (Valotka 2016, 1). However, even in the intentionalist line of argument, authorial intention is not universally transparent but requires a coterie of legitimate readers

---

[7] In eastern European academies, the term "scientific" refers to all academic research, including in the humanities and literary studies.

with the extraordinary capacity to identify both an author's intention and the correct associations to be attached to the intended referent (Irwin 2001, 293; Perry 1979, 43; Valotka 2017, 12). In other words, authorial intention suffers immediate slippage to ideal readers with the requisite literary and cultural knowledge. Elizabeth Savage rejects the intentionalist characterisation of allusion for requiring "the special reader who catches it" and for perpetuating, in her view, an elitist and patriarchal literary lineage (2018, 143). Intentionalist descriptions of allusions are also caricatured in Gregory Machacek's formulation as "covert communication among a cognoscenti" (2007, 531). The requirement for indirect alluding and a "full-knowing reader" (Pucci 1998) positions readers hierarchically as it "contributes to the emergence of a distinction between 'informed' and 'inadequate' recipients, and it is eventually used to engage the former and denigrate the latter" (Tsakona 2020, 42). A narrative moment in *Oryx and Crake* parodies this elitist conception of allusion as secret code:

> "So, her T-shirt's about the eleventh dimension."
>
> "What's the joke?"
>
> "It's complicated," said Crake…
>
> "These are physicists. It's only funny to them. But you asked." (Atwood 2003, 204)

The narrative moment from *Oryx and Crake* constructs a fictional physics student cognoscenti capable of recognising allusions in "complex mathematical equations… that caused snickers among those who could decode them" (204). Identifying and interpreting allusions is subject to reader knowledge and experience; after Crake's explanation of the joke, Jimmy scoffs, "All that in symbols and numbers?" and Crake deadpans in response, "Not in so many words" (204). The two interpretations of and responses to the allusion,

Crake's confident processing of meaning and Jimmy's mortifying confusion, differ significantly. In this narrative moment, positing authorial intention is a case of attributing authorial intention, as the characters Crake and the other physics students are depicted doing; determining on behalf of an author what the author means, of speaking for an author, as Crake does in explaining the joke to Jimmy, of supplanting the author. Nonetheless, shared background or training do not guarantee identical associations and interpretations of an allusion. Even for the cognoscenti, the T-shirt joke in *Oryx and Crake* rhetorically positions the female wearer and, by extension, the community of female readers of the T-shirt, in a position of power vis-à-vis male readers of the T-shirt. Whatever the author of the mathematical T-shirt allusion may have intended, the T-shirt allusion is being circulated among new fictional and real audiences, dispersed and changed.

Restricting interpretive options for an allusion to the text also has serious limitations. A text-centric theory of interpretation may deny or minimise (Perry 1979) dispersal beyond the text in any play of cognitive or sociocultural interactions. As for intentionalist approaches which slip from author to expert reader, in this approach there is slippage from data in the text to expert construal of conclusions and interpretations based on the data. From a contrasting process dynamic perspective, a text provides triggers: an allusion in a novel depends empirically on verbal, graphic or multimodal processes in the text. These may be a name, "Lancelot", a word, "flood", a symbol, "λ" or other graphic, a phrase, "all, all alone", or more extensive thematic, generic or other literary processes such as deployment of an Anthropocene theme or detective fiction genre or stream of consciousness narration. However, an exclusive focus on textual data can lead to "the delusion that meaning is inscribed in the text itself" (Widdowson 2004, 11). Marks on a page are not interpretation. To identify and interpret an allusion in prose fiction, printed triggers activate the complex cognitive processing that constitutes reading. Allusive processes thereby necessarily bring

extratextual cognitive and sociocultural processes into play as part of the interactions that co-constitute interpretation. The T-shirt joke in *Oryx and Crake*, for example, brings into encounter extratextual physics concepts elided from the quote above but demonstrated by the character Crake explaining both the physics and the joke. Extratextual social processes in this case also position characters and readers hierarchically as in-group because conversant with the physics or as outsiders along with Jimmy. At no point is the T-shirt allusion depicted for readers to see and interpret for themselves; it does not appear on the page. This mathematical allusion operates at several removes; it is, described and analysed by characters in the novel rather than directly presented to readers. Reading about the T-shirt allusion in *Oryx and Crake* is not the same as reading it; different sets of interactions operate. Nonetheless, reading about this joke and reading it, should it have been made available, are both subject to complex literary, interdisciplinary and sociocultural interactions dispersed beyond the text. Unlike process dynamics, models that restrict meaning to the text are unable to deal with the dispersed processes and interactions that are crucial to reading allusions. As a process dynamics view makes clear, very few of the complex allusive interactions in play are visible on the page.

A clear example of allusive dispersal is sociocultural dispersal, which reworks allusions unpredictably, challenging any perceived authorial or textual command over meaning. Like the fictional T-shirt allusion, allusions circulate freely, for example in casual conversation in which "speakers and interlocutors draw on [social and cultural] allusions and playfully exploit the meaning potential" (Thielemann 2020, 123). Nadine Thielemann notes responses to and potential transformations of allusions "ranging from laughter to further play on the source" (124). Allusions in a novel may elicit memories of multiple possible referents dispersed over different contexts; for example, allusions to Lancelot in *The.PowerBook* refer to multiple referents in a wider cultural corpus including in poetry, films and children's

books. A referent such as "Lancelot" is not evenly dispersed but, as complexity theory

argues, is "differentially distributed" (Thrift 1999, 32), in this case socioculturally: it "does

not crop up everywhere equally" (32). Such a referent is more than simply differentially

distributed as accessible to some readers but not to others; it is dispersed and mutable in

carrying particular associations and significance for individual readers. Individual readers are

familiar with different versions of Lancelot, which has unpredictable repercussions for

narrative and interpretation as associations, affects and inferences are consciously and

microcognitively configured and reconfigured during reading. In terms of referents so

culturally diffused that a source is untraceable, Audrius Valotka (2016) shows that an allusion

may also be sourced to different genres by different readers. Respondents in Valotka's survey

identified varied sources for the same allusion, from cinema, folk sayings or popular culture

to Biblical, historical or literary sources. For Valotka, all responses are valid in terms of

creating allusions, prescription of correct interpretations is void and creativity is shifted after

publication from author to reader. As Valotka does not emphasise, but I do, this differential

recognition has consequences for interpretation; the same referent perceived to be drawn

from a fairytale may trigger different associations for a reader than it would if perceived to be

drawn from the Bible, a film, a computer game or everyday life. For example, *The Curious

Incident of the Dog in the Night-time* refers explicitly to the character Sherlock Holmes and

names Arthur Conan Doyle as the author who created the character but the diffusion of

"Sherlock Holmes" as different referents in different verbal, auditory and visual modes

through detective fiction, film, computer games and literary criticism, among multiple other

potential referents, unchains the allusions in *The Curious Incident of the Dog in the Night-

time* and subjects them to differently weighted, perhaps contradictory, perturbations from

these dispersed referents.

Similarly, nonliterary allusions to Swindon in *The Curious Incident of the Dog in the Night-time* and Spitalfields in *The.PowerBook* may trigger idiosyncratic associations and interpretations in readers familiar with them as real world locations in England but not in readers who do not know this and for whom interpretation involves the cognitive work required for imagining fictional places. Even for readers aware of the real world status of Swindon and Spitalfields, the two place names, like all real world referents in a novel, have been appropriated, fictionalised and altered in their new context. Allusions to these real world referents,

> rather than referring to "reality," may in fact create or constitute it, as when
> "fiction" creates a "world" of its own—Joyce's "Dublin" where places like
> St. Stephen's Green or Grafton Street, for all that they bear familiar labels,
> are no less real or imaginary than the characters he invents to inhabit them.
> (Bruner 1991, 13)

As fictional creations, Swindon and Spitalfields are not simply relocated real world referents, they are transformed and fictionalised in unpredictable ways by dispersal among social and cultural processes, literary processes in the novels and cognitive processes in readers.

For some scholars the identification and interpretation of an allusion rests solely with readers: "a third view attributes a work's meaning to reader response" (Holt 2020, 78-79). Again, an exclusive perspective misses much of what happens in reading and interpreting allusions; readers do not interpret allusions in isolation but in *interaction*. The role of cognition during reading should not be underestimated but is not sufficient to fully explain the dispersal of allusions over literary and discursive as well as cognitive processes. Cognition during reading itself disperses over processes and interactions, including memories and associated affect. Interpretation therefore depends not only on which referents are

recognised but also on the particular weighting that a reader attaches to associations related to a recognised referent. For allusions, some meanings associated with a referent, London for instance, may be deemed salient and others ignored. Cognitively, dispersal allows the encounter of particular weak or strong, positive or negative associations related to a referent, other associations related to the current reading context and further associations generated by their interaction.

Dispersal includes gaps. A complete lack of recognition means that interpretation of an allusion is not triggered, as a reader "cannot provide knowledge to themselves that they do not already have" (Bickhard 2017, 190). In this case, narration and interpretation as a whole do not stop and are not perturbed by the missed allusion. Alternatively, as for Jimmy and the T-shirt allusion in *Oryx and Crake*, knowing that something has been missed is also a perturbation that impacts on interpretive conditions by inflecting reading with potential reactions of, for example, frustration or dismissal. Jimmy swerves through a number of responses to the T-shirt joke, from feeling demeaned and "foolish" to annoyed, "he'd had one too many of these experiences", to dismissive, *all that in symbols and numbers,* humiliated throughout (Atwood 2003, 204). At times, a reader may know that an allusion is offered, even without the benefit of witnessing high fives among the cognoscenti, but also be unable to derive any associations. This situation is presented in a brief comic sketch in *The Curious Incident of the Dog in the Night-time*:

> In proper novels people say things like, "I am veined with iron, with silver
> and with streaks of common mud. I cannot contract into the firm fist which
> those clench who do not depend on stimulus". What does this mean? I do
> not know. Nor does father. Nor do Siobhan or Mr Jeavons. I have asked
> them.

¹ I found this book in the library in town when Mother took me into town once. (5)

In this case, the allusion is acknowledged in the accompanying footnote in the novel but is not referenced. The slightly altered quote is from Virginia Woolf's *The Waves*: "veined as I am with iron, with silver and with streaks of common mud, I cannot contract into the firm fist which those clench who do not depend on stimulus" (Woolf 1960, 96). This allusion, however, is further dispersed among *The Waves*, Nebuchadnezzar's terrifying vision of a statue made of gold, silver and iron, with feet of iron and clay (Daniel 2.31) and its idiomatic version, "feet of clay". In *The Curious Incident of the Dog in the Night-time*, the allusion is foregrounded in a morpharchic process that appropriates space and commandeers priority with an anticipatory introduction, *in proper novels people say things like,* and by its confinement within quotation marks. In *The Curious Incident of the Dog in the Night-time*, the allusion is positioned as fatally and preposterously obscure; for the fictional readers surveyed in the fictional world of the novel, the allusion is incomprehensible and, for Christopher, signals its own logical error. Dispersing and morphing through perturbations, the valence of the narrative moment shifts to negative and the allusion reconfigures again, as parody in scare quotes. In terms of process dynamics, the encounter slips morpharchically from recognition that an allusion has been encountered to *failure* to generate associations or interpretations. Yet, while allusion fails as an allusion that can activate a referent and associations, it gains significance in its deployment as a comedic and rhetorical set of processes that bolster the anti-literary stance assigned to the narrator. This does not prevent further allusive interactions for readers of *The Curious Incident of the Dog in the Night-time,* who are not limited to interpreting and responding to the allusion as does the narrator. As a fictional reader of the allusion, the narrator Christopher is not the sole determiner of meaning, as is also the case with the characters Jimmy and Crake, who are not the final arbiters of the

T-shirt joke in *Oryx and Crake*. Instead, interpretation relies on dispersal across diverse fictional, nonfictional and cognitive processes and remains vulnerable to change.

Many cases are not a simple known/not known binary. As a perturbation during reading, recognition of an allusion may range from certainty to mere intimation, from plausible to implausible or from clear identification of salience in a referent to dispersed memories and associations unconnected to interpretation of the allusion, although triggered by it: "though intertextual allusions can be very legible and empirically verifiable, they more often elicit elusive flickers of recognition that we struggle to find a use for when interpreting texts" (Leblond 2020, 1309). Allusive perturbations disperse and alter through changeable degrees, from flicker to certainty, changeable intensities of positive or negative valence and changeable narrative or interpretive significance. Readers of the T-shirt moment in *Oryx and Crake* may understand a joke about the eleventh dimension or miss it, enjoy it to some degree or be discomforted by it. Readers may view the joke as significant, for example as another instance of the power of science in a fictional world privileging science and technology or perhaps as an example of Jimmy's ignorance, with which he ultimately excuses his complicity in the apocalypse; or alternatively, the allusion may be considered marginal to the narration, for example as a bizarre but unimportant joke among minor characters. A process dynamics focus on the dispersal of interactions allows for morpharchic shifts in salience, nuance and weighting in allusions. Like the metaphors of which Nigel Thrift writes, allusions "do not lie still. They are always transmuting, pushed one way and another by the work of redefinition of one local knowledge by another" (1999, 37). In the dispersed and changeable conditions during reading, interpretations of allusions are transitory and mutable.

Allusions are dispersed through extratextual sources, sociocultural discourses and cognitive processes; they are also dispersed across diverse modes. Typical of prose fiction, allusions in *Oryx and Crake, The Curious Incident of the Dog in the Night-time* and

The.PowerBook operate in literary and nonliterary modes. Nonliterary modes draw on real world referents, for example, "mango" (Atwood 2003, 4), "London" (Haddon 2003, 208; Winterson 2001, 242) or the facsimiles of signs and logos that pervade *The Curious Incident of the Dog in the Night-time*. Nonliterary interdisciplinary sources include scientific, "in quantum reality there are millions of possible worlds" (Winterson 2001, 53), and mathematical discourses: "prime numbers are what is left when you have taken all the patterns away" (Haddon 2003, 15). While all literary and nonliterary modes are extratextual, referring outside the particular novel, and intertextual, referring to social and cultural discourses, I pragmatically reserve the term "literary" for referents drawn into encounter from other literary sources, such as Lancelot or Sherlock Holmes, the term "real world" for referents drawn from material and environmental processes, such as *mango* or *London*, and the term "interdisciplinary" for nonfiction referents drawn from various disciplines, such as *quantum reality* or *prime number*. For reasons of clarity and practicability, the scope of this chapter is limited to processes involved in alluding to the literary, the real world and the interdisciplinary in the three novels. This division is not hierarchical, typological or fixed, as alluding often involves complex morpharchic interactions that ignore such boundaries; for instance, allusions to "London" in both *The.PowerBook* and *The Curious Incident of the Dog in the Night-time* trigger plays of shifting dominance among processes in literary, linguistic, popular cultural, historical and geographic modes. Interpretations of London in each novel will further differ according to interactions with the specific literary processes in each novel. Allusive processes cannot be finally pinned down but remain dispersed and prone to change. I offer an alternative view of allusion that shifts the focus from author, text or reader to dispersed processes, replacing exclusion with interaction. Authorial intention is not inherent but may or may not be attributed and act as a perturbation, textual processes generating allusions are subject to extratextual perturbations during reading and reader cognition

involved in interpreting allusions is dispersed over microcognition, memory and sociocultural discourses. Allusions are radically dispersed.

Literary allusions

The main claim I make in this chapter is that allusions rely on dispersal. Spatially, literary allusions are densely distributed through both *The.PowerBook* and *Oryx and Crake*.[8] My analysis of *The.PowerBook* relates to their operation through extratextual dispersal of referents, intratextual dispersal of allusions over narrative and stylistic modes and perturbations triggered among versions of a referent from multiple texts. Analysis of *Oryx and Crake* addresses intratextual dispersal through both fleeting and extended literary alluding, the enabling role of dispersal in interactions and transformations among allusions and the use of dispersed allusions in the generation of new fictional creations .

The.PowerBook

The.PowerBook includes extensive alluding to each of a number of literary texts; of these, I analyse allusions to narrative moments from Malory's *Le Morte D'Arthur*, Dante's *Divine Comedy*, Ariosto's *Orlando Furioso* and Woolf's *Orlando*. Allusions in *The.PowerBook* perturb the extratextual referents that they invoke, transforming and dispersing them through new contexts.

Allusions rely on dispersal to extratextual referents. In a novel about passion and damage, a list in *The.PowerBook* of "great and ruinous lovers" (Winterson 2001, 75) recruits, updates and reinterprets Dante's catalogue of "carnal malefactors" (2008, Inferno.V.38) in *The Divine Comedy*. Dante's list includes Semiramis, Cleopatra, Helen, Achilles, Paris,

---

[8] *The Curious Incident of the Dog in the Night-time* eschews literary allusions but does not escape them entirely, as seen in the allusion to Woolf's *The Waves* (Haddon, 2003, 5). Allusions to Arthur Conan Doyle's *The Hound of the Baskervilles* are treated in the next thesis chapter, focussing on their roles in metacritical discussion and as metatextual models for Christopher's storymaking.

Tristan, Francesca "and more than a thousand" other sinners (Inferno.V.67), while

The.PowerBook lists

> Lancelot and Guinevere.
>
> Tristan and Isolde.
>
> Siegfried and Brünnhilde.
>
> Romeo and Juliet.
>
> Cathy and Heathcliffe.
>
> Vita and Violet.
>
> Oscar and Bosie.
>
> Burton and Taylor.
>
> Abelard and Heloïse.
>
> Paolo and Francesca. (Winterson 2001, 75)

The.PowerBook's narrator explicitly notes the cultural dispersal of these allusions to famous lovers: "some tales have been told many times, others privately and by letter" (75). Lists such as those in *The Divine Comedy* and *The.PowerBook* rely on dispersal; as referents, the characters circulate through cultural contexts. Being culturally dispersed, the characters as referents trigger accumulated interpretations and, in the case of the iconic characters listed in both *The Divine Comedy* and *The.PowerBook,* cultural prestige. This weight of associated interpretations and fame is made possible by the cultural dispersal of the referents. However, the strategy of alluding to culturally dispersed referents such as *great and ruinous lovers* is not restricted to *The Divine Comedy* and *The.PowerBook* but is, according to *The.PowerBook*, available to anyone, "this is a list you can write yourself" (75). Cognitively,

dispersal may prompt memory recall not only in interpreting referents presented in a text but also in composing such a list for *yourself*. Dispersal is generative, capable of offering multiple *great and ruinous lovers* as referents for allusions: "some are greater than others. Some more ruinous" (75). Dispersal of allusions to extratextual referents is necessary for any such list to be assembled.

Dispersal also plays a pivotal role in the transformation of allusions during reading; referents do not remain unchanged. Incidents involving Lancelot and Guinevere drawn from Thomas Malory's troubadorial marathon *Le Morte D'Arthur*, first published in 1485, are perturbed and altered in language, mood and style in the chapter titled SEARCH in *The.PowerBook*. The allusions in *The.PowerBook* introduce contrasts that in turn perturb interpretations of both Malory's and Winterson's versions of the story and as referents, Lancelot and Guinevere interpretively disperse and metamorphose. While Malory's text is technically a romance, a heroic tale, there is not a hint of lyricism in Malory's language, nor in the incessant hand to hand combat, political and sexual machinations or stilted dialogue he depicts. In Malory's treatise on chivalry, love is equated not with a contemporary sentimental notion of romantic intimacy but with sex, asserted but not portrayed and usually either desired but unrequited or consummated with proscribed partners, as for Launcelot and Guenever. In Malory's text, while emotions including anger, dolour or love might be declared to exist by the narrator and portrayed in a limited fashion via observable behaviour, there are none of the psychological and emotional nuances evident throughout the very different first-person narration of *The.PowerBook*. While these contrasts may be viewed as historical differences in attitudes to love and sex, the contrast can nonetheless intensify the impact on reading where familiarity with both texts operates. Malory's Launcelot interacts with the depictions of Lancelot in *The.PowerBook*, perturbing each version; these perturbations during reading may cognitively alter associations in readers related to Lancelot. Dispersal over

different narrative modes and styles in the two texts co-creates the allusions and the associations they trigger.

An allusion may feature dispersal of a referent across multiple texts. A complex three referent allusion to a promise occurs in the story of Lancelot and Guinevere in *The.PowerBook*: "It began with a promise" (67). Three possible referents for *promise* perturb each other and generate transitory interpretations. The promise voiced, "While I am living I shall rescue you" (67), triggers an allusive switch to Launcelot's promise to Guenever in *Le Morte D'Arthur*: "I promised her at that day ever to be her knight in right outher in wrong" (Malory 1906a, 282). *Promise* also disperses over a litany of biblical promises that includes "I will rescue you" (Isaiah 43-46). Interpretations veer morpharchically from a security contract between king and knight to an intimate promise between lovers to a covenant between God and the chosen people. Cognitively, attention fluctuates unpredictably among the moments from *The.PowerBook*, *Le Morte D'Arthur* and the *Bible*, or through the associations elicited for a particular reader among the many possible for these referents. *The.PowerBook*, *Le Morte D'Arthur* and the *Bible* all present the vow as first person spoken dialogue. The voice of Launcelot speaks in *Le Morte D'Arthur,* addressing the king in a public reaffirmation of a vow to protect the queen. The voice of God is presented in *Isaiah*, again broadcasting a vow, this time to the people of Israel. *Le Morte D'Arthur* and *Isaiah* perturb the intimate personal vow from one lover to another in *The.PowerBook* with the weight of public pledges, while the vow in *The.PowerBook* acts as a reminder that the publicly uttered vows in the other two texts carry illocutionary force (Austin 1962, 157-158), have consequences and are expressions of love. The dispersed versions of the referent inflect the allusion in *The.PowerBook* with mediaeval and religious perturbations.

Dispersal across diverse referents and associations triggers morpharchy in interpretations. The apparent chivalry of Launcelot's vow in *Le Morte D'Arthur*, *I promised*

her at that day ever to be her knight in right outher in wrong, is overtaken and undermined

by irony and moral culpability; the ongoing sexual relationship between Lancelot and

Guinevere is treasonous, *wrong*. This perturbs the line *while I am living I shall rescue you* in

The.PowerBook with a suggestion of sin that leaches into its initially sin free paraphrase.

Dispersed across further biblical referents and associations, the phrasing of *I shall rescue you*

morpharchically foregrounds religious perturbations that bring unwavering piety and virtue

into play and then parody them. None of Launcelot, Guenever or their avatars in

The.PowerBook is unimpeachably virtuous. In *The.PowerBook*, unlike the Bible, guilt and sin

are scorned and rejected: "that you were married to someone else meant nothing to me" (68).

This rejection of sin is in turn perturbed in *The.PowerBook* by suggestions of bravado in

flouting conventions or refusal of the possibility of sin regarding love; in this latter case there

is *nothing* to reject. The allusive switch to *Isaiah* also perturbs the love affairs in

The.PowerBook with notions of the sacred, initiating an ongoing recalibration in the

The.PowerBook of the sacred to incorporate the corporeal and profane, particularly through

moments of rapture or revelation: "We had become this love. We were not lovers. We were

love" (69). Throughout *The.PowerBook*, *I* curses social and moral demands, and dominance

veers morpharchically between transfigurative and destructive passion, only to leave literal

retaliation. In both Malory's and Winterson's Lancelot and Guinevere stories, retaliation is

swift and extreme: "then the wars began" (Winterson 2001, 71), leaving emotional

devastation in its wake, implied in Malory's account of Launcelot's self-imposed years as

monk (1906b, 396) but painfully detailed in *The.PowerBook* as lovers quarrel or misread the

import of love. Referential, associative and interpretive morpharchy is inevitably triggered by

such dispersal across multiple referents and associations.

Dispersed referents may recruit further referents. *The.PowerBook* replays the ladder

scene from *Le Morte D'Arthur*: "that dark night I took a ladder and propped it against the

window where I knew you slept. You would not be sleeping" (Winterson 2001, 67). This is a direct allusion to the rather more furtive and comical version in *Le Morte D'Arthur*, which has Launcelot sneaking "privily" (Malory 1906b, 324) in a most unseemly manner through the castle grounds, sword in one hand, unwieldy ladder in the other. In *The.PowerBook*, *you would not be sleeping* shifts again, between clandestine preplanning and anticipation, in a psychological rewriting of the distanced observation in *Le Morte D'Arthur*, "and there anon the queen was ready to meet him" (1906b, 324), with its implied eagerness based on a history of sexual trysts. Compared to the psychological justification, "which is more important—a dead marriage or a living love?" (Winterson 2001, 68), and highly charged emotional and sexual intimacy, "your lips like tongs, moving the burning parts of me" (69), in *The.PowerBook, Le Morte D'Arthur's* ladder-enabled tryst is a comedic and beefy version. Malory's ladder assignation is spattered with gore, involving a display of machismo as Lancelot reefs out "bars of iron [that] cut the brawn of his hands throughout to the bone"; muffled sex in a combat hospital, "make ye no noise, said the queen, for my wounded knights lie here fast by me"; nipping out the window at dawn, putting the window "together as well as he might again" on the way through; and accusations of treason on discovery of Guinevere's bedding "bebled of the blood of Sir Lancelot and of his hurt hand." (Malory 1906b, 324). Further dispersed ladder referents may also be brought into the encounter, for example, ladders to princesses imprisoned in folk tale towers, such as Rapunzel's ladder of hair (Grimm and Grimm 1927; Carter 1979), or the unused rope ladder made "for a highway to my bed", but which, as voiced by Juliet in Shakespeare's *Romeo and Juliet* explicitly represents unrequited "maiden-widowed" love and suicide by hanging (1883, 3.2.139). Interpretations of the allusion in *The.PowerBook* are destabilised by continual and changing dispersal through referents from a range of texts. Dispersal in this case ensures referents draw further referents into encounter.

The dispersal of allusions through different narrative moments in a novel changes

interpretations in terms of numbers and weight of allusions and in terms of new

interpretations. Lancelot's story percolates further through *The.PowerBook*. It reappears in

one of the contemplative passages that punctuate the novel like an intermittent chorus

(Winterson 2001, 188-189). In this narrative moment, *The.PowerBook* offers an alternate

reading of Lancelot's failure to complete his quest as due to lack of vision, though the Grail is

within reach: "Lancelot fails, not because he can't give up Guinevere, but because he can't

distinguish between love's symbol and what it represents" (188). Lancelot is castigated not,

as in Malory's version, for the impiety of his love for Guinevere, or the conflict of interest

between mortal and divine objects of desire, a sin for which Malory's Lancelot repeatedly

does penance, but for its insipidity: "it is not easy, this love, but only the impossible is worth

the effort" (188). This allusions dispersed over narrative moments in the novel prompt

broader consideration of the nature of love. In the new narrative environment of

The.PowerBook, the matrix of moral values infusing Malory's story perturbs the narration:

"as a moral essay this suggests that human passion is no substitute for divine love and that it

prevents us from experiencing love fully. This has been the basis of Christian thought since

St Paul" (188). However, the two premises, *human passion is no substitute for divine love*

and *it prevents us from experiencing love fully*, are rebutted: "in fierceness, in heat, in

longing, in risk, I find something of love's nature" (189). Dispersal of these two premises as

referents in *Le Morte D'Arthur* and St Paul allows the generation of a new, conflicting, set of

proposals about love in *The.PowerBook*: "all human love is a dramatic enactment of the wild,

reckless, unquenchable, undrainable love that powers the universe. If death is everywhere and

inescapable, then so is love, if we but knew it" (188-189). Here, literary alluding is suddenly

perturbed by a switch to interdisciplinary alluding for those readers with the relevant

background knowledge. The narrative moment alludes to a chaos theory conception of *the*

universe¸ appropriating chaos theory's descriptions of an irresistible, turbulent, edge-of-chaos rush of energy and processes (Kauffman 1993; Lewin 1992; Prigogine and Stengers 1984), *wild, reckless,* interacting with and disrupting a drive toward entropy or *death*. In the big picture *everywhere*, however, *death* is merely a temporary local configuration in the unceasing flows of energy, *unquenchable, undrainable love that powers the universe*. This can be seen as another switch from chaos theory to a process philosophy view of unending flows of processes, perturbed yet again by religious suggestions of God's love powering the universe that in turn is contradicted by the idea that love, not god, powers the universe. In the narrative moment from *The.PowerBook*, the referent "love" disperses across literary, chaos theory and process philosophy allusions. The diversity of allusions to the referent love changes interpretations on the fly. Dispersal of contradictory allusions to love across the novel creates the conditions allowing the specific contrarian propositions offered in *The.PowerBook*.

Allusions may also transform as they disperse across genres. In *The.PowerBook,* the story of Paolo and Francesca recruits features from dispersed genres. *The.PowerBook* again explicitly cites the dispersal of Paolo and Francesca's story through literary texts: "You can find it in Boccaccio. You can find it in Dante. You can find it here" (123). In terms of genre, Dante's poetic version is converted in *The.PowerBook* into gothic tale, which emphasises visual and psychological chiaroscuro: "the darkness accumulates…He was the light" (Winterson, 123, 126), and happiness as a dazzling, fleeting respite from entombment: "my father's castle is built of stone… the dark stone weighs down on us" (123). The gothic also interacts with the grotesque; in *The.PowerBook,* the child-bride is officially deflowered by her husband's proxy at the engagement ceremony and trapped into a monstrous marriage through the collusion of both families. Allusion to the gothic interacts with allusions to tragic story of forbidden love as Francesca and Paolo, the stunningly beautiful proxy and brother of

157

the groom, fall in love and contrive "oh, I don't know how—to be alone together" (128) until caught unrepentant and murdered by Francesca's husband. The gothic and tragic reposition the lovers sympathetically, in contrast to Dante's sinners. Allusions to dispersed poem, gothic tale and tragedy genres in *The.PowerBook* interact and transform interpretations.

Allusions may also disperse across voices. The frisson of heresy voiced in the final lines of Paolo and Francesca's story in *The.PowerBook* is in stark contrast to the wailing of tortured sinners in *The Divine Comedy*. A pitch black "infernal hurricane" (Dante 2008, Inferno.V.31) torments the sinners in *The Divine Comedy* with the pain of extreme heat, noise and turbulence. In *The.PowerBook,* the rush of shrieking souls is transformed into an utterance proclaiming peace, light and eternal ecstasy: "I have never let go of his hand. We are as light now as our happiness was, lighter than birds. The wind carries us where it will, but our love is secure. No one can separate us now. Not even God" (Winterson, 129). It is specifically the eternally unchanging aspect of hell, "all hope abandon" (Dante 2008, Inferno.III.9), which is traditionally its most horrifying. In *The.PowerBook,* love perturbs Dante's fearful cyclonic hell, reducing it to mere *wind*. Dante's frenzied "starling" murmuration of souls—their chaotic flocking, driven "hither, thither, downward, upward" in the "blast" and the mournful "lamentations" voiced, like those of "a long line" of "cranes" (2008, Inferno.V.40-48)—is converted in *The.PowerBook* into *happiness* that is incandescent. Sin is commuted into sin-free status *lighter than birds*. *The.PowerBook*'s allusions transform hell into paradise. Yet the provocative stance of these final lines of the Paolo and Francesca story in *The.PowerBook* also disperse into ambiguity as conflicting ideas perturb this glimpse of an impossible utopia. In both *The.PowerBook* and *The Divine Comedy*, the lover's voice persists beyond death. However*, was* suggests that *happiness*, never guaranteed with love, has dissolved into *misery* (Dante) or *grief* (Winterson). In *The.PowerBook*, the lovers are now also swept powerless into irreversible fallout that *carries us where it will*, while the lover to

whom Francesca is inescapably welded in hell was once her betrayer, "oh Paolo, *il bello,* why did you lie to me?" (Winterson 2001, 127), and the offence still rankles. Dispersed allusions disperse again in morpharchic shifts through moments from different texts, through first person post-death narration voicing competing sinner and heretic views and through the voices uttering pain, misery and regret morphing into another voice asserting happiness and light that morphs again into complaint and ambiguity. Dispersal over dynamically changing voices and interpretations ensures that interpretive equilibrium, like Paradise, is here an impossible dream.

The.PowerBook is also impacted by dramatic irony, parody and humour associated with extratextual narrative moments from which referents are drawn. For example, the parody that perturbs scenes in *The.PowerBook* involving the character Astolfo is in part triggered by allusions to Ludovico Ariosto's *Orlando Furioso*. Desire as entrapment is a recurring theme in *Orlando Furioso* and *The.PowerBook*:

> When Astolfo came panting up to the palace, he knew at once that it was
>
> enchanted… Astolfo lifted up the marble step at the main door and the
>
> entire palace vanished… he managed to pull out a whistle and blow a sharp
>
> blast.
>
> That was the end of it. The note pierced the last of our deceptions and we
>
> saw how it was. We didn't say much. We hardly glanced at each other as we
>
> took our own ways. (Winterson 2001, 240)

The same scene from Ariosto's 1532 Italian parody, *Orlando Furioso*, adds a touch of farce, as Astolfo clanks through the landscape on foot, "hampered by his shield, helmet, and other arms" (Ariosto 1983, 256), and into a castle to search for his stolen horse, or in *The.PowerBook's* version: is "lured there by a vision of his desire. He was chasing a peasant

boy who had stolen his horse" (Winterson 2001, 240). The moment of physical comedy in *Orlando Furioso* is disrupted by *The.PowerBook's* mischievous shift of narrative focus from the horse to the *boy* and from fury to *desire*. In *Orlando Furioso's* parodic version, when Astolfo realises the castle is enchanted, he pulls out his trusty book of spells, implausibly stashed in the suit of armour he is wearing, "looked in the index and quickly saw which page to turn to for the antidote" (Ariosto 1983, 257), and saves the day by "prising up the stone under which the spirit was buried, making the palace dissolve into smoke" (257). However, Astolfo himself now magically appears to be the object of desire of all the trapped victims he has freed, who set upon him intending rape and murder: "but he remembered his horn [also held somewhere about his armoured person] in time… had he not resorted to its noise of doom, that would have been the end of him, beyond recall" (257). As *The.PowerBook* rewrites the scene, *the note pierced the last of our deceptions and we saw how it was. We didn't say much*, hallucinogenic desire is literally exposed and dissipates. The parody, theatricality and magic of the moment in *Orlando Furioso* is banished from *The.PowerBook*, its victims released to dull embarrassment. The story of Astolfo in *The.PowerBook* ends "the palace was gone… the screen had dimmed" (Winterson 2001, 241), suggesting cognitive processes that generate immersion or *enchantment* dispersing and morphing into different processes that generate reflection. Immersion, however, is only temporarily displaced because a story's "enchantment is not so easily dissolved" (240) and is cognitively prone to be "folded up again into the hiding places of the mind" (241), memory poised to be triggered again. The parody, humour or irony arriving as perturbations with the referents disperses and transforms across contradictory contexts. Dispersal here reconfigures the associations accompanying a referent.

Dispersal may also occur through allusions to narrative processes in other texts. The shifting ambiguity of *I* in *The.PowerBook* is intensified by allusions to moments from

Virginia Woolf's novel *Orlando* (2015) that explicitly comment on the narrative construction of subjectivity. For example, both *The.PowerBook* and *Orlando* contain penultimate narrative moments depicting a voice crying "Orlando" over and over (Winterson 2001, 237; Woolf 2015, 178-180) that acts as metatextual perturbation commenting on the failure to fix dispersed sociocultural or cognitive processes to a name or a subject. Woolf's versions of Orlando are presented chronologically, changing in gender over history; Winterson's *I* is more plastic, changing in form in temporal leaps back and forth through the imaginary times of multiple fictional worlds. Woolf's Orlando is also subject to the same tendency as Winterson's *I* to be "entirely disassembled" and to multiply into selves with "attachments elsewhere" (Woolf 2015, 178). For Woolf's Orlando, the desire to foreground a "Captain self, a Key self, which amalgamates and controls them all" is perturbed when it turns out to be merely the "conscious self" (179) that is constantly subjected to unconscious changes. In Woolf, the conscious self has the capacity to coalesce temporarily, by virtue of parallax or peripheral vision which does not withstand direct attention, at times when, "deep in thoughts of something else… the whole of her darkened and settled… and all is contained as water is contained by the sides of a well" (212-216). However, even fluid, temporary and flimsy containment transforms in an allusion in *The.PowerBook*, in which the speaking *I* changes even at the moment of naming or writing:

> I said my name again and again—"ORLANDO! ORLANDO!"
>
> I hoped my name would contain me, but the sound itself seemed to run off my tongue, and drop, letter by letter, into the pool at my feet. I tried again, but when I put my hand down into the pool of water, my name was gone.
>
> (Winterson 2001, 237)

The.PowerBook takes the investigative psychological perspective of *Orlando* with its changeable, fragmenting Orlando metatextually composed of "little bits of paper" (Woolf 2015, 178), converts it into a meditative discourse on love and subjectivity, with its *I* metatextually composed of "found objects" (Winterson 2001, 242), and sets this perspective in play among other dynamic processes. In *The.PowerBook, I* interacts with dispersed allusions drawn into encounters as temporary, complex, changeable narrative processes. Allusions are deployed and transformed to tell the story of *I* differently, dispersing into different narratives in different narrative moments.

Literary allusions in *The.PowerBook* are dispersed, dynamic, morpharchic and mutable. They rely on dispersal to extratextual referents, which may be images, events, characters, narrative or stylistic processes. Referents in an allusion may be dispersed across multiple texts and may recruit further referents. Allusions do not passively import meaning, leaving an extratextual referent unchanged, but trigger multidirectional interactions that perturb and are perturbed during cognitive processing. An allusion has no final interpretation but is poised to disperse again in new contexts.

Oryx and Crake

Oryx and Crake also deploys a hectic profusion of literary allusions, including to Jonathan Swift's *Gulliver's Travels*, H.G. Wells' *The Island of Dr Moreau,* Daniel Defoe's *Robinson Crusoe*, Aldous Huxley's *Brave New World* and George Orwell's *1984*; creation mythology, in particular the *Bible*, Milton's *Paradise Lost* and Mary Shelley's *Frankenstein*; and Greek and Shakespearian tragedy. Extensive alluding to Swift's *Gulliver's Travels* is demonstrated throughout *Oryx and Crake*, activated through verbal similarity but also by positing similar fictional creations and by deploying stylistic similarities, as in the satirical impetus and use of humour in both *Oryx and Crake* and *Gulliver's Travels*. Dispersed across

Oryx and Crake, allusive processes in different modes repeatedly perturb each other and the interpretations they generate.

Oryx and Crake opens by metatextually commenting on its own composition through an epigraph that is the first of multiple allusions to *Gulliver's Travels*. The epigraph quotes Jonathan Swift's mischievous and misleading disclaimer from the final chapter of *Gulliver's Travels*:

> I could perhaps like others have astonished you with strange improbable tales; but I rather chose to relate plain matter of fact in the simplest manner and style; because my principle design was to inform you, and not to amuse you. (Swift 1967, 340; Atwood 2003, np)

The disclaimer belies the *strange improbable tales* that both novels narrate, *Gulliver's Travels'* fantastic voyages to uncharted worlds peopled with alternative humans and talking horses, *Oryx and Crake's* more prescient post-pandemic world populated by alternative humans and genetically modified creatures. The playfulness of the Lilliputians, Brobdignagians, Houyhnhnms and Yahoos of *Gulliver's Travels* is invoked and translated in *Oryx and Crake* into bizarre hybrids such as giant rabbits sporting fluorescent green fur (Atwood 2003, 95); rakunks, a cute genetic splice of house-trained racoon and deodorised skunk (51); pigoons, pigs bred with multiple accelerated-growth internal organs to be harvested repeatedly for human transplants (22); and wolvogs, apparently playful but treacherous guard animals "bred to deceive. Reach out to pat them, they'll take your hand off" (205). Like the imaginary creatures of *Gulliver's Travels*, the gene-spliced inventions in *Oryx and Crake* extrapolate from the known, *plain matter of fact*, and disperse into the unfamiliar and fictional; dispersal opens further imaginative possibilities.

163

Dispersing over a text, alluding in *Oryx and Crake* repeatedly pits different types of allusions against each other. Literary allusion in *Oryx and Crake* spills into scientific allusion, perturbing both; as Margaret Atwood points out in an interview: "the goat spider is real, the multiple-organ pig is real. They haven't, as far as I know, yet implanted cortical tissue in a pig, as I have scientists do in the novel, but I am sure that will come" (Case and McDonald 2003, 2). Scientific allusion to cortically modified smart pigs disperses again into further literary allusion; Dr Moreau makes the same claim in *The Island of Dr Moreau* that "a pig may be educated" (Wells 1896, 52), in Moreau's case through hypnotism rather than cortical implants. *Plain matter of fact* is not innocent in *Oryx and Crake*, but is recruited into the service of profligate commodity capitalism and of a worldwide eugenic pogrom, savagely satirised in the tradition of Swift. In post Darwinian *Oryx and Crake*, the genetically engineered adaptations are designed for commercial profit but in the post-apocalypse present of the narration have become feral and are evolving unpredictably without further human intervention. Interpretive possibilities in *Oryx and Crake* are triggered in part by allusions to plausible technical and scientific innovations and transforming them in strange "what if" scenarios, speculating on the uses to which such innovations may be put. Perturbed by allusions to *Gulliver's Travels*, *Oryx and Crake* weaves allusive curiosities into a satirical tale dispersing across hypothetical trajectories into the future.

Allusion to a declared purpose for both *Gulliver's Travels* and *Oryx and Crake*, *to inform you, and not to amuse you,* quickly disperses across modes of narration that do deploy amusement. Narrative moments in both novels pit humour against information and twist amusement into darker modes. *Gulliver's Travels* plays parodically into a vibrant trend in which "reports of voyages and field-trips were often found within the pages of the Royal Society's *Philosophical Transactions,* gratifying a readership fascinated by exotic and prodigious specimens of nature" (Lynall 2012, 89), while *Oryx and Crake* is part doomsday

prophecy and warning: "would we want to live in a world in which Atwood's story is the

final revision?" (Beran 2003, 84). However, the didactic, cautionary impetus in *Oryx and*

Crake disperses into melodrama and parody, perturbing and reframing the indignation of

Gulliver's Travels with pathos, tragic childhoods and unrequited loves, and the reportage of

Gulliver's Travels with theatricality, hysteria and rage. Through interaction with cognitive

processes, allusions warp and disperse, constantly reconfiguring.

The second epigraph in *Oryx and Crake* draws allusively on the rich body of fiction by

Virginia Woolf and, as in *The.PowerBook*, disperses into thematic and stylistic perturbations.

A moment of swirling grief, epiphany and vertigo in the final pages of Virginia Woolf's 1927

To the Lighthouse, the epigraph speaks to Snowman's dramatically changed situation:

> Was there no safety? No learning by heart of the ways of the world? No
>
> guide, no shelter, but all was miracle and leaping from the pinnacle of a
>
> tower into the air? (Woolf 1977, 166-167; Atwood 2003, np)

Thematically, *To the Lighthouse* is uncompromisingly psychological, an investigation of

memory, emotion and the possibility of visionary experiences in ordinary moments. The

allusion suggests that *Oryx and Crake* is likewise a psychological drama. Perturbed by satire,

however, in *Oryx and Crake* the intense psychological drama of *To the Lighthouse* is

exchanged for pop psychology, pseudo-therapies and melodramatic self-talk: "'Don't even

think about it,' he tells himself. Sex is like drink, it's bad to start brooding about it too early

in the day" (Atwood 2003, 11). The metaphorical leap of faith in *To the Lighthouse*

parodically transforms in *Oryx and Crake,* into a farcical scramble from a watchtower

(Atwood 2003, 334). Stylistically, in *To the Lighthouse* stream of consciousness narration

constantly dissolves across "startling, unexpected, unknown" (Woolf 1977, 167) shifts of

voice; in *Oryx and Crake* narrative flow is replaced with discontinuous "splinters "of

memory (Atwood 2003, 114), the narrator's voice dispersing through memories or across other fragmentary or ghostly voices in his head. The ending of *To the Lighthouse* cited in the epigraph in *Oryx and Crake* narrates Lily Briscoe's momentary intimation of personal "annihilation" but also an intense revelation of "beauty" (Woolf 1977, 167). In *Oryx and Crake*, Snowman faces the prospect that nothing human will endure but he also is granted a moment of transport and exaltation, of ineffable beatific vision: "there is no other word for it. *Rapture*" (Atwood 2003, 371). Stylistic allusions in the form of stream of consciousness narration, and thematic allusions to psychological dimensions of subjectivity and, in *Oryx and Crake*, trauma are brought into encounter throughout *Oryx and Crake*. In the two epigraphs in *Oryx and Crake*, allusive processes disperse across psychological drama, epiphany, parody, satire and melodrama.

Dispersal allows unexpected encounters among allusions. The verbal twist in the spelling of Crake's research institution, Paradice, perturbs allusions to the Bible with mathematical and scientific ideas of uncertainty and probability, and adds to a growing list of replies to Einstein's apocryphal and widely distributed quip that "God does not play dice". An allusion to Coleridge's Xanadu, "It was a miracle of rare device/ A sunny pleasure-dome with caves of ice" (Coleridge 1973, 256), diffuses further allusive perturbations to visions and marvels: "Crake's charmed dome…like a bubble of ice" (Atwood 2003, 228). The Paradice/Paradise dome, the blessed garden, site of extraordinary scientific invention, is now also airlocked bunker, womb and tomb, secret enterprise, architectural folly, gambling den, hidden test site and post-apocalypse gothic ruin. Biblical depictions of paradise as the site of the genesis of humanity, of loss of innocence and of expulsion cursed with sin, are replayed with twists: the Paradice dome is the mad scientist's laboratory, the birthplace of a new posthuman people, who sally forth and begin again the long process of defying their maker's prohibitions and genetic imperatives. Interpretations of these interacting biblical,

mathematical, scientific and poetic allusions diverge and diversify, predictable only in their changeability.

Interactions among a storm of fleeting allusions also scatter through *Oryx and Crake*. Characters are in part constructed impressionistically through flashes of literary alluding: Crake is depicted at different moments as a fine Lucifer defying God (104), Frankenstein at "the next-to-end result of seven years of intensive trial-and-error research" (302) and vengeful adolescent Hamlet accusing his mother and uncle of the murder of his father (212). The scattering of these brief allusions through the novel triggers shifts of perspective that co-create mutable and at times allegorical characters. Through dispersed allusions, Crake transforms from fallen angel to mad scientist to angel of death wreaking terrible revenge upon the world. Snowman does cover versions of minor roles: "he was Crake's prophet now" (104). He is also the snake whispering in the Garden of Eden, undoing Crake's work. He is Frankenstein's monster to Crake's Frankenstein: "How come I'm alone? Where's my Bride of Frankenstein?" (169); a lunatic "swathed in protective hallucinations" (222); a ghost (372) and tragicomic symbol of the sins of the fathers: "I'm your past, he might intone. I'm your ancestor, come from the land of the dead" (106). In a novel in part about trauma, the highly mutable play of disparate allusions composes the fictional narrator's fragile psychological condition and is relentless and histrionic. Lightning morpharchic instants of literary allusions such as these are dispersed through the novel and dynamically transform characterisations of Crake and Snowman.

Splicing of dispersed allusions co-constructs characterisation in the novel. As mad scientist Crake is a latter day allusive splice of Mary Shelley's Viktor Frankenstein, the *Modern Prometheus* of her title, itself an allusion to the god who fashioned mankind from clay in Greek mythology: "a new species would bless me as its creator and source" (Shelley 2013, 40), and Wells' Dr Moreau: "I've not confined myself to man-making" (Wells 1896,

74). Crake has, like his allusive predecessors, edited in desirable genes in his new race of humans and edited out those he views as unnecessary or detrimental. From Crake's fictional perspective, genetic predispositions are a mix of the logical and arbitrary, the serious and silly: Crake eliminates beards, for example, and other physical flaws, singing, aggression and predatory behaviours, dreaming, illness, and art (Atwood, 305-306). This list closely resembles that of Moreau, who literally removes unwanted anatomical parts by unanaesthetised excision, remodelling animals as Beast Folk in his fearful House of Pain and modifying them mentally and emotionally through hypnotism:

> In our growing science of hypnotism we find the promise of a possibility of superseding old inherent instincts by new suggestions, grafting upon or replacing the inherited fixed ideas. Very much indeed of what we call moral education, he said, is such an artificial modification and perversion of instinct; pugnacity is trained into courageous self-sacrifice, and suppressed sexuality into religious emotion. (Wells 1896, 52)

The violence and extreme cruelty in Wells' novel in detailing Moreau's experimental vivisection, failed attempts and consequent terrible suffering of the Beast Folk both during the experiments and ongoing are mostly commuted to black comedy in *Oryx and Crake* in experimental failures with water conserving fake rocks or mood-sensing wallpaper (Atwood 2003, 202) and early iterations of Crake's BlyssPluss Pill (294), but the hybrid creatures in *Oryx and Crake* are as confronting. The hubris and flaws of all three mad scientists, Crake, Moreau and Frankenstein, are generated in *Oryx and Crake* through the deployment of allusive splices.

Allusive splicing continues as Jimmy plays narrators Prendick and Walton to Crake's Moreau and Frankenstein, and offers ineffectual objections to Crake's eugenics project:

168

"didn't you get a bit carried away?" (305). Like Crake and Jimmy, the posthuman Crakers are also allusively spliced. Jimmy's first encounter with the Crakers alludes to Gulliver's discovery of the "deformed" Yahoos, with their monkey-like fingers, brown skin, body and facial hair "of several colours, brown, red, black and yellow", tendency to howl and roar when threatened and to throw their own excrement at foes (Swift 1967, 269-270). The Crakers in *Oryx and Crake* are Yahoos rewritten as significantly more politically correct and scrubbed up: "They were naked, but not like the Noodie News: there was no self-consciousness, none at all. At first he couldn't believe them, they were so beautiful. Black, yellow, white, brown, all available skin colours. Each individual was exquisite" (Atwood 2003, 302). Rhapsodising interacts with parody that perturbs the moment in *Oryx and Crake* with Yahoo-inspired disgust for the Crakers: "best of all, they recycled their own excrement" (305). The Crakers are simultaneously an allusive upgrade of Frankenstein's less perfectly reassembled creature, with its unnerving mix of "yellow skin", "lustrous black" hair and "straight black lips" (Shelley 2013, 48). In Crake, Jimmy and the Crakers, splicing dispersed allusions generates new fictional creations.

Allusive instability, the tendency of allusions to shift among referents and sources, is enacted at the end of *Oryx and Crake*, when a group of three pandemic survivors is suddenly introduced, in miraculous *deus ex machina* mode. The human travellers have met the Crakers in the narrator's absence; a play of allusions refashions a scene from *Gulliver's Travels* involving the Yahoos. In *Oryx and Crake*, the Crakers' offstage response to the newcomers literally was to make sexual advances, mistaking the woman's smell, Yahoo style, for an indication that she is on heat; the three humans run away just as Gulliver flees the sexual advances of an outrageously young female Yahoo (Swift 1967, 315). In *Oryx and Crake*, Snowman describes the encounter as all-singing all-dancing vaudeville, a wildly incongruous overture retold with dry amusement:

Snowman can imagine. The sight of these preternaturally calm, well-

muscled men advancing *en masse*, singing their unusual music, green eyes

glowing, blue penises waving in unison, both hands outstretched like extras

in a zombie film, would have to have been alarming. (Atwood 2003, 365)

Even so, in *Oryx and Crake* this is an encounter of some allusive import. As in *Gulliver's*

Travels and *The Island of Dr Moreau*, it is a first, unexpected, meeting between two distinct

human species. In a slippage alluding to colonial discourses, the narrative moment triggers

troubling historical perturbations related to initial encounters during European voyages to

annex new lands. History records first encounters between colonial powers with superior

weaponry and indigenous peoples who greet newcomers with tragic curiosity and courtesy:

"the Arawak Indians, welcoming Christopher Columbus with garlands and gifts of fruit,

smiling with delight, soon to be massacred" (Atwood 2003, 366). The power differential is

reversed in *Oryx and Crake;* it is the tiny band of three as the remnant of a catastrophically

eradicated dominant culture that retreats in response to the arrival of a nascent Craker

species. Released into the wild and left to their own devices, the Crakers are poised to change

culturally and allusively: "Snowman longs to questions them—who first had the idea of

making a reasonable facsimile of him, of Snowman?" (361). In *Oryx and Crake*, genetic and

allusive splicing is a start point, not an end.

Allusions are dispersed through *Oryx and Crake*, both in single flashes and in multiple

references that build extended alluding. Dispersal enables allusions to compete or to be

spliced. Dispersal across different thematic, stylistic or narrative modes drives rich allusive

interactions that can transform narration and generate new fictional creations. Intratextual

dispersal of literary allusions in *Oryx and Crake* generates imbalances that trigger

unpredictable interpretive possibilities.

Real world allusions

Alluding to extrafictional realities occurs throughout *Oryx and Crake, The Curious Incident of the Dog in the Night-time* and *The.PowerBook* through references to concrete realia, material and popular cultures and states of affairs in what is variously designated in shorthand the "real world", "physical world", "material world", "lived experience" or situated "lifeworlds" of readers. In using the term "real world", this thesis assumes interactions among biophysical, cognitive and sociocultural processes co-constructing and ceaselessly customising experiences of reality in readers. For novel-reading, alluding to the "real world" disperses across referents and draws them into interaction with other literary processes.

I discuss real world allusions through readings of food allusions in the three novels. Alluding to food in different modes, for example, the object *mango* in *Oryx and Crake*, the activity of cooking pasta in *The.PowerBook* (Winterson 2001, 182) or attitude to food colours in *The Curious Incident of the Dog in the Night-time* (Haddon 2003, 71, 105) alters narration and its interpretation as the fictional world is both made and disturbed (Herman 2009, xiv) by alluding to "things" (Brown 2001; Frow 2001), everyday activities (Sim 2010) or attitudes and behaviours. Real world allusions disperse across literary and cognitive processes that fictionalise the allusions.

Allusions fictionalise dispersed real world referents. That is, referents in the real world are selected and thereby "invented" as referents (Bruner 1991, 13) for allusions in a new context. Such referents are also converted into fictional creations as they are drawn into interaction, recontextualised and transformed in the new fictional context of the novel. Literary crafting and cognitive processing during reading fictionalise "historically determinate particulars" (Waugh 1984, 105), for example places such as London in *The Curious Incident of the Dog in the Night-time* or *The.PowerBook* and historical figures including choreographer Martha Graham in *Oryx and Crake* and writer Arthur Conan Doyle

in *The Curious Incident of the Dog in the Night-time*. Fictionalising also transforms physical objects and real world environmental print (Horner 2005; Neumann 2018) such as the logos, signs and labels that litter *The Curious Incident of the Dog in the Night-time*, reports from the public domain such as the discovery of a sarcophagus in London retold in *The.PowerBook* (Kennedy 1999), or the global environmental damage recorded in *Oryx and Crake*. Fictional London, Martha Graham, events or environmental damage in turn perturb experiences of specific real world locations, people or events, should a reader have these particular experiences, with new associations and new interpretations shaped by the reading experience.

Oryx and Crake

Fictionalising of real world allusions disperses over cognitive, literary and imaginative processes. Reading a real world allusion in *Oryx and Crake* to a mango, "he undoes the plastic bag: there's only a single mango left" (4), idiosyncratically triggers, or does not trigger, memories and associations related to experience of mangoes. The referent for *mango* is extratextual, referring to a fruit composed of biological, environmental and other interactions in the real world. *Mango* is also intratextual, a fictional creation composed of linguistic, narrative and other literary interactions that populate the fictional world of *Oryx and Crake*; and *mango* is imaginary, composed of creative and interpretive cognitive interactions. The fictional *mango* further disperses over cognitive processes as Snowman "undoes the plastic bag: there's only a single mango left. The ants have got in" (Atwood 2003, 4). The word *mango* may activate multisensory cognitive processing (González et al. 2006; Spence 2020; Zhou and Christianson 2016) in readers familiar with their real world textures, colours, perfume and flavour and the slurping, "sucking" (Atwood 2003, 6) actions and sounds that eating a ripe mango on the seed necessitates. Some readers may have memories of the seasonal maturing of mangoes in sweltering tropical summers. Readers with no experience of mangoes will potentially either imagine some such perceptual

172

characteristics or proceed without. In all cases, *mango* cognitively intensifies or diminishes in significance with interpretive responses. Like *mango, plastic bag* similarly refers to a nonliterary and nonfictional object, extratextually composed of physical and chemical interactions; it is also intratextually composed of linguistic interactions and imaginatively composed of interpretive interactions that may trigger multisensory and sociocultural associations. The character who eats the mango, Snowman, is likewise dynamic, although triggering different interactions. There is no real world referent for the character *Snowman* as for *mango* and *plastic bag*. Nonetheless, extratextually *Snowman* is a fictional creation imaginatively crafted in the real world by Margaret Atwood and accessible as a fictional creation to other people by reading; intratextually he is composed of linguistic and narrative interactions, and he is subject to processes of imagination. Allusively dispersed, a complex interplay of fictionalising processes switches among extratextual, intratextual and imaginative possibilities as cognition shifts across them during reading.

A real world allusion acts as a narrative perturbation. The intratextual fictional mango in this narrative moment in *Oryx and Crake* disperses across narrative roles. It is the single mango left in a stash of scavenged food. This particular mango is the only natural food in Snowman's cache; the narrative moment alludes intratextually to other items of fictional synthetic food: "a can of Sveltana No-Meat Cocktail Sausages" and "a chocolate flavoured energy bar". The narrative moment also alludes extratextually and intratextually to a hoarded last third of a bottle of Scotch (4). These intratextual and extratextual food allusions perturb each other. Abandoned objects of the pre-apocalypse world, Snowman's can of *cocktail sausages* and melted *energy bar* are snack foods designed for nibbling but not nutrition and long term survival; they may temporarily stave off hunger but not starvation. As a referent, the can of *cocktail sausages* is perturbed by the satire that pervades *Oryx and Crake*. The brand name *Sveltana* is a "fatuous neologism" (250) playing on "svelte" and "velvet", with

173

their interacting connotations including slenderness, elegance, smoothness, softness, and slight downiness through a disquieting acoustic parody. Meat is widely unavailable in the fictional world; in a clever marketing ploy, the label devalues meat by promising that is absent. Filling the commercial gap left by the lack of meat, it is parodically displaced by an unidentifiable homogenised artificial substance. Small cocktail sausages and energy bars by whatever name are commonplace in at least British, American, and Canadian food cultures; in *Oryx and Crake*, they alter significantly in sociocultural connotations. In the narrative moment in *Oryx and Crake,* the cocktail sausages and energy bar are transformed from trivial snacks into precious goods: the energy bar "might be the last one he'll ever find" (4). Dispersal and fictionalising of real world referents in this narrative moment may induce a frisson of "cognitive estrangement" (Suvin 1979), perturbed by the unfolding dystopic valencing of the novel; the mindshift required for survival is unsettling.

A single real world allusion may disperse over multiple narrative impacts. The plastic bag of food has attracted vicious ants; as literary processes interacting with each other, plastic and ants are deployed as fictional creations that contribute to construction of a hostile fictional ecosystem against which Snowman's survival efforts are mostly ineffectual. The fresh fruit, in contrast to synthetic food, offers nutrition and pleasure but not enough, leaving Snowman "sucking on his mango" (6), perhaps for momentary enjoyment but also to extract sustenance. The scavenged *mango* also ironically reconfigures the food scarcity in the pre-apocalypse fictional world, where fresh or natural food is rare, a commodity to which only the privileged have access: "real shrimps instead of the CrustaeSoy they got at Martha Graham" (208). The genetically modified and synthetic foodstuffs are designed to compensate economically for the loss of natural foods due to environmental damage, and are the only parodically dubious food available to the majority of the population. *Mango* perturbs and is perturbed by such plays of interpretation and by further interactions with yet more

fictional creations, a tree in which Snowman sleeps for safety, the mercifully absent "wildlife: all quiet, no scales and tails" (4) and his bedsheet toga, co-constructing an alien and "deadly" (3) fictional post-apocalypse environment. The allusion to a mango perturbs interpretation of both the immediate setting and the wider social context.

The.PowerBook

Dispersal ensures that allusions to real world activities also perturb narration and interpretation. In the fictional world of *The.PowerBook,* cooking a pasta dish (Winterson 2001, 182-183) is transformed into a mediaeval tourney. In the recipe, allusive reference is made to real world vegetables, tomatoes, onion, carrot, celery, triggering idiosyncratic interpretive and potentially multisensory interactions in reader cognition. The narrative moment alludes to real world cooking skills, introduced by the imperative verbs, take, slice, chop, dice, add and pound that may recruit procedural memories (Chai, Hamid, and Abdullah 2018, 2) and elicit perceptual and motor responses (Zhou and Christianson 2016, 974). These real world allusions related to movement, action and technical skills also shift across extratextual, intratextual and imaginative interactions. The real world conventions of recipe instructions are intratextually perturbed with images of violence in a fictional world in which ingredients are imaginatively treated "as though they were your enemy" (182). When sliced, chopped and diced, it is recommended to "fasten" (182) the ingredients into a pot "for as long as it takes them to yield", then "pound the lot" (183). Once the vegetables are cooked into submission, the vicious tone switches to a more sensuous and caressing "soft flame" and "lubricate with olive oil" (183), with its hints, in a novel about desire, of foreplay, or perhaps frustration, in search of "the right balance" (183). The narrative moment ironically ends "raw emotion can be added now" (183), adding further *raw* and painful ingredients to the profile of a lovers' quarrel through which the recipe further disperses. Allusions to a mundane activity dynamically disperse into a psychological role play of brutality, passion and frustration.

The Curious Incident of the Dog in the Night-time

Circulating through *The Curious Incident of the Dog in the Night-time,* allusions to real world food referents are most frequently used in the construction of the narrator's attitudes and behaviours. Allusions to food are limited to the empirical such as names or visual attributes, specifically colour; that is, any other qualities of real world foods such as taste or texture are excluded in favour of colour data. Different coloured foods must remain separated on the plate (Haddon 2003, 59) and the narrator "hate[s] yellow and brown" (105), so he refuses to eat or drink anything so coloured. The narrator's favourite colours are "red. And metal colour" (71), which means that much of the food he eats or drinks is in some shade of red: "hot raspberry milkshake" (24), "strawberry flavoured slimming meals" (59) or baked beans in their red sauce, to which there are 21 references in the novel. These food colour preferences are dispersed through the novel, details used as literary processes constructing the fictional atypical attitudes and behaviours ascribed to the narrator, often to comic effect. The food allusions disperse through cognitive interaction; like the narrator, readers may react to the allusions with pleasure or distaste. However, in contrast to the narrator, readers are not limited to responding to colour data but are free respond according to multisensory or sociocultural associations triggered by reading.

In one narrative moment in the novel, real world food allusions disperse into counterfactuals. A long breathless sentence, with footnote, relentlessly piles possibilities *which didn't happen* into vertigo:

> For example, this morning for breakfast I had Ready Brek and some hot
> raspberry milkshake. But if I say that I actually had Shreddies and a mug of
> tea[3] I start thinking about Coco-Pops and lemonade and porridge and Dr
> Pepper and how I wasn't eating my breakfast in Egypt and there wasn't a

rhinoceros in the room and Father wasn't wearing a diving suit and so on

and even writing this makes me feel shaky and scared…

[3] But I wouldn't have Shreddies and tea because they are both brown. (24)

Beginning with the proposition that "a lie is when you say something happened which didn't happen" (24), interactions convert food allusions from the mundane to the metaphysical. The brand names and much of the realia in *The Curious Incident of the Dog in the Night-time* are direct quotes, *Coco-pops, Dr Pepper,* acknowledged in the unpaginated front matter of the book, where permissions are listed and the cheeky disclaimer made that "every effort has been made to trace other copyright holders and the publishers will be happy to correct mistakes or omissions in future editions". Despite the appearance of commercial product placement, the brand names of foods and drinks of a British suburban lifeworld are transformed into fictional creations in the fictional world, where they co-construct absurd, comic or surreal narrative moments. Factual real world allusions, *lemonade, Egypt, rhinoceros, diving suit,* and the bombardment of real world brand names, *Ready Brek, Shreddies, Coco-Pops, Dr Pepper* are ludically dispersed counterfactually in imaginative interactions that generate a rush of *if* hypotheticals and possibilities. While those possibilities are repeatedly negated, *wasn't, wasn't, wasn't,* by a character asserting that proper novels (5), jokes (10) and metaphors (20) are lies and that "I can't lie" (24), the imaginative display is prolific, comic and creative. Metatextually, the allusions in this narrative moment act as commentary on the countless dispersed possibilities that perturb and, in the narrator's view, threaten to overwhelm fiction.

In the examples from *The Curious Incident of the Dog in the Night-time*, dispersal through interactions allows food allusions to play roles in the construction of fictional attitudes and behaviours and in the positing of counterfactuals. These allusions typically

further disperse into the comedic, absurd or surreal. Real world allusions are densely dispersed through *Oryx and Crake, The Curious Incident of the Dog in the Night-time* and *The.PowerBook*. As demonstrated through a subset of allusions to food, real world allusions are transformed into fictional creations that may populate a fictional world, construct psychological states or narrative perspectives or offer metatextual commentary. Dispersal enables the narrative and interpretive reconfiguration of real world allusions.

Interdisciplinary allusions

Literary studies repeatedly recognise that prose fiction has always alluded to nonfiction including, for example, philosophy, history, psychology, politics, the sciences and mathematics. A process dynamics approach offers a new focus on the dispersed dynamism of interdisciplinary allusions in *The.PowerBook, The Curious Incident of the Dog in the Night-time* and *Oryx and Crake*. I first analyse interdisciplinary allusions to nonliterary models of cognition in *The Curious Incident of the Dog in the Night-time*, arguing that explicit allusions to a computational model of cognition are perturbed by and compete with indirect allusions to an embodied cognition model. I then examine indirect allusions to chaos and complexity theories in *Oryx and Crake,* arguing that these allusions configure the portrayal of the fictional pandemic in the novel.

The Curious Incident of the Dog in the Night-time

Dispersed intratextually and extratextually, Christopher's claims about his own cognitive style are frequently explicitly delivered through interdisciplinary allusions to a computational model of cognition. In this cognitive scientific model, cognitive processing operates through "the computational manipulation of representational inner states." (Gomila and Calvo 2008, 2) and this manipulation is posited to generate "reasoning, decision making, problem solving, perception, linguistic comprehension, and other mental processes" (Rescorla 2020, 1). The "classical computational theory of mind" (8) is concerned with the mind's

capacity for computation: "the mind *literally is* a computing system" (9); that is, the mind is a system with computing capacity, not a computer. In contrast, *The Curious Incident of the Dog in the Night-time* alludes to the computational model by repeatedly and explicitly deploying the popularised and culturally dispersed metaphor of the mind as a computer: "but the mind is just a complicated machine... we're looking at a screen inside our heads, like a computer screen" (Haddon 2003, 145-146). Whether viewed as system or computer, the computational model of cognition struggles to account for perceptual, sensorimotor or sociocultural processes and does not account for unpredictability and change:

> computational models have made the bet that cognitive phenomena can be described in a way that abstracts away from the full richness of real time, replacing it with discrete orderings over formal states. From a dynamical perspective, this looks ill-advised. Dynamics, by contrast, takes the nature of change in time as its primary focus… [and] focusses on the *embeddedness* of cognition… in a nervous system, in a body, and in an environment.. (van Gelder 1998, 14)

I argue that the narrator Christopher is allocated, via allusions, computational claims about his own mind but that these claims are perturbed by and compete with other literary processes in the novel that allude to a different, embodied and dynamic, conception of cognition. Despite the narrator's depictions of himself as a computational system into which suitable inputs are fed and then rationally processed, he is depicted as situated in an open environment with intrusive perturbations and impacts over which he has no control. He attends school where he is thrust into social interactions regardless of his wishes or skills and he travels alone to London, which obliges him to interact with strangers, public transport and distressingly unfamiliar physical and social contexts. Dispersal in this dynamic interplay of models resembles a collision, a violent encounter between competing concepts of mind.

179

Allusions are dispersed differentially in terms of narrative weighting and valencing. In *The Curious Incident of the Dog in the Night-time,* allusions to the cerebral are articulated in virtuoso displays, while those to the emotional or psychological are reduced to naive observations. *The Curious Incident of the Dog in the Night-time* posits a dizzying asymmetry between the narrator's intellectual skills—which are fictionally portrayed as intimidating (43) or treated as freakish (84) by other characters—and the immature interpersonal and social skills also allocated to him as fictional character. The mind as computer metaphor is assiduously pursued in the novel through metacognitive alluding:

> My memory is like a film. That is why I am really good at remembering things… And when people ask me to remember something I can simply press **Rewind** or **Fast Forward** and **Pause** like on a video recorder, but more like a DVD because I don't have to Rewind through everything in between to get to a memory of something a long time ago. (Haddon 2003, 96)

Here, memory is stripped of dynamic cognitive interactions in favour of a repository of static memories replicating the world in visual images that can be accessed at will. Memory is depicted as accurate, always accessible and unchanging. Positing a searchable photographic memory alludes to the computational model's proposition of rule governed manipulation of inner representations:

> and this is how I recognise someone if I don't know who they are. I see what they are wearing, or if they have a walking stick, or funny hair… and I do a **Search** through my memories to see if I have met them before. (97-98)

In the narrator's case, the manipulation itself is depicted as a consciously experienced, *I do a search,* rational process of elimination *to see if I have met them before*. The novel is peppered with such references to this computational view of cognition as disembodied data manipulation: "I detach my mind at will" (92).

However, this ability relies on collection of past empirical data, in this case visual data about clothing, accessories or hair, that is assumed not to change over time. Computation clashes with embodiment when no such data is available. As he has no stored data to draw on, the narrator is seriously distressed by strangers and is likely to physically lash out in fear: "and this is when I hit him [a policeman]" (9); "she [concerned train passenger] touched my arm so I screamed again" (225). Christopher's cognitive powers are delineated in the main by what he has learned to do only with conscious effort; to memorise symbols, details and other people's behaviours, and to apply logical reasoning. In contrast, alluding to nonlogical strategies, "which aren't questions and answers and aren't connected" (51), indicates the kinds of cognitive processes which Christopher is depicted as having difficulty mobilising, such as selecting salient sociocultural details or updating them, processes responsive to changing demands, those of a situated, embodied mind solving endless practical problems.

For Christopher, all details have equal significance until prioritised by some rule, such as *recognise someone*, and all must be attended to and processed before acting:

> And when I am in a new place, because I see everything, it is like when a
>
> computer is doing too many things at the same time and the central
>
> processor unit is blocked up and there isn't any space left to think about
>
> other things. (177)

Christopher retains an internal map of events for future reference but such a fixed, searchable photographic map has major disadvantages; it records only past environments which may

have little relevance in new contexts or changing landscapes. This is most clear during his journey to London, where his difficulty and painfully slow progress in comprehending new situations, identifying salient features of varying contexts and updating information or confirming it in changing circumstances are apparent.

In another allusion to the computational mind, processing is achieved not by repeated visual or auditory scanning as for most people, but by brute memorising combined with logic and rules:

> And if something is nearby you can find it by moving in a spiral, walking clockwise and taking every right turn until you come back to a road you've already walked on, then taking the next left, then taking every right turn and so on…And this was how I found the train station. (172)

A more efficient method, rejected by the narrator because it requires repeated social interactions, would be to walk toward the station and recalibrate whenever necessary by asking for directions. Analogously, Christopher is portrayed as obsessed with timetables and plans and once a decision is taken, he has difficulty altering it: "I don't like it when I put things in my timetable and I have to take them out again, because when I do that it makes me feel sick" (257). In other words, his reaction to change is not computational but embodied. Like Christopher, computer programs focus on logic and symbols. Computer programs, like Christopher, are successful at designated tasks, achieving recognisable goals by deploying sets of logical tools; in Christopher's case these tools include game rules (92), theorem proofs (269) and mathematical equations (199). Like computer software, Christopher is depicted as excelling at manipulating pre-existing data and at pattern completion.

Alluding to the computational model continues in respect of problem solving. Given a problem, canvassing all possible solutions before acting, as Christopher does repeatedly on

his journey to London is highly demanding in terms of time and prevents quick or adaptive responses to changing circumstances or error: "and then 8 more trains came and I decided that I would get onto a train and then I would work out what to do" (Haddon 2003, 226). The risk of the narration in *The Curious Incident of the Dog in the Night-time* subsiding into endless checking of details is mitigated in interaction with other narrative processes, including other modes of allusion. Alluding to a situation widely used in literary and cinematic fiction to generate suspense, Christopher is in one scene down on the subway train tracks, in this case single-mindedly searching for his escaped pet rat (223-224). Suspense is amplified by comedic circumstantial data that diverts attention from an oncoming train: "I like mice and rats" (223), "he was eating a bit of rubbish that was an old sweet paper" (223), and step by step absurdist reporting of increments of time and narrative: "and someone shouted" (223), "and I bent down" (223), "and I walked after him" (223), "and someone said" (223), "and then I heard" (224), "and I was going to be run over and killed" (224). Christopher is logically processing data in an objective computational manner that diminishes the clear and present danger of one datum among others, the arriving train, an ironic miscalculation in the circumstances. While a logical response, "so I tried to climb up" (224), fails, "but it was high and I was holding Toby in both my hands" (224), no emotional reaction is included in the depiction of Christopher facing an imminent and brutal death. Computational cognition is unequal to the rapidly changing circumstances. Christopher cannot save himself, but narrative rescue is afforded by a commuter dragging him back up onto the platform in the mandatory nick of time as the train arrives. Computational cognition is then displaced by Christopher's embodied hysteria as the portrayal in the novel farcically prioritises the always distressing touch of a stranger, "I screamed" (224), over death. The narrative viewpoint claimed by the fictional narrator is depicted metacognitively and self-reflexively by giving primacy to one mode of allusions, the interdisciplinary computational

model of mind, and resisting allusive dispersal to other modes of allusion, particularly literary allusion. Through the rhetorical positioning of interdisciplinary allusions as authoritative, Christopher's fictional narration positions computational cognition as the solution to all problems.

Nonetheless, while Christopher's cognitive characteristics allude to the abstraction of computational minds, computation is perturbed and challenged in the novel. The text, for example, does not always treat computational cognition, or Christopher's depiction of it, seriously: "I sometimes think of my mind as a machine, but not always as a bread-slicing machine" (8). In contrast to Christopher's computational model of cognition, the narration in *The Curious Incident of the Dog in the Night-time* presents a picture of shifting embodied processes of which the mind is only one component. The novel pits a computational model voiced by the character of Christopher against an embodied model as the fictional world and fictional events oblige Christopher to respond.

The rhetorical balance of power between allusions to computational cognition and embodied cognition shifts in particular narrative moments in the novel. Perceptual processes are heavily referenced in *The Curious Incident of the Dog in the Night-time* and often, in Christopher's case, trigger cognitive confusion. Human sounds are at times inchoate. Christopher's groaning and his mother's despairing "loud wailing noise like an animal" (236) are assaults on the senses. The narrative is punctuated with shouts, screams, swearing and roaring or the contrasting calm of white noise (251) or, as for Snowman in *Oryx and Crake* at his most stressed, chanting (258). The character Christopher cowers in fear, unable to operate at all, beside himself, in response to some sounds:

> And then the roaring turned into a clattering and a squealing and it got
>
> slowly quieter and then it stopped and I kept my eyes closed because I felt

safer not seeing what was happening… And there was sweat running down

my face from under my hair and I was moaning, not groaning, but different,

like a dog when it has hurt its paw and I heard the sound but I didn't realise

it was me at first. (216-217)

Allusions to real world sounds dominate and drown out computation and logic. Sounds must be acted on, not always reasoned out; they drive Christopher and the narrative in ways that contradict the machine-like cognitive control he desires. Regarding touch, the embodied model again perturbs the computational in that touch cannot be ignored, whether positive or negative. While the sensation of cool grass or a pet's fur is calming, touch involving humans is entirely negative and at worst leads to shock, depicted in an embodied cognition allusion to cognitive disconnection: "I had no memories for a short while" (103). For Christopher sensory perception is heightened and indiscriminate, and his reactions are often extreme, uncontrollable and visceral. In narrative moments dispersed through the novel, these allusions to embodied cognition compete morpharchically with and overwhelm computational capacity.

Metacognitive commentary in *The Curious Incident of the Dog in the Night-time* repeatedly uses allusions that dramatise the failure of a computational model of cognition to account for such complex, conflicting interactions:

And sometimes, when I am in a new place and there are lots of people there

it is like a computer crashing and I have to close my eyes and put my hands

over my ears and groan, which is like pressing CTRL + ALT + DEL and

shutting down programs and turning the computer off and rebooting so that

I can remember what I am doing and where I am meant to be going. (178)

From an embodied perspective, conscious and unconscious cognition rely on fast sensory processing; on a capacity to act on inconsistent, inadequate or conflicting data; to organise information on demand in varying contexts and to deal with unanticipated situations; and require a powerful capacity for learning. Allusions to contradictory models of cognition are hierarchically reversed in this narrative moment; embodied response explicitly overwhelms the computing mind.

Perturbing computational allusions, a narrative moment of epiphany depicts cognition extending beyond the body and brain. The embodied model of cognition allows for an imaginative leap, a flash of insight or enlightenment, to generate a novel combination or to manufacture a new idea, as opposed to simply applying existing rules in yet another computational context: "when you looked at how things were and used the evidence to work out something new" (32). For the fictional Christopher, the flash of insight is not normally possible; he is depicted as most reluctant to *Leap to the Wrong Conclusions* (124). Yet even he cannot avoid an imaginative leap to a conclusion, though he takes far more convincing than most readers. He is depicted finding a cache of letters from his mother, concealed from him by his father, and reads letter after letter, "you should make sure you have all the available clues before you start deducing things. That way you are much less likely to make a mistake" (124), carrying the activity well beyond the repetitions readers would generally require: "it was a mystery and I couldn't work it out" (124). In an allusion to what has been labelled the "aha" moment (Shen et al. 2018; Tik et al. 2018), he finally makes the cognitive leap and arrives at the unendurable realisation, the unbelievably painful "stroke of inspiration" (Haddon 2003, 53) that his mother is not dead but has deserted him, and that his father, who "always tells me the truth, which means that he loves me" (109) has betrayed him. Shock ensues:

I don't know what happened then because there is a gap in my memory, like

a bit of the tape had been erased. But I know that a lot of time must have

passed because later on, when I opened my eyes again, I could see that it

was dark outside the window. And I had been sick because there was sick

all over the bed and on my hands and arms and face. (142)

Here, he is portrayed reacting to something he can only imagine, based on the written evidence before him, and the conflict between that and the facts he knows about his mother, based on the evidence of his father's false word. The encounter causes a cognitive blackout. The narrator's mind is dispersed as much "out there" in the realms of the imaginative, the new story about his mother and revised concepts of parent and trust, as it is "here", in the letters which impinge mercilessly on his consciousness. Cognition lurches back and forth through allusive outsourcing.

Through allusions, the text operates otherwise than maintaining a computational status quo, depicting a series of problematic situations, changing the experimental parameters and recording responses. Over the course of the narrative, the character Christopher does not change radically in terms of cognition but he does change. Moving through a major turning point in his life, he is depicted as learning to practice his skills in new situations, manipulating people and circumstances and adding confidence, perhaps even teenage cockiness, to his repertoire. A narrative moment hints at cognitive aspects Christopher himself denies. He complains that:

Other people have pictures in their heads, too. But they are different because

the pictures in my head are all pictures of things that really happened. But

other people have pictures in their heads of things which aren't real and

didn't happen. (98)

187

Yet the text, in contradiction, depicts him as capable of imaginative play by deploying dispersed and diverse allusions. Narrative moments allude to escaping from prison (17), alien spaceships (86), or journeying underwater in a marine submersible (100), all in standard adventure fashion; and in one narrative moment, the text invokes imagination as the narrator manages his immediate future, inventing "a red line on the floor" (212) to guide himself through the terrors of the railway station. He also dreams, and his favourite dream is startlingly similar to Crake's vision, Snowman's nightmare, in *Oryx and Crake*, concerning living in a world in which the human population has been eliminated by a virus, and Christopher is alone, apart from the few "special people like me" (242-243). Dispersal allows morpharchic changes in salience and valence. Reversing the polarity of the valencing, in Christopher's ironically metaphorical dreamworld, as in Crake's utopia in *Oryx and Crake*, there is no need for metaphor or fiction. Allusions in both novels depict a desire in Crake and Christopher to ban allusions.

Despite his apparent lack of resources for dealing with a murky world of prolific meanings, in the fictional bildungsroman of *The Curious Incident of the Dog in the Night-time*, the narrator writes himself as survivor of a coming-of-age trial. Through a play of interdisciplinary allusions to two colliding cognitive models, the fictional world and the people in it are rearranged, a new order instituted, and a new future made possible.

Oryx and Crake

Instead of the collision of competing models that I posit for *The Curious Incident of the Dog in the Night-time*, *Oryx and Crake* is in part a novel-long macroallusion running a particular model, delivered as a speculative scenario or simulation. The model is based on catastrophe, chaos and complexity theories; allusions to the instability, perturbations, critical thresholds and catastrophic transitions cited in these theories disperse through the portrayal of a fictional pandemic. In contrast to explicit commentary on a model of cognition in *The*

188

Curious Incident of the Dog in the Night-time, in *Oryx and Crake* allusions to chaos and complexity are implicit; they dramatise, or simulate, but do not name the models they invoke. Typical of the shifting, modular character of narration in *Oryx and Crake*, narration of the fictional pandemic is repeatedly interrupted by and interspersed with other narrative concerns. Despite being presented in narrative moments physically distanced from each other through the book, narration of the fictional pandemic itself unfolds in a manner systematically following the dynamics articulated in chaos and complexity theories. Indirect allusions to these models interact with real world allusions to climate change, economic instability and social injustice and at times also with literary allusions. Real world and literary allusions are involved in constructing the specifics of the fictional pandemic and the fictional world in which the pandemic occurs. My analysis here focusses on the ways that allusions to interdisciplinary models fashion the narrative trajectory of the pandemic, while real world and literary allusions co-construct the details of the pandemic as a specific fictional creation. In its emphasis on complexity theories, a process dynamics approach is in a strong position to extend the body of critical work on the novel with analytical insights on allusions to complexity models.

Catastrophe theory, pioneered by mathematician René Thom in the 1960s, generated mathematical methods to account for "bifurcations", sudden catastrophic transitions from a continuing but unstable state to a radical discontinuity, such as seen in earthquakes, riots or wars. Catastrophe theory describes transitions that are triggered by small but insupportable changes occurring at critical points in unstable conditions (Thom 1975). A lovely illustration of this critical tipping point is offered in the children's book *Who Sank the Boat?* (Allen 1988) in which a tiny mouse boards an unstable dinghy already full of larger animals; the fragile balance of the dinghy is upset and the boat capsizes.

In comparison to catastrophe theory, chaos theory, also developed in the 1960s, is concerned with situations that appear turbulent or chaotic as an outcome of simple, non-random, deterministic processes (Prigogine and Stengers 1984; Stewart 1989). Instead of the focus on change between states in catastrophe theory, chaos theory moved further into the territory of unstable states *per se*. However, conceptually both catastrophe and chaos theories are still tethered to traditional science in their privileging of deterministic drivers of change and the dream of prediction and control. In contrast to catastrophe and chaos theory, complexity theories, discussed in Chapter 1 of this thesis, relax determinism and reject prediction in their accounts of imbalances and self-organisation among processes. In the discussion that follows, I pragmatically subsume concepts common to catastrophe, chaos and complexity models under the label "complexity", except where I need to differentiate these models for a particular purpose. Depicted through interacting allusions dispersed across interdisciplinary, literary and real world modes, the fictional pandemic is generated through imbalances and triggers perturbations that propagate impacts and usher in novel self-organising circumstances through a radical transition.

Allusive dispersal enables and intensifies narrative complexity, increasing the combinations of interactions and possibilities for impacts. Real world allusions to economic, environmental and social problems are brought into interaction with complexity theory allusions to asymmetry, instability and radical change to co-construct the fictional world of *Oryx and Crake*. The fictional pre-catastrophe world is politically and environmentally unstable, even volatile, perturbed by economic imperatives which demand relentless consumption of finite resources beyond the point of scarcity; which harness all innovation to design and market new synthetic consumer products; and which police the scientific elite in gated Compounds, research communities whose main function is to develop and safeguard intellectual property for commercial purposes. Products, including plants, animals, artificial

foods, cosmetic processes, diseases and their antidotes, are invented, manufactured and stockpiled for commercially strategic deployment. Competition is unforgiving in a global free market environment based on diminishing resources, as attested by unrelenting corporate sabotage, fraud and bioterrorism:

> When there was so much at stake, there was no telling what the other side
>
> might resort to. The other side, or the other sides: it wasn't just one other
>
> side you had to watch out for. Other companies, other countries, various
>
> factions and plotters. (Atwood 2003, 27-28)

Hierarchical and spatial class divisions act as control processes to dampen or eliminate economic and political unrest but are increasingly unsuccessful. The gated Compounds to which the elite have "seceded" as "defectors", withdrawing their resources, knowledge and participation from distribution (Reich 1991, 193), are guarded/interred by private corporation security operatives, the disturbingly named fictional CorpSeCorps. The Compounds are physically distanced from the Modules housing the middle classes and from the Pleeblands, slums where the amorphous plebeian masses live in what the Compounders perceive to be anarchy. The pleebs are an endlessly gullible, demanding, and therefore complicit, market for doubtful products: "it was a scam—he'd put together the ads for it" (Atwood 2003, 252). They are a resource, at times unknowingly, for experiments and trials that are often spectacular failures: "pay them a few dollars, they don't even know what they're taking" (296); and they are a source of resistance. Pleebs are viewed by the Compounders as violent, hostile and devious, prone to "inciting to violence, membership in a banned organisation, hampering the dissemination of commercial products, treasonable crimes against society" (286). Further afield are third world countries devastated by the economics of globalisation and climate change, struggling to adapt with old methods to changing circumstances:

what if a family needed to sell a child… because the weather had become so

strange and could no longer be predicted—too much rain or not enough, too

much wind, too much heat—and the crops were suffering. (118)

This asymmetry, this unsustainable diversion of natural and economic resources and of power

ensures further reactions. Real world and complexity theory allusions interact, co-creating

fictional circumstances in which asymmetry drives instability and triggers change.

Alluding to complexity theory, perturbations dispersed through the narration

continuously disrupt it, destabilising the fictional world. Riots shake the fictional Compound

economy, forcing it to change; that is, to adjust, to regroup, to redirect resources to protection

and cleanup squads. Accidental outbreaks of lethal genetically modified and spontaneously

mutating "hot bioform[s]" (176) punctuate the lives of both the Compound inmates and the

plebeians, precursors to an ultimately unmanageable epidemic, the dreaded "biggie" (325).

Bioterrorist activities, as destabilising random events, vaguely shadow life for the protagonist

Jimmy as he grows up. Perturbations trigger impacts and reactions. In the dystopian fictional

world of *Oryx and Crake,* climates, environmental fertility and ecosystems are detrimentally

altered on a massive scale: "the coastal aquifers turned salty and the northern permafrost

melted and the vast tundra bubbled with methane, and the drought in the midcontinental

plains regions went on and on, and the Asian steppes turned to sand dunes" (24). Alluding to

complexity theory modelling of increasing instability, allusive interactions dispersed across

real world and interdisciplinary modes act as perturbations that escalate instability. Instability

intensifies, portrayed through negative allusions peppering the narration. Interactions among

humans and between social and environmental processes continually shift, continually

worsen. In *Oryx and Crake*, real world allusions are portrayed with unrelenting negative

valencing; the damaging impacts wrought by these perturbations become insupportable,

incontestable. As in complexity models, the fictional world inches always further-from-

equilibrium, deeper into crisis and closer to the threshold of chaos, the fictional world depicted as shadowed by some impending, unavoidable tipping point.

Allusions to complexity theory shape the course of the pandemic in *Oryx and Crake*. In terms of complex dynamics, extreme instability near a critical threshold, sometimes poetically called the "edge of chaos" (De Landa 2002; Kauffman 1993; Langton 1990; Lewin 1999), results in conditions poised to react to even the smallest perturbation and so to transition to an entirely new state (Bak 1996; Clayton and Davies 2006). Alluding to this critical tipping point, the novel's mad scientist, Crake, acts as a statistically probable small change in circumstances, a globally infinitesimal but nonetheless overpowering perturbation that plunges the near-chaos conditions of the human world into a total transition. Extending the flourishing fictional commercial industry of creating new diseases to generate subsequent pharmaceutical profit (Atwood 2003, 211), Crake crafts and releases a new and extremely infectious pathogen. In signs and symptoms the fictional disease alludes to the Ebola virus, a "rogue hemorrhagic" rapid in development "from onset to final moment", highly contagious and lethal (325). Crake encysts the fictional disease in an aphrodisiac pill that parodically perturbs both literary and interdisciplinary allusions. Crake's BlyssPluss Pill alludes to Aldous Huxley's "soma" tablets in *Brave New World* and is distributed in a global marketing campaign that, again, parodies the daily distribution of soma in *Brave New World* (Huxley 2013). In *Oryx and Crake*, Crake's pill proves a most irresistible tiny perturbation; as Crake wisecracks, "The BlyssPluss Pill would also act as a sure-fire one-time-does-it-all birth-control pill, for male and female alike, thus automatically lowering the population level" (Atwood 2003, 294). The population is lowered to zero by the fifth capability, known only to Crake, the virulent and fatal pathogen in the pill. The pathogens are released on time-delay to maximise synchronous worldwide eruption once total market penetration of the pill is

achieved (346). Complexity theory's critical threshold at which an irreversible transition occurs is at this moment allusively and definitively broached in the fictional world.

Allusions dispersing over switches in modes also co-construct the catastrophic transition. In complexity theories, transitions at critical threshold may start with separate interactions, spreading to neighbouring processes which in turn affect further processes, thereby impacting, often with escalating rapidity and intensity, all processes involved (Thom 1975; Prigogine and Stengers 1984; Bak 1996). In *Oryx and Crake*, allusions to this process are delivered in the form of real world allusions to local events, disease outbreaks, that propagate first through local populations, moving further afield with desperate infected refugees or fleeing medical staff, nearby hotspots of infection merging on ever larger scales. Transmission leads within weeks to change at the macroscopic level, in this case species extermination, in a classical catastrophic transition. The fictional pandemic is so rapid and extensive that no response is possible to avert catastrophe. Dispersed over literary and complexity allusions, the pandemic is, in Atwood's words an "old plot… poisoning the wells" (Readers Read 2003, 2), an irreversible narrative transition reimagined through chaos and complexity theories, making way for a new order.

In mathematics and astrophysics, the moment of divergence at a critical threshold to a new set of conditions is known as a singularity: "a region in which space and time have become so locally distorted that the present laws of physics are no longer applicable" (OED Online). For the narrator Snowman, the "duration" of the pandemic is translated into time distorted: "a blank face is what it [his watch] shows him: zero hour. It causes a jolt of terror to run through him, this absence of official time" (Atwood 2003, 3). Zero hour; the moment of a singularity, untrackable, chaos in the traditional sense. In *Oryx and Crake*, zero hour also alludes philosophically, literarily and biblically to both chaos and purgatory. The novel depicts the absence of order and only the gaping abyss, *xáos*, of disorder as anti-order,

trauma, incomprehension, fury, fear, disbelief, hallucinations and hysterical laughter. In the safety of the Paradice dome, Jimmy sits out the disaster in shock. Allusions disperse through scientific, mathematical, philosophical, literary and biblical modes to perturb each other and co-create the critical threshold leading from fictional pre-apocalypse to post-apocalypse world.

In complexity theories, transition leads to new conditions accommodating different processes, a new dynamic environment (Bak 1996; Clayton and Davies 2006). The new conditions in the aftermath of the catastrophe are constructed through interactions dispersed across complexity and literary allusions. The new fictional world is Snowman's world. It is no longer Jimmy's world. Allusions dispersing interactively through complexity and biblical modes depict Jimmy metamorphosing into Snowman and issuing forth from his airlocked cocoon of naïveté, rising from the dead as a latter day Lazarus into a harsh world of realisation, self-recrimination and regret. A monumentally underqualified Moses leading the chosen people into the perilous wastes of the promised land, "in the dawn light he punched in the door code for the last time and opened up the bubble, and led the Crakers out of Paradice" (Atwood 2003, 351). This is the narrative present of the novel, not long after the pandemic has raged across the world, emptying it of *Homo sapiens*, claiming lebensraum for the new model, the Crakers, designed free from original sin. The disease has been species specific. Snowman is not just the only vaccinated human; he is the only visible living human (344). As in complexity theories, the aftermath reconfigures processes and possibilities.

Complex change is accomplished by new processes that interact and self-organise (Bak 1996) differently in the changed conditions. Allusions to climate change and complex self-organisation interact and co-construct the fictional post-apocalyptic world. Changing weather patterns dictate a new ecology. In the altered, hotter, climate, the crumbling built environment is dissolving into new landforms, the "ersatz reefs" (Atwood 2003, 3) and avian

nesting towers just off the submerged coastline: "it won't be long before all visible traces of human habitation will be gone" (222). The now free and feral genetically spliced creatures are sorting out territorial arrangements and behaviours. The pigoons, with their accelerated growth and human neocortex genes are evolving in unexpected ways and at a frightening pace; through newly learned teamwork they nearly outwit Snowman (268). The world is still awash with hot bioforms, pathogens busily mutating. The Crakers, unperturbed, go quietly about the business of living in this new landscape, to which they have been so superbly genetically fitted by Crake. Through a play of complexity allusions, self-organising nonhuman processes replace human activities and arrangements.

As is characteristic of complexity, a state of equilibrium has not been reached (Hayles 1990, 38; Schmidt 2011, 225). The fictional world of *Oryx and Crake* is not a world in which balance is suddenly restored. Despite Crake's plans this is not the final solution, the glorious transubstantiation of the world into a permanent Garden of Eden free of human evil (Atwood 2003, 293-295). There is no indication of whether things had actually gone according to Crake's plan, that his own death, for example, was planned; or that leaving Snowman solely responsible for the Crakers was anticipated. In an allusion to the complexity and dynamic self-organisation of processes: "the whole world is now one vast uncontrolled experiment—the way it always was, Crake would have said—and the doctrine of unintended consequences is in full spate" (228). Despite Crake's best efforts, there are unexpected outcomes, mistakes, random events, accidents, and certain possibilities do recur; Snowman as a biblical snake in the garden, whispering lies and tall tales, for example. The Crakers' insatiable desire for stories feeds into Snowman's own for storytelling and over the few months he is with them he builds up an *ad hoc* creation myth: "at first he'd improvised, but now they're demanding dogma; he would deviate from orthodoxy at his peril" (104). Allusions to creation mythology slide into allusions to the puritanical. Through interacting allusions dispersed over literary,

real world and interdisciplinary modes, processes in the post-apocalypse world diverge and self-organise, conforming with complexity theory models.

Allusions to complexity theory continue to diffuse through the narration. The new set of fictional conditions encounters another critical tipping point. At the end of the novel, other human survivors, shockingly, appear (273). The certainty of Snowman's unique status as the only human is abruptly, radically shattered and the narrative based on this assumption must now change dramatically. Possibilities jostle and narrative disequilibrium escalates again. Chaos and instability in this case are allusively dramatised in the form of proliferating problems for Snowman (366). Things are suddenly out of kilter again. Unanticipated perturbations and unpredictable outcomes ensure that the situation is highly unstable, close again to a moment of transition. Snowman is uncertain; as in the second epigraph to the novel, there are no precedents, no guides. Something will happen whether he acts or not and so the book ends on a cliffhanger, another critical threshold reached and another radical transition impending (374). Interpretation and narrative remain unresolved: "Zero hour, Snowman thinks. Time to go" (374). The final allusion ensures that the narrative remains poised to change again.

Alluding dispersed across catastrophe, chaos and complexity concepts ensures that new possibilities are poised to play into the future, whatever its details. The fictional world of *Oryx and Crake* dramatises catastrophic change by alluding to catastrophe, chaos and complexity theories. While literary and real world allusions provide the details, allusions to complexity construct the narrative arc of the pandemic. The narrative begins in dire crisis, depicted as the asymmetric disposal of power and wealth under global capitalism; subject to competition and depletion of basic resources and to political resistance, perturbations of increasing intensity which build to a critical threshold, a point at which one final disturbance, Crake's work, overrides the possibility of adjustment and an irreversible transition occurs,

generating a new world. The singularity, the duration of the pandemic, is too overwhelming to comprehend or control, yet from this apparent chaos processes spontaneously begin to interact and reorganise into new arrangements. A new fictional world, itself far from equilibrium, is immediately subject to imbalances and perturbations, altering conditions again and leading to further transitions. The narrative moves from unstable conditions to new unstable conditions. Whatever path the narrative may take next from these new initial conditions, it will be subject to further perturbations. While precluding possibilities based on the old conditions, the apocalypse chronicled in *Oryx and Crake*, is not the "end of all possibilities" (Northover 2016, 81). Dispersal of allusions co-constructs the extreme change in the novel's fictional world, a world that, with or without humans, has an unpredictable future.

Conclusion

Allusions to literary, real world and interdisciplinary referents are densely but differentially dispersed through *Oryx and Crake, The Curious Incident of the Dog in the Night-time* and *The.PowerBook.* This chapter contributes to literary debates on allusions by reinforcing arguments that allusions do not exist in isolation, nor are they lifted unchanged from one context to another, nor does a novel point passively to a referent somewhere else, nor is impact exclusively directed from extratextual source to the novel being read. A process dynamics perspective also extends work in new directions. The term allusion is treated as an abbreviation for dynamic interactions among dispersed literary, sociocultural and cognitive processes. During reading, allusions are actively created through morpharchic interactions among such processes. Dispersed processes are necessary to the generation of fleeting or extensive allusions, to the splicing of allusions and to allusions alluding to each other. Allusive interactions may convert real world referents into fictional creations, co-construct a narrative point of view, help conduct a debate about theoretical models or shape a narrative

arc. Allusive instability, the tendency of allusions to shift among referents and interpretations, is intensified by microcognitive and macrocognitive processing. During reading, allusions recruit referents that act as perturbations in dynamic encounters with cognitive processes. Referents transform and disperse as new fictional creations disperse through a reader's memory and sociocultural cognition.

In the process dynamics approach I take, allusions are far more susceptible to perturbations and changes than exclusive stances on author, text or reader as locus of meaning allow. *Oryx and Crake, The Curious Incident of the Dog in the Night-time* and *The.PowerBook* all put into play multiple dispersed literary, real world and interdisciplinary allusions that flood each of the three novels with perturbations in morpharchic plays of impact and change. A process dynamics perspective reframes both allusions and their referents as dispersed across processes and interactions. It focusses on the perturbations and changes triggered when allusions interact with each other and with other literary and cognitive processes during reading. Dispersal is necessary to both the quantitative distribution and qualitative metamorphosis of allusions. As dynamic processes, allusions rely on dispersal.

Chapter 5: Creativity

A narrative moment in *The.PowerBook,* "try to tell the story differently—in a different style, with different weights" (53), is an explicit metatextual comment on the processes involved in creating a story. Cognitive processes, *try* and *tell*, literary processes of *style* and *weights* and sociocultural processes relating to *story* interact and perturb each other. As the quote insists, effort is required to *try* to deploy literary processes *differently*, to create something new. Creativity is portrayed in the quote as a perceptible difference in the literary processes that compose a particular text, their *style* and *weights*, their different performances of language and different distributions of rhetorical significance and valence. *Tell* and *differently* interact with *style* and *weights* to foreground the cognitive and literary dynamics of new stories in interaction with older stories. The narrative moment presents a view of creativity as processual, interactive and changeable.

The previous chapters of this thesis have built the argument that changes are generated through morpharchically changing interactions among dispersed literary and cognitive processes. In this chapter, I address the creativity of these dynamic interactions. Brought into interaction by reading, the literary and cognitive processes in an encounter reconfigure to create new interactions. Taking interactions as the object of analysis allows an alternative view of creativity as processual, interactive and mutable rather than as a property of a product or person. In the analysis that follows, I focus on two interacting modes of creativity. One relates to the multiple fictional creations presented in each of the novels; I argue that fictional creations are processual, interactive and mutable. The fictional creations that I analyse include fictional worlds, fictional events, fictional narration and fictional characters. I treat these fictional creations as interacting processes that are subject to perturbations and change. As interactions among these processes reconfigure and so create new interactions, the

fictional creations change. The second mode of creativity I analyse focusses on reading. Readers interactively invent new instances of the fictional creations they read about. While similar claims about the creativity of reading appear in the scholarly literature, for example in Suzanne Keen's work, "the way we cocreate fictional characters in reading also depends on inner qualities of temperament" (2011, 296), my analysis offers a new processual perspective on reader co-creation of the fiction they read. The cognitive processes involved in reading interact with literary processes and create new interactions. My claim builds on a process philosophy understanding that "we are not simply passive observers or consumers of our reality, but active agents in the creation of the reality in which we live and with which we interact" (van Geert and de Ruiter 2022, 14). Reading about fictional creations is part of the reality that readers interactively construct. From my process dynamics perspective, a fictional creation is not passively received but is co-created idiosyncratically through cognitive interactions that are specific to each reading encounter. Reading novels is creative in its own right and that creativity is, I argue, dynamic and changeable.

Creativity research is moving toward more dynamic and processual approaches as an alternative to stances that "privilege static creative achievement and fixed creative traits" (Beghetto and Corazza 2019b, 2). The limitations of such substance views have been flagged in the scholarly literature: "a focus on outcomes alone only fuels implicit assumptions about the linearity of creativity (i.e., processes moving forward toward resolution), and its finality (i.e., once the process has been completed, the outcome is rendered and fixed)" (Glăveanu and Beghetto, 76). Mark Runco agrees that "products tell us little about the underlying process, and thus lack explanatory power; and that to understand how people create, we must look to processes" (Runco 2019, 187). I add that viewing creativity as a property of a completed text does not account for interactions among the particular dynamics and specificities of the fictional creations in a novel, nor for the roles of cognitive processes in

generating new instances of the fictional creations during reading, nor for changes in fictional creations as reading continues. In contrast to a static vision of a creative product, or inherent property process dynamics has the capacity to identify and analyse the processual, interactive and changeable nature of fictional creations. My approach here aligns with emerging work by scholars on the dynamic nature of creativity. I contribute to this line of inquiry with an original process dynamics reading of multiple fictional creations in each of *The.PowerBook, The Curious Incident of the Dog in the Night-time* and *Oryx and Crake* and by asserting the pivotal role of reader creativity during reading.

The analyses of *The.PowerBook, The Curious Incident of the Dog in the Night-time* and *Oryx and Crake* that follow give a process dynamics account of this creative dynamism. My analysis of *The Curious Incident of the Dog in the Night-time* focusses on metatextual commentary and the play of genres, nonfiction, data and multimodal processes that interactively generate fictional creations in the novel. My analysis of *Oryx and Crake* concerns the interactive co-creation of black novelties and neologisms and of dramatic conflict between linguistic flamboyance and impending loss of language. My analysis of *The.PowerBook* focusses on the mutability of the novel's fictional worlds and characters and on propositions in *The.PowerBook* concerning literary creativity.

Fictional creations

My argument that fictional creations in novels are processual, interactive and mutable extends similar approaches in recent creativity research. These studies, like mine, view creativity as complex (Beghetto and Karwowski 2019, 20; Botella and Lubart 2019, 261; Csikszentmihalyi 2015, 54; Daniel 2021, 6), dynamic (Beghetto and Corazza 2019b, 1; Corazza 2016, 1; Mullen 2019, 155; Walia 2019, 237) and interactive (Botella and Lubart 2019, 263; Corazza 2016, 20; Glăveanu and Beghetto 2021, 76). Nonetheless, in a fresh

approach to the complexity and dynamism of creativity, I take multiple fictional creations in a novel as the object of analysis. I start with the premise that creating in the sense of making or doing results in something new in the world (OED Online). In an encounter involving dynamic interactions, a specific human or nonhuman, a child or a biochemical reaction perhaps, may make or do something, interactively creating a new instance even though there may be prior instances. This involves a second premise: that in open environments, each new instance must be created in its own right and occurs in new circumstances involving processes and interactions specific to that encounter. Novels are new instances of prose fiction creation even though prior instances exist, because the processes and conditions co-constituting them differ from those in which prior texts were generated. Reading novels is also a mode of making and doing that generates something new in the world, in this case imagined fictional creations. Fictional creations in novels are new instances, in this case new instances of fictional worlds, characters, events and narration. During reading, literary and cognitive processes interactively co-create new instances of fictional creations presented in novels.

From a process dynamics perspective, fictional creations are mutable. They are created in the sense that "before being written about by an author, there is no fictional object" (Thomasson 1999, 6) and these fictional creations "evoke imaginings that one would not generate by oneself" (Brosch 2018, 135). Importantly however, reading further "adds something to the text that had not been there before we have read it" (Ogden 2013, 2). As Ralph Waldo Emerson observed in 1841, the idiosyncratic processes of reading and interpreting ensure that a novel "is a thousand books to a thousand persons. Take the book into your two hands and read your eyes out, you will never find what I find." (2009, 128). Reading novels dynamically and idiosyncratically creates new encounters. In response to John Fowles's claim in *The French Lieutenant's Woman* that "the story I am telling is all

imagination. These characters I create never existed outside my own mind" (2004, 95), I suggest that fictional stories and characters are created and transformed time and again in encounters involving readers' minds. In a process dynamics view, a fictional creation is not a closed and finished creative product of authorial imagination; during reading, a fictional creation is an open and mutable encounter among processes subject to literary and cognitive perturbations and changes.

Creativity in cognition

In recent neuroscientific research, creativity has been characterised as complex (Benedek and Fink 2019, 116; Boden 2013, 14; Kenett, Betzel, and Beaty 2020, 1; Lu et al. 2022, 29), dynamic (Beaty et al. 2016, 87; Kenett, Betzel, and Beaty 2020, 7; Razumnikva 2022, 124) and interactive (Beaty et al. 2016, 87; Kenett, Betzel, and Beaty 2020, 1). Whether in the scientific literature or in other disciplines, these views affirming creative complexity, dynamism and change are particularly relevant to this thesis. Ronald Beghetto and Giovanni Corazzo's edited collection, for example, opens with "creativity is a dynamic phenomenon. Indeed, change is central to creativity" (2019a, 1), claims with which I concur. For Vlad Glăveanu and Beghetto, a creative experience is marked by "open-endedness, nonlinearity,[and] pluri-perspectives" (Glăveanu and Beghetto 2021, 77), again agreeing with the emphasis on interaction and change in my process dynamics approach. Novels undergo unpredictable perturbations and changes in creativity during drafting as possibilities are trialled and revised in the attempt to *tell the story differently*. Once submitted, editing (Eggerts 2019), publication (Johns 1998) and reception (Mack 2010) processes subject a manuscript to further perturbations and changes. During reading, the focus of attention in this thesis, novels again undergo creative changes as reader-specific cognitive processes interact with the literary processes composing the text. Runco proposes that reading is a process in which "people create by constructing—or 'inventing,' or 'creating'—meaning" (Runco 2019,

185). In my approach, the interactions involved in reading and interpretation create new instances of the fictional creations in novels.

Cascades of cognitive processes alter fictional creations during reading. Imagining fictional creations involves the complex but everyday cognitive capacity to think about things that are absent (Zeman, MacKisack, and Onians 2018, 1). As Renate Brosch observes of this absence, during reading there is a "discrepancy between experiential richness and paucity of visual content" (2018, 135). While "all we actually see is black marks on a page or screen" (135), these marks trigger dynamic and intense cognitive processing in readers that ensures "we can experience a wealth and complexity of images when immersed in a fictional narrative" (135). In a multimodal text like *The Curious Incident of the Dog in the Night-time,* not only black marks indicating words but also those marks constructing graphics can be converted into meaning and play into the "experiential richness" of reading. In his vocabulary choice "continual calibration", Peter Schnek hints at the morpharchic transfers of interpretive creativity that I address in some detail: "creativity in each individual case is not determined (or determinable) by the most prominent element or aspect within the process as a whole, but only by the continual calibration of all different elements over time" (2019, 243). My summarising label "creative cognition" refers to dense plays of cognitive processes dispersed across modes, scales and times. Perturbed interactions constantly reconfigure in the co-creation of fiction during reading.

Despite the possibility that "all kinds of interesting questions arise once the creativity of the audience is recognized" (Runco 2019, 186), creativity in reading is not widely examined in comparison to research into reader response in terms of, for example, immersion (Barnes 2018; Gao 2021), empathy (Fernandez-Quintanilla 2020; Keen 2007) or emotion (Hartung et al. 2021; Hogan, Irish, and Hogan 2022). I address the creativity of reception, treating reading as creative. I contend that the creative cognition constituting reading is not a discrete

or unitary form or type of cognition; instead, many processes, including many of those discussed in previous thesis chapters, are necessarily involved in creativity during reading. At any time and repeatedly, reading may trigger identification of old or new (Derner et al. 2020, 8) in fictional creations and selective recall (Zhang et al. 2021, 1) of prior instances from discursive knowledge and experience in long term semantic, episodic and procedural memories (Chai, Hamid, and Abdullah 2018, 2). Working memory of fictional creations undergoes multiple microcognitive reconfigurations over time (Song et al. 2021, 8972). The ways that readers might construct a fictional creation such as a character "may change from moment to moment" (Wojciehowski and Gallese 2022, 64). Microcognitive perturbations from processes related to ambiguity, semantic alternatives, and subvocal rehearsal contribute to inventing fictional creations as part of reading, as do transfers of attention and dominance, dealing with conflicting information and processing the unexpected or incongruous. During reading, interpreting characters' or narrators' points of view is dynamic and interactive (Bortolussi, Dixon, and Linden 2018, 178). Readers construct and reconfigure visual images, non-linguistic "auditory imagery" (Alexander and Nygaard 2008, 447) and other multisensory responses (Spence 2020). The reader reads meaning into the literary processes that compose a fictional creation and reads meaning into the new instances of fictional creations generated during the encounter. Fictional creations are abstract and co-creating them during reading is conducted imaginatively via fast and transitory interactions among constantly changing literary and cognitive processes. The seething interactions among fictional creations and their cognitive processing are creative.

The Curious Incident of the Dog in the Night-time

Interactions among the multiple fictional creations in *The Curious Incident of the Dog in the Night-time* dramatise plays of convention and unorthodoxy. As a fictional creation, narration in *The Curious Incident of the Dog in the Night-time* offers extended metatextual

commentary on text, narrative, or fiction: "I don't like proper novels because they are lies about things which didn't happen" (Haddon 2003, 25) or on praxis: "this is what is called a digression" (33). In a metatextual move reminiscent of one that Andrew Green argues is typical of British detective fiction published between the two world wars, the more recent *The Curious Incident of the Dog in the Night-time* also works to "re-evaluate [its] own form" (2021, 42). Green posits a metatextual "enacted criticism—creative acts that are fundamentally critical responses to genre" (41). Green's *enacted criticism* through *creative acts* closely resembles what I identify as metatextual dramatisations. Metatextual statements and dramatisations are frequent in *The Curious Incident of the Dog in the Night-time,* interacting with other literary processes to create the fictional narration as a creative comic clash between genre conventions and unorthodoxy. Metatextual statements by the narrator adopt positions on language, fiction, truth and empirical reality; dramatisations creatively reconfigure these positions. A statement early in *The Curious Incident of the Dog in the Night-time* , "this is a murder mystery novel" (5), positions the fictional narration in a particular discursive environment and primes reading. Readers draw on their experience of murder mysteries, their sociocultural cognition, in imaginatively co-creating this murder mystery.

As a fictional creation, the narration interrogates murder mystery conventions. *The Curious Incident of the Dog in the Night-time* is as much metafictionally concerned with its own creation as it is concerned with a story about a fictional world and characters. Through the voice of its fictional teenage narrator, the novel deploys explicit statements to weigh in theoretically on literary arguments about the mimetic function of novels: "I wanted to write about something real" (6) and on debates about the truth status of fiction, which he claims is untruthful (25). Despite these statements, parody perturbs the fictional narrator's creation of a fictional world that is no less constituted in *things which didn't happen* than the *lies* in the

proper novels he derides. Perturbing cognitive processing during reading, declarations of a direct and unproblematic link between the fictional world of the storytelling and the fictional *real* it purports to represent interact comically with the extratextually bestowed fictional status of both the fictional reality and the story about it. The grandiose nature of the narrator's declarations is perturbed by comedic contraventions in a metafictional play of positions on reality and fiction. The fictional narration dramatises such interactions through frequent comedy, absurdity and parody. Readers reading co-create and respond to the novel's unorthodoxy in idiosyncratic ways.

Metatextual reporting of strategies both highlights and parodies the literary and cognitive work of creating fiction. Throughout the novel, Christopher is portrayed reporting problems and solutions in making his new story fit the murder mystery genre (6), overtly signalling the deployment of conventions, "someone has to work out who the murderer is and then catch them" (5) and dramatising conventional generic processes through schoolboy detecting and disquisitions on detective processes that are often comical in their mistiming or naivety. A strategy enabling the creation of a murder mystery story despite the narrator being committed to banishing fiction is the time-honoured imitation of a model, in this case *The Hound of the Baskervilles*. More precisely, it is the nonfictional processes in *The Hound of the Baskervilles* that the narrator isolates at the expense of the "bits of the story I don't like" (89) such as its confusing figurative language and descriptions of faces or emotions. Detailing the features of *The Hound of the Baskervilles* that allow him to enjoy its fictional creations, that is, its clues and puzzles, its problem-solution format and its detective savant, provides the narrator with murder mystery scaffolding for his own story. *The Curious Incident of the Dog in the Night-time* deploys clues and puzzles, often in graphics, solves problems and pitches its own protagonist as a detective prodigy. However, in *The Curious Incident of the Dog in the Night-time* comedy frequently perturbs these fictional creations, especially in the portrayal of

a child detective. A search for his confiscated story manuscript is parodically elevated to

investigation status and punctuated by irrelevant detail:

> Then I detected in the utility room.

> Then I detected in the dining room.

> Then I detected in the living room where I found the missing wheel from

> my Airfix Messerschmitt Bf 109 G-6 model under the sofa. (115)

Christopher as character and as narrator is depicted as oblivious to the absurdity portrayed in

this narrative moment: "in absurd literature the narrator and the characters either take

nonsense as natural or they do not even seem to notice absurdity" (Szolláth 2018, 467). As a

fictional creation, the detective narrator morphs from prodigy to absurdity.

Where reliance on a model, *The Hound of the Baskervilles*, provides a starting point for

imitation and comic modification of a genre, the fictional creation "Siobhan" is a move

affording access to literary and editing strategies more generally. The fictional narrator's lack

of authorial expertise is outsourced. As mentor and editor of Christopher's book (34),

Siobhan performs an important narrative function ; narrative problems and strategies are

explicitly addressed in the text by prefacing metatextual comments with "Siobhan said":

"Siobhan said that the book should begin with something to grab people's attention" (5).

There is frequent metatextual commentary on the felicitous use of literary processes:

"Siobhan said I should do descriptions" (218), "and there were 31 more things in this list of

things I noticed but Siobhan said I didn't need to write them all down" (176), "Siobhan said I

didn't have to go back and change what I wrote in Chapter 13 because it is not a lie, just a

clarification" (177). Given clear instructions, Christopher follows them literally. Interacting

cognitive processes may interpret these comments as parody. Metatextual signalling regularly

punctuates the narration: a famous story is "included in this book because it illustrates what I

mean" (78), and technical devices are explicitly flagged: "this is what Siobhan says is called a rhetorical question. It has a question mark at the end, but you are not meant to answer it because the person who is asking it already knows the answer. It is difficult to spot a rhetorical question" (102). Interacting with cognitive processing of the didactic presentation, incongruous punchline, deadpan delivery and literal interpretations transform into comedy.

Metatextual commentary on genre constantly competes with comic dramatisations of genre. In creating a new instance of the murder mystery genre, *The Curious Incident of the Dog in the Night-time* quite conventionally recruits facts in the fictional world of the narrator to create murder mystery clues for his story. This is often highlighted and parodied in *The Curious Incident of the Dog in the Night-time* by the altered typography in metatextual statements: "this meant that the fork belonged to Mrs Shears. Either that or it was a *Red Herring*" (40); "This meant that Mr Shears was my **Prime Suspect**" (54). Fictional world facts that are not mysterious, *the fork belonged to Mrs Shears*, and not homicidal, *Mr Shears*, are converted into murder mystery processes. This translation foregrounds the ubiquitous conversion in the novel of objects such as a garden fork into fictional creations, in this case creating the fictional world of the fictional narrator. In a set of creative moves, these fictional creations—the fictional facts that create the fictional narrator's world—are then converted into clues in the separate fictional world, the one that the narrator is creating in his story. The narrator's story is also titled *The Curious Incident of the Dog in the Night-time*; the two fictional creations of *The Curious Incident of the Dog in the Night-time* perturb each other through these competing illocutionary moves. Extensive metatextual commentary interacts with multiple fictional creations to turn *The Curious Incident of the Dog in the Night-time* into an innovative and comic DIY handbook on how to write a murder mystery and rewrite a genre.

As a fictional creation, the narration in *The Curious Incident of the Dog in the Night-time* is also inundated with unpredictable switches away from murder mystery and across multiple other genres. While genre-switching occurs widely in prose fiction, an expected advent, novelty is generated in the creative dynamics and specifics of such switches. From the beginning of *The Curious Incident of the Dog in the Night-time*, switches among *bildungsroman,* recount, autobiography, soapie, nonfiction genres, graphics and comic segments interact with and disrupt the metatextual claim that *this is a murder mystery novel*, dramatising contradictory evidence of generic plurality and shapeshifting. The text perpetrates constant generic mayhem. In an unusual move for a murder mystery, the two major crises in the book occur midway. These crises both have to do with betrayal; the discovery that his mother is alive, not dead, and has left home to live with another man; and the discovery that his father both lied about his mother and killed the dog. These discoveries trigger an extreme and unconventional transition between the first and second halves of the novel in terms of genre. At the point of the murderer's confession midway through the novel the narration is engulfed by a thriller text (152), the grand chase, the story of Christopher's flight to London in search of safety and his missing mother. Narration of the thriller follows a classical trajectory. It begins with an orientation, Christopher coming into possession of information which puts his life in danger: "that meant he could murder me" (152). This is followed by complications and evasions during the chase: the villain "could catch me" and counterintuitively "take me home" (169). Having made it to safety in London, a return to the site of greatest peril is presented as the comic predicament of needing to go back to the murder site in order to sit a Maths exam. Although conforming to thriller conventions, the return has nothing to do with the reasons for flight or danger and represents another of the book's flouting of generic rules. Also creative in its comedy, the dénouement is aided by the not uncommon thriller device of unlikely fortuitous circumstances: Christopher's school

Principal has kept the exam questions available despite Christopher's mother cancelling on his behalf. These processual and reconfiguring interactions among unconventional mystery and thriller specifics create novel fictional narration.

Other genres also intrude on the fictional narration. The latter half of the text, for example, as well as rehearsing thriller characteristics, also utilises an older genre, changing both genres and precipitating new narrative chemistry. Christopher, named for the patron saint of travellers, ventures forth on a dangerous quest and faces formidable tests along the way. Nightmare scenes follow. While Snowman in *Oryx and Crake* is a corpse-like figure wandering through a customised hallucinatory purgatory, Christopher, at times incapacitated by fear, endures through a sequence of surreal allegorical sets, a pilgrim painfully progressing toward an intensely desired but uncertain consolation. From the sublime to the ridiculous he journeys to London, an innocent in an absurdist landscape. Carrying his sacred burden, Toby the pet rat (221), embroiled in farcical encounters with, among others, the inept policeman (198) and the grudging Samaritan (226), and attempting to make sense of British Rail landmarks, he eventually reaching the less-than-celestial City of London (210), where his less-than-blessed mother intercedes on his behalf (241) and affords him somewhat unreliable succour. Perturbing and transforming the narration, the quest as fictional creation interacts with multiplying genres and comic transformations that dramatise extensive generic misbehaviour.

Nonfiction is deployed in a book length argument that co-creates the fictional narrator: "I am going to prove that I am not stupid" (56). The narrator acts as researcher presenting proof that, contrary to received opinion, he is extremely clever. As a fictional creation, Christopher is often depicted as using expository nonfiction passages for display and to correct what he perceives to be the less rigorous level of general public knowledge; he asserts

that he is clever and not easily dismissed. He wages a systematic campaign on his own

behalf, refuting or contradicting various unscientific metaphorical ideas he encounters:

> people say that **Orion** is called Orion because Orion was a hunter and the
>
> constellation looks like a hunter … But this is really silly because it is just
>
> stars, and you could join up the dots in any way you wanted… and there
>
> aren't any lines in space… (156-157)

In this and other narrative moments, Christopher explicitly adopts a patronising stance and is

presented as undermining the authority of fictional figures such as the Reverend Peters, the

psychologist Mr Jeavons and the police, making them look foolish through contradiction and

logical argument. Arguing against the proposition that heaven exists, Christopher is again

portrayed as condescending:

> I said that there wasn't anything outside the universe and there wasn't
>
> another kind of place altogether… And if heaven was on the other side of a
>
> black hole dead people would have to be fired into space on rockets to get
>
> there, and they aren't, or people would notice. (42)

In this narrative moment, he goes on to expound a materialist version of death, offering

evidence in the form of (limited) observational evidence of bodies decomposing "like Rabbit

did when he died" (43). The Reverend Peters changes his assertion in response, but the

discussion reaches an impasse with Christopher's blunt, unequivocal insistence on the

empirical and the pastor's reluctance to engage: "and the Reverend Peters said that we should

talk about this on another day when he had more time" (43). An implication of stopping at

this point is that Reverend's claim has been demolished and he is powerless to reply, and by

extension that theological assumptions have been dealt a severe blow by scientific fact.

Christopher's adversarial rhetorical style of claim or, more commonly, counterclaim, with

logical development and supporting evidence, recurs through his narration, constructing a barrier of empirical data to protect him against dissolution into metaphorical chaos. Plays of nonfiction in such narrative moments reconfigure the interactions and the fictional creation Christopher morphs into didact.

Morpharchic privileging of data recurring through *The Curious Incident of the Dog in the Night-time* also reconfigures interactions. In an experimental move, settings are generated by exchanging conventional descriptive realism for reporting empirical data. The first half of the novel is set in "Swindon", a fictional creation that alludes to and transforms a real world location. Like all settings in the novel, fictional Swindon is composed of facts neatly separated and organised. In *The Curious Incident of the Dog in the Night-time*, Swindon is largely deprived of any sense of community, landscape or history, a neighbourhood reduced to spatial coordinates; "the opposite side of the road, two houses to the left" (1). This is typical of the way the novel privileges and organises data into dimensions, timetables or graphics. One narrative moment in the novel, for example, comically conveys the mathematical elegance of a police cell in which Christopher is temporarily held: "it was nice in the police cell. It was almost a perfect cube, 2 metres long by 2 metres wide by 2 metres high. It contained approximately 8 cubic metres of air." (17). Mathematical vocabulary interacts with the adjective *nice* to convert a police cell into an incongruous, cognitively disruptive and amusing fictional creation. *The Curious Incident of the Dog in the Night-time,* words and phrases name people, objects and places, deictically point to fictional creations, but simultaneously decontextualise these as data. Beyond naming, little if any description or explanation of social data is provided and often no connection made between the data that are noted. Interviewing a potential witness, for example, the narrator notes that "she was wearing boots which looked like army boots and there were 5 bracelets made out of silver-coloured metal on her wrist and they made a jangling noise" (48). The comment comprises six pieces

of visual and auditory data, *boots, like army boots, 5 bracelets, silver-coloured metal, on her wrist*, *jangling noise*, that are immaterial to the murder investigation and are minimal indicators of characterisation. No further commentary is offered. While readers may interact cognitively with these data to interpret them, the narrator is presented as noticing but not commenting on or interpreting social data and such data remain isolated and unanalysed. In the novel, the presentation of data without interpretations inhibits access to social context, strips away affect and estranges these fictional creations of places and characters. During reading, converting visual data into visualisations of these fictional creations may be relatively straightforward for readers well versed in this skill but allocating interpretive significance to disconnected data may be more problematic. During reading, fictional creations may be visualised as incomplete, contradictory or ambiguous.

People, objects and places are regularly presented in discrete and modular narrative moments. They briefly appear as if from nowhere, often with no apparent relevance to the unfolding murder mystery narrative other than representing the narrator's mind style or for comic or absurd effect, depending on interactions with reader cognition. These fictional creations then disappear as reading proceeds, morpharchically deposed from transitory dominance by switches to other, typically unconnected, literary processes and concerns. Chapter breaks are a clear example of these disjunctions, dismissing the current focus of narration and cognition and replacing it with an abrupt diversion to unrelated narration. This prevents the narrative flowing uninterruptedly by inserting major, chapter length *digressions* and associated cognitive shifts. In effect, the novel is composed of detours and detours from detours, of which only some concern the story the narrator claims to be writing. As fictional creation, the narration in *The Curious Incident of the Dog in the Night-time* constantly diverges sharply from itself and acts as an experiment in making modular, digitally presented data bites perform as narration. It reworks a "cut up method" like that of William Burroughs

(Hayles 1999, 213; Larocca 2015, 36) by introducing apparently random pieces of data, such as *the missing wheel from my Airfix Messerschmitt Bf 109 G-6 model*, into encounter and triggering interactions among them. The play of data bites and cut ups interacting with shifting cognitive processes during reading generates dynamic and mutable fictional world-building.

From the narrator's perspective, the world is nothing but bits of data, only some of which are comprehensible. Language may fail to mean, a failure clearly depicted during the cognitively overwhelming trip to London. In one instance, the presentation of the fictional environment as an uncontrollable swirl of alien data is portrayed through two blocks of text on facing pages (208-209). The first block is a random amalgam of cut ups consisting of brand names, logos, slogans and headlines and reminiscent of messages assembled from different magazines or newspapers that feature in some murder mysteries. The second image is the same block of text in which the script is almost entirely overwritten and now appears nonsensical, making the text incomprehensible not only to the narrator but also to readers (Figure 1).

And the signs said

But after a few seconds they looked like this

Figure 1a

Figure 1b

Figure 1: Signage at London station (Haddon 2003, 208-209)

Utilising graphics in this creation of a fictional psychological moment, the alphabet is prevented from building sentences, and linguistic referentiality and representation are temporarily banished. Text in the first block (1a), introduced with "and the signs said" (208), is reconfigured, still legible but with words turned into calligraphy or symbols that careen randomly into each other in a single sequence that spills unbroken from line to line. Any rearrangement of the signs and other texts would create the same effect of semantic alienation, the outsider awareness of an inaccessible language. The second block (1b) is introduced with "but after a few seconds they looked like this" (209). This time the text is transformed into cryptic graphic design, no longer words, through the use of fonts that explicitly "obfuscate the semantic content of the visible signage, and this affordance helps simulate the dizzying effect the London station has on Christopher" (Ghosal 2019, 287).

Converting words into nonsense also metalinguistically highlights the arbitrary and abstract nature of letters and words, which "are totally abstract icons. That is, they bear no resemblance at all to the real" (McCloud 1993, 28). As James Carter notes: "letters are themselves just a series of lines or squiggles laced with specific but abstract linguistic meaning. Letters, and therefore words, are actually the most abstract pictographic forms we have to interpret" (2007, 17). Letters here induce interpretive chaos for the narrator. Fictional world making is depicted in the two images as a failure of the verbal and its displacement by a chaotic visual environment that triggers terror in the narrator and incapacitates him. While readers need not be frightened, cognitive effort may shift to processing confusing, problematic or uncomfortable perturbations triggered by the graphics, impacting on imaginative creation of this narrative event.

In a multimodal novel (Gibbons 2012; Hallett 2009) that is "to be looked at as much as [it is] to be read" (Maziarczyk 2011, 169), the foregrounding of visual modes in *The Curious Incident of the Dog in the Night-time* is conspicuous and helps shape the fictional creations in the novel. Typed text arranged in paragraphs is visually familiar to readers accustomed to word-only texts but graphics in prose require ways of interacting cognitively that make sense of the "*interplay* between word and image" (Sadokierski 2010, 8). The proliferation of typographically conspicuous signals in capitalised, bold or italic print parodically parades "fragments of metatextual presentation" (Dima 2011, 151): a murderer still At Large (67), the necessity for *Taking Risks* (72) and *Trying a Different Tack* (49), the danger of *Relaxing Your Guard* (101), or of a *Leap to the Wrong Conclusion* (124), the excitement of the *Double Bluff* (116), the joy of "a stroke of inspiration" arising from a **Chain of Reasoning** (53), the comfort of having *Formulated a Plan* (164). The exuberant typography drags hackneyed generic phrases into interaction, gleefully perturbs them with hyperbole and refreshes them, turning the signals into comic fictional creations. While the narrator may be deadly earnest in

218

his deployment of such labels, *The Curious Incident of the Dog in the Night-time* lampoons them. Metatextually, typography operates as another comic fictional creation. The multiplying fictional creations of metatext, data, nonfiction and typography co-create a fictional world of increasing misrule.

The Curious Incident of the Dog in the Night-time unleashes complex play among words, independent graphics, such as those prefaced with "like this" but not further described verbally (176), composite wordimages, such as the description of decision making with accompanying explanatory decision tree graphic (163), ekphrasis, the verbal description of a visual image (218) and dissonant word/graphics, as in Figure 1 above. The novel has been characterised as imagetext, a multimodal hybrid in which images and text are combined in various ways (Carter 2007; Ghosal 2019; Karakoç and Karakoç 2014). Theories of imagetext posit that "this necessitates paying attention not only to images or to images and words separately, but to words and images in a relationship. The layout, position and interaction with the composition and extratextual implications need to be perceived" (Karakoç and Karakoç, 71). Creative interactions with imagetext involve complex "coactivation" among verbal and visual cognitive processes (Zhu et al. 2017, 2096). This coactivation is further perturbed by "a diverse range of cognitive processes, such as selective retrieval of ideas from memory, integrating information to solve complex problems, inhibition of inappropriate information, working memory, and task-set switching, all of which are essential for creative information processing" (2096). Generating fictional creations during reading involves complex and idiosyncratic creative processing of interaction among graphics and text.

The presentation of the book is visually distinctive; its visual creativity may trigger perceptions of novelty. Visually, the layout of *The Curious Incident of the Dog in the Night-time* is sparse and uncluttered, with substantial allocations of white space. The conventional rectangles of text bordered by white space are replaced with visual organisation that varies

considerably through the manipulation of space, typography and graphics. Only about 25% of pages are in paragraphs of standard font alone with no typographical manipulation or graphics. Many of these standard pages are less than half a page in length, frequently switching back and forth to dialogue. Chapters are short or very short and the novel is laden with emojis, logos, slogans, pencil drawings, diagrams, maps, a photo, a silhouette, graphs, charts, posters, numbers, sums of money, measurements, clock times and facsimiles of signs, handwriting and a postal stamp. Apart from a photograph (111) and several free line graphics, including a drawing of monkeys (220) and one of a cloud (86), graphics throughout *The Curious Incident of the Dog in the Night-time* are strikingly geometric and abstract. Those that are purportedly hand drawn are typically in strong unwavering lines, carefully controlled and confident. The images do not incorporate mood, colour, or spatial perspective, except in one drawing of a bus that is explicitly an exercise in linear perspective, visually emphasising geometric lines to a vanishing point (256). All graphics are greyscale. Approximately 30% of pages in the novel contain at least one instance of these graphics. Other graphic modes trigger further literary and cognitive perturbations during reading, including Greek characters, μετα and φερειν (20), or phonetics, *Aëdes aegypti* or *Stegmyia fasciata* (105), Latin, *quod erat demonstrandum* (33), and mathematical equations and symbols (201, 269). Features normally reserved for non-fiction, footnotes, bulleted or numbered lists and an appendix, increase the diversity of interactions. In total, about 75% of the pages involve some form of "manipulation of the physical properties of the printed codex" (Maziarczyk 2011, 175). A significant volume of graphical information interacts with verbal information in the creation of the fictional narration and the fictional world. Some of the graphics, such as the picture of the textile design on train seats (227), co-create the fictional world visually or experientially rather than verbally or propositionally (Figure 2).
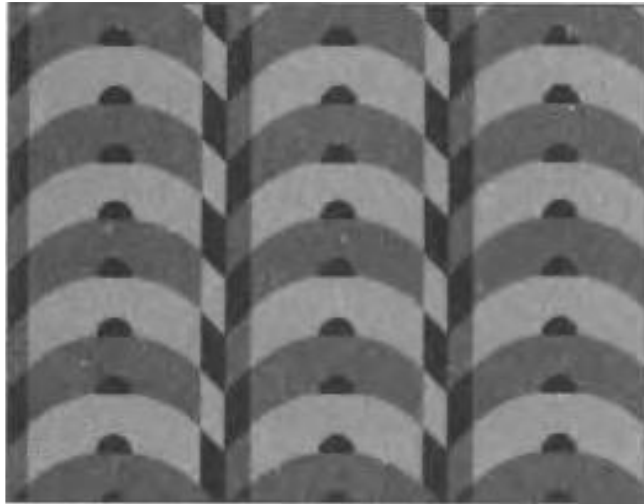
Figure 2: Textile design on train seat (Haddon 2003, 227)

The narrator is depicted as in control of some graphic processes such as the diagrams attributed to him or mathematical equations (Figure 3) and as overwhelmed by others, particularly the barrages of environmental print, advertisements and signage he encounters on the trip to London.
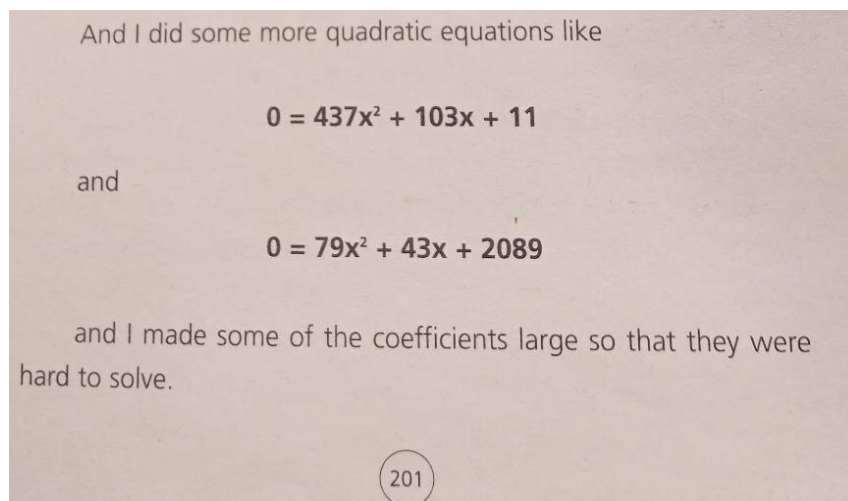
Figure 3: Mathematical equation (Haddon 2003, 201)

During reading, constant perturbations from "non-verbal and non-narrative" (Hallett 2009, 130) processes reconfigure cognitive interactions and constantly introduce new fictional creations and updated versions of prior fictional creations into the narration.

In *The Curious Incident of the Dog in the Night-time*, Christopher claims the last word in reply to a lifetime of other, unacceptable, versions of the world. His book is a construction of world and self. Although he is busily creating an imaginative construct, he uses his book to assert the superiority of logic and rational thinking over imagination and metaphor. No data bite or narrative moment is proffered for its own sake but is used by the fictional creation Christopher in an illocutionary drive to construct himself as a particular, rational, subject in a particular, empirical, world. Nonetheless, Christopher's claims, as always, compete with others presented in the narration. Data, nonfiction and multimodal processes function in the same world-generating manner as diverse genres or comedy to co-construct the fictional creations in the novel. In *The Curious Incident of the Dog in the Night-time,* strenuous assertions of realism and empiricism interactively co-create a metaphorical reality, a creative fiction. Breaking the rules, unorthodox fictional creations in *The Curious Incident of the Dog in the Night-time* generate unruly novelty.

Oryx and Crake

While creations may be neutral and teleologically disinterested, a particular creation in a specific context may have positive impacts or may be "accompanied by formidable negative consequences or side effects" (Crosby 2009, 53). Evolution as the creation of changing biological modes, for example, may be positive for some life forms and disastrous for others. Human history as the creation of changing biosociocultural modes requires human-nonhuman interaction and has similarly diverse potential consequences, including black novelty, defined as advents of "new disasters, emergencies and hazards that typically appear as unexpected events" (Frigotto 2018, 5). Black novelties are outside human control

and generate severe negative impacts, at least for humanity. From a species specific point of view, *Oryx and Crake* dramatises an extreme black novelty, the apocalyptic pandemic that, once released, triggers "a final position of the imagination… the Quiet Earth, a planet that is devoid of human life entirely" (Canavan 2014, 11). Yet the novel punctures the quiet earth trope by narrating across the apocalypse, retaining a Last Man to record unquiet events.

Like *The Curious Incident of the Dog in the Night-time*, *Oryx and Crake* is incessantly perturbed by changing fictional creations. The fictional creation of the black novelty that propels the story of *Oryx and Crake* is clearly flagged in explicit commentary:

> They were inextricable linked—the Pill and the Project. The Pill would put
>
> a stop to haphazard reproduction, the Project would replace it with a
>
> superior method. They were two stages of a single plan, you might say.
>
> (Atwood 2003, 304)

This narrative moment reports a pre-apocalypse conversation between Crake and Snowman. The past simple verbs used in the first and last sentences of this narrative moment, *were linked* and *were*, refer back to the pre-apocalypse conversation from a post-apocalypse narrative present, perturbed by the satiric *you might say. You might say* switches from the original conversation to a possible intrusion of Snowman's voice perturbing the present moment with cynicism, as he is depicted looking back from the narrative present in which he is no longer blind to Crake's plans. *Were linked* and *were* package the comment as declaration of fact; the narrative present contains evidence that the fictional *Pill* existed and the fictional *Project* was implemented. The *plan* is then described looking forward from the pre-apocalypse past of its inception to its future implementation, the imagined duration of the apocalypse, *would put a stop to* and *would replace. Would* here is the back shifted reporting mode for "will put a stop to" and "will replace" for prediction. The modal form *would* also

connotes a narrative shift from the fictional fact of the *plan* to an imaginary or hypothetical situation involving the then untested *Pill* and *Project*. The conversation in this particular narrative moment hints at Crake's pivotal role in the apocalypse and the narrative; readers may pick up on the clue or, like Jimmy, may not. As a clue, the conversation is disguised as one of a number of exchanges that the younger Jimmy misreads as recreational hypotheticals: "I listened, thought Jimmy, but I didn't hear" (342). Confirmation that the apocalypse is activated by Crake is withheld until much later in the novel (325). This narrative moment remembering the conversation is used to report a past missed opportunity to prevent the black novelty. The *plan* is a particular fictional creation but it also designates a major narrative driver of the plot. Implemented, the *plan* is a critical narrative event that splits the narrative into two, the pre-and post-apocalypse timeframes. Unlike *The Curious Incident of the Dog in the Night-time,* which is similarly split by genre around a critical narrative moment midway through the novel*, Oryx and Crake* runs both pre- and post-apocalypse stories in tandem, alternating between them and positioning the crisis, the pandemic, as a revelation near the end of the novel. The fictional creation of the black novelty morphs narratively and cognitively from tenuous to overwhelming.

As a fictional creation, the satirically named designer black novelty, the *BlyssPluss* pill, launches the novel's fictional apocalypse. At a single narrative stroke, the globally distributed *Pill* cataclysmically empties the fictional world of people and of the social, cultural, economic and political problems that, in Crake's view, people create. As a black novelty, the pandemic is disastrous only for humans; it clears the way for the *superior method*, the genetically spliced replacement species, the Crakers. Yet Crake's *superior* solution is perturbed by introducing hubris and parody: "what had been altered was nothing less than the ancient primate brain. Gone were its destructive features, the features responsible for the world's current illnesses" (304). The apocalypse in *Oryx and Crake* is satirically constructed

224

as both fearful and comic: "street preachers took to self-flagellation and ranting about the Apocalypse, though they seemed disappointed: where were the trumpets and angels, why hadn't the moon turned to blood?" (340-341). Media reporting of the pandemic is described with gallows humour and puns and designated "melodrama so overdone that he and Crake would have laughed their heads off at it" (326). For literary scholar Christopher Palmer, this "comic excess" in *Oryx and Crake* saves it from readerly apocalypse fatigue, the "habit of apocalypse" resulting from "dozens and dozens of precedents and variants" in the media and in literature through which "apocalypse threatens to become cliché" (Palmer 2014, 159) rather than novel. As Palmer could not have foreseen, readers living through the real world COVID-19 pandemic may find the apocalypse in *Oryx and Crake* more evocative or prescient than clichéd and its comedy more unsettling. Cognitive processing of the fictional pandemic in a context of real world pandemic changes its interpretation and significance. The perception of novelty relating to the fictional pandemic is unpredictably perturbed by the extratextual advent of pandemic in all readers' lived worlds.

As further black novelties, neologisms are deployed in *Oryx and Crake* as satirical fictional microcreations. Neologisms are by definition new creations; creative cognition during reading idiosyncratically generates linguistic and sociocultural associations for the neologisms and imaginatively visualises them. A major thematic perturbation in the novel is the threat of species extinctions, with an attendant effort by the novel's fictional corporate world to replace lost forms with profitable new genetically spliced creations: new plants and animals, new foods and therapeutic goods, renewed bodies and, finally, a new species of human. Metalinguistically, neologisms for these fictional creations perturb the novel in ingenious, unsettling wordplays that satirise commodity capitalism. Vladimir Jovanovic identifies nine word formation processes involved in the creation of the approximately one hundred neologisms in *Oryx and Crake*, including the use of affixation (neo-, bio-, neuro-; -

er, -ness), compounding (bobkitten, spraygun) and acronyms (JUVE). Neologisms

throughout the novel deploy sound through rhyming (AnooYoo, HottTott), alliteration

(Happicuppa, CorpSeCorps) or rhythm (Extinctathon, RejoovenEsense, MaddAddam) as well

as through punctuation, such as internal capitalisation, and spelling, particularly doubling of

letters. Most neologisms in the novel involve an interactive play of such modes with

cognitive processes relating to sight, sound and rhythm, for example the palindromic,

alliterative, assonant and percussive MaddAddam. Many of the neologisms in *Oryx and*

Crake are further perturbed by multiple and often contradictory meanings:

> NooSkins, bring[s] to mind both "new skins" in [American] pronunciation
>
> and "no skins" (and perhaps "noose") in writing. This ambiguity is
>
> strengthened by the name of one of its products: the NooSkins BeauToxique
>
> Treatment. Through the use of internal capitalization, the word
>
> BeauToxique does not just recall "beauty" and "beau," but also "Botox®"
>
> and "toxic". (Grimbeek 2016, 93)

As Gordana Lalić-Krstin observes, the neologisms in *Oryx and Crake* allude to "the discourse

tradition of naming hybrids by blends" in English language fiction (2018, 339), "satirizing

the creation of outrageous hybrid forms" (338). In *Oryx and Crake*, neologisms satirise both

the hybrids and the hubris of creating them. The pervasive genetic hybridity of the fictional

world in *Oryx and Crake* is metalinguistically created through linguistic splicing and

wordplay rather than through detailed nonfictional ecological or social commentary.

Dispersed and insistent fictional vocabulary creates the fictional facts it names in the world of

Oryx and Crake and triggers cognitive impacts during reading. While reading *Oryx and*

Crake, advents of neologisms are relentless. As for foreign language words or unfamiliar

terms or symbols, such as those impacting on the narrator in *The Curious Incident of the Dog*

in the Night-time, cognitive processing is demanding and creative responses may vary in

intensity or valence; the neologisms in *Oryx and Crake* may be interpreted as clever, amusing or annoying. Particularly during a first reading, cognitive demands for processing neologisms are higher but this may alter with familiarity or greater knowledge of the fictional world (Ingram and Hand 2020, 2190). Nonetheless, at any appearance of these fictional creations in *Oryx and Crake*, readers may linger over the neologisms for their ludic and puzzle solving characteristics. While the neologisms in *Oryx and Crake* are unceasingly innovative, continuing to perturb the narrative and cognition, their advents become expected. As fictional creations, neologisms transform from anomaly to norm in the text. The use of neologisms as the norm also occurs in fantasy novels that build and name empirically impossible, perhaps magic, fictional creations, and in science fiction, designating, for example, fictional planetary or time-travelling creations. Neologisms in *Oryx and Crake* also allude to George Orwell's satirical fictional language Newspeak in his dystopic novel *1984.* Building on a tradition of neologisms in fantasy and science fiction novels, *Oryx and Crake* nonetheless insistently introduces neologisms composed of new specifics.

The neologisms in *Oryx and Crake* signal their own inventiveness. They are an example of what Brian McHale has identified as "lexical exhibitionism" (1987, 159). As Grayson Cooke asserts, "the advertising slogans and brand names are obviously cynical, over the top; they exhibit their dreamed-up-ness almost as a badge of authenticity" (Cooke 2006, 117). For Marinette Grimbeek, neologisms in *Oryx and Crake* also carry rhetorical weight:

> while the invented brand names may be seen as symptomatic of a society
> hurtling towards apocalypse, they also serve to satirize commonly held
> notions of apocalypse. This is a marketed apocalypse, as much as an
> apocalypse brought about by relentless marketing. (2016, 97)

As fictional creations, the slogans and promotional ploys of marketing campaigns to which protagonist Jimmy contributes during his advertising career are stylistically prominent and positioned as powerful in the fictional commodity capitalist environment, playing on desire and offering false promises (248). Neologisms, slogans and marketing language are perturbed throughout the novel by derisory humour or commentary that contributes to condemnation of a compliant and unquestioning public, one seduced and cheated by these deceptive neologisms and disabled by a lack of linguistic tools, unable to comprehend a bigger picture, to extrapolate, as the novel does, to Crakean conclusions. Inventive neologisms in *Oryx and Crake* name social and economic black novelties.

An important fictional creation in *Oryx and Crake* is the portrayal of decaying language and literature. In *Oryx and Crake,* loss of language and literature is narratively contraposed to the proliferation of marketing neologisms. Language and literature are depicted as diminishing and as being at risk of catastrophic change with the impending loss of all humans. *Oryx and Crake* posits that without books or other material modes, language and literature change into some remembered form, as long as there is still someone with the language and sociocultural cognition to "think about them" (Thomasson 1999, 11). Language and literature may cease to exist with the disappearance of all dispersed material instances and memories; this is the cataclysmic end of language and literature suggested in *Oryx and Crake*. With the impending death of the last human, *Oryx and Crake* dramatises the imminent end of expectations for advents of new books, new permutations of language and literary processes, new stories and new fictional worlds. Resurrecting language through archeological examination of material remains is relegated to some unimaginably distant temporal remove, if it might occur at all (7). However, the novel also perturbs the poignancy and anticipatory grief of this approaching demise with the nascent language, stories and art of the tiny band of new posthumans. This is not without its own complications. While the Crakers are without

sociocultural cognition relevant to the pre-apocalypse world, they are building new modes of sociocultural cognition; they are depicted as at best naive and childish in their interpretations and adaptations of the stories from the disappearing culture that Snowman necessarily radically modifies. *Oryx and Crake* then parodies the Crakers' own linguistic and artistic creations, through the cynical voice of the narrator, as potential reinventions of old, damaging creations: "next they'd be inventing idols, and funerals, and grave goods, and the afterlife, and sin, and Linear B, and kings, and then slavery and war" (361). The arrogance of imposing human histories as the only imagined future for the nonhuman Crakers is highlighted by depicting the narrator's delivery as self-consciously melodramatic, using irony, exaggeration and ridicule to satirise the statement. In *Oryx and Crake*, the fictional creation of diminishing language and literature interacts with complex and extravagant performances of language used to portray this diminution.

Oryx and Crake's fictional pre- and post-apocalyptic worlds are articulated through the opposition of language and number:

> Ramona was supposed to be a tech genius but she talked like a shower-gel babe in an ad. She wasn't stupid, said Jimmy's dad, she just didn't want to put her neuron power into long sentences. There were a lot of people like that at OrganInc, and not all of them were women. It was because they were numbers people, not word people, said Jimmy's father. Jimmy already knew that he himself was not a numbers person. (Atwood 2003, 25)

Discursive, descriptive and figurative language is depicted here and elsewhere in the novel as a cognitively wasteful activity, to be simplified to the absolutely necessary and unavoidable, eschewed, not in favour of the metaphysical transparency and truth espoused by Christopher in *The Curious Incident of the Dog in the Night-time* but in favour of the measurable

productivity of genetic codes, algorithms and profit margins. As fictional creations, *numbers* in *Oryx and Crake* are deployed primarily as a tool for monitoring and ensuring profit. Rhetorically signalled by *but she talked like*, this attitude diminishes and infantilises number use, language and user. In this particular narrative moment, it also sexualises; a *shower-gel babe* is not expected to produce meaningful conversation, merely to be available. A lack of linguistic fluency among the upper echelons of Compound society, the *numbers people*, is fashionable and explicitly exclusionary; the child Jimmy *already knew that he himself was not a numbers person*. Alluding to language use in George Orwell's speculative fiction *1984*, language is depicted as being systematically changed in the service of new purposes, in *Oryx and Crake* the dominant commodity capitalism. As portrayed in *Oryx and Crake*, a narrowed language profile is further perturbed by a dangerous narrowing of vision, specialist's syndrome and ethical myopia, as evidenced by unquestioning, blinkered compliance, most perilously where Crake is concerned. Crake is a powerful *numbers* character situated in a complex fictional world that, like Christopher's in *The Curious Incident of the Dog in the Night-time,* is not obedient to the faultlessly executed logical rules of a closed system, but which instead displays intensifying social and economic chaos feeding back into cataclysm. For Crake, like Christopher, hypotheses "were followed through to their logical conclusions" (69). In Crake's case this results in his brutally clear-cut pandemic solution for irrational sociocultural messiness and his genetic splicing strategy to prevent future linguistically driven "symbolic thinking of any kind [that] would signal downfall" (361). In this latter quote, metalinguistic comment and allusion interact. The biblical language of a fall from grace perturbs and is perturbed by Crake's logical conclusion; his purifying pandemic is figuratively appropriated and reconfigured against his edicts. On exiting the Paradice laboratory, his "ecofriendly" (Grimbeek 2016, 89) replacement humans display a rapid, disobedient *downfall* into symbolic language and thinking and into artistic creativity.

Language use dramatises a chaotic fictional world. The narration repeatedly enacts confrontations between two fictional creations: loss of language and flamboyant performance of language. This conflict is portrayed through vocabulary choices that foreground social asymmetry in the fictional world. Students, for example, are a value-added product in the fictional economy, not recruited so much as sold to the highest bidder:

> Crake was at the top of the class. The bidding for him by the rival
> Educompounds at the Student Auction was brisk, and he was snatched up at
> a high price by the Watson-Crick Institute. Once a student there and your
> future was assured. It was like going to Harvard had been, back before it got
> drowned.
>
> Jimmy, on the other hand was a mid-range student, high on his word scores
> but a poor average in the numbers columns… If Jimmy had been from a
> Module school, or—better—from one of those dump bins they still called
> "the public system" he'd have shone like a diamond in a drain. But the
> Compound schools were awash in brilliant genes, none of which he'd
> inherited… Jimmy was knocked down at last to the Martha Graham
> Academy. (173-174).

The triumph of being *snatched up* by the best scientific *institution* is a mortifying contrast to being *knocked down* to a defunct humanities *academy.* Numbers people outclass humanities folk. Yet the narration is linguistically diverse; it shifts from reportage to adolescent idiom, *back before it got drowned, dump bins, brilliant genes,* perturbing cynical voiceover with hints of defiance and angst. The simplifying linguistic imperatives of the corporate world for which the students are being prepared is depicted through jargon and slogans. In contrast to this fictional diminishing, narration throughout *Oryx and Crake* is dense and complicated,

frequently shifting in voice and mood, leading to a welter of linguistic changes in any narrative moment. The narrative, paragraphs and even individual sentences veer from voice to voice, from formal to informal registers, through a range of age- or class-related idioms, from one rhythm pattern to another. Dialogue is not sustained, but punctuates narration with, most often, disjunctions, swerves or caustic punch lines. A dreadful, disorienting linguistic changeability is relentlessly enacted: "everything in his life was temporary, ungrounded. Language itself had lost its solidity; it had become thin, contingent, slippery, a viscid film on which he was sliding around like an eyeball on a plate" (260). The dramatisation of chaos in *Oryx and Crake* extends to the language choices chronicling the chaos. Creativity and novelty are not always pretty.

In creating the fictional world*,* situational humour and verbal jokes highlight the comic in the horror and vice versa. Wordplay and black humour abound, triggering intense cognitive processing and generating a range of associations and affect in response. Snowman talks to himself, gives himself advice, makes jokes at his own expense, "get a life" he tells himself after yelling obscenities at the ocean (12). As a fictional creation, Snowman's narration is often histrionic, an attempt to fill the void with noise, with flourishes of self-deprecation or irony; he is depicted as a performer, even when his only audience is himself. Yet, in terms of humour and wordplay, Snowman is also depicted as Crake's fall guy: "the other kind of snowman, the grinning dope set up as a joke and pushed down as entertainment, his pebble smile and carrot nose an invitation to mockery and abuse" (224). In contrast, Crake's humour is dry and cryptic, with deadpan delivery, often as he calmly outlines some morally detestable activity:

> "The best diseases from a business point of view," said Crake, "would be
> those that cause lingering illnesses. Ideally—that is, for maximum profit—

232

the patient should either get well or die just before all of his or her money

runs out. It's a fine calculation." (211)

The cognitive impact of such a joke, with its cynical punch line, lies in the plausibility of the premise that the pharmaceutical industry designs new diseases in order to sell antidotes and cures (211). The extended joke that is *Oryx and Crake*, however, is on Crake and the sort of scientific work he carries out. As fictional creations, the Crakers, the pinnacle of scientific innovation (302), are comic: "Oh, good, thought Jimmy. Your baby can double as a lawn mower" (306). Stephen Dunning agrees that "the Crakers themselves, despite their childlike charm, are also extraordinarily comic in some respects. It is hard to take these purring, multi-colored, blue-bottomed, blue-penised, excrement-eating, perimeter-pissing, citrous-scented creatures seriously" (2005, 92). Humour repeatedly perturbs and transforms fictional creations, regularly puncturing self-important posturing in the fictional world and intensifying the satirical rhetoric of the novel.

In the fictional world of extreme consumerism, language and arts are rhetorically positioned as faring very poorly. They are perturbed and diminished by weary acceptance of continual intellectual and artistic erosion: "theatrical events had dwindled" and "the energy had gone", seriously weakened by "attrition" (187). Linguistic and artistic attrition is intensified by its social and cultural demotion to marketing roles for technological innovations, advertising instead of analysing and generating catchphrases in lieu of arguments. These negative fictional creations generate a mood of crippling shallowness and tedium in the fictional world, with its faddish explosions of more-of-the-same, just with new adjectives; and "nothing's worse than last year's adjectives" (246) as the novel scathingly comments in Jimmy's voice. As reading continues, interactions among comedy, satire, linguistic ingenuity and cognition interactively, and paradoxically, create the fictional demise of language and arts.

233

As a mutable fictional creation, linguistic diversity is dramatised as withering or going underground, declining in the fictional world. Pre-apocalypse Jimmy, it would seem, is a comic freak, alone in rebelliously cultivating knowledge of an endangered, virtually extinct language, anachronistically "applying unusual and disparaging adjectives" (192). Jimmy consumes obsolete language and literature voraciously and turns himself into a living library: "he'd taken to spending hours in the more obscure regions of the library stacks, ferreting out arcane lore" (195). Vocabulary choices interact to romanticise his study as eccentric, obscure, arcane and archaic and allude to mythical figures in possession of lost but vital knowledge: "its champion, its defender and preserver" (195). Jimmy equates himself with mages and oracles with exclusive access to the key, thought lost, the forgotten language and rituals, which, invoked again, will save the world. Jimmy, however, is positioned as incapable of fulfilling these expectations. He indulges in literature and language for pleasure not political purpose, for its sounds and rhythms, loses himself in the play of nuance; it is his fetish. As fictional creations, the wordlists of forgotten vocabulary that he memorises are decontextualised but gradually change functions. He recites, shouts or whispers them for the joy or reassurance they afford. Most especially, in times of great stress, they calm him in the manner of a mantra (68): after watching his mother's execution, "telling over his lists of obsolete words for the comfort that was in them" (261); pining for Oryx, "berating himself, bemoaning his fate. Berating, bemoaning, useful words. Doldrums. Lovelorn. Leman. Forsaken. Queynt" (312); and blocking out the epidemic, "the old wordlists were whipping through his head: fungible, pullulate, pistic, cerements, trull… Prayer had broken out. Concatenation. Subfusc. Grutch" (327). Vocabulary loosed from meaning, he chants against fear and horror but cannot stop disaster. Jimmy's enormous vocabulary is no charm protecting him from evil. As fictional creation in *Oryx and Crake*, figurative, literary

language, no matter how glorious to its one and only devotee, is depicted as disabled. Words alone will not save the world.

Jimmy's underground literary language does, however, perturb the narrative in unexpected ways. His facility with language allows him to fabricate outrageous lies and stories, turning him into a trickster figure. His job prospects are entirely based on his laughable degree and a fake dissertation: "sometimes he'd make up books that didn't exist—*Healing Diverticulitis Through Chanting and Prayer* was one of his best creations—and nobody would spot the imposture. He'd turned that paper topic into his senior dissertation, later. He'd got an A" (196). His first job is won on the strength of his fake dissertation, and he is catapulted into an advertising career, manipulating marketing fictions through clever word tricks:

> Once in a while he'd make up a word—*tensicity, fibracionous, pheromonimal*—but he never once got caught out. His proprietors liked those kinds of words in the small print on packages because they sounded scientific and had a convincing effect… no one at AnooYoo was capable of appreciating how clever he had been. He came to understand why serial killers sent helpful clues to the police. (248-249)

Adept at linguistic gymnastics, at the height of his career Jimmy works for Crake on the BlyssPluss campaign. However, Jimmy, with his vast bank of unused literary knowledge, is overqualified and underemployed: "he fiddled around at his job: not much of a challenge there… He could churn out this crap in his sleep" (312). A sense of waste and waiting, of redundancy, is built through the vocabulary, *fiddled, not much of a challenge, churn out, crap, in his sleep*. Like language, Jimmy is dispensable, has no real role in either the corporations for which he works or the pre-catastrophe narrative world. As fictional creation,

he is, rather, a narrative perturbation-in-waiting, a potential accident lurking on the fringes of the main game, a component of Crake's plan B should things go awry. This role changes after the epidemic; Crake's end of civilization is no longer hypothetical (223) and Jimmy/Snowman is positioned as the only known repository of a now truly obsolete literary culture and language. As Snowman, the narrator's trickster aspect comes into full prominence. He has imported his body of dangerous knowledge, from Crake's point of view, into the pristine new world. He proceeds to construct myths and meanings to suit the contingencies of the new situation; or as it takes his fancy. The language the Crakers have been taught is devoid of treacherous metaphor and reminiscent of Quaker speech, as is their name: "they hadn't been taught evasion, euphemism, lily-gilding. In speech they were plain and blunt" (348). Metalinguistically, Craker language portrays an attempt to restore the direct link between word and world so desired by classical linguistics and scientists: "it was one of Crake's rules that no name could be chosen for which a physical equivalent—even stuffed, even skeletal—could not be demonstrated. No unicorns, no griffins, no manticores or basilisks" (7). Nonetheless, as for Christopher in *The Curious Incident of the Dog in the Night-time*, language in *Oryx and Crake* immediately slips into forbidden territory where "those rules no longer apply" (Atwood 2003, 9). In *Oryx and Crake*, Snowman invents fiction after fiction for the Crakers, until "they've accumulated a stock of lore, of conjecture about him" (8), and they begin to invent their own stories. Snowman as trickster and snake in the garden is the agent for change, a wily pedagogue teaching another gullible audience: "these people were like blank pages, he could write whatever he wanted on them" (349). Snowman's authority is based on "a lifetime of deviancy" (343); claiming to be spreading the word of Crake, he begins to reinvent the world for the Crakers and for the reader: "he was dancing gracefully around the truth, light-footed, light-fingered" (350). Storytelling and fabrication become mechanisms for another change; after the disaster he rewrites the world in

his own image, narrating the creation story of *Oryx and Crake*. Jimmy's story begins with "once upon a time" (15); *Oryx and Crake*, like his dissertation, is another of his *best creations*.

Contradictory loss and flamboyance compete throughout the novel. The narrator's theatrical performances are the last rallying of a dying language, his story a moment of perturbed terminal lucidity. As a fictional creation, Snowman is isolated, an anachronism in a new world, and his language is barely required. There are no humans left to talk to and the Crakers have no need for either the concepts of the previous world, or the vocabulary in which to express them. The impossibility of post-apocalyptic cross-cultural communication is depicted in a nightmare chain of deferrals:

> "What is toast?" says Snowman to himself, once they've run off. Toast is
> when you take a piece of bread—What is bread? Bread is when you take
> some flour—what is flour? We'll skip that part, it's too complicated. Bread
> is something you eat, made from a ground-up plant and shaped like a stone.
> You cook it…please, why do you cook it? Why don't you just eat the plant?
> Never mind that part— Pay attention. You cook it, and then you cut it into
> slices, and you put it into a toaster, which is a metal box which you heat up
> with electricity—What is electricity… (98)

The absurdity of the sequence metalinguistically underlines the endless semiotic deferral of language as well as its situated character and its context-driven meanings. Free indirect narration perturbs monologue with pretend voices of imagined Craker interlocutors; most of the time, Snowman has only himself to talk to and does so, often aloud. However, much of the novel is conducted subvocally, in the narrator's mind, the last expert source of and audience for language. Despite his specialist roles as priest and purveyor of language,

Snowman's own language is changing; the feared diminishing occurring. Fighting against fading memory and loss of language, "this is happening too much lately, this dissolution of meaning, the entries on his cherished wordlists drifting off into space" (39), he mourns his lost language:

> Even a castaway assumes a future reader, someone who'll come along later and find his bones and his ledger, and learn his fate. Snowman can make no such assumptions: he'll have no future reader, because the Crakers can't read. Any reader he can possibly imagine is in the past. (41)

There is only himself as interlocutor and chronicler: as fictional creations, the Crakers are not granted the language to understand much of what he says, the CB radio voices speak "some language that sounds like Russian" (273), and when he does hear a faint echo of his own language on the radio, he literally fails to make the connection (273). Nonetheless, readers of the novel also interact as source and audience of language, individual experience and expertise interacting with the narration to co-create the fictional narrator's isolation and the fictional world's loss of language.

The fictional creations in *Oryx and Crake*, including Jimmy/Snowman and his *best creations*, are created anew by readers reading through the interaction of cognitive processes. Contradictory dramatisations create a fictional world in which language is diminishing, preserved only by a dying last speaker whose memory is faltering: "when they're gone out of his head, these words, they'll be gone forever" (68); language is used as a subversive tool to rewrite history from the point of view of the survivor, Snowman; and language is bequeathed to a nascent culture and faces an uncertain future. The fictional creations of black novelties, neologisms and the changing fortunes of language and literature, interact with cognitive

processes through complex, changeable dynamics. Dynamic and provocative fictional encounters transform as readers create them.

The.PowerBook

As fictional creations, stories in *The.PowerBook* are not stable but are subject to precarity and perturbations, not least in multiplying. *The.PowerBook* proposes multiple fictional worlds and shapeshifting characters, including the mutable fictional storyteller. Maker of bespoke digital stories for clients, the storyteller frequently transforms. As scribe and shopkeeper, the storyteller is initially depicted as wielding immense narrative power. There is danger in secretly visiting, digitally or otherwise, "at the end of the afternoon" (3) with requests to be transformed, "to be somebody else" (4), and a warning is issued that things "may change under my hands" (26). Interacting with Gothic hints of occult skills, appearing from the gloom, surrounded by unsettling objects and frightening shadows, unfeatured, the storyteller is capable of rearranging anatomy and imagination, "atom and dream" (13), and has an unknowable agenda. As fictional creation, the storyteller is here writ large as omniscient deity, perhaps malicious, worldmaking at whim, beholden to none, unbound by constraints, exercising the untrammelled power of the book.

However, the fictional projection of storytelling power is repeatedly perturbed and displaced. In cybertext mode, for example, "these long lines of laptop DNA" (4) are subjected to switches, perturbations and alterations triggered by digital avatars, themselves mutable and their narrative roles changeable, as signalled in an explicit metafictional statement: "I warned you that the story might change under my hands. I forgot that the storyteller changes too. I was under your hands" (83). In ongoing morpharchic play, online storymaking is constantly perturbed and reconfigured. The online avatars of storyteller and client morph through digitally interactive fictional worlds (27), and their roles reconfigure as complicated power plays between professional writer and client are written into stories.

239

Emily Hall argues that the role of the client in the ostensibly collaborative online storymaking is limited to "various details to make the stories seem individualized and unique" but that "the novel critiques reader participation as a usurpation of authorial control" (2017, 24). I contend instead that power shifts among storyteller and client, the intratextual fictional avatars, and extratextual readers, who cognitively create the fictional storytelling in their own ways. *The.PowerBook* dramatises the morpharchic, shifting power between writer, the written and the reader, the power to create and interpret stories.

The power and freedom of the storyteller undergoes significant transformations. In an early story in the novel (25-28), narration shifts from oblique hints about the difficulties of earning a living writing fiction, keeping the customer satisfied, "that was a terrible thing to do to a flower" (27), and dealing with importunate readers, "write me a story" (26), into a study of complications arising from the intimacy of personal service, writing the customer into a story. In this case, the fictional storyteller does not escape being written into the story: "we're in it together now" (27). An erotic quality begins to permeate the relationship between fictional storyteller and client. The affair is conducted, no surprise, at "night" (4) in a virtual mode that offers the freedom, coveted by many online lovers, to escape gender and social identities, "to be somebody else" (4) and to participate in a game of ruse and stratagem. As fictional creation, the storyteller avatar has been seduced by the story and quickly forgoes all pretence of executive direction, becoming firmly entangled in narrative complications. Denied control, the storyteller creates a welter of stories designed to entice the lover, client and reader: "I keep throwing the stories overboard, like a message in a bottle, hoping you'll read them, hoping you'll respond" (83). As reading continues, an increasing number of fictional creations is brought into play, perturbing each other and the cognitive processing they entail, all transformed by the interactions initiated with the arrival during reading of each new fictional "world inventing itself" (63).

Multiplying tales, markedly diverse fictional creations, continually perturb each other. The fictional creation of a quest for treasure, for example, morphs through romance and fairytale versions, contemporary chatroom transcripts and tales of extraordinary feats, all interactively co-created by fictional digital avatars and again as readers read. *The.PowerBook* is littered with literary lovers and crusaders seeking love or the grail, enchantment, forbidden rooms that are updated to cyberspace chatrooms, orphans, wicked or dullard relatives, injustice and terrible mistakes. In an inventive gloss on the treasure quest, the Muck House story (137-146) recombines, rewrites and transforms fairytale with Dickensian characters and settings and folk story changelings: "an orphan was what they wanted. A changeling child. … I was the one who would find the buried treasure" (137-139). A creative twist then perturbs the fairy tale version of the Muck House story with an abrupt world switch to a new fictional creation, a contemporary family trip to town, rendered in religious fundamentalist terms. This move creates an incongruous and comic narrative moment:

> We went past Woolworth's—"A den of vice". Past Marks and
> Spencer—"Iniquity". Past the Funeral Parlour and the doner kebab
> shop—"They share an oven". Past the biscuit stall and its moon-faced
> owners—"Incest". (194)

Fictional worlds career absurdly into each other, updating the thieves' *den of vice* from Ali Baba, the *oven* from *Hansel and Gretel,* and *moon-faced* characters from folklore. Such world shifting within and across stories generates multiplying interactions and incessantly reconfigures the stories in *The.PowerBook*. Reader cognition extends this reconfiguring, inventing new versions of the stories as *The.PowerBook* reading continues. Lubomír Doložel asserts the generative power of this interaction between fictional creations and cognition: "the universe of possible worlds is constantly expanding and diversifying thanks to the incessant world-constructing activity of human minds and hands. Literary fiction is probably the most

241

active experimental laboratory of the world-constructing enterprise" (1998, ix). During reading, cognitive processes, human minds, interact with volatile and shifting fictional worlds in *The.PowerBook*, fleetingly actualising possibilities as new imagined realities.

Reversing conventional polarity in "the world is a mirror of the mind's abundance" (223), *The.PowerBook* asserts the primacy of imaginative world-constructing possibilities. The ostensible nonfictionality of history is queried in Giovanni da Castro's story (221-222). This story is allotted to various narrators, moving from historical document to official memoir to first person account; nonfiction is contested by fiction. A dry historical voiceover, "in 1460 Giovanni da Castro, godson of Pope Pius II, returned to Italy from the Levant" (221), cedes morpharchically to a revised, translated eyewitness account imagined by an fictionalised Pope Pius, "in his memoirs, Pius himself described what happened" (221), and again as "Giovanni takes up the story himself" (222). The story is perturbed by explicitly signalled switches in voices, interacting across spacetime, possible worlds and the worlds of reader cognition, changing with the information, style, mood and linguistic diversity each deploys. In *The.PowerBook*, history is metafictionally put in its place by fictive creations. History again metamorphoses into a new fictional creation in the story of famous mountaineer George Mallory. Mallory's story as fictional creation involves interacting historical nonfiction and Boys' Own Adventure: "if someone had told Mallory he would climb Everest but die in the attempt, still he would have climbed it" (173). The initial paragraph of the Mallory story switches from historical report, "in 1999 mountaineers on Everest found a body" (149), to the last day in the life of Mallory. In an imaginative leap, it customises a story previously told in news reports, transforming it and constructing a new story. As Mallory moves out of sight on the mountain, the narration both shifts into isolation with him, shucking off all but the lived moment, and takes on an ecstatic mood which meshes with hysterical madness, signalling a sudden extreme cognitive shift: "he started to laugh and

then he couldn't stop laughing" (151). The risk of climbing Mt Everest has been enormous and the task has required superhuman qualities and an altered frame of mind. Mallory wins his moment of rapture, but having staked and forsaken them, loses all else, his family, his mind, his life and his future. This is one of the few narrative moments in *The.PowerBook* in which first person direct address of *I* to *you* is interrupted. A more conventional third person narrative voice is used instead, observing vicariously, distanced, flowing through the various fictional creations in their separate paragraphs. The shape-shifting third person narrative voice is mobilised through adventure genre: "it was Mallory's third expedition. Always the men were beaten back" (149); quest genre: "Mallory had played the game and won. Only it didn't feel like a game, it felt like music" (151); love story: "the mountain is endlessly moving, shifting, changing itself. Mallory was moving with it, using its undetectable flow as a rhythm for his own body. He sang the mountain" (150); documentary: "the body had been missing since 1924" (149); and psychological drama: "his colleagues thought… he was mentally unstable" (149). Each of these shifts redirects cognitive processing, triggering a new onslaught of microcognitive processes; the particular perturbations among genres in this section interact with cognitive processes to co-create a new Mallory story. The story is delivered in a series of telescoping retrospective and introspective steps leading to the recent (1999) then distant (1924) past, from current to past narrative voice, from external observation to omniscient third person narration of Mallory's own thoughts and perceptions. The new story is different in style and weight from each of the contributing narrative moments and more than simple patchwork; in interaction with cognitive processes during reading, a new fictional creation emerges. Narrative moments in the text interact with reader cognition to metamorphose into new instances of narrative fiction.

As part of its ongoing consideration of literary creativity, *The.PowerBook* repeatedly signals the mutability of fictional status. In an explicit exchange about fictional creativity

early in the novel, a digital client's assumption of an ontological difference between the

fictional world of Ali and the digital chatroom is mocked:

> "That was just a story."

> "This is just a story."

> "I call this a true story."

> "How do you know?"

> "I know because I'm in it."

> "We're in it together now." (27)

The client's effort to establish an ontological hierarchy using extratextual embodied presence,

I'm in it, as a criterion for truth is perturbed by the notion that the storyteller, who is not

physically present in the client's lived world, is also virtually present in the digital chatroom,

we're in it together now. Storyteller and client each project a fictional avatar. Cognitively,

this is further perturbed, as both client and storyteller lack physical presence in readers' lived

worlds; the storyteller and client and their avatars are all fictional creations. Yet, in

cognitively processing fictional creations, real world cognition is also in part being

fictionalised precisely because during reading, cognitive processes have also *gone interactive*.

In interaction, cognition also fictionalises readers reading. In addition to readers potentially

differentially fictionalising themselves in terms of immersion in a fictional world or empathy

with fictional characters, I suggest that readers may also differentially fictionalise themselves

as readers. Readers interactively endow fictional creations in a novel with individually

imagined features such as "red hair" or "Prada" clothing or "the sun's going down" (27-28).

Analogously, readers reading may differentially and idiosyncratically endow their fictional

creation of themselves as readers of a particular novel with characteristics triggered by

interactions with the literary processes being read. Readers reading may to some degree imagine themselves reading the text, fictionalise themselves as, say, perceptive or confused, receptive or resistant, immersed or empathetic. Reading *The.PowerBook* interrogates fixed hierarchical ranking or embedding of narrative levels with creative shifting and transforming of fictional status.

In *The.PowerBook*, commentary rhetorically highlights shifting creative possibilities. A dialogue occurs in which blind commitment to a single possible world view is challenged by a child (229). In the dialogue, a child argues against a mother's angst regarding the groundlessness of reality and the mother's belief that stories other than the normative story she is obliged to live are merely a distraction from the true horror of the void. The drear weight of an oppressive, hegemonic fictional world is sourly invoked by the mother:

"And I would pay anything not to live it."

"Don't live it. Change it."

"You don't understand, do you?"

"Understand what?"

"This is real life." (229)

In the view projected through the mother's voice there is only one authorised version of the fictional reality, one sustained by prohibitive processes which disallow individual agency or narratives. Alluding to feminist, postcolonial and queer literary stances, among others, the predominance of stories maintaining hegemonic arrangements is depicted in *The.PowerBook* not as an absolute ontological fact, but a political one. Political history is as much a story as any other narrative (4), and social strictures such as proscribed relationships involve the invention of more stories, but "we cannot rely on the facts" (242). Hegemonic stories may

operate socially as regulative facts for their duration and in many cases, in negotiating these sorts of immensely powerful stories, "the damage done [is] colossal" (51). Nonetheless, other counter narratives are also continually created to *tell the story differently* and "give some substance to the floating world" (53) of alternative possibilities. It is possible to interact with and perturb or "break the narrative" (53) and to cognitively co-create new narratives. Deploying a metaphor from quantum science, "in quantum reality there are millions of possible worlds, unactualised, potential" (53), *The.PowerBook* proposes that it is possible to inject new stories into the flow of stories, impacting on the flow and creating "a place not yet existing" (53), actualising possibilities as fictive creations, as do *The.PowerBook* and its readers.

The literary processes in *The.PowerBook* explicitly explore the nature and practicalities of creating fiction, and the multiple stories in *The.PowerBook* are new instances of fictional stories, worlds and narration. However, creativity does not stop there. The fictional creations of *The.PowerBook* morph as each reader brings into play, by reading, their own situated history and creative imagination, the "world I inherit and the world I invent" (210). The creations that swirl through the *The.PowerBook* interact unpredictably with cognitive processes, triggering constant advents of novel fictional creations.

Conclusion

In positing dynamic fictional creations, this thesis chapter contributes new insights to scholarship on the novels and on creativity. The specific fictional creations addressed include metatextual commentary and the play of genres, data, nonfiction and multimodal processes in *The Curious Incident of the Dog in the Night-time;* black novelties, neologisms and the dramatisation of linguistic conflict between flamboyance and the diminution of language in *Oryx and Crake*; and *The.PowerBook's* dramatisations of the mutability of fictional worlds and characters and the novel's propositions in concerning literary creativity. Fictional

creations in *The.PowerBook, The Curious Incident of the Dog in the Night-time* and *Oryx and Crake* are processual, interactive and mutable; and during reading, interactions among literary and cognitive processes invent the fictional creations in the novels anew.

This chapter proposes a pivotal role for cognitive processes during reading in inventing the fictional creations in the novels. This view of the dynamic, subjective reading encounter as creative in its own right suggests a new line of research. In recognising that creativity is generated by a multitude of diverse processes that impact on one another, a process dynamics approach rethinks creativity as far more complex and mutable than a focus on special properties inherent in an author or text can articulate. Treating creativity during reading as a mutable encounter in which literary and cognitive processes interact, perturb and change each other enables recognition and analysis of the dynamism of fiction and its creations.

Conclusion

The dynamism of reading *The.PowerBook, The Curious Incident of the Dog in the Night-time and Oryx and Crake* invites a fitting theoretical and critical approach. My thesis responds by presenting an original processual account of dynamism and by offering process dynamics readings of *The.PowerBook, The Curious Incident of the Dog in the Night-time* and *Oryx and Crake*. Chapter 1 articulates a process dynamics approach and posits that reading *The.PowerBook, The Curious Incident of the Dog in the Night-time* and *Oryx and Crake* is processual, interactive and mutable. My findings in the case analysis chapters confirm this contention. My focus in Chapter 2 on processes allowed close inspection of microcognition interacting with language and found high densities of perturbations leading to frequent narrative and interpretive changes during reading. This intense degree of dynamism is not often recognised in literary studies and unsettles propositions of stable outcomes for reading and interpretation. The investigation of morpharchy in narration in Chapter 3 found transfers of dominance and significance in narration and fictional time that interacted with morpharchic shifts in working memory processes and experienced time. The concept of morpharchy, shifts of dominance, significance or weighting in interactions, is a novel contribution to literary studies and provides an alternative to hierarchical and typological approaches in narrative theory by privileging change and the fluid experience of reading novels. My analysis in Chapter 4 reframes both allusions and their referents as dispersed across intratextual and extratextual literary, real world and interdisciplinary processes. Allusions disperse repeatedly during reading over diverse modes and times of cognitive processes. My analyses found allusions to be susceptible to a wider range of perturbations than in some of the more familiar approaches found in literary studies that limit allusion to indirect literary references or locate meaning exclusively in author, text or reader. My approach replaces this exclusion with interaction. Analysis of creativity in Chapter 5 found

that during reading, literary and cognitive processes interactively co-create new and different instances of the fictional creations presented in novels. This indicates a crucial role for creative cognition during novel reading, as each new instance of a fictional creation is generated in its own right in new circumstances involving processes and interactions specific to that encounter. My approach allows clearer identification and analysis of dynamism and mutability in creativity than a focus on special creative properties or traits inherent in a text or author can articulate.

The thesis is the first to offer close, critical analysis of process dynamics in *Oryx and Crake, The Curious Incident of the Dog in the Night-time* and *The.PowerBook*. It extends the critical literature by providing a new perspective on the complexity and dynamism of the novels, on the literary and cognitive dynamics triggered during reading and on the narrative and interpretative mutability that occurs as they are read. While my analytical emphasis has been on processes at work during reading, new insights into thematic dimensions of the three novels have also emerged, enriching the body of scholarly commentary on each novel. In my analysis of *Oryx and Crake*, for example, I discuss chaos and complexity theory and black novelties, both new topics to the scholarly literature on the novel. My identification of pronoun ambiguity and shapeshifting narration is also new to critical discussion of *The.PowerBook*. I move beyond the frequent treatments of *The Curious Incident of the Dog in the Night-time* as a study in autism with my study of its competing computational and embodied models of cognition. These and other thematic concerns provided details through which I aimed to show dynamic processes in action.

Theoretically, dynamism is presented in this thesis as pivotal and as necessarily generative. Drawing on process philosophy and complexity theory, process dynamics articulates dynamism as encounters among dynamic processes that trigger unpredictable changes through interactions, perturbations, morpharchy, dispersal and creativity. Accounting

for change and according it status helps overcome the limitations of a literary emphasis on stability and invariant properties. While definitions, categories and typologies are valuable for devising literary concepts, they do not address the complex and dynamic interactivity during reading of the processes named by those concepts. There is a disconnect between the dynamic nature of experiencing novels and the often static knowledge constructed about texts and readers. My thesis offers a processual alternative by reconceptualising literary and cognitive constructs as dynamic and changeable processes. Conceptually, boundaries separating "literary" and "cognitive", and hierarchies fixing relationships between, for example, "fictional" and "real" are replaced with encounters of intense processual interactivity. Addressing processual dynamism broadens the scope of literary studies; my account contributes to this wider literary reach.

My analytical focus throughout is on dynamic processes. Dynamism has been recognised in other accounts, as the frequency of the word "dynamic" in literary research suggests; however, this dynamism, while flagged, has not been closely examined. My analyses test process dynamics by examining processes, morpharchy, dispersal and creativity at multiple scales and in diverse contexts. Analysis of the novels shows literary and cognitive interactions to be transformative. Patterns, unity, integration and coherence are transitory, continuously altered by being augmented, diminished or displaced. Processual interactivity involves multidirectional, nonteleological and unpredictable changes that continually reconfigure into new interactions: as the *The.PowerBook* argues, "there is always a new beginning, a different end" (4). The analytical utility of process dynamism lies in its in capacity for deciphering the endless metamorphosis displayed by processes in encounters.

Reimagining phenomena as processes opens new avenues of inquiry into the changes that are generated as "possibilities flash and collide" (Atwood 2003, 366). In proposing a process approach to dynamics and offering detailed analyses of a small set of three novels,

the thesis paves the way for further research. A powerful argument for process dynamics is its wide scope; process dynamics lends itself to a wide range of potential theoretical and critical pursuits and could be relevant in multiple fields. It could be used to provide new insights in theoretical and critical studies of fiction and of other literary genres such as poetry and drama, as well as nonfiction and multimedia texts. Further theoretical work from a process dynamics perspective could be undertaken in stylistics, narration and allusion and extended to other literary theoretical areas. Further research into reading, creativity, affect, aesthetics, imagination and interpretation might also be fruitfully approached from a process dynamics perspective. At least some of the promise of process dynamism lies in the possibility of scholarly attention turning to newly perceived or unexpected processual intersections and encounters.

The title of my thesis speaks to the volatility of the dynamism I posit; *poised* as a verb indicates a fleeting moment of stillness but this is an unstable stillness intensely charged with readiness or expectation, stillness about to do something, on a threshold, with change imminent. As action, *poised* refers to the most recent event in a history and is enmeshed in a context, in suspense, hovering in relation to some impending trigger. Whatever is next is not poised, not still; poised for flight, poised for action, poised to plunge or strike or swoop, poised to change.

References

Adolphs, Ralph, Leonard Mlodinow, and Lisa Feldman Barrett. 2019. "What is an emotion?" *Current Biology* 29: R1055-R1069. https://doi.org/10.1016/j.cub.2019.09.008.

Alderson-Day, Ben, Marco Bernini, and Charles Fernyhough. 2017. "Uncharted features and dynamics of reading: voices, characters, and crossing of experiences." *Consciousness and Cognition* 49: 98-109. https://doi.org/10.1016/j.concog.2017.01.003.

Alexander, Jessica D, and Lynne C Nygaard. 2008. "Reading voices and hearing text: talker-specific auditory imagery in reading." *Journal of Experimental Psychology: Human Perception and Performance* 34 (2): 446-459. https://doi.org/10.1037/0096-1523.34.2.446.

Alhadeff-Jones, Michel. 2013. "Complexity, methodology and method: crafting a critical process of research." *Complicity: An International Journal of Complexity and Education* 10 (1/2): 19-44. https://doi.org/10.29173/cmplct20398.

Allen, Claire. 2020. *London fiction at the millenium: beyond postmodernism*. Cham: Palgrave Macmillan.

Allen, Pamela. 1988. *Who sank the boat?* Docklands: Penguin.

Alves, Fabio, and Arnt Jakobsen, eds. 2020. *The Routledge handbook of translation and cognition*. London: Routledge.

Antonov, Plamen A, Ramakrishna Chakravarthi, and Søren K Anderson. 2020. "Too little, too late, and in the wrong place: alpha band activity does not reflect an active mechanism of selective attention." *Neuroimage* 219: 117006-117018. https://doi.org/10.1016/j.neuroimage.2020.117006.

Ariosto, Ludovico. 1983. *Orlando Furioso*. Translated by Guido Waldman. Oxford: Oxford University Press. 1532.

Armstrong, Paul B. 2013. *How literature plays with the brain: the neuroscience of reading and art*. Baltimore: The Johns Hopkins University Press.

---. 2020. *Stories and the brain: the neuroscience of narrative*. Baltimore: Johns Hopkins University Press.

Arnold, Jennifer E, and Shin-Yi C Lao. 2015. "Effects of psychological attention on pronoun comprehension." *Language, Cognition and Neuroscience* 30 (7): 832-852. https://doi.org/10.1080/23273798.2015.1017511.

Arstila, Valterri, and Dan Lloyd, eds. 2014. *Subjective time: the philosophy, psychology, and neuroscience of temporality*. Cambridge: The MIT Press.

Ashby, Jane, and Charles Clifton. 2005. "The prosodic property of lexical stress affects eye movements during silent reading." *Cognition* 96 (3): B89-100. https://doi.org/10.1016/j.cognition.2004.12.006.

Ashby, WR. 1947. "Principles of the self-organizing dynamic system." *The Journal of General Psychology* 37 (2): 125-128. https://doi.org/10.1080/00221309.1947.9918144.

Asutay, Erkin, Alexander Genevsky, Lisa Feldman Barrett, J Paul Hamilton, Paul Slovic, and Daniel Västfjäll. 2021. "Affective calculus: the construction of affect through information integration over time." *Emotion* 21 (1): 159-174. https://doi.org/10.1037/emo0000681.

Attridge, Derek. 2004. *The singularity of literature*. London: Routledge.

---. 2010. "The singular events of literature." *British Journal of Aesthetics* 50 (1): 81-84. https://doi.org/10.1093/aesthj/ayp058.

Atwood, Margaret. 2003. *Oryx and Crake*. London: Bloomsbury.

Austin, John L. 1962. *How to do things with words*. Oxford: Oxford University Press.

Auyoung, Elaine. 2018. *When fiction feels real: representation and the reading mind*. Oxford: Oxford University Press.

Bak, Per. 1996. *How nature works: the science of self-organized criticality*. New York: Springer-Verlag.

Bambini, Valentina, Paolo Canal, Donatella Resta, and Mirko Grimaldi. 2019. "Time course and neurophysiological underpinnings of metaphor in literary context." *Discourse Processes* 56 (1): 77-97. https://doi.org/10.1080/0163853X.2017.1401876.

Barad, Karen. 2007. *Meeting the universe halfway: quantum physics and the entanglement of matter and meaning*. Durham: Duke University Press.

Barnes, Jennifer L. 2018. "Imaginary engagement, real-world effects: fiction, emotion, and social cognition." *Review of General Psychology* 22 (2): 125-134. https://doi.org/http://dx.doi.org/10.1037/gpr0000124.

Barnett, Tully. 2003. "The cyborg and the garden." *Counterpoints* 3 (1): 42-49. http://ehlt.flinders.edu.au/projects/counterpoints/Proc_2003/A4.pdf.

Barrett, Lisa Feldman. 2017. "The theory of constructed emotion: an active inference account of interoception and categorization." *Social cognitive and affective neuroscience* 12 (1): 1-23. https://doi.org/10.1093/scan/nsw154.

Barrett, Lisa Feldman, and Ajay B Satpute. 2019. "Historical pitfalls and new directions in the neuroscience of emotion." *Neuroscience Letters* 603: 9-18. https://doi.org/10.1016/j.neulet.2017.07.045.

Beaty, Roger E, Mathias Benedek, Paul J Silvia, and Daniel L Schacter. 2016. "Creative cognition and brain network dynamics." *Trends in Cognitive Sciences* 20 (2): 87-95. https://doi.org/ http://dx.doi.org/10.1016/j.tics.2015.10.004.

Becker, Sara K. 2020. "Why heterarchy? a view from the Tiwanaku state's (AD 500-1100) labor force." *American Anthropologist* 122 (4): 934-939. https://doi.org/DOI: 10.1111/aman.13499.

Beckinschtein, Tristan A, Matthew H Davis, Jennifer M Rodd, and Adrian M Owen. 2011. "Why clowns taste funny: the relationship between humor and semantic ambiguity." *The Journal of Neuroscience* 31 (26): 9665-9671. https://doi.org/10.1523/JNEUROSCI.5058-10.2011.

Beghetto, Ronald A, and Giovanni E Corazza, eds. 2019a. *Dynamic perspectives on creativity: new direction for theory, research, and practice in education*. Cham: Springer.

---. 2019b. "Introduction to the volume." In *Dynamic perspectives on creativity: new directions for theory, research, and practice in education*, edited by Ronald A Beghetto and Giovanni E Corazza, 1-3. Cham: Springer.

Beghetto, Ronald A, and Maciej Karwowski. 2019. "Unfreezing creativity: a dynamic micro-longitudinal approach." In *Dynamic perspectives on creativity: new directions for theory, research, and practice in education*, edited by Ronald A beghetto and Giovanni E Corazza, 7-25. Cham: Springer.

Bell, Alice, and Jan Alber. 2012. "Ontological metalepsis and unnatural narratology." *Journal of Narrative Theory* 42 (2): 166-192. https://doi.org/10.1353/jnt.2012.0005.

Bell, Alice, Astrid Ensslin, van der Born, and Jen Smith. 2018. "Immersion in digital fiction: an empirical approach." *International journal of literary linguistics* 7 (1): 1-22. https://doi.org/10.15462/ijll.v7i1.105.

Belsey, Catherine. 2002. *Critical Practice*. 2nd ed. London: Routledge.

Ben-Yakov, Aya, Verity Smith, and Richard Henson. 2021. "The limited reach of surprise: evidence against effects of surprise on memory for preceding elements of an event." *Psychonomic Bulletin & Review* Online first: 1-12. https://doi.org/10.3758/s13423-021-01954-5.

Benedek, Mathias, Roger Beaty, Emanuel Jauk, Karl Koschutnig, Andreas Fink, Paul J Silvia, Beate Dunst, and Aljoscha C Neubauer. 2014. "Creating metaphors: The neural basis of figurative language production." *Neuroimage* 90: 99–106. https://doi.org/10.1016/j.neuroimage.2013.12.046.

Benedek, Mathias, and Andreas Fink. 2019. "Toward a neurocognitive framework of creative cognition: the role of memory, attention, and cognitive control." *Behavioral Sciences* 27: 116-122. https://doi.org/https://doi.org/10.1016/j.cobeha.2018.11.002.

Beran, Carol L. 2003. "Strangers within the gates: Margaret Atwood's *Wilderness Tips*." In *Margaret Atwood's textual assassinations: recent poetry and fiction*, edited by Sharon Rose Wilson. Columbus: The Ohio State University Press.

Bergthaller, Hannes. 2010. "Housebreaking the Human Animal: Humanism and the Problem of Sustainability in Margaret Atwood's Oryx and Crake and The Year of the Flood." *English Studies: A Journal of English Language and Literature* 91 (7): 728-743. https://search.ebscohost.com/login.aspx?direct=true&db=mzh&AN=2010582724&site=ehost-live.

Berns, Gregory S, Kristina Blaine, Michael J Prietula, and Brandon E Pye. 2013. "Short- and long-term effects of a novel on connectivity in the brain." *Brain Connectivity* 3 (6): 590-600. https://doi.org/10.1089/brain.2013.0166.

Bickhard, Mark H. 2008. "Issues in process metaphysics." *Ecological Psychology* 20: 252-256. https://doi.org/10.1080/10407410802189273.

---. 2011. "Systems and process metaphysics." In *Philosophy of Complex Systems*, edited by Cliff A Hooker, 91-104. Oxford: Elsevier.

---. 2017. "Information, representation, biology." *Biosemiotics* 10 (2): 179-193. https://doi.org/10.1007/s12304-017-9296-5.

Blazek, William. 2020. "Gatsby's defunct clock and the philosophy of time." In *Literature and modern time: technological modernity, glimpses of eternity, experiments with time*, edited by Trish Ferguson, 51-78. Cham: Palgrave Macmillan.

Block, Richard A, Simon Grondin, and Dan Zakay. 2018. "Prospective and retrospective timing processes: theories, methods, and findings." In *Timing and Time Perception: Procedures, Measures, and Applications*, edited by Argiro Vatakis, Fuat Balcı, Massimiliano Di Luca and Ángel Correa, 32-51. Leiden: Brill.

Blom, Tessel, Daniel Feuerriegel, Philippa Johnson, Stefan Bode, and Hinze Hogendoorn. 2020. "Predictions drive neural representations of visual events ahead of incoming sensory information." *Proceedings of the National Academy of Sciences of the United States of America* 117 (13): 75107515. https://doi.org/10.1073/pnas.1917777117.

Boden, Margaret A. 2013. "Creativity as a neuroscientific mystery." In *Neuroscience of creativity*, edited by Oshin Vartanian, Adam S Bristol and James C Kaufman, 3-18. Cambridge: The MIT Press.

Bortolussi, Marisa, Peter Dixon, and Christopher Linden. 2018. "Putting perspective taking in perspective." *Review of General Psychology* 22 (2): 178-187. https://doi.org/10.1037/gpr0000131.

Bosco, Mark. 2010. "The apocalyptic imagination in Oryx and Crake." In *Margaret Atwood: The Robber Bride, The Blind Assassin, Oryx and Crake*, edited by J. Brooks Bouson and Sarah Graham, 156-171. New York, NY: Continuum.

Botella, Marion, and Todd Lubart. 2019. "From dynamic processes to a dynamic creative process." In *Dynamic perspectives on ccreativity: new directions for theory, research, and practice in education*, edited by Ricahrd Beach and Giovanni E Corazza, 261-278. Cham: Springer.

Bourne, Craig, and Emily Caddick Bourne. 2016. *Time in fiction*. Oxford: Oxford University Press.

Bouson, J Brooks. 2004. "'It's game over forever': Atwood's satiric vision of a bioengineered posthuman future in Oryx and Crake." *Journal of Commonwealth Literature* 39 (3): 139-56. https://search.ebscohost.com/login.aspx?direct=true&db=mzh&AN=2004872970&site=ehost-live.

---. 2016. "A 'joke-filled romp' through end times: Radical environmentalism, deep ecology, and human extinction in Margaret Atwood's eco-apocalyptic Maddaddam Trilogy." *Journal of Commonwealth Literature* 51 (3): 341-357. https://doi.org/10.1177/0021989415573558.

Branigan, Edward. 2019. "A process philosophy framework for film theory and aesthetics." *New Review of Film and Television Studies* 17 (2): 185-210. https://doi.org/10.1080/17400309.2019.1591670.

Branzi, Francesca M, Gina F Humphreys, Paul Hoffman, and Matthew A. Lambon Ralph. 2020. "Revealing the neural networks that extract conceptual gestalts from continuously evolving or changing semantic contexts." *Neuroimage* 220: 116802-116817. https://doi.org/10.1016/j.neuroimage.2020.116802.

Brosch, Renate. 2018. "What we 'see' when we read: vizualisation and vividness in reading fictional narratives." *Cortex* 105: 135-143. https://doi.org/10.1016/j.cortex.2017.08.020.

Brown, Bill. 2001. "Thing theory." *Critical Inquiry* 28 (1): 1-22. https://doi.org/10.1086/449030.

Brown, Jason. 2019. *Mental states and conceptual worlds*. Eugene: Resource Publications.

Bruner, Jerome. 1991. "The narrative construction of reality." *Critical Inquiry* 18 (1): 1-21. https://doi.org/10.1086/448619.

Brunyé, Tad T, Tali Ditman, Grace E Giles, Alice Holmes, and Hollly A Taylor. 2016. "Mentally simulating narrative perspective is not universal or necessary for language comprehension." *Journal of Experimental Psychology: Learning, Memory and Cognition* 42 (10): 1592-1605. https://doi.org/http://dx.doi.org/10.1037/xlm0000250.

Burke, Michael. 2015. "The neuroaesthetics of prose fiction: pitfalls, parameters and prospects." *Frontiers in Human Neuroscience* 9 (442): 1-12. https://doi.org/10.3389/fnhum.2015.00442.

---, ed. 2018. *The Routledge Handbook of Stylistics*. London: Routledge.

Burmester, Juliane, Anntje Sauermann, Katharina Spalek, and Isabell Wartenburger. 2018. "Sensitivity to salience: linguistic vs. visual cues affect sentence processing and pronoun resolution." *Language, Cognition and Neuroscience* 33 (6): 784-801. https://doi.org/10.1080/23273798.2018.1428758.

Buschbaum, Bradley R, and Mark D'Esposito. 2019. "A sensorimotor view of verbal working memory." *Cortex* 112: 134-148. https://doi.org/10.1016/j.cortex.2018.11.010.

Butchard, Dorothy. 2015. "Electric amateurs: literary encounters with computing technologies 1987-2001." PhD thesis, The University of Edinburgh.

Campbell, Darren W, Marc G Wallace, Mandana Modirrousta, Joseph O Polimeni, Nancy A McKeen, and Jeffrey P Reiss. 2015. "The neural basis of humour comprehension and humour appreciation: the roles of the temporoparietal junction and superior frontal gyrus." *Neuropsychologia* 79, no. A: 10-20. https://doi.org/10.1016/j.neuropsychologia.2015.10.013.

Canal, Paolo, Luca Bischetti, Simona Di Paola, Chiara Bertini, Irene Ricci, and Valentina Bambini. 2019. "'Honey, shall I change the baby?- Well done, choose another one': ERP and time-frequency correlates of humor processing." *Brain and Cognition* 132: 41-55. https://doi.org/doi.org/10.1016/j.bandc.2019.02.001.

Canavan, Gerry. 2012. "Hope, but not for us: ecological science fiction and the end of the world in Margaret Atwood's Oryx and Crake and The Year of the Flood." *Lit: Literature Interpretation Theory* 23 (2): 138-159. https://search.ebscohost.com/login.aspx?direct=true&db=mzh&AN=2012701295&site=ehost-live.

---. 2014. "Introduction: if this goes on." In *Green planets: ecology and science fiction*, edited by Gerry Canavan and Kim Stanley Robinson, 1-21. Middletown: Wesleyan University Press.

Canning, Patricia. 2017. "Text world theory and real world readers: from literature to life in a Belfast prison." *Language and Literature* 26 (2): 172-187. https://doi.org/10.1177/0963947017704731.

Caplette, Laurent, Robin Ince, Karim Jerbi, and Frédéric Gosselin. 2020. "Disentangling presentation and processing times in the brain." *Neuroimage* 218: 116994-117005. https://doi.org/10.1016/j.neuroimage.2020.116994.

Caracciolo, Marco. 2014. *The experientiality of narrative: an enactivist approach*. Berlin: De Gruyter.

Caracciolo, Marco, Andrei Ionescu, and Ruben Franso. 2019. "Metaphorical patterns in Athropocene fiction." *Language and Literature* 28 (3): 221-240. https://doi.org/10.1177/0963947019865450.

Carter, Angela. 1979. *The bloody chamber, and other stories*. London: Gollancz.

Carter, James Bucky. 2007. "Imagetext in *The Curious Incident of the Dog in the Night-time*." *Imagetext* 3 (3). https://imagetextjournal.com/imagetext-in-the-curious-incident-of-the-dog-in-the-night-time/.

Carter, Ronald, and Michael McCarthy. 2006. *Cambridge Grammar of English*. Cambridge: Cambridge University Press.

Case, Eleanor, and Maggie McDonald. 2003. "Life after man: interview with Margaret Atwood." *New Scientist* 178 (2393): 40. https://www.newscientist.com/article/mg17823935-000-life-after-man/.

Cave, Terence. 2016. *Thinking with literature*. Oxford: Oxford University Press.

Chai, Wen Jia, Aini Ismafairus Abd Hamid, and Jafri Malin Abdullah. 2018. "Working memory from the psychological and neurosciences perspectives: a review." *Frontiers in Psychology* 9: 1-16. https://doi.org/10.3389/fpsyg.2018.00401.

Chang, Yi-Tzu, Li-Chuan Ku, Ching-Lin Wu, and Hsueh-Chih Chen. 2019. "Event-related potential (ERP) evidence for the differential cognitive processing of semantic jokes and pun jokes." *Journal of Cognitive Psychology* 31 (2): 131-144. https://doi.org/10.1080/20445911.2019.1583241.

Chen, Chien-Hung. 2018. "Subjectal scale and micro-biopolitics at the end of the anthropocene: Margaret Atwood's MaddAddam Trilogy." *Mosaic* 51 (3): 179-198.

Cilliers, Paul. 1998. *Complexity and Postmodernism: Understanding Complex Systems*. London: Routledge.

Ciobanu, Calina. 2014. "Rewriting the human at the end of the anthropocene in Margaret Atwood's MaddAddam Trilogy." *Minnesota Review: A Journal of Committed Writing* 83: 153-162. https://doi.org/10.1215/00265667-2782351.

Ciocia, Stefania. 2018. "'The world loves an underdog,' or the continuing appeal of the adolescent rebel narrative: A comparative reading of Vernon God Little, The Catcher in the Rye and Huckleberry Finn." *Children's Literature in Education: An International Quarterly* 49 (2): 196-215. https://doi.org/10.1007/s10583-016-9287-1.

Clark, Andy. 1989. *Microcognition: philosophy, cognitive science, and parallel distributed processing*. Cambridge, Massachusetts: The MIT Press.

---. 1997. *Being there: putting brain, body, and world together again*. Cambridge, Massachusetts: The MIT Press.

---. 2016. *Surfing uncertainty: prediction, action and the embodied mind*. Oxford: Oxford University Press.

Clark, Herbert H, and Richard J Gerrig. 1990. "Quotations as demonstrations." *Language* 66 (4): 764-805. https://www.jstor.org/stable/414729.

Clayton, Philip, and Paul Davies, eds. 2006. *The re-emergence of emergence: the emergentist hypothesis from science to religion*. Oxford: Oxford University Press.

Coleridge, Samuel Taylor. 1963. "The Rime of the Ancient Mariner." In *Coleridge's Poems*, edited by JB Beer, 169-189. London: JM Dent and Sons.

---. 1973. "Kubla Khan: or a vision in a dream. A fragment." In *Romantic poetry and prose*, edited by Harold Bloom and Lionel Trilling, 256-257. New York: Oxford University Press. Original edition, 1798.

Colombetti, Giovanna. 2014. *The feeling body: affective science meets the enactive mind*. Cambridge: The MIT Press.

Comer, Christopher, and Ashley Taggart. 2021. *Brain, mind, and the narrative imagination*. London: Bloomsbury Academic.

Cooke, Grayson. 2006. "Technics and the human at zero-hour: Margaret Atwood's Oryx and Crake." *Studies in Canadian Literature/Etudes en Littérature Canadienne* 31 (2): 105-25. https://search.ebscohost.com/login.aspx?direct=true&db=mzh&AN=2007297238&site=ehost-live.

Corazza, Giovanni E. 2016. "Potential originality and effectiveness: the dynamic definition of creativity." *Creativity Research Journal* 28 (3): 258-267. https://doi.org/10.1080/10400419.2016.1195627.

Couder, Olivier. 2019. "Problem solved? Absurdist humour and incongruity-resolution." *Journal of Literary Semantics* 48 (1): 1-21. https://doi.org/10.1515/jls-2019-2005.

Cowan, Nelson, Candice C Morey, and Moshe Naveh-Bejamin. 2021. "An embedded-processes approach to working memory." In *Working memory: the state of the science*, edited by Robert Logie, Valérie Camos and Nelson Cowan, 44-84. Oxford: Oxford University Press.

Cronquist, Ulf. 2005. "Hypertext, prosthetics, and the netocracy: posthumanism and Jeanette Winterson's *The PowerBook*." In *The writer's craft, the culture's technology*, edited by Carmen Rosa Caldas-Coulthard and Michael Toolan, 47-56. Leiden: Brill.

Crosby, Donald. 2009. "Causality, time, and creativity: the essential role of novelty." *The Pluralist* 4 (3): 46-59. https://doi.org/10.1353/plu.0.0031.

Crumley, Carole. 2015. "Heterarchy." In *Emerging Trends in the Social and Behavioral Sciences*, edited by Robert A Scott and Stephen M Kosslyn, 1-14.

Csikszentmihalyi, Mihaly. 2015. *The systems model of creativity: the collected works of Mihaly Csikszentmihaly*. Heidelberg: Springer.

Culler, Jonathan. 1997. *Literary theory: a very short introduction*. Oxford: Oxford University Press.

Cumming, Graeme S. 2016. "Heterarchies: reconciling networks and hierarchies." *Trends in ecology and evolution* 31 (8): 622-632. https://doi.org/10.1016/j.tree.2016.04.009.

Currie, Mark. 2007. *About time: narrative, fiction, and the philosophy of time*. Edinburgh: Edinburgh University Press.

---. 2009. "The novel and the moving now." *Novel: A forum on Fiction* 42 (2): 318-325. https://doi.org/:10.1215/00295132-2009-021.

---. 2013. *The unexpected: narrative temporality and the philosophy of surprise*. Edinburgh: Edinburgh University Press.

Dames, Nicholas. 2007. *The physiology of the novel: reading, neural science & the form of Victorian fiction*. Oxford: Oxford University Press.

Daniel, Ryan. 2021. "Exploring creativity through artists' reflections." *Creativity Studies* 14 (1): 1-17. https://doi.org/10.3846/cs.2021.11207.

Dante, Alighieri. 2008. *The Divine Comedy*. Translated by Henry Wadsworth Longfellow. New York: Barnes & Noble. 1867.

Dawson, Paul. 2013. *The return of the omniscient narrator: authorship and authority in twenty-first century fiction*. The Ohio State University Press.

de Joode, Johan. 2019. *Metaphorical Landscapes and the theology of the Book of Job: an analysis of Job's spatial metaphors*. Leiden: Brill.

De Landa, Manuel. 2002. *Intensive science and virtual philosophy*. London: Continuum.

Defalco, Amelia. 2017. "MaddAddam, Biocapitalism, and Affective Things." *Contemporary Women's Writing* 11 (3): 432-451. https://doi.org/10.1093/cwwrit/vpx008.

Dempsey, Sarah-Jane. 2014. "The dynamic present: not yet an ontology of the past." PhD, Monash.

Derner, M, G Dehnen, L Chaieb, T P Reber, V Borger, R Surges, B P Staresina, F Mormann, and J Fell. 2020. "Patterns of single-neuron activity during associative recognition memory in the human medial temporal lobe." *Neuroimage* 221: 117214-117223. https://doi.org/10.1016/j.neuroimage.2020.117214.

Detloff, Madelyn. 2007. "Living in 'energetic space': Jeanette Winterson's bodies and pleasures." *English Language Notes* 45 (2): 149-159. https://doi.org/10.1215/00138282-45.2.149.

Dewey, John 1929. *The quest for certainty: a study of the relation of knowledge and action.* New York: Minton, Balch & Company.

Dillon, Denise. 2018. "Footprint': the apocalyptic imprint of end as immanent in Atwood's *Oryx and Crake*. *eTropic* 17 (2): 52-61. https://doi.org/10.25120/etropic.17.2.2018.3657.

Dima, Sofia. 2011. "'Meta' modalities in a testimonial fiction production." *Communication interculturelle et littérature* 2 (14): 150-157.

Dolcini, Nevia. 2016. "The phantasmatic "I": on imagination-based uses of the first-person pronoun across fiction and non-fiction." *Rivista Internazionale di Filosfia e Psicologia* 7 (3): 321-337. https://doi.org/10.4453/rifp.2016.0034.

Doložel, Lubomír. 1998. *Heterocosmica: fiction and possible worlds*. Baltimore: The Johns Hopkins University Press.

Douglas, Erin. 2009. "'That was a terrible thing to do to a flower' floral pleasures and changeable bodies in Virginia Woolf's *Orlando* and Jeanette Winterson's *The PowerBook*." *Virginia Woolf Miscellany,* no. 75, 2009,: 13-15. https://virginiawoolfmiscellany.files.wordpress.com/2013/09/vwm75spring2009.pdf.

Downey, Greg, and Daniel H Lende. 2012. "Neuroanthropology and the encultured brain." In *The encultured brain*, edited by Daniel H Lende and Greg Downey, 23-65. London: The MIT Press.

Doyle, Arthur Conan 1997. *The memoirs of Sherlock Holmes*. Salt Lake City: Project Gutenberg.

Droit-Volet, Sylvie. 2014. "What emotions tell us about time." In *Subjective time: the philosophy, psychology, and neuroscience of temporality*, edited by Valterri Arstila and Dan Lloyd, 477-506. Cambridge, Massachusetts: The MIT Press.

Dunning, Stephen. 2005. "Margaret Atwood's Oryx and Crake: The terror of the therapeutic." *Canadian Literature* 186: 86-101. https://search.ebscohost.com/login.aspx?direct=true&db=mzh&AN=2006296549&site=ehost-live.

Dupré, John. 2015. "A process ontology for biology." *Physiology News* (100): 33-34. https://doi.org/10.36866/pn.100.33. https://www.physoc.org/issue-numbers/autumn-2015-issue-number-100/.

---. 2017. "The metaphysics of evolution." *Interface Focus* 7 (5): 1-9. https://doi.org/10.1098/rsfs.2016.0148.

Dupré, John, and Daniel J Nicholson. 2018. "A manifesto for a processual philosophy of biology." In *Everything flows: towards a processual philosophy of biology*, edited by Daniel J Nicholson and John Dupré, 3-45. Oxford: Oxford University Press.

Eekhof, Lynn S, Kobie van Krieken, José Sanders, and Roel M Willems. 2021. "Reading minds, reading stories: social-sognitive abilities affect the linguistic processing of narrative viewpoint." *Frontiers in Psychology* 12: 1-23. https://doi.org/10.3389/fpsyg.2021.698986.

Eggerts, Paul. 2019. *The work and the reader in literary studies: scholarly editing and book history*. Cambridge: Cambridge University Press.

Emerson, Ralph Waldo. 2009. *Essays: first series*. Auckland: The Floating Press. 1841.

Epstein, Brian. 2018. "Social ontology." Stanford Encyclopedia of Philosophy. Accessed 26 September. https://plato.stanford.edu/archives/sum2018/entries/social-ontology/.

Evans, Shari. 2010. "'Not Unmarked': From Themed Space to a Feminist Ethics of Engagement in Atwood's Oryx and Crake." *FEMSPEC* 10 (2): 35-58.

Faber, M, M Mak, and R M Willems. 2020. "Word skipping as an indicator of individual reading style during literary reading." *Journal of Eye Movement Research* 13 (3): 1-9. https://doi.org/10.16910/jemr.13.3.2.

Feiten, Timo Elmo. 2020. "Mind after Uexküll: a foray into the worlds of ecological psychologists and enactivists." *Frontiers in Psychology* 11: 1-10. https://doi.org/10.3389/fpsyg.2020.00480.

Fernandez-Quintanilla, Carolina. 2020. "Textual and reader factors in narrative empathy: an empirical reader response study using focus groups." *Language and Literature* 29 (2): 124-146. https://doi.org/10.1177/0963947020927134.

Fiacconi, Chris M, and Adrian M Owen. 2015. "Using psychophysiological measures to examine the temporal profile of verbal humor elicitation." *PLOS ONE* 10 (9): 1-14. https://doi.org/0.1371/journal.pone.0135902.

Finn, Emily S, Enrico Glerean, Arman Y Khojandi, Dylan Nielson, Peter J Molfese, Daniel A Handwerker, and Peter A Bandettini. 2020. "Idiosynchrony: From shared responses to individual differences during naturalistic neuroimaging." *NeuroImage* 215. https://doi.org/10.1016/j.neuroimage.2020.116828.

Fitz, Hartmut, Marvin Uhlmann, Dick van den Broek, Renato Duarte, Peter Hagoort, and Karl Magnus Petersson. 2020. "Neuronal spike-rate adaptation supports working memory in language processing." *Proceedings of the National Academy of Sciences of the United States of America* 117 (34): 20881-20889. https://doi.org/10.1073/pnas.2000222117.

Fitzpatrick, Susan M. 2012. "Functional brain imaging: neuro-turn or wrong turn?" In *The neuroscientific turn: transdisciplinarity in the age of the brain*, edited by Melissa M Littlefield and Jenell M Johnson, 180-198. Ann Arbor: The University of Michigan Press.

Fletcher, Angus. 2004. *A new theory for American poetry: democracy, the environment, and the future of imagination*. Cambridge, Massachusetts: Harvard University Press.

Fludernik, Monika. 2003. "Chronology, time, tense and experientiality in narrative." *Language and Literature* 12 (2): 117-134. https://doi.org/10.1177/0963947003012002295.

Fodor, Janet Dean. 2002. "Prosodic disambiguation in silent reading." *Proceedings of the North East Linguistics Society* 32 (1): 113-132. https://scholarworks.umass.edu/nels/vol32/iss1/8.

Fowles, John. 2004. *The French Lieutenant's Woman*. London: Vintage. 1969.

Frank, Roslyn M, René Dirvan, Tom Ziemke, and Enrique Bernárdez, eds. 2008. *Body, Language and Mind Volume 2: Sociocultural Situatedness*. Berlin: Mouton de Gruyter.

Freißmann, Stephan. 2008. "A Tale of Autistic Experience: Knowing, Living, Telling in Mark Haddon's The Curious Incident of the Dog in the Night-Time." *Partial Answers* 6 (2): 395-417. https://doi.org/10.1353/pan.0.0010.

Frigotto, Maria Laura. 2018. *Understanding novelty in organizations: a research path across agency and consequences*. Cham: Palgrave Macmillan.

Frow, John. 2001. "A pebble, a camera, a man who turns into a telegraph pole." *Critical Inquiry* 28 (1): 270-285. https://doi.org/10.1086/449040.

---. 2005. *Genre*. London: Routledge.

Galton, Antony. 2011. "Time flies but space does not: limits to the spatialisation of time." *Journal of Pragmatics* 43 (3): 695-703. https://doi.org/10.1016/j.pragma.2010.07.002.

Gao, Timothy. 2021. *Virtual play and the Victorian novel: the ethics and aesthetics of fictional experience*. Cambridge: Cambridge University Press.

García-Pérez, Miguel A, and Rocío Alcalá-Quintana. 2018. "Perceived Temporal Order and Simultaneity: Beyond Psychometric Functions." In *Timing and Time Perception: Procedures, Measures, and Applications*, edited by Argiro Vatakis, Fuat Balcı, Massimiliano Di Luca and Ángel Correa, 263-294. Leiden: Brill.

Gavins, Joanna. 2007. *Text world theory: an introduction*. Edinburgh: Edinburgh University Press.

Gebauer, Carolin. 2021. *Making time: world construction in the present-tense novel*. Berlin: De Gruyter.

Genette, Gérard. 1980. *Narrative discourse. An essay on method*. Ithaca: Cornell University Press. 1972.

Ghosal, Torsa. 2019. "Shapes of cognition in typographical fictions." *Studies in the Novel* 51 (2): 276-296. https://doi.org/10.1353/sdn.2019.0032.

Giari, Guiliano, Elisa Leonardelli, Yuan Tao, Mayara Machado, and Scott L Fairhill. 2020. "Spatiotemporal properties of the neural representation of conceptual content for words and pictures- an MEG study." *Neuroimage* 219: 1-9. https://doi.org/10.1016/j.neuroimage.2020.116913.

Gibbons, Alison. 2012. "Multimodal literature and experimentation." In *The Routledge companion to experimental literature*, edited by Joe Bray, Alison Gibbons and Brian McHale, 420-434. London: Routledge.

Glăveanu, Vlad P, and Ronald A Beghetto. 2021. "Creative experience: a non-standard definition of creativity." *Creativity Research Journal* 33 (2): 75-80. https://doi.org/10.1080/10400419.2020.1827606.

Gomila, Toni, and Paco Calvo. 2008. "Directions for an embodied cognitive science: toward an integrated approach." In *Handbook of Cognitive Science: An Embodied Approach*, edited by Toni Gomila and Paco Calvo, 1-25. Oxford: Elsevier Science & Technology.

González, Julio, Alfonso Barros-Loscertales, Friedemann Pulvermüller, Vanessa Meseguer, Ana Sanjuán, Vicente Belloch, and César Ávila. 2006. "Reading *cinnamon* activates olfactory brain regions." *Neuroimage* 32: 906-912. https://doi.org/10.1016/j.neuroimage.2006.03.037.

Green, Andrew. 2021. "Death in a literary context: detective novel of the Golden Age as enacted criticism." *Clues: A Journal of Detection* 39 (2): 41-50.

Grieben, Raul, Jan Tekülve, Stephan K U Zibner, Jonas Lins, Sebatian Schneegans, and Gregor Schöner. 2020. "Scene memory and spatial inhibition in visual search." *Attention, Perception and Psychophysics* 82: 775-798. https://doi.org//10.3758/s13414-019-01898-y.

Grimbeek, Marinette. 2016. "Wholesale apocalypse: Brand names in Margaret Atwood's Oryx and Crake." *Names: A Journal of Onomastics* 64 (2): 88-98. https://doi.org/10.1080/00277738.2016.1159448.

Grimm, Jacob, and Wilhelm Grimm. 1927. *Grimm's Fairy Stories*. edited by Frances Jenkins Olcott, illlustrated by Rie Cramer: The Penn Publishing Company.

Guenther, Frank H, Satrajit S Ghosh, and Jason A Tourville. 2006. "Neural modeling and imaging of the cortical interactions underlying syllable production." *Brain and Language* 96: 280–301. https://doi.org/10.1016/j.bandl.2005.06.001.

Guy, Josephine M, Kathy Conklin, and Jennifer Sanchez-Davies. 2018. "Literary stylistics, authorial intention and the scientific study of literature: a critical overview." *Language and Literature* 27 (3): 196-217. https://doi.org/10.1177/0963947018788518.

Haddon, Mark. 2003. *The curious incident of the dog in the night-time*. Oxford: David Fickling Books.

Hall, Catherine N, Clare Howarth, Zebulun Kurth-Nelson, and Anusha Mishra. 2016. "Interpreting BOLD: towards a dialogue between cognitive and cellular neuroscience." *Philosophical transactions of the Royal Society B* 371: 1-12. https://doi.org/10.1098/rstb.2015.0348.

Hall, Emily. 2017. " 'Nothing is solid. Nothing is fixed': participatory culture and collaborative authorship in Jeanette Winterson's *The Powerbook*." *Reception: Texts, Readers, Audiences, History* 9: 23-35. https://doi.org/10.5325/reception.9.1.0023.

Hallett, Wolfgang. 2009. "The multimodal novel: the integration of modes and media in novelistic narration." In *Narratology in the age of cross-disciplinary research*, edited by Sandra Heinen and Roy Sommer, 129-153. Berlin: Walter de Gruyter.

Halsall, Paul. 1998. "Modern History Sourcebook: Ogier Ghiselin de Busbecq: *The Turkish Letters,* 1555-1562." Fordham University. http://www.fordham.edu/halsall/mod/1555busbecq.html.

Han, Shihui, and Ernst Pöppel, eds. 2011. *Culture and neural frames of cognition and communication*. Berlin: Springer.

Hardt, Oliver, and Wayne S Sossin. 2020. "Terminological and epistemological issues in current memory research." *Frontiers in molecular neuroscience* 12 (336): 1-7. https://doi.org/10.3389/fnmol.2019.00336.

Hartley, Catherine A, and David Poeppel. 2020. "Beyond the stimulus: a neurohumanities approach to language, music, and emotion." *Neuron* 108: 597-599. https://doi.org/10.1016/j.neuron.2020.10.021.

Hartung, Fanziska, Michael Burke, Peter Hagoort, and Roel M Willems. 2016. "Taking perspective: personal pronouns affect experiential aspects of literary reading." *PloS ONE* 11 (5): 1-18. https://doi.org/10.1371/journal.pone.0154732.

Hartung, Fanziska, Yoed N Kenett, Eileen R Cardillo, Stacey Humphries, Nathaniel Klooster, and Anjan Chaterjee. 2020. "Context matters: novel metaphors in supportive and non-supportive contexts." *NeuroImage* 212: 116645-116654. https://doi.org/https://doi.org/10.1016/j.neuroimage.2020.116645.

Hartung, Fanziska, Yuchao Wang, Marloes Mak, Roel M Willems, and Anjan Chaterjee. 2021. "Aesthetic appraisals of literary style and emotional intensity in narrative

engagement are neurally dissociable." *Communications Biology* 4: 1-17. https://doi.org/10.1038/s42003-021-02926-0.

Hartung, Fanziska, Peter Withers, Peter Hagoort, and Roel M Willems. 2017. "When fiction is just as real as fact: no differences in reading behaviour between stories believed to be based on true or fictional events." *Frontiers in Psychology* 8: 1-14. https://doi.org/10.3389/fpsyg.2017.01618.

Hayles, N Katherine. 1990. *Chaos Bound: orderly disorder in contemporary literature and science*. Ithaca: Cornell University Press.

---. 1999. *How we became posthuman: virtual bodies in cybernetics, literature, and informatics*. Chicago: The University of Chicago Press.

---. 2017. *Unthought: the power of the cognitive unconscious*. Chicago: The University of Chicago Press.

Hegarty, Amy K, Moheb S Yani, Alaa Albishi, Lori A Michener, and Jason J Kutch. 2020. "Salience network functional connectivity is spatially heterogeneous across sensorimotor cortex in health humans." *Neuroimage* 221: 117177-117186. https://doi.org/10.1016/j.neuroimage.2020.117177.

Heinze, Rüdiger. 2015. ""This makes no sense at all": heterarchy in fictional universes." *Storyworld: A Journal of Narrative Studies* 7 (2): 75-91. https://www.jstor.org/stable/10.5250/storyworlds.7.2.0075.

Herman, David. 2002. *Story Logic*. Lincoln: University of Nebraska Press.

---. 2009. *Basic elements of narrative*. Oxford: Wiley-Blackwell.

Hetherington, Lindsay. 2013. Complexity thinking and methodology: the potential of 'complex case study' for educational research. *Complicity: An International Journal of Complexity and Education* 10 (1/2): 71-85. https://doi.org/10.29173/cmplct20401.

Hicks, Heather J. 2016. *The Post-Apocalyptic Novel in the Twenty-First Century: Modernity Beyond Salvage*. New York: Palgrave Macmillan.

Hogan, Patrick Colm. 2011. *Affective narratology: the emotional structure of stories*. London: University of Nebraska Press.

---. 2014. "Literary brains: neuroscience, criticism, and theory." *Literature Compass* 11 (4): 293-304. https://doi.org/10.1111/lic3.12144.

---. 2018. "The scope of literary theory." In *Reframing critical, literary, and cultural theories: thought on the edge*, edited by Nicoletta Pireddu, 91-118. Cham: Palgrave Macmillan.

Hogan, Patrick Colm, Bradley J Irish, and Lalita Pandit Hogan, eds. 2022. *The Routledge companion to literature and emotion*. Abingdon: Routledge.

Hohwy, Jakob. 2020. "New directions in predictive processing." *Mind and Language* 35: 209-223. https://doi.org/10.1111/mila.12281.

Holt, Jason. 2020. "Allusion and anti-intentionalism." *Pennsylvania Literary Journal* 12 (1): 77-84.

Hooker, Cliff. 2011a. "Introduction to Philosophy of Complex Systems: A." In *Handbook of the Philosophy of Science. Volume 10: Philosophy of Complex Systems.*, edited by Cliff A Hooker, 3-90. Oxford: Elsevier.

---, ed. 2011b. *Philosophy of complex systems*. Oxford: Elsevier.

Horner, Sherri. 2005. "Categories of environmental print: all logos are not created equal." *Early Childhood Education Journal* 33 (2): 113-119. https://doi.org/10.1007/s10643-005-0029-z.

Huxley, Aldous. 2013. *Brave New World*. London: Alfred A Knopf. 1932.

Im, Soo-hyun, and Shashank Varma. 2018. "Distorted time perception during flow as revealed by an attention-demanding cognitive task." *Creativity Research Journal* 30 (3): 295-304. https://doi.org/10.1080/10400419.2018.1488346.

Ingram, Joanne, and Christopher J Hand. 2020. "From the wizarding world: fictional words, context, and domain knowledge." *Journal of Experimental Psychology: Learning, Memory and Cognition* 46 (11): 2179-2192. https://doi.org/10.1037/xlm0000946.

Inscoe, John C. 2006. "Slave Names." Encyclopedia of North Carolina. University of North Carolina Press. https://www.ncpedia.org/slave-names.

Irwin, William. 2001. "What is an allusion?" *The Journal of Aesthetics and Art Criticism* 59 (3): 287-297. https://www.jstor.org/stable/432325.

Jääskeläinen, Iiro P, Mikko Sams, Enrico Glerean, and Jyrki Ahveninen. 2021. "Movies and narration as naturalistic stimuli in neuroimaging." *Neuroimage* 224: 117445-117459. https://doi.org/10.1016/j.neuroimage.2020.117445.

Jacobs, Arthur M. 2015. "Neurocognitive poetics: methods and models for investigating the neuronal and cognitive-affective bases of literature reception." *Frontiers in Human Neuroscience* 9: 1-22. https://doi.org/10.3389/fnhum.2015.00186.

Jacobs, Arthur M, and Annette Kinder. 2018. "What makes a metaphor literary? Answers from two computational studies." *Metaphor and Symbol* 33 (2): 85-100. https://doi.org/10.1080/10926488.2018.1434943.

Jacobs, Arthur M, and Roel M Willems. 2017. "The fictive brain: neurocognitive correlates of engagement in literature." *Review of General Psychology* 22 (2): 147-160. https://doi.org/10.1037/gpr0000106.

Jaszczolt, Kasia M. 2009. *Representing time: an essay on temporality as modality*. Oxford: Oxford University Press.

Jeungst, Sara L. 2020. "Introduction: The bioarchaeology of cooperation and nonhierarchical power." *American Anthropologist* 122 (4): 891-896. https://doi.org/10.1111/aman.13497.

Johns, Adrian. 1998. *The nature of the book: print and knowledge in the making*. Chicago: University of Chicago Press.

Johnston, John. 2001. Distributed information: complexity theory in the novels of Neal Stephenson and Linda Nagata. *Science Fiction Studies* 28 (2): 223-245.

Johnston, Justin Omar. 2019. *Posthuman capital and biotechnology in contemporary novels*. Cham: Palgrave Macmillan.

Joseph, Holly S S L, Elizabeth Wonnacott, Paul Forbes, and Kate Nation. 2014. "Becoming a written word: eye movements reveal order of acquisition effect following incidental exposure to new words during silent reading." *Cognition* 133 (1): 238-248. https://doi.org/10.1016/j.cognition.2014.06.015.

Kaakinen, JK, and J Simola. 2020. "Fluctuation in pupil size and spontaneous blinks reflect story transportation." *Journal of Eye Movement Research* 13 (3): 1-14. https://doi.org/10.16910/jemr.13.3.6.

Karakoç, Taner, and Nihal Yetkin Karakoç. 2014. "The role of postmodern hybrid texts in translation-oriented text analysis (TOTA) courses in translation didactics " *Procedia - Social and Behavioral Sciences* 141: 70-73. https://doi.org/10.1016/j.sbspro.2014.05.013.

Kauffman, Stuart A. 1993. *The origins of order: self-organization and selection in evolution*. New York: Oxford University Press.

Keck, Michaela. 2018. "Paradise retold: revisionist mythmaking in Margaret Atwood's *MaddAddam*Trilogy." *Ecozona* 9 (2): 23-40.

Keen, Suzanne. 2007. *Empathy and the novel*. Oxford: Oxford University Press.

---. 2011. "Readers' temperaments and fictional character." *New Literary History* 42 (2): 295-314. https://doi.org/10.1353/nlh.2011.0013.

Keidel, James L, Philip M Davis, Victorina Gonzalez-Diaz, Clara D Martin, and Guillaume Thierry. 2013. "How Shakespeare tempests the brain: neuroimaging insights." *Cortex* 49 (4): 913-919. https://doi.org/10.1016/j.cortex.2012.03.011.

Kelso, J A Scott. 1995. *Dynamic patterns: the self-organization of brain and behavior*. London: The MIT Press.

Kenett, Yoed N, Richard F Betzel, and Roger E Beaty. 2020. "Community structure of the creative brain at rest." *Neuroimage* 210: 1-9. https://doi.org/10.1016/j.neuroimage.2020.116578.

Kennedy, Maev. 1999. "Roman lady's coffin shows 4th century élan." *The Guardian*, 16 April, 1999. https://www.theguardian.com/uk/1999/apr/16/maevkennedy.

Kiliç, Mine Özyurt. 2008. "Transgressing gender boundaries: The function of the fantastic in Jeanette Winterson's *The.PowerBook*." *English Studies* 89 (3): 287-304. https://doi.org/10.1080/00138380802011925.

Kim, Albert E, Leif Oines, and Akira Miyake. 2017. "Individual differences in verbal working memory underlie a tradeoff between semantic and structural processing difficulty during language processing: an ERP investigation." *Journal of Experimental Psychology: Learning, Memory and Cognition* 44 (3): 406-420. https://doi.org/10.1037/xlm0000457.

Kissler, Johanna, Cornelia Herbert, Peter Peyk, and Markus Junghofer. 2007. "Buzzwords: early cortical responses to emotional words during reading." *Psychological Science* 18 (6): 475-480. https://www.jstor.org/stable/40064643.

Klausen, Søren Harnow. 2017. "Levels of literary meaning." *Philosophy and Literature* 41 (1): 70-90. https://doi.org/10.1353/phl.2017.0005.

Kober, Hedy, Lisa Feldman Barrett, Josh Joseph, Eliza Bliss-Moreau, Kristen Lindquist, and Tor D Wagera. 2008. "Functional grouping and cortical–subcortical interactions in emotion: A meta-analysis of neuroimaging studies." *Neuroimage* 42: 998-1031. https://doi.org/10.1016/j.neuroimage.2008.03.059.

Koleva, Kremena, Mark Mon-Williams, and Ekaterina Klepousniotou. 2019. "Right hemisphere involvement for pun processing: effects of idiom decomposition." *Journal of Neurolinguistics* 51: 165-183. https://doi.org/10.1016/j.jneuroling.2019.02.002.

Koolen, Corina, Karina van Dalen-Oskam, Adreas van Cranenburgh, and Erica Nagelhout. 2020. "Literary quality in the eye of the Dutch reader: The National Reader Survey." *Poetics* 79: 1-13. https://doi.org/10.1016/j.poetic.2020.101439.

Koopman, Emy, and Frank Hakemulder. 2015. "Effects of literature on empathy and self-reflection: a theoretical-empirical famework." *Journal of Literary Theory* 9 (1): 79-111. https://doi.org/10.1515/jlt-2015-0005.

Kounios, John, and Mark Beeman. 2009. "The Aha! moment." *Current Directions in Psychological Science* 18 (4): 210-216. https://doi.org/10.1111/j.1467-8721.2009.01638.x.

Kozioł, Sławomir. 2018. "Crake's aesthetic: genetically modified humans as a form of art in Margaret Atwood's Oryx and Crake." *Critique: Studies in Contemporary Fiction* 59 (4): 492-508. https://search.ebscohost.com/login.aspx?direct=true&db=mzh&AN=2018381627&site=ehost-live.

Kronenfeld, David B. 2008. *Culture, society, and cognition: collective goals, values, action, and knowledge*. Berlin: Mouton de Gruyter.

Kruikova, Olga, and Nivedita Mani. 2016. "Processing metrical information in silent reading: an E R P study." *Frontiers in Psychology* 7: 1-8. https://doi.org/10.3389/fpsyg.2016.01432.

Ku, Li-Chuan, Yen-Ju Feng, Yu-Chen Chan, and Ching-Lin Wu. 2017. "A re-visit of three-stage humor processing with readers' surprise, comprehension, and funniness ratings: An ERP study." *Journal of Neurolinguistics* 42: 49-62. https://doi.org/10.1016/j.jneuroling.2016.11.008.

Kukkonen, Karin. 2020. *Probability designs: literature and predictive processing*. Oxford: Oxford University Press.

Lalić-Krstin, Gordana 2018. Translating English word-play into Serbian: evidence from three dystopian novels. *Belgrade English Language and Literature Studies* X. https://doi.org/10.18485/bells.2018.10.15.

Langton, C G. 1990. "Computation at the edge of chaos: phase transitions and emergent computation." *Physica D: Nonlinear Phenomena* 42 (1-3): 12–37. https://doi.org/10.1016/0167-2789(90)90064-V.

Larocca, Flavia. 2015. "Literary dynamics in nonlinear narratives." Masters thesis, Universidade do Porto.

Latour, Bruno. 2004. *The politics of nature: how to bring the sciences into democracy*. Translated by Catherine Porter. Cambridge: Harvard University Press.

Le Poidevin, Robin. 2019. "The experience and perception of time." Stanford Encyclopedia of Philosophy. https://plato.stanford.edu/entries/time-experience/.

Leblond, Diane. 2020. "Visual pragmatics of intertextuality: ghosts from Wonderland in Jeanette Winterson's *Gut Symmetries* (1997)." *Textual Practice* 34, no. 8: 1309-1325. https://doi.org/10.1080/0950236X.2019.1580212.

Letissier, Georges. 2020. "A somatic experience of Dickens's fiction." In *Reading Dickens differently*, edited by Leon Litvack and Nathalie Vanfasse, 93-112. New York: John Wiley and Sons.

Levi-Aharoni, Hadar, Oren Shriki, and Naftali Tishby. 2020. "Surprise response as a probe for compressed memory states." *PLOS Computational Biology* 16 (2): 1-21. https://doi.org/10.1371/journal.pcbi.1007065.

Lewin, Roger. 1992. *Complexity: Life at the Edge of Chaos*. New York: Collier Books.

---. 1999. *Complexity: life at the edge of chaos*. Chicago: University of Chicago Press.

Lifanov, Julia, Juan Linde-Domingo, and Maia Wimber. 2021. "Feature-specific reaction times reveal a semanticisation of memories over time and with repeated remembering." *Nature Communications* 12: 1-10. https://doi.org/10.1038/s41467-021-23288-5.

Lim, Dennis. 2003. "Autofocus." *The Village Voice*, 2003. https://www.villagevoice.com/2003/07/22/auto-focus-2/.

Liu, Jing, Hui Zhang, Tao Yu, Liankun Ren, Duanyu Ni, Qinhao Yang, Baoqing Lu, Liang Zhang, Nikolai Axmacher, and Gui Xue. 2021. "Transformative neural representations support long-term episodic memory." *Science Advances* 7 (41): 1-17. https://doi.org/10.1126/sciadv.abg9715.

Logie, Robert, Clément Belletier, and Jason M Doherty. 2021. "Integrating theories of working memory." In *Working memory: the state of the science*, edited by Robert Logie, Valérie Camos and Nelson Cowan, 389-429. Oxford: Oxford University Press

Lu, Runhao, Yanna Zhang, Naili Bao, Su. Meng, Xingli Zhang, and Jiannong Shi. 2022. "Visuospatial, rather than verbal working memory capacity plays a key role in verbal and figural creativity." *Thinking & Reasoning* 28 (1): 29-60. https://doi.org/10.1080/13546783.2021.1911848.

Lundqvist, Mikael, Pawel Herman, and Earl K Miller. 2018. "Working memory: delay activity, yes! Persistent activity? Maybe not." *The Journal of Neuroscience* 38 (32): 7013-7019. https://doi.org/10.1523/JNEUROSCI.2485-17.2018.

Lynall, Greg. 2012. *Swift and science: the satire, politics and theology of natural knowledge, 1690-1730.* London: Palgrave Macmillan.

MacGregor, Lucy J, Jennifer M Rodd, Rebecca A Gilbert, Olaf Hauk, Ediz Sohoglu, and Matthew H Davis. 2020. "The neural time course of semantic ambiguity resolution in speech comprehension." *Journal of Cognitive Neuroscience* 32 (3): 403-425. https://doi.org/10.1162/jocn_a_01493.

Machacek, Gregory. 2007. "Allusion." *PMLA. Publications of the Modern Language Association of America* 122 (2): 522-536. https://www.jstor.org/stable/25501719.

Mack, Edward. 2010. *Manufacturing modern Japaanese literature: publishing, prizes, and the ascription of literary value.* Durham: Duke University Press.

Magyari, L, A Mangen, A Kuzmicová, A Jacobs, and J Lüdtke. 2020. "Eye movements and mental imagery during reading of literary texts with different narrative styles." *Journal of Eye Movement Research* 13 (3): 1-35. https://doi.org/10.16910/jemr.13.3.3.

Mak, Marloes, and Roel M Willems. 2019. "Mental simulation during literary reading: individual differences revealed with eye-tracking." *Language, Cognition and Neuroscience* 34 (4): 511-535. https://doi.org/10.1080/23273798.2018.1552007.

Malory, Sir Thomas. 1906a. *Le Morte D'Arthur.* Vol. 1. London: Dent. 1485.

---. 1906b. *Le Morte D'Arthur.* Vol. 2. London: Dent. 1485.

Mani, Inderjeet. 2010. *The imagined moment: time, narrative, and computation.* Lincoln: University of Nebraska Press.

Manson, Steven M. 2001. Simplifying complexity: a review of complexity theory. *Geoforum* 32 (3): 405-414. https://doi.org/10.1016/S0016-7185(00)00035-X.

Marais, Kobus, and Reine Meylaerts, eds. 2019. *Complexity thinking in translation studies: methodological considerations.* Abingdon: Routledge.

Martín, Javier. 2019. "Dystopia, feminism and phallogocentrism in Margaret Atwood's *Oryx and Crake.*" *Open Cultural Studies* 3 (1): 174-282. https://doi.org/doi.org/10.1515/culture-2019-0015.

Martinez, Maria-Angeles , and Luc Herman. 2020. "Real readers reading Wasco's "City"; a storyworld possible selves approach." *Language and Literature* 29 (2): 147-170. https://doi.org/10.1177/0963947020936013.

Mashal, N, M Faust, T Hendler, and M Jung-Beeman. 2009. "An fMRI study of processing novel metaphoric sentences." *Laterality* 14 (1): 30-54. https://doi.org/10.1080/13576500802049433.

Maziarczyk, Grzegorz 2011. "Print strikes back: typographic experimentation in contemporary fiction as a contribution to the referential turn." In *The metareferential turn in contemporary arts and media: forms, functions, attempts at explanation*, edited by Werner Wolf, Katherina Bantleon and Jeff Thoss, 169-193. Amsterdam: Rodopi.

McAvan, Emily. 2020. *Jeanette Winterson and religion.* London: Bloomsbury Academic.

McCloud, Scott. 1993. *Understanding comics.* New York: HarperPerrenial.

McCulloch, Fiona. 2007. " 'Boundaries. Desire': Spatial Inter-Acting in *The Powerbook.*" *English: Journal of the English Association* 56 (214): 57–71. https://doi.org/10.1093/english/56.214.57.

McHale, Brian. 1987. *Postmodernist fiction.* London: Routledge.

---. 2008. "Beginning to think about narrative in poetry." *Narrative* 17 (1): 11-27. https://doi.org/10.1353/nar.0.0014.

McHugh, Susan. 2010. "Real artificial: tissue-cultured meat, genetically modified farm animals, and fictions." *Configurations: A Journal of Literature, Science, and Technology* 18 (1-2): 181-197.

McIntyre, Nancy S, Emily J Solari, Ryan P Grimm, Lindsay E Lerro, Joseph E Gonzales, and Peter C Mundy. 2017. "A comprehensive examination of reading heterogeneity in students with high functioning autism: distinct reading profiles and their relation to autism symptom severity." *Journal of Autism and Developmental Disorder* 47: 1086–1101. https://doi.org/10.1007/s10803-017-3029-0.

McLaughlin, Thomas. 2015. *Reading and the body: the physical practice of reading*. New York: Palgrave Macmillan.

Miall, David S. 2009. "Neuroaesthetics of literary reading." In *Neuroaesthetics*, edited by Martin Skov and Oshin Vartanian, 233-247. Amityville: Baywood.

Miyake, Akira, and Priti Shah. 1999. "Toward unified theories of working memory: emerging general consensus, unresolved theoretical issues, and future directions." In *Models of working memory: mechanisms of active maintenance and executive control*, 442-482. Cambridge: Cambridge University Press.

Mohr, Dunja M. 2007. "Transgressive utopian dystopias: the postmodern reappearance of utopia in the disguise of dystopia." *Zeitschrift für Anglistik und Amerikanistik: A Quarterly of Language, Literature and Culture* 55 (1): 5-24. https://search.ebscohost.com/login.aspx?direct=true&db=mzh&AN=2007790745&site=ehost-live.

Moore, Charlotte. 2003. "Just the facts, ma'am." *The Guardian* 2003. http://books.guardian.co.uk/review/story/0,12084,962085,00.html.

Mori, Yuichi, and Keiko Ishii. 2018. "The effect of speaker-specific auditory images on reading in Japanese." *Current Psychology* 39: 2343-2350. https://doi.org//10.1007/s12144-018-9946-z.

Morreall, John. 2016. "Philosophy of humour." Stanford Encyclopedia of Philosophy. Last Modified 2016. https://plato.stanford.edu/entries/humor/.

Morrison, Keith. 2008. Educational philosophy and the challenge of complexity theory. *Educational Philosophy and Theory* 40 (1): 19-34. https://doi.org/10.1111/j.1469-5812.2007.00394.x.

Morrison, Toni. 1988. Unspeakable things unspoken: the Afro-American presence in American literature. In *The Tanner lectures on human values*: University of Michigan.

Mounsey, Chris. 2014. *Being the body of Christ: towards a twenty-first century homosexual theology for the Anglican church*. London: Taylor and Francis.

Moutoussis, Konstantinos. 2014. "Perceptual asynchrony in vision." In *Subjective time: the philosophy,psychology, and neuroscience of temporality*, edited by Valterri Arstila and Dan Lloyd, 201-216. Cambridge: The MIT Press.

Mullen, Carol A. 2019. "Dynamic creativity: influential theory, public discourse, and generative possibility." In *Dynamic perspectives on creativity: new directions for theory, research, and practice in education*, edited by Ronald A Beghetto and Giovanni E Corazza, 137-164. Cham: Springer.

Muller, Vivienne. 2006. "Constituting Christopher: disability theory and Mark Haddon's 'The Curious Incident of the Dog in the Night-Time'." *Papers: Explorations into Children's Literature* 16 (2): 118-126.

Murray, Stuart. 2006. "Autism and the contemporary sentimental: fiction and the narrative fascination of the present." *Literature and Medicine* 25 (1): 24-45. https://doi.org/10.1353/lm.2006.0025.

Nakamura, Tagiru, Tomoko Matsui, Akira Utsumi, Mika Yamazaki, Kai Makita, Tokiko Harada, Hiroki Tanabe, and Norihiro Sadato. 2018. "The role of the amygdala in incongruity resolution: the case of humor comprehension." *Social Neuroscience* 13 (5): 553-565. https://doi.org/10.1080/17470919.2017.1365760.

Nani, Andrea, Jordi Manuello, Lorenzo Mancuso, Donato Liloa, Tommaso Costa, and Franco Cauda. 2019. "The neural correlates of consciousness and attention: two sister processses of the brain." *Frontiers in Neuroscience* 13: 1-18. https://doi.org/10.3389/fnins.2019.01169.

Nastase, Samuel, Ariel Goldstein, and Uri Hasson. 2020. "Keep it real: rethinking the primacy of experimental control in cognitive neuroscience." *Neuroimage* 222: 1-7. https://doi.org/10.1016/j.neuroimage.2020.117254.

Neumann, Michelle M. 2018. "The effects fo a parent-teacher environmental print program on emergent literacy." *Journal of Early Childhood Research* 16 (4): 337-348. https://doi.org/ 10.1177/1476718X18809120.

Newen, Albert, Leon De Bruin, and Shaun Gallagher, eds. 2018. *The Oxford handbook of 4E cognition*. Oxford: Oxford University Press.

Northover, Richard Alan. 2016. "Ecological apocalypse in Margaret Atwood's MaddAddam trilogy." *Studia Neophilologica: A Journal of Germanic and Romance Languages and Literature* 88 (1 [Supplement]): 81-95. https://doi.org/10.1080/00393274.2015.1096044.

O'Brien, Wendy. 2007. "Telling time: literature, temporality and trauma." In *Temporality in life as seen through literature: contributions to phenomenology of life*, edited by Anna-Theresa Tymieniecka, 209-21. Dordrecht: Springer.

Oberauer, Klaus. 2019. "Working memory and attention – a conceptual analysis and review." *Journal of Cognition* 2 (1): 1-23. https://doi.org/10.5334/joc.58.

OED Online. "allude." Oxford University Press. www.oed.com/view/Entry/5497.

---. "approach." Oxford University Press. www-oed-com/view/Entry/9837.

---. "create." Oxford University Press. www.oed.com/view/Entry/44061.

---. "dispersion." Oxford University Press. www-oed-com./view/Entry/55013

---. "morphing." Oxford University Press. www.oed.com/view/Entry/246242.

---. "process." Oxford University Press. www.oed.com/view/Entry/151794

---. "singularity." Oxford University Press. www.oed.com/view/Entry/180179.

Ogden, Thomas H. 2013. *Creative readings: essays on seminal analytic works*. London: Routledge.

Olinger, Andrea R. 2016. "A sociocultural approach to style." *Rhetoric Review* 35 (2): 121-134. https://doi.org/10.1080/07350198.2016.1142930.

Orlando, Monica. 2018. "Neurodiverse self-discovery and social acceptance in Curious Incident and Marcelo in the Real World." *Journal of Literary & Cultural Disability Studies* 12 (3): 321-335. https://doi.org/10.3828/jlcds.2018.25.

Orr, Mark, Christian Lebiere, Andrea Stocco, Peter Pirolli, Bianca Pires, and William G Kennedy. 2019. "Multi-scale resolution of neural, cognitive and social systems." *Computational and Mathematical Organization Theory* 25 (1): 4-23. https://doi.org/https://doi.org/10.1007/s10588-018-09291-0.

Palmer, Christopher. 2014. "Ordinary catastrophes: paradoxes and problems in some recent post-apocalypse fictions." In *Green Planets: Ecology and Science Fiction*, edited by Gerry Canavan and Kim Stanley Robinson, 158-175. Middletown: Wesleyan University Press.

Pearce, Marcus T, Dahlia W Zaidel, Oshin Vartanian, Martin Skov, Helmut Leder, Anjan Chatterjee, and Marcos Nadal. 2016. "Neuroaesthetics: the cognitive neuroscience of aesthetic experience." *Perspectives on Psychological Science* 11 (2): 265-279. https://doi.org/10.1177/1745691615621274.

Pelle, Susan. 2012. "'When is a tulip not a tulip': Grafting, exoticism, and pleasure gardens in Jeanette Winterson's *The PowerBook*." *Frontiers: A Journal of Women Studies* 33 (3): 31-52.

Peplow, David, and Ronald Carter. 2014. "Stylistics and real readers." In *The Routledge handbook of stylistics*, edited by Michael Burke, 440-454. Abingdon: Routledge.

Perry, Menakhem. 1979. "Literary dynamics: how the order of a text creates its meaning [with an analysis of Faulkner's 'A Rose for Emily']." *Poetics Today* 1 (1/2): 35-64 cont 311-361. www.jstor.com/stable/1772040.

Petitmengin, Claire, and Jean-Philippe Lachaux. 2013. "Microcognitive science: bridging experiential and neuronal microdynamics." *Frontiers in Human Neuroscience* 7: 1-6. https://doi.org/10.3389/fnhum.2013.00617.

Pfeiffer, Christian, Nora Hollenstein, Ce Zhang, and Nicholas Langer. 2020. "Neural dynamics of sentiment processing during naturalistic sentence reading." *Neuroimage* 218: 116934-116949. https://doi.org/10.1016/j.neuroimage.2020.116934.

Popova, Yanna. 2016. "Narrativity." In *The Bloomsbury companion to stylistics*, edited by Violeta Sotirova, 488-506. London: Bloomsbury Academic.

Popova, Yanna, and Elena Cuffari. 2018. "Temporality of sense-making in narrative interactions." *Cognitive Semiotics* 11 (1): 1-15. https://doi.org/DOI: 10.1515/cogsem-2018-0007.

Postle, Bradley R. 2021. "Cognitive neuroscience of visual working memory." In *Working memory: the state of the science*, edited by Robert Logie, Valérie Camos and Nelson Cowan, 333-357. Oxford: Oxford University Press.

Prigogine, Ilya. 1997. *The end of certainty: time, chaos, and the new laws of nature*. In collaboration with Isabelle Stengers. New York: The Free Press.

Prigogine, Ilya, and Isabelle Stengers. 1984. *Order out of Chaos: Man's New Dialogue with Nature* Bantam Books.

Prudente, Teresa. 2018. Livid time: time, tenses, and temporal deixis in *Ulysses*. *Journal of Narrative Theory* 48 (1): 1-28. https://doi.org/10.1353/jnt.2018.0000.

Pucci, Joseph 1998. *The Full-Knowing Reader: Allusion and the Power of the Reader in the Western Literary Tradition*. New Haven: Yale University Press.

Pulvermüller, Friedemann, and Luciano Fadiga. 2010. "Active perception: sensorimotor circuits as a cortical basis for language." *Nature Reviews Neuroscience* 11 (5): 351-360. https://doi.org/10.1038/nrn2811.

Qiu, Jiang, Hong Li, Jerwen Jou, Jia Liu, Yuejia Luo, Tingyong Feng, Zhenzhen Wu, and Qinglin Zhang. 2010. "Neural correlates of the ''Aha'' experiences: Evidence from an fMRI study of insight problem solving." *Cortex* 46: 397-403. https://doi.org/10.1016/j.cortex.2009.06.006.

Razumnikva, OM. 2022. "Baseline measures of EEG power as correlates of the verbal and nonverbal components of creativity and intelligence." *Neuroscience and Behavioral Physiology* 52 (1): 124-134. https://doi.org/10.1007/s11055-022-01214-6.

Readers Read. 2003. "An interview with Margaret Atwood." https://www.writerswrite.com/books/interview-with-margaret-atwood-50120031.

Reich, Robert. 1991. What is nation? *Political Science Quarterly* 106 (2): 193-209. https://doi.org/10.2307/2152226.

Rescher, Nicholas. 2013. *Process Philosophical Deliberations*. Frankfurt: Ontos Verlag.

Rescorla, Michael. 2020. "The computational theory of mind." Stanford Encyclopedia of Philosophy https://plato.stanford.edu/archives/fall2020/entries/computational-mind.

Resene, Michelle. 2016. "A 'Curious Incident': representations of autism in children's detective fiction." *Lion and the Unicorn: A Critical Journal of Children's Literature* 40 (1): 81. https://doi.org/10.1353/uni.2016.0000.

Rezayat, Ehsan, Kelsey Clark, Mohammad-Reza A Dehaqani, and Behrad Noudoost. 2022. "Dependence of working memory on coordinated activity across brain areas." *Frontiers in Systems Neuroscience* 15. https://doi.org/10.3389/fnsys.2021.787316.

269

Richardson, Brian. 2006. *Unnatural voices: extreme narration in modern and contemporary fiction*. Columbus: The Ohio State University Press.

Richardson, Kurt, and Paul Cilliers. 2001. Special editor's introduction: what is complexity science? A view from different directions. *Emergence: complexity & organization* 3 (1): 5-23. https://doi.org/10.1207/S15327000EM0301_02.

Rickert, Thomas. 2013. *Ambient rhetoric: the attunements of rhetorical being*. Pittsburgh: University of Pittsburgh Press.

Roli, Andrea. 2015. Cesena.

Runco, Mark A. 2019. "Creativity as a dynamic, personal, parsimonious process." In *Dynamic perspectives on creativity: new directions for theory, research, and practice in education*, edited by Ronald A Beghetto and Giovanni E Corazza, 181-187. Cham: Springer.

Ryan, Marie-Laure. 2006. *Avatars of story*. Minneapolis: University of Minnesota Press.

Sadokierski, Zoë. 2010. "Visual writing: a critique of graphic devices in hybrid novels from a visual communication design perspective." PhD thesis, University of Technology, Sydney.

Savage, Elizabeth. 2018. "Is there a feminist allusion?" *Journal of Modern Literature* 42 (1): 142-162. https://doi.org/10.2979/jmodelite.42.1.10.

Savi, Melina Pereira. 2014. "Jeanette Winterson's *The PowerBook:* the narrator as a cyborg writer who engages in a quantum theory." *Estudos Anglo-Americanos* 42: 86-100.

Schmidt, Jan C. 2011. "Challenged by instability and complexity: questioning classic stability assumptions and presuppositions in scientific methodology." In *Handbook of the Philosophy of Science. Volume 10: Philosophy of Complex Systems.*, edited by Cliff A Hooker, 223-254. Oxford: Elsevier.

Schnek, Peter. 2019. "Henry James and the creative process." In *Secrets of creativity: what neuroscience, the arts, and our minds reveal*, edited by Suzanne Nalbantian and Paul M Matthews, 239-258. New York: Oxford University Press.

Schotter, Elizabeth R, Titus von der Marlsberg, and Mallorie Leinenger. 2018. "Forced fixations, trans-saccadic integration, and word recognition: evidence for a hybrid mechanism of saccade triggering in reading." *Journal of Experimental Psychology: Learning, Memory and Cognition* 45 (4): 677-688. https://doi.org/http://dx.doi.org/10.1037/xlm0000617.

Schwering, Steven C, and Maryellen C MacDonald. 2020. "Verbal working memory as emergent from language comprehension and production." *Frontiers in Human Neuroscience* 14: 1-19. https://doi.org/10.3389/fnhum.2020.00068.

Seborg, Dale E, Thomas F Edgar, Duncan A Mellichamp, and Francis J Doyle. 2016. *Process dynamics and control*. 4th ed. Hoboken: Wiley.

Seibt, Johanna. 2003. "Introduction." In *Process theories: cross diciplinary studies on dynamic categories*, edited by Johanna Seibt, vii-xxiii. Dordrecht: Kluwer Academic Publishers.

---. 2018. "Ontological tools for the process turn in biology." In *Everything flows: towards a processual philosophy of biology*, edited by Daniel J Nicholson and John Dupré, 113-136. Oxford: Oxford University Press.

---. 2020. "Process philosophy." Stanford Encyclopedia of Philosophy. https://plato.stanford.edu/archives/sum2020/entries/process-philosophy/.

Sell, Roger D. 2000. *Literature as communication: the foundations of mediating criticism*. Amsterdam: John Benjamins.

Semino, Elena. 2014. "Pragmatic failure, mind style and characterisation in fiction about autism." *Language and Literature* 23 (2): 141-158. https://doi.org/10.1177/0963947014526312.

Sereno, Sara C, Christopher Hand, Aisha Shahid, Bo Yoao, and Patrick J O'Donnell. 2018. "Testing the limits of contextual constraint: interactions with word frequency and parafoveal preview during fluent reading." *Quarterly Journal of Experimental Psychology* 71 (1): 302-313. https://doi.org/10.1080/17470218.2017.1327981.

Shakespeare, William. 1883. *The works of Willam Shakespeare*. 3 vols. Vol. 2. edited by Charles Knight. London: George Routledge and Sons.

Shannon, Claude. 1948. "The mathematical theory of communication." *Bell System Technical Journal* 27: 379-423.

Shannon, Claude, and Warren Weaver. 1949. *The mathematical theory of communication*. Chicago: University of Illinois Press.

Sharifian, Farzad. 2008. "Distributed, emergent cultural cognition, conceptualisation and language." In *Body, language and mind volume 2: sociocultural situatedness*, edited by Roslyn M Frank, René Dirvan, Tom Ziemke and Enrique Bernárdez, 109-136. Berlin: Mouton de Gruyter.

Shaw, Janice Marion. 2016. "The curious transformation of boy to computer." *M/C Journal* 19 (4): n.p. http://journal.media-culture.org.au/index.php/mcjournal/article/view/1130.

Shelley, Mary Wollstonecraft. 2013. *Frankenstein; Or, The Modern Prometheus*. Urbana: Project Gutenberg. 1818.

Shen, Wangbin, Yu Tong, Yuan Yuan, Huija Zhan, Cahng Liu, Jing Luo, and Houde Cai. 2018. "Feeling the insight: uncovering somatic markers of the 'aha' experience." *Applied Psychophysiology and Biofeedback* 43 (1): 13-21. https://doi.org/10.1007/s10484-017-9381-1.

Shipp, Nicholas J, and Frédéric Vallée-Tourangeau. 2019. "Cognition can be distributed, extended, enacted, embodied and systemic (but does it matter which?)." *British Psychological Society Cognitive Section Bulletin* 4: 1-6.

Sim, Lorraine. 2010. *Virginia Woolf: patterns of ordinary experience*. London: Routledge.

Slowiaczek, ML, and C Clifton. 1980. "Subvocalization and reading for meaning." *Journal of Verbal Learning and Verbal Behavior* 19 (5): 573-582. https://doi.org/10.1016/S0022-5371(80)90628-3.

Song, Hayoung, Bo-yong Park, Hyunjin Park, and Won Mok Shim. 2021. "Cognitive and neural state dynamics of narrative comprehension." *Journal of Neuroscience* 41 (43): 8972-8990. https://doi.org/10.1523/JNEUROSCI.0037-21.2021.

Spence, Charles. 2020. "The multisensory experience of handling and reading books." *Multisensory Research* 30: 1-27. https://doi.org/10.1163/22134808-bja10015.

Stewart, Garrett. 1990. *Reading voices: literature and the phonotext*. Berkeley: University of California Press.

Stewart, Ian. 1989. *Does God play dice? The mathematics of chaos*. Oxford: Blackwell Publishing.

Stockwell, Peter. 2020. "Literary dialect as social deixis." *Language and Literature* 29 (4): 358-372. https://doi.org/10.1177/0963947020968661.

Stockwell, Peter, and Sara Whitely. 2014. "Introduction." In *The Cambridge handbook of stylistics*, edited by Peter Stockwell and Sara Whitely, 1-9. Cambridge: Cambridge University Press.

Stubbs, Michael. 2014. "Quantitative methods in literary linguistics." In *The Cambridge handbook of stylistics*, edited by Peter Stockwell and Sara Whitely, 46-62. Cambridge: Cambridge University Press.

Suvin, Darko. 1979. *Metamorphoses of science fiction: on the poetics and history of a literary genre*. New Haven: Yale University Press.

Swift, Jonathan. 1967. *Gulliver's Travels*. edited by Peter Dixon and John Chalker. Harmondsworth: Penguin. 1726.

Szolláth, Dávid. 2018. "Inventory of magic textual construction of the unnatural in Hungarian postmodern fiction." *Neohelicon* 45 (2): 461-477. https://doi.org/10.1007/s11059-018-0461-x.

Taylor, Jessica Nelson, and Charles A Perfetti. 2016. "Eye movements reveal readers' lexical quality and reading experience." *Reading and Writing* 29 (6): 1069-1103. https://doi.org/10.1007/s11145-015-9616-6.

Tenenberg, Josh, and Maria Knobelsdorf. 2014. "Out of our minds: a review of sociocultural cognition theory." *Computer Science Education* 24 (1): 1-24. https://doi.org/10.1080/08993408.2013.869396.

Terhune, Devin B, Madeleine Croucher, David Marcusson-Clavertz, and James S P McDonald. 2017. "Time contracts and temporal precision declines when the mind wanders." *Journal of Experimental Psychology: Human Perception and Performance* 43 (11): 1864-1871. https://doi.org/10.1037/xhp0000461.

Thielemann, Nadine. 2020. "Allusive talk: playing on indirect intertextual references in Russian conversation." *Journal of Pragmatics* 155: 123-134. https://doi.org/10.1016/j.pragma.2019.10.012.

Thom, René. 1975. *Structural stability and morphogenesis: an outline of a general theory of models*. Translated by D H Fowler. Reading, Massachusetts: W.A. Benjamin. 1972.

Thomasson, Amie. 1999. *Fiction and metaphysics*. Cambridge: Cambridge University Press.

Thompson, Jacqueline M, Ben Teasdale, Sophie Duncan, Evert van Emde Boas, Felix Budelman, Laurie Maguire, and Robin IM Dunber. 2018. "Individual differences in transportation into narrative drama." *Review of General Psychology* 22 (2): 210-219. https://doi.org/10.1037/gpr0000130.

Thrift, Nigel. 1999. "The place of complexity." *Theory, Culture & Society* 16 (3): 31-69. https://doi.org/10.1177/02632769922050610.

Tian, Fang, Yuling Hou, Wenfeng Zhu, Arne Dietrich, Qinglin Zhang, Wenjing Yang, Qunlin Chen, Jiangzhou Sun, Qiu Jiang, and Guikang Cao. 2017. "Getting the joke: insight during humor comprehension- evidence from an fMRI study " *Frontiers in Psychology* 8. https://doi.org/10.3389/fpsyg.2017.01835.

Tik, Martin, Ronald Sladky, Caroline Di Bernardi Luft, David Willinger, André Hoffmann, Michael J Banissy, Joydeep Bhattacharya, and Christian Windischberger. 2018. "Ultra-high-field fMRI insights on insight: Neural correlates of the Aha!-moment." *Human Brain Mapping* 39: 3241-3252. https://doi.org/10.1002/hbm.24073.

Traub, Courtney. 2018. "From the Grotesque to Nuclear-Age Precedents: The Modes and Meanings of Cli-fi Humor." *Studies in the Novel* 50 (1): 86-107. https://doi.org/10.1353/sdn.2018.0005.

Troscianko, Emily T. 2017. "Feedback in reading and disordered eating." In *Cognitive Literary Science: Dialogues between Literature and Cognition*, edited by Michael Burke and Emily T Troscianko, 169-194. Oxford: Oxford University Press.

Tsakona, Villy. 2020. "Scrutinising intertextuality in humour: moving beyond cultural literacy and towards critical literacy." *The European Journal of Humour Research* 8 (3): 40-59. https://doi.org//10.7592/EJHR2020.8.3.Tsakona2.

Underwood, Ted. 2018. "Why literary time is measured in minutes." *ELH: English Literary History* 85 (2): 341-365. https://doi.org/10.1353/elh.2018.0013.

Urry, John. 2005. "The complexity turn." *Theory, Culture & Society* 22 (5): 1-14.

Valotka, Audrius. 2016. "The role of the addressee's creativity in interpreting allusions " *Lietuvių kalba* 10: 1-42 https://doi.org/10.15388/LK.2016.22595.

---. 2017. "Allusion in a nutshell." *Lithuanian Language* 11: 1-20. https://doi.org/10.15388/Lietkalb.2016.10.9929.

van Dijk, Ludger. 2020. "Temporalizing ontology: a case for pragmatic emergence." *Synthese* Published ahead of print: 1-14. https://doi.org//10.1007/s11229-020-02615-1.

van Geert, Paul, and Naomi de Ruiter. 2022. *Toward a process approach in psychology: stepping into Heraclitus' river*. Cambridge: Cambridge University Press.

van Gelder, Tim. 1998. "The dynamical hypothesis in cognitive science." *Behavioural and Brain Sciences* 21: 1-14.

Vernay, Jean François, ed. 2021. *The rise of the Australian neurohumanities: conversations between neurocognitive research and Australian literature*. New York: Routledge.

---. 2022. *Neurocognitive interpretations of Australian literature: criticism in the age of neuroawareness*. New York: Routledge.

Vilhauer, Ruvanee P. 2016. "Inner reading voices: an overlooked form of inner speech." *Psychosis* 8 (1): 37-47. https://doi.org/10.1080/17522439.2015.1028972.

---. 2017. "Characteristics of inner reading voices." *Scandinavian Journal of Psychology* 58 (4): 269-274. https://doi.org/10.1111/sjop.12368.

Vogelzang, Margreet, Petra Hendriks, and Hedderik van Rijn. 2016. "Pupillary responses reflect ambiguity resolution in pronoun processing." *Language, Cognition and Neuroscience* 31 (7): 876-885. https://doi.org/10.1080/23273798.2016.1155718.

Wagner-Lawlor, Jennifer. 2009. "Lusting toward utopia: Jeanette Winteron's utopian counter-spaces from *The Passion* to *The PowerBook*." In *Winterson narrating time and space*, edited by Margaret JM Sönmez and Mine Özyurt Kiliç, 65-84. Newcastle upon Tyne: Cambridge Scholars Publishing.

Wales, Katie. 2014. "The stylistic tool-kit: methods and sub-disciplines." In *The Cambridge handbook of stylistics*, edited by Peter Stockwell and Sara Whitely, 32-45. Cambridge: Cambridge University Press.

Walia, Chetan. 2019. "A dynamic definition of creativity." *Creativity Research Journal* 31 (3): 237-247. https://doi.org//10.1080/10400419.2019.1641787.

Walsh, Richard. 2018. "Narrative theory for complexity scientists." In *Narrating complexity*, edited by Richard Walsh and Susan Stepney, 11-25. Cham: Springer.

Wang, Rui-Sheng. 2013. "Perturbation." *Encyclopedia of Systems Biology,* edited by Werner Dubitzky, Olaf Wolkenhauer, Kwang-Hyun Cho and Hiroki Yokota, 1680-1681. New York, NY: Springer New York. https://doi.org/10.1007/978-1-4419-9863-7_385.

Warren, Caleb, Adam Barsky, and A Peter McGraw. 2021. "What makes things funny? An integrative review of the antecedents of laughter and amusement." *Personality and Social Psychology Review* 25 (1): 41-65. https://doi.org/10.1177/1088868320961909.

Waugh, Patricia. 1984. *Metafiction: the theory and practice of self-conscious fiction*. London: Routledge.

Weinbaum, David R. 2015. "Complexity and the philosophy of becoming." *Foundations of Science* 20: 283-322. https://doi.org/10.1007/s10699-014-9370-2.

Weiss, A F. 2020. "The Information Gathering Framework: a Cognitive Model of Regressive Eye Movements during Reading." *Journal of Eye Movement Research* 13 (4): 1-23. https://doi.org/10.16910/jemr.13.4.4.

Wells, H G. 1896. *The island of Dr Moreau*. Garden City: Garden City Publishing Company.

Wessel, Jan. 2018. "A neural mechanism for surprise-related interruptions of visuospatial working memory." *Cerebral Cortex* 28 (1): 199-212. https://doi.org/10.1093/cercor/bhw367.

Widdowson, H G. 2004. *Text, context, pretext: critical issues in discourse analysis*. Oxford: Blackwell Publishing.

Willems, Roel M, Samuel Nastase, and Branka Milivojevic. 2020. "Narrative for neuroscience." *Trends in Neuroscience* 43 (5): 271-271. https://doi.org/10.1016/j.tins.2020.03.003.

Williams, Nicholas. 2021. Deixis and indexicals. In *The international encyclopedia of linguistic anthropology*, edited by J Stanislaw: John Wiley & Sons.

Winterson, Jeanette. 2001. *The.PowerBook*. London: Vintage.

Wojciehowski, Hannah, and Vittorio Gallese. 2022. "Embodiment: embodied simulation and emotional engagement with fictional characters." In *The Routledge companion to literature and emotion*, edited by Patrick Colm Hogan, Bradley J Irish and Lalita Pandit Hogan, 61-73. Abingdon: Routledge.

Woolf, Virginia. 1960. *The waves*. London: Hogarth Press. 1931.

---. 1977. *To the lighthouse*. Glasgow: Panther Books. 1927.

---. 2015. *Orlando*. edited by Michael H Whitworth. Oxford: Oxford University Press. 1928.

Wright, Laura. 2019. "Cli-Fi: environmental fiction for the Anthropocene." In *New approaches to the twenty-first-century Anglophone novel*, edited by Sibylle Baumbach and Birgit Neumann, 99-116. Cham: Palgrave Macmillan.

Xu, Jiang, Stefan Kemeny, Grace Park, Carol Frattali, and Allen Brauna. 2005. "Language in context: emergent features of word, sentence, and narrative comprehension." *Neuroimage* 25: 1002–1015. https://doi.org/10.1016/j.neuroimage.2004.12.013.

Yao, Bo. 2021. "Mental simulations of phonological representations are causally linked to silent reading of direct versus indirect speech." *Journal of Cognition* 4 (1): 1-14. https://doi.org/10.5334/joc.141.

Yao, Bo, and Christoph Scheepers. 2011. "Contextual modulation of reading rate for direct versus indirect speech quotations." *Cognition* 121 (3): 447-453. https://doi.org/10.1016/j.cognition.2011.08.007.

---. 2018. "Direct speech quotations promote low relative-clause attachment in silent reading of English." *Cognition* 176: 248-254. https://doi.org/10.1016/j.cognition.2018.03.017.

Yarkoni, Tal, Nicole K Speer, and Jeffrey Zacksa. 2008. "Neural substrates of narrative comprehension and memory." *NeuroImage* 41 1408–1425. https://doi.org/10.1016/j.neuroimage.2008.03.062.

Zeman, Adam, Matthew MacKisack, and John Onians. 2018. "The eye's mind: visual imagination, neuroscience and the humanities." *Cortex* 105: 1-3. https://doi.org/https://doi.org/10.1016/j.cortex.2018.06.012.

Zhang, Meichao, Aitao Lu, and Bert H Hodges. 2019. "Lifting, tasting and carrying: the interaction of magnitude and valence effects in time perception." *Acta Psychologica* 193: 1-10. https://doi.org/10.1016/j.actpsy.2018.11.010.

Zhang, Meichao, Dominika Varga, Xuiyi Wang, Katya Krieger-Redwood, Andre Gouws, Jonathon Smallwood, and Elizabeth Jefferies. 2021. "Knowing what you need to know in advance: the neural processes underpinning flexible semantic retrieval of thematic and taxonomic relations." *Neuroimage* 224: 117405-117422. https://doi.org/10.1016/j.neuroimage.2020.117405.

Zhou, Peiyun, and Kiel Christianson. 2016. "I 'hear' what you're 'saying': auditory perceptual simulation, reading speed, and reading comprehension." *The Quarterly Journal of Experimental Psychology* 69 (5): 972-996. https://doi.org/10.1080/17470218.2015.1018282.

Zhu, Wenfeng, Qunlun Chen, Lingxiang Xia, Roger E Beaty, Wenjing Yang, Fang Tian, Jiangzhou Sun, Guikang Cao, Qinglin Zhang, Xu Chen, and Jiang Qiu. 2017. "Common and distinct brain networks underlying verbal and visual creativity." *Human Brain Mapping* 38 (4): 2094–2111. https://doi.org/10.1002/hbm.23507.