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Kortekallio, Kaisa

2022-06

Kortekallio , K 2022 , ' Dancing with the Posthumans : Readerly Choreographies and More-than-Human Figures ' , Partial Answers , vol. 20 , no. 2 , pp. 277-295 . <https://doi.org/10.1353/pan.2022.0016>

<http://hdl.handle.net/10138/346576>

<https://doi.org/10.1353/pan.2022.0016>

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Dancing with the Posthumans: Readerly

Choreographies and More-than-Human Figures*

Kaisa Kortekallio

University of Helsinki

Paolo Bacigalupi's short story "The People of Sand and Slag" (2008) features characters who are *posthuman* in the transhumanist sense of the word: their bodies are designed and bio-engineered from scratch to ensure perfect health and resistance to damage.¹ The posthumans guard an industrial mining area from intruders. As their diet consists primarily of the ubiquitous toxin-saturated mud and sand, they are truly omnivorous. One of the characters even explicitly declares: "We can eat anything. We're the top of the food chain" (Bacigalupi 55). In this grim storyworld, the "food chain" is rather short, as there are practically no unmodified organisms left alive. Human bodies have been completely adapted to a drastically impoverished ecosystem that seems to consist entirely of ore, oil, the hi-tech gadgets manufactured from them, and the posthumans themselves. Such an ecosystem can be seen as the logical ending point of Anthropocene processes — a

* This essay was written during a research period in the consortium project *Instrumental Narratives: The Limits of Storytelling and New Story-Critical Narrative Theory* (2018–2022), funded by the Academy of Finland (no. 315052); it was finalized during a research period in The School of Resource Wisdom (JYU.Wisdom) at the University of Jyväskylä.

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world of humans, for humans, where the need for other forms of life has been

eliminated through technological means.

The above description might suggest that Bacigalupi's short story has dystopian and satirical features, and perhaps an environmentalist agenda. However, these modes and themes are not clear from the start. Rather, the narrative begins with an exciting description of action that creates an expectation for action-adventure entertainment. The narrator-focalizer is roused from his immersion in a video game and sent on a surveillance mission. Together with his teammates, he dons a set of fantastic techno-gear ("TS-101 and slashbangs," "impact exoskeleton," "bandoleers of surgepacks," 49) and boards a flying vehicle.

Lisa overrode the computers and forced the ship back down against the soil, driving us so low I could have reached out and dragged my hands through the broken scree as we screamed over it. . . . Ahead, a tailings ridge loomed. We ripped up its face and dropped sickeningly into the next valley. The Hentasas shuddered as Lisa forced them to the edge of their design buffer. We hurtled up and over another ridge. Ahead, the ragged cutscape of mined mountains stretched to the horizon. We dipped again into mist and skimmed low over another catchment lake, leaving choppy wake in the thick golden waters. (50)

The passage mimics the thrill of an action film or a first-person shooter video game, thereby producing a generic frame for reading. As Christy Tidwell (96–97) has noted in her New Materialist reading of the story, the virtual action of gameplay and the real-world action of the characters are described in the same "matter-of-fact"

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language that highlights the interchangeability of the virtual and the actual. The characters, the opening situation, and the narrative form and style all align the story with the genres of action adventure or cyberpunk and prime readers to seek the affective pleasures of corporeal excitement and identification with a heroically capable, technologically augmented body. In just a few lines, the narrative also constructs a dynamic juxtaposition between the protagonists and the terrain. Their violent action, which consists of overriding, forcing, ripping, and dropping, is directed “against the soil” in a hostile manner. These metaphors conjure up a rough experience that is full of adrenaline. They also extend beyond the narrative perspective to encompass the postnatural aesthetics of the storyworld (cf. Tidwell 100).

This initial reading strategy of heroic fantasy soon loses its viability. Ending the introductory scene, the posthumans plummet from the vehicle onto the ground, smashing their exoskeletons and limbs into pieces. This is portrayed as standard procedure, with no emphasis on the demolition of their bodies. They rise from the ground, instantly heal, and get back to work. Despite their heroic air, the protagonists turn out to be complacent components in techno-industrial machinery, programmed for casually violent border-control and bonus-hunting. As the emotions raised by the narrative become ever grimmer, the readers’ thrill is short-lived.

In this essay, I propose that to properly appreciate the thematic import and narrative strategies of works such as “The People of Sand and Slag,” scholars need to both embrace and critically analyze the bodily affectivity of fictional posthuman figures. While theories of bodily reading and affect have been widely developed in recent years, there are still plenty of unanswered questions on the side of

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methodology. One line of questioning is inspired by the “material turn” in the humanities: what happens to reading if we take seriously the suggestions of feminist and New Materialist scholars that bodies, human and other, are always exposed and porous to the influence of other bodies — including influences that are toxic and damaging (see, e.g., Alaimo; Neimanis)? How should narrative studies approach narratives that strategically employ toxic and damaging devices, such as the pervasive violence in “The People of Sand and Slag” (cf. Sobchack)? How could we read such violence through the notions of material agency and embodied cognition without losing sight of its fictionality?

Tidwell (108) suggests that the story argues for “an ethical and embodied posthumanism” by revealing what happens in its absence, and her analysis demonstrates how the thematic entanglement of technology and embodiment matters for the ethical responses of readers. My take on the story complements this interpretation by considering readerly choreographies — iterative patterns of bodily feelings evoked in reading. I propose that such a method may bring more nuance to our conceptions of human corporeality in fiction and also take reading beyond conventional assumptions about human bodies, toward more-than-human experientiality.

Reading Posthuman Bodies

Reading bodies are impressed by fictional bodies. This is more complex than it seems. Cognitive literary studies focusing on embodied cognition have sought to explain the phenomenon through concepts such as empathy, imitation, simulation, and kinesis. As Alexa Weik von Mossner explains, readers perform “embodied simulations” of narrative environments and events. Such performances will be

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“idiosyncratic to some degree, because they are fueled by [the readers’] own

personal experiences, by their historical and socio-cultural contexts, and . . . by their

immediate reading environments”; however, they also have much in common

because they respond to the same textual cues and arise from shared “physiological

processes that allow readers to entertain such imaginings are similar in all humans”

(Weik von Mossner 2017a: 23; see also Caracciolo 2014; Kuzmičová 2014; 2016).

Studies of readerly cognition often assume that interpretation utilizes cognitive processes that are developed in everyday life: readers attune to fictional bodies much as they would to actual people. Neuroscientific explanations of such attunement are founded on the functioning of mirror neurons, which fire in the same way regardless of whether the stimulus is actual or fictional (see, e.g., Gallese). As many critics (e.g. Kuzmičová 2014; Weik von Mossner 2017a) have pointed out, arguments based on mirror-neuronal activity tend to bypass the aesthetic aspects of fictional narratives, including their conventional limitations. Fictional bodies, whether posthuman or not, do not accurately represent actual people, and encounters with them are not analogous with encounters with actual people. This does not mean that attuning to fictional bodies should be considered in isolation from attuning to actual bodies. On the contrary: reading and everyday life are in a dynamic, reciprocal relationship. As reading minds construct fictional bodies based on textual and contextual prompts, which are conditioned by ideologies as well as aesthetic and rhetorical conventions, they also develop their modes of attuning to actual bodies (cf. Rabinowitz 5).

In most contemporary literature, the conventions of constructing fictional bodies tend to be both *anthropocentric* and *humanist*: they invite readers to perceive fictional worlds through the perspectives of human individuals, and they construct

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those human individuals as subjects that do not mesh with nonhuman entities. In

other words, contemporary literature establishes and maintains the figure of

Anthropos: the humanist vision of human subjectivity (see Braidotti; Hellstrand).

Within this ideological frame, literature tends to fill anthropocentric and

antropomorphic expectations. For example, readers following the anthropomorphic

principle of minimal departure (cf. Ryan) are seldom let down by the narratives

they read: even if the text does not explicitly equip the character with four limbs, a

head, and a working gut, they imagine a person who is both wholly embodied and

able-bodied, and nothing in the narrative suggests that they might be wrong. In his

Strange Narrators, Marco Caracciolo explores this phenomenological and cognitive

dynamic:

literary narrative can ask readers to perceive a pattern of continuity and deviation between their own self and the self they attribute to a fictional character. This pattern involves continuity insofar as what is being woven is a recognizably human self: it is reassuringly familiar, it speaks in a human voice, it evokes images of everyday interaction, conversation, even intimacy. But at the same time the pattern involves deviation: what readers hear from the character is at odds — sometimes subtly, sometimes dramatically — with what they would wish or expect to hear. (2016: xv)

In my reading of Bacigalupi's short story, I explore how a science fiction narrative can draw on such patterns of "continuity and deviation" to challenge the limits of anthropocentrism and humanism. Whereas Caracciolo (2016) focuses on voices and narration, my focus is on the bodily affectivity and action of fictional figures. I refer

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to the human-like entities I discuss as “figures” rather than “characters.” Instead of searching the text for fictional minds, personas, or voices, I want to foreground the material, affective, and perceptual impact that fictional bodies have on readerly bodies — the “carnal responses” they elicit, in Vivian Sobchack’s (49) terms. This perspective is especially important in the analysis of texts that thematize posthuman or more-than-human corporeality as well as habitual patterns of reading. The term “figure” thus extends theories and methods of attuning to fictional bodies to these kinds of corporeality.

Posthuman bodies can meet readerly expectations about actual humans in some ways and challenge them in others. Bodies might feature four limbs, a head, and a working gut, but they might also contain machine parts (prosthetic enhancements or additions in the bodies of Terminator, RoboCop, or the posthuman figures of the Netflix show *Altered Carbon*), heads that sprout alien appendices (Octavia E. Butler’s *Xenogenesis* series), or a superhuman digestive system (“The People of Sand and Slag”). The physiological processes of posthuman bodies might also deviate from readers’ experiential backgrounds: they might communicate through scent (Greg Bear’s *Darwin’s Radio*), operate machinery with four hands (Lois McMaster Bujold’s *Falling Free*), or grow new limbs in a matter of minutes (“The People of Sand and Slag”).

For this reason and others, readers of science fiction cannot fully surrender to the principle of minimal departure or other conventional expectations of fictional bodies. Yet they engage — intellectually, affectively, corporeally. Philosopher Donna Haraway, who has often foregrounded science fiction as a particularly fruitful site for exercising the bodily skills of reading and thinking, calls this attitude “both generous and suspicious” (326). Haraway describes the receptive

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posture of readers of science fiction in corporeal terms: they are “motivate[d] to engage actively” and to make the stories “move” (ibid.). In this model of reception, the reader is both conscious of the fictionality and artifice involved in the experience of engaging with a science fiction narrative (“suspicious” of it) and able to generously accept its experiential affordances.

Suspicion is another reason why fictionality matters to bodily reading.

While I agree with Weik von Mossner (2017a: 26) that the issue of fictionality is irrelevant to the basic dynamic of embodied simulation — that readerly bodies respond to narrative cues as they would to phenomena in the actual world — I want to stay with the significance that fictionality has for readerly experience as a whole. On the level of mirror-neuronal activity, readers respond to posthuman bodies as they would to real (albeit strange) bodies; yet this affective resonance is also modulated by their awareness of artifice, by generic conventions, and by aesthetic, contextual, and ideological frames. Merja Polvinen (2017), who has explained science fiction reading strategies in narratological terms, suggests that many texts belonging to this genre invite readers to adopt a “double vision of fiction”: engaging emotionally and corporeally with the narrative and its elements while also remaining aware of the artifice involved. Furthermore, Polvinen suggests that both empirically and theoretically-oriented studies of literature should “sharpen their own conceptual and theoretical apparatus” the better attend to reading as a skillful activity that includes such complex cognitive strategies (148).

Taking such engagement with fictional bodies as a point of departure, the rest of this essay presents some tools that may help sharpen the concepts under consideration. The characteristic experiential threads of the reading practice I propose are patterned responses akin to dancing or piloting a plane. Enacting the

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experiential patterns of posthuman bodies, readers perform complex moves of surrender and resistance that are both generous and suspicious.

Readerly Choreography

In order to develop a materialist, posthumanist methodology for narrative studies, I turn to the narrative construction of bodily experientiality and affect. Feminist narratologists have prepared the ground: drawing on the work of Judith Butler, Robyn Warhol describes narrative techniques as “devices that work through readers’ bodily feelings to produce and reproduce the physical fact of gendered subjectivity” (24). In Warhol’s model, the body is understood “not as the location where gender and affect are expressed, but rather as the medium through which they come into being” (10). For Warhol, feelings are always to some extent socially and culturally constructed, and bodily events such as crying over a sentimental novel are considered in terms of *generating* rather than *expressing* feelings. In this way, emotional engagement with fiction reproduces affective patterns that are both conventional and gendered — and participates in the ongoing production of gendered subjectivity. Here, I extend Warhol’s work to consider how reading both produces anthropocentric patterns of subjectivity and challenges them by suggesting posthuman and more-than-human patterns.

In reading, figures — understood as textual and contextual patterns — are incorporated by readerly bodies: readers mentally simulate (or enact) their actions, whether they decide to do so or not.² This means that it matters not only what *kinds* of bodies are represented in the narratives we encounter, but also what those bodies *do*. While many other aspects of reading allow for conscious choice and interpretation, the basic level of bodily attunement to the actions of fictional bodies

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mostly takes place on a nonconscious level. In a literal and fundamental sense, readers are always affected by fictional figures even when such affects are not consciously experienced. We can conceptualize this form of affective resonance as kinesis: the sensorimotor understanding of other human bodies, which is formed in perceiving their materiality and movement (Bolens 2).³

While many processes relevant to kinesis are nonconscious, the border between conscious and nonconscious cognition is somewhat fuzzy. Guillemette Bolens, who has developed a literary-analytical model for reading bodily movement and gestures in narrative, claims that the understanding of other bodies can be either conscious or unconscious depending on the moment. This means that some part of nonconscious bodily affect can be brought into the light of consciousness through amplification. Attending to bodily aspects of reading, in first-person experience, is one way to “slow down” the kinesic and affective effects of reading that happen slightly faster than conscious reflection (Cave 41). For poet and critic Tenney Nathanson, “kinetic identifications” in reading are moments of heightened awareness, in which “some particular motion or gesture seems to impinge on us with special sharpness, shooting a gap” (396). As cognitive literary critic Terence Cave puts it,

once one begins to notice such effects in literature and indeed elsewhere, reading becomes subtly different: kinesic reading brings to the surface something you always already felt when you read the text properly, but somehow ignored for the sake of supposedly “higher,” more intellectual or aesthetic pleasures. (29)

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Some bodily feelings are too vague, weak, or irrelevant for conventionally trained sensoria. Focusing on the iterative patterns of readerly choreography suggested by the narrative, we can amplify such bodily feelings. Fiction provides plenty of examples of such patterns, for instance the exciting corporeal pleasures of reading action-adventure stories, the skin-crawling dread produced by horror films, and the tides and ebbs of arousal associated with serial drama and romance. Readerly choreography can also be extended to include conscious, practical attention to iterative experiential patterns. It thus becomes a methodological device serving to amplify the kinesic experientiality of the narrative.

The notion of readerly choreography builds on feminist narratology and theories of embodied cognition, but its central dynamic is best explained using the enactivist terms of Alva Noë. Noë (see also Varis in this issue) argues that art and philosophy can stop our habitual organized activities and display them to us. While the general idea has been presented by philosophers and theorists of aesthetic experience from Shklovsky to Dewey, Noë's model provides a corporeal and performative framework for considering the cognitive processes of familiarization and defamiliarization. His primary example is the relationship between dance and choreography.

While dancing is natural to humans, as an organized activity that they are "lost in," choreography is designed to induce reflection (Noë 14). A new choreography can prevent dancers from becoming absorbed in dancing by making them consciously reflect on this practice. For Noë, dancing, like other organized activities, is a "level 1" activity. Choreography, like other artistic and philosophical practices, is a "level 2" activity (29). Importantly, however, level 2 affects level 1

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not only by stimulating reflection, but also by informing the habitual patterns of

activity. Noë suggests that choreography

loops back down and shapes how we think about dancing, and thus how we dance, even when we are by ourselves or in our most intimate settings. In a world in which dance has been *represented*, it is not generally possible to dance in a way that is insulated from dance's image, that is, from choreography's model of ourselves as dancing. Watch people dance, and you see them perform; they cite and sample the postures, attitudes, steps, and styles that they have consumed. It is as if their spontaneous, free, untutored forays into dancing are shaped by a culturally shared motion bank.

(31)

Noë's ideas about dancing and choreography can be adapted to the practice of reading. I propose that all narratives, intentionally or not, suggest experiential and affective patterns of enactment. In most cases, enacting such patterns feels natural, and readers "go with the flow," aligning themselves with characters and immersing in the events. Readers "perform the moves" without realizing that those moves are informed by the conventions of narrative production and reception. Thus, they draw from a repertoire of patterns that resembles Noë's "culturally shared motion bank."

As literary scholars (e.g. Rabinowitz) have been arguing for decades, the cultural construction of narrative conventions, affective patterns included, is a political matter. However, cultural construction should not be considered merely at the level of social structures or ideologies — rather, the patterns of enactment Noë

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describes emerge from the material conditions of experience. As feeling bodies, readers continuously draw on their materially embedded experiential backgrounds (see Scarry; Warhol; Hogan; Caracciolo 2014; Weik von Mossner 2017a: 27).

Cognitive scientist Giovanna Colombetti also argues that “kinetic portrayals” in visual arts and music “reproduce bodily movements analogous to those we often experience in our body when we feel the portrayed emotions,” for example that “a piece of music that feels ‘angry’ (think heavy metal) . . . feels so because it mimics the kinesthetic character of anger, with its sense of bodily upsurge and frantic impulse to shake and kick” (120). Readerly choreographies can also mimic and replicate the kinesthetic character of feelings and emotions. As Warhol suggests, the daily construction of bodily and affective subjectivity takes place through this iterative dynamic (see also Sobchack).

Sometimes, as with “The People of Sand and Slag,” a narrative suggests a readerly choreography that turns our attention to the affective and corporeal dynamics of reading. The emergence of such reflective moments does not necessarily lead to disengagement from the narrative whereby readers stop feeling and shift completely to a detached analytical mode of reading (cf. Warhol; Polvinen). On the contrary, the kind of reflective engagement that readerly choreographies suggest requires readers to feel with the narrative. The notion of choreography provides a better grasp of the iterative experiences of engaging with genre-typical kinesis. As with familiar dances that “cultivate different forms of bodily awareness” (Colombetti 164), with familiar genres we do not necessarily notice that we are performing coded movements — not until something in the music, or the text, changes. Even if we realize that our movement is coded (as when

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to experience the affects it produces.

The following reading of Bacigalupi's short story demonstrates how the narrative invites readers to enact the material and bodily movements of posthuman figures, and thus temporarily reorganizes the habitual patterns of their perception, attention, and feeling. The reading also discusses bodily attunement to nonhuman bodies through the notion of kinetics.

Paolo Bacigalupi's "The People of Sand and Slag"

Bacigalupi's fiction uses time-worn stock types of popular fiction, from artificial girls and cyborg gunmen to cunning oriental merchants, and thematizes the ethically problematic effects of such figures.⁴ It is highly affective in its frequent descriptions of material events, strange bodies, violence, and action, and has been previously studied in the contexts of cyberpunk and New Materialism (Tidwell), young adult climate fiction (Weik von Mossner 2017b), and the affective politics of genetic modification (Selisker). Bacigalupi's human figures tend to be as objectified and instrumentalized as cattle, broiler chicken, or genetically-modified corn. These instrumentalized figures generate disturbing bodily feelings, unsettle the readerly choreographies of popular fiction, and open avenues for more-than-human reading.

"The People of Sand and Slag" is one of Bacigalupi's earliest publications, and it sheds light on the stylistic choices in his later, better known works such as *The Windup Girl* (2009), *The Water Knife* (2015), and the *Ship Breaker* trilogy (2010–2017). As noted above, the main figures inhabiting the story's techno-industrial milieu are three "tactical defense responders" who guard industrial mining grounds from intruders — usually by killing or "slagging" them on the spot.

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The story calls attention to the habitual actions of these posthuman figures: playing games, eating sand and mud, casually modifying their bodies with packs of blades and spikes, routinely checking the premises of the mine, and equally routinely “slagging” living creatures with the naturalized assumption that they are expendable. The routinized quality of these actions is communicated by way of simple statements with no emphasis: “We ate sand for dinner” (53); “After dinner, we sat around and sharpened Lisa’s skin” (54). This is presented in a scene portraying a familiarized, even domestic night at the home base: “It was comforting to hear those machines cruising back and forth all day. Just you and the bots and the profits, and if nothing got bombed while you were on duty, there was always a nice bonus” (54). For the protagonist, the rumble of industrial machinery is the sound of home.

“The People of Sand and Slag” is the kind of science fiction that invites Haraway’s “generous and suspicious” receptive posture. Enacting the posthuman bodily routines of these action figures, readers are encouraged to go with the flow of a genre-typical readerly choreography: the rush of the vehicle and the cut of the blades on the self-healing skin. This pattern extends to enjoying the design of the story itself: its skillful manipulation of genre tropes, its vivid language, its grim imagery. The artifice of the fiction is foregrounded as a source of brutal aesthetic enjoyment. As Abigail Nussbaum (2008) has pointed out in her review of Bacigalupi’s collection *Pump Six and Other Stories*, “The People of Sand and Slag” is blatantly a “dead dog” story that uses the cheapest tricks in the writers’ technical manual and does not even try to hide it.

However, the short story not only evokes conventional patterns of affective response but also thematizes them. It does so by using both familiarizing and

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defamiliarizing techniques. The everyday frame of posthuman routines serves a twofold purpose: with its plain and matter-of-fact style and conventional narrative form, it invites readers to participate in a domestic atmosphere — to accept eating sand and cutting one's skin as everyday activities (Tidwell 96). Yet the material affectivity of such actions defamiliarizes that routine. In my reading experience, enacting the posthumans' bodily actions generates diverse bodily feelings, ranging from the thrill of the initial scene to awe, disgust, and, after repeated descriptions of violent and unsavory acts, sensory numbing. While the readerly choreography of the story invites readers to adopt the position of a posthuman figure tranquilly eating sand for dinner, the experiential background of any human alive would create a sense of estrangement.

While estranging the reader from the posthumans, the narrative construes sympathies along other, more-than-human lines. It presents a practically impossible occurrence: an unmodified organism, a stray dog, is found trespassing on the tailing pits. The emotional trajectory of the story follows the posthumans' responses to the dog, from bafflement (they have never seen an unmodified animal, except once in a zoo) to excitement and endearment (one of the posthumans wishes to keep the dog as a pet, and begins to appreciate its companionship) to rejection (eventually, they decide that caring for the dog requires too much effort, and roast it on a spit).

Readers are presented with the ethical and emotional labor of responding to such responses. As vulnerable beings familiar with pain and suffering, they are bound to align themselves not with the invulnerable posthumans but with the dog, which is presented in terms that arouse sympathy. It is described from an outside perspective: without speculating on its experiential states, the narrator merely details its appearance: "a good thirty kilos of snarling mange. Its paws were slashed

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underneath" (52). Its material fragility and lack of instant healing powers is a cause of perplexity for the posthumans: "I only broke a couple bones on it, and now look at it. It just lies there and pants" (ibid.).

This is where the story initiates more-than-human modes of bodily attunement that have previously been studied from a posthumanist perspective (Tidwell). By drawing on recognition and empathy that are not strictly human but mammalian and even organismic, it invites readers to extend their bodily attunement beyond anthropocentric limitations. The more-than-human attunement also extends to the non-organismic landscape: throughout the story, the landscape is presented as an object of violence and thus a potential locus of bodily affect.

In reading the story, one becomes aware of the technologies presented: weapons, vehicles, videogames, biotechnology, and extractive mining. All technological production follows the same logic of dividing the world into matter, which is considered only as a reified resource, and human reason, which shapes matter (Tidwell 98–100). As it manipulates the living flesh of its readers, the narrative itself can be experienced as a technological apparatus — and thus its readers are aligned with matter, the object of violence and exploitation. Readers are vulnerable to the affective cues of the story; they are sliced, turned, and polluted by it, just as the hills are sliced, turned, and polluted by industrial machinery. Experiencing thrill, awe, pleasure, distress, and disgust, readers can enact a wasteland-like state: the narrative exploits their aptitude for feeling with the narrative elements and adds insult to injury by using clichés such as action sequences and a stray dog to achieve this effect. In this way, it suggests more-than-

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theories of embodied cognition.

From Intersubjective Kinesis to More-than-Human Kinetics

Terence Cave suggests that “kinesis should be understood as playing a fundamental role in mind-reading, in the broadest sense of that term,” and that motor resonance and mind-reading should be considered as “a single suite of responses [that] affords empathy” (29, 30). Thus, he sees the kinesis effects of literature as intersubjective. Bolens also explains that kinesis intelligence pertains to “interpersonal gestures and expressive movements [and] implies the possibility of intersubjectivity” (10). Both present kinesis as a mode for understanding the expressive movements of other humans, and kinesis analysis as an approach to making sense of such expressions in literature and art.

This understanding of kinesis is thus somewhat limited by anthropocentrism. Cave allows that “there is no sharp cut-off point between the way animals ‘read’ each other’s movements and the more elaborate performances that humans have developed out of that evolutionary adaptation” (37). Kinesis perception is a social skill not limited to humans, as many kinds of animals are attuned to perceiving the movements and intentions of other animals, and the attunement tends to cross species borders. We know this from our shared lives with domesticated cats, dogs, and other animals with familiar styles of kinesis expressiveness. It is easy for us to understand that the panting, growling dog in Bacigalupi’s story feels pain and exhaustion. However, neither Cave nor Bolens covers the meaning-making processes that are based on the movement and feel of nonhuman entities that are remarkably different from human bodies: plants, rocks,

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not only by anthropocentrism but also by anthropomorphism.

These limitations imply that the concept of kinesis cannot be used to explain affective and meaningful encounters with nonhuman entities. Nor does kinesic analysis reach beyond the mimetic understanding of fictional movement, into perception and meaning arising from the artifact itself: for example, from the dynamic of drawn lines in a graphic narrative, the sensuous feel of words, or the rhythm and pace of narration. Kinesis thus cannot account for the material feel of Bacigalupi's description of the "ragged cutscape of mined mountains" (50) or for the excitement that arises from the rapid pace of the action sequence.

If we wish to discuss the bodily effects of posthuman and nonhuman bodies in terms beyond anthropocentric and anthropomorphic mimesis, it is useful to turn to other notions, couched in a posthumanist understanding of fictional movement. My choice is to appropriate the term "kinetic," which Bolens (10) employs, in contrast to kinesic intelligence, to describe the perception of "aspects of movements that may be objectively measured," and Maxine Sheets-Johnstone (118) draws on to refer to one's understanding of one's own body as a material thing. My use of the term maintains this distinction between human-like expressive bodies and moving bodies more generally but allows for perceptual movement over the human-nonhuman boundary, which extends the notion of readerly choreography beyond anthropocentric models of embodiment.⁵

David Abram argues that attuning to embodied sensitivity encourages an animist experience of nonhuman bodies as animate, expressive, communicating beings: human bodies can "respond to the eloquence of certain buildings and boulders, to the articulate motions of dragonflies. We find ourselves alive in a

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listening, speaking world” (86). Following Maurice Merleau-Ponty, he calls this mode of experience participatory perception. Part of our human experience is made up of affects, perceptions, and judgments that we share with other animals and even plant life. We share with mammals a preference for warmth over cold, for example; and with green plants, a preference for certain cycles of light and darkness. We also recognize material and kinetic affectivity, such as the weight and texture of Bagicalupi’s tailing mountains.

Participatory perception reminds us that kinesic and kinetic modes of perceptual meaning-making exist on the same continuum.⁶ Responding to the swaying of a tree may be distinct from responding to the bending of a human body, but I make sense of the movement of the tree through my kinetic understanding of weight, rigidity, and elasticity, familiar to me through my lived history as an embodied being in a more-than-human world. In turn, this kind of kinetic understanding participates in the way I make sense of human movement, such as dance. Likewise, while I certainly perceive human gestures as meaningful and expressive, this kinesic mode of perception also pertains to my understanding of ominously approaching rain clouds or the vigorous growth of bean sprouts.

While one axis of this perceptual movement is anthropomorphic, the other is attuned to nonhuman forms. If we conceive of a dancer’s movement based on our kinetic understanding of a swaying tree, we might call such perception dendromorphic; if we draw on the feel of boulders, it might be petromorphic; and so on (Morton 120). Such more-than-human processes inform human meaning-making — including the meaning-making processes relevant to fictional movement and materiality. From here, participatory perception can be extended into the realm of reading fiction: to enacting the feel and movement of fictional bodies. In “The

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People of Sand and Slag” we can witness a mode of perception impoverished by the lack of ecological meaning: because the posthumans’ understanding of worldly events is based exclusively on human design and extraction and mediated by their invulnerable bodies, they have no way of perceiving the pain and suffering of a nonhuman animal — or the limits of their perception. As lived bodies embedded in more-than-human worlds, readers, by contrast, can perceive the corporeal and affective difference between the capabilities of posthuman bodies and their own. This distinction can also bring them to understand the limitations of the posthumans’ mode of perception.

“The People of Sand and Slag” is a satirical dystopian vision of an Anthropocene society. The story takes issue with the advancements of biotechnology by presenting a rift between the individual and industrial benefits of commodified human enhancement — invulnerability and the guaranteed availability of task-oriented workforce — and the ethical and societal harm they can do. It also foregrounds the usually hidden environmental costs of high technology: the landscapes transformed and toxified by extractive mining, and the exclusion and extinction of nonhuman species. In a deep-ecological vein, the narrative weaves these two technocapitalist phenomena into one system, in which environmental destruction is a necessary (and, in the storyworld, perfectly accepted) requirement for the production of posthuman bodies.⁷

Bacigalupi’s stylistic choices draw attention to the artifice at play in generating affect and give rise to a double vision of fiction (Polvinen). This means that I feel the affect yet also simultaneously appreciate how it is achieved by narrative techniques. To rephrase this dynamic in Haraway’s terms, I become

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suspicious of the narrative exactly because I generously engage with its “images, plots, figures, devices, linguistic moves, in short, with worlds” (326). Awareness of fictionality cultivates awareness of the artificial aspects of embodiment, that is, the production of bodies in a technocapitalist society. Human bodies are included in the category of natural resources, to be shaped and modified into more interesting and fashionable products, such as, in the case Bacigalupi’s story, invulnerable action figures. The narrative presents its own affects as material forces that elicit certain receptive postures — generosity, pleasure-seeking, moral distress, suspicion, self-reflection — and, through kinesic and kinetic experientiality, forms an analogical link between textual affectivity and the production of such entities as strip mines, video games, and posthuman bodies. By exploiting its readers, “The People of Sand and Slag” may develop their reflective conception of narratives and other meaning-generating apparatuses: they might see how their experiences and feelings are generated by iterative enactments of readerly choreographies.

If we consider fictional figures as “affective devices,” we can see how their motions and affects recreate types familiar from literary and cultural traditions (see Caracciolo; Warhol 24). In reading, enacting such typical motions and affects recreates the habitual kinesic, kinetic, and affective patterns of response associated with these cultural forms. On the level of motor response and affective attunement, readers enact the readerly choreographies specific to, for example, the rebellious robot, the teenage mutant, or the posthuman action hero. During personal histories of reading, such choreographies are enacted countless times, and thus they stay relevant to and active in the embodied experience of readers. This enactive performativity plays a part in the constitution of embodied subjectivities, as theorized by feminist critics (Kortekallio; cf. Butler; Warhol). I propose that literary

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analysis can take hold of this dynamic in an intentional, methodological manner by engaging with fiction through notions such as readerly choreography.

With my discussion of kinesis and kinetics, I hope to have demonstrated that the cognitive dynamic of attuning to fictional figures also involves aspects that can be considered more-than-human, and that we make sense of nonhuman entities in fiction through anthropomorphism as well as the kind of participatory perception described by Abram. This implies, among other things, that we do not fully own our human limitations.

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¹ "Posthuman" generally refers to entities or phenomena that transcend biological human embodiment or subjectivity in some way. Like "the human," the notion of "the posthuman" should be regarded as "a historically specific and contingent term rather than a stable ontology" (Hayles 160; see also Vint; Braidotti; Neimanis).

² In theories of embodied cognition and their literary-theoretical adaptations, some scholars explain the process of cognizing the bodies and movement of other (actual or fictional) people in terms of mental simulation, that is, the construction of mental models; others prefer the more direct model of enaction, which situates the process at the level of sensorimotor activity. For the sake of properly representing studies of bodily reading, this essay draws on both views. For theories based on simulation, see, e.g., Bolens; and Weik von Mossner 2017a; for enactive theories, see, e.g., Caracciolo 2014; Noë; and Polvinen.

³ Bolens distinguishes *kinesis* from *kinesthesia*. *Kinesthesia* refers to motor sensation, that is, one's knowledge of the movements of one's own body. According to Bolens, kinesthetic sensations cannot be shared, but kinesic intelligence is constantly communicated in encounters between people. This essay follows Bolens' conceptual distinction.

⁴ I do not claim that conventional figures in popular fiction are ethically problematic as such. As any figures, they can be, and are, circulated in countless modes and contexts, and ethically oriented readings should always account for such variation. Here, I only wish to highlight Bacigalupi's distinct style, which builds on genre

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conventions to draw attention to themes such as societal segregation, biotechnology, and the social construction of identity.

⁵ This theoretical move could also be made by adjusting the concept of kinesis to better explain more-than-human aspects of embodied cognition (rather than involving a new term). My rationale for bringing in *kinetics* is that a new term can better orient us toward unconventional aspects of experience.

⁶ Participatory perception could be fruitfully contrasted with intersubjective approaches to narrative meaning-making, particularly with Yanna Popova's participatory sense-making, in which the reader's enactive construction of meaning is discussed in terms of communicative interaction (Popova borrows the term from De Jaegher and Di Paolo; see also Colombetti and Torrance).

⁷ On ethical readings of science fiction that deals with themes of technocapitalism, see also the essay by Hanna-Riikka Roine and Esko Suoranta in this volume.