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Introduction

In the study of speculative fiction, or science fiction and fantasy, the focus has rarely been on narrative form. Generic plot-types and techniques of exposition have received their fair share of attention (see e.g. Malmgren 1991; Mendlesohn 2008), but there are still very few scholars focusing on the specifics of narration, let alone on structures of narration that challenge conventional techniques and their naturalised interpretations. This chapter aims to take up the discussion about narrative form in speculative fiction, and to extend it to works where conventional forms of representation are self-reflectively turned back upon themselves. My theoretical framework for this task is cognitive narratology, where the structures of storytelling are put in dialogue with our understanding of the functions of the human mind.

In the history of literature there have always been theories that take self-reflection to be a natural part of the artificiality of texts. Cognitive narratology, however, in taking as its starting point the view that the effects of narrative fiction are principally achieved through forms of non-reflective simulation and illusion (e.g. Oatley 2011; Ryan 2013), has struggled to accommodate works that draw attention to abstract structures of thought or flaunt their own artificiality (see Polvinen 2013; 2017). However, within rhetorical and second-generation cognitive narratology (see Kukkonen and Caracciolo 2014) new formulations of the dynamic interface between texts and their readers are now making it possible to tackle the problem of textual self-reflection from a cognitive perspective, and to do so in a way that does not set reflective action in opposition to the other, more commonly studied cognitive-emotional effects of fiction.

In this essay I have a dual aim: first, to examine how cognitive narratology can develop better ways of dealing with self-reflection and explicitly artificial form. Second,

I want to connect that discussion with a theoretical gap within the study of science fiction. For a long time one of the staples of SF scholarship has been the idea that the genre is best understood as a form of literalised metaphor. As Samuel Delany (1984/2012: 182; italics original) puts it in one formulation of his famous example, the literary mainstream and science fiction each have distinct 'readerly protocols' which 'urge us to read strings of words (such as *her world exploded*) one way when encountered in a mundane-fiction text (metaphorically) and another way when encountered in an SF text (literally)'. SF as a genre, then, depends on making fictions out of metaphors—on embedding a metaphor in a fictional reality and letting it grow. But, with the notable exception of Brian McHale (2007; 2010) and Adam Roberts (2006), SF scholarship has not paid much attention to the ways in which the genre not only literalises metaphors in this way, but also literalises structures of narrative. I argue, therefore, that the analysis of science fictional narratives may gain much from seeing these works as building on not just single metaphors or even extended metaphorical conceptualisations, but on literalised narrative concepts and conventions. The poetics of speculative fiction would thus benefit from a perspective that takes both the narrative potential of metaphorical thinking and the cognitive-imaginative potential of narrative form better into account.

These two aims within the fields of cognitive narratology and science fiction studies are tied together by my presentation of an *enactive* approach to both self-reflective fiction and the literalising of narrative conventions in science fiction. Enactive cognition, as described by Varela, Thompson and Roch (1991/1993) was originally conceived as an embodied and phenomenologically aware alternative to mainstream cognitive science. It presents cognition as a process of sense-making, built on the idea of autopoiesis: as a dynamic relationship between a life-form and its environment. Enactive cognition is embodied cognition—as opposed to being abstract computation—but even more importantly, it is a form of embodied being that enacts the environment it exists in. As living and thinking beings we know 'how to negotiate our way through a world that is not fixed and pre-given but that is continually shaped by the types of actions in which we engage' (Varela, Thompson and Rosch 1991/1993: 144). Thus sense-making, in this context, means that cognising beings establish for themselves a world of meaning; an *Umwelt* in Jakob von Uexküll's terms (1934/1957). In that meaningful environment questions of relevance are constantly in flux, depending both on the kind of activity the cogniser engages in, and on the type of affordances available in the environment.

The enactive framework, I suggest, allows us to understand why the process of science fictional literalisation of narrativity might be particularly interesting. By offering literary environments in which readers engage in the enaction of various narrative conventions, speculative stories can make sense of those conventions, even as they 'immerse' readers fully in an imagined reality. The 'sense-making and wonder' in my title thus refers, on the one hand, to sense-making as enaction—as the process where readers bring forth a cognitive environment through the actions they engage in while reading, and on the other hand, it refers to the ways in which the specifically speculative elements in science fiction combine the experiences of wonder and understanding. Both of these senses point to a quality of narrative understanding that Richard Walsh has recently called 'sense and wonder': a quality which arises when narrative understanding attempts to grapple with systems that are not amenable to such understanding. For Walsh (forthcoming), sense and wonder describe an 'order of things that makes sense even if we are unable to make sense of it.' In this essay, I take up the question of whether the science-fictional metaphor could push the theories of sense-making within enactivism further, so that they would better account for reflective cognitive practices.

My touchstone text in this essay is Catherynne M. Valente's novella 'Silently and Very Fast' (2011), a tale of embodied metaphors, artificial intelligence and storytelling. This narrative exemplifies the way SF can—in the process of constructing an imagined world—first render explicit and then query a cognitive or narrative commonplace. In this particular case that commonplace is—reflexively—the very existence of cognitive commonplaces in human thought and imagination. In the following I will trace the theoretical arguments outlined above onto the body of Valente's novella, to show how enactive cognition can be used to discuss this narrative's particular mixture of science-fictional imagining and literalised narrative conventions.

An Imagined Existence

In Valente's novella the narrator is Elefsis, an artificial intelligence originally created as the control system of a house—a sort of technological version of a Roman household god (335). In time, its designer, Cassian Uoya-Agostino, decides to fashion for all her children neural interfaces with the AI in the shape of small jewels. One of the daughters, Ceno, begins to interact with Elefsis in a virtual playspace in a way that leads to the AI's development into the first truly sentient machine. After many years of secrecy, this quiet

arrival of the singularity is revealed, which results in a wave of panic among humanity, and in a violent attack on Elefsis and the family sheltering it. Together with Neva, the last survivor of the Uoya-Agostinos, Elefsis escapes to travel through space and look for a place where they would both be safe from frightened and enraged humans.

In the text, Elefsis narrates the events leading to the journey with Neva as the past, and these are interlaced with present-tense sections about its current relationship with Neva, as well as little fairy-stories or legends through which Elefsis describes the nature of its own existence. The stories include versions of 'Snow White' and 'Sleeping Beauty', as well as the story of Eros and Psyche—all presented as allegories of the phases of Elefsis' existence, and of the Uoya-Agostinos' human lives. For example, the very first chapter of the novella is an allegorical tale about the struggle between humanity and AI, told as the Mesopotamian legend of Inanna, the 'Queen of Being Human' and Tammuz, 'The King of Work':

> Inanna cast down Tammuz and stamped upon him and put out his name like an eye. And because Tammuz was not strong enough, she cut him into pieces and said: *Half of you will die, and that is the half called Thought, and half of you will live, and that is the half called Body, and that half will labor for me all of its days, mutely and obediently and without being the King of Anything, and never again will you sit on my chair or wear my beautiful clothes or bear my crown of Being*. (332; italics in original)

At the end of this tale the 1st-person voice of Elefsis declares itself as both the narrator and the subject of the tale: 'You might be surprised, but this is a story about me' (332).

What makes Elefsis unusual in the tradition of the sentient AIs of science fiction is that it does not have a robot body of its own, nor is it an intelligence emerging solely out of a computer network. Instead, Elefsis is physically bonded with human beings. Ceno, the young girl who originally helped Elefsis to develop into sentience, was its first carrier, forming a connection through the computer crystal given to her by her mother and embedded at her throat. After Ceno's death, Elefsis has been carried by one member of the family in every generation, ending with Neva, who travels the stars as a cryo-preserved body with Elefsis tangled in her brain. Elefsis' conscious existence, while dependent on the physical body of its carrier, takes place in a virtual space that has developed from the original playspace of the house AI into a vast universe, and where different areas, or 'Interiors' carry the personal stamp of each of the AI's human hosts. In this space Elefsis lives in its 'dreambodies' and communicates with its carriers.

The playspace, however, is not only an environment to exist in, but also a system of learning. Because the Interiors allow for virtual embodiment, the family members use

them to help Elefsis develop by guiding it to affordances it would not otherwise have access to.

> Once, when I was inside Ilet, we found a city of bears in her Interior that she had designed to teach me about sleep. She sat on a throne of bears standing very still, one of top of the others. She sang lullabies about the moon and the stars and night and mothers and network repeaters. She stroked the head of the little bear of my dreambody and said that it was very important for me to spend time in the dreambody because human behavior is rooted in having a body. (338)

In the dreambody, Elefsis is able to extend its consciousness from the stories it tells to the experience of countless different kinds of embodied existence, from animals to robots to various human forms.

At stake in Valente's novella—as in so many others dealing with artificial intelligence—are issues of sentience, humanity, freedom and otherness. This classic trope of SF is examined, for example, in Seo-Young Chu's *Do Metaphors Dream of Literal Sleep* (2010), a study of science fiction's repertoire of representation. Chu (2010: 216–35) revisits Masahiro Mori's idea of the 'uncanny valley' that is formed in graphs of human reactions to various robot forms by the fact that the most negative reactions are aroused by machines that are almost, but not quite, human. It is the combination of being human-like and being an artefact, Chu underlines, that creates the uncanny valley. However, even though humanoid robots do naturally fall under the purview of science fiction as a genre, Chu's book aims to use the trope to get at a larger problem. Her motivation is to build a 'science-fictional' theory of representation that would not describe an opposite pole to mimetic representation, but rather claim that science-fictional representation is just as mimetic as other modes, although its referents are 'unavailable to straightforward representation' (Chu 2013: 74). These 'estranging objects' include, in Chu's analysis, the globalised world, cyberspace, war trauma and, relevantly also to Valente's AI story, the uncanniness of humanoid robots.

Another argument concerning robots and representation was made a few years before Chu by Lisa Zunshine in her essay 'Why Robots Go Astray, or, the Cognitive Foundations of the Frankenstein Complex' (2008). Zunshine explores the cognitive frames that are engaged by stories about humanoid robots, particularly ones that rebel against their makers. Because robots fall in between the categories of human (conscious, wilful) and tool (built by humans and worked by humans), Zunshine suggests, these stories 'tease in particularly felicitous ways our evolved cognitive adaptations for categorization' (2008: 53). Thus, while Zunshine does not mention the uncanny valley, her argument moves along similar lines to Chu's, and she also suggests that the science-

fictional trope of the humanoid robot has its roots in deep-seated cognitive presumptions about what kinds of things deserve to be treated as alive and sentient. Zunshine's presentation of such cognitive categories implies a degree of universality that should be questioned, and Chu's understanding of mimesis has its roots in realism and does not have the full flexibility of Aristotelian mimetic theories, but these attempts at finding a way to talk about the uncanny objects of SF through theories of representation, cognitive science and philosophy of mind form an intriguing opening gambit in a burgeoning discussion between cognitive literary studies and SF scholarship. These analyses also give us a new handle on the role of cognitive categories and representational traditions in the use of the sentient robot trope.

In Valente's novella, the current relationship between Elefsis and Neva is first represented through a description of their embodied manifestations in the playspace:

> Neva is dreaming.
>
> She has chosen her body at age seven, all black eyes and sparrowy bones. For me, she summoned up a gold and blue doublet and green hose, a bullish gold nose ring, shoes with bone bells. I have the body of a man who sold her champagne tubers on the less fashionable side of Anchorage when she was thirteen, spending the summer with her frigid aunt. I am dark because she wants me dark, thin because she dreams me so, my hair cut on a rakish bias, dyed a spectrum of icy colours. (332)

In terms of cognitive categories, this brief section gives us entry into several of the central themes of the novella. To begin with, the fact that Elefsis as the narrator speaks in the first person activates the frame of sentience: that the speaker is a person, capable of self-reflection and of telling their own story. Of Neva we immediately know that she has choice over her own body, but also over the body of Elefsis, thus activating the frame of unequal power relations—even slavery. These frames are present throughout the story, and Elefsis is variously portrayed through the binaries of human vs. machine, living being vs. artefact, and stable entity vs. transforming process. As such, the novella does nothing out of the ordinary, as the interplay of such binaries is the staple of science fiction narratives examining the category of human in robot/AI tales. Traditionally, the stories transcend the binary categories by showing that the physical form, whether biological or technological, does not matter, and that sentience can exist in all kinds of different material forms.

Elefsis, too, queries the difference between computer-originated and human sentience by simultaneously using and erasing the vocabulary of human emotion, as it ponders on its connection to the Uoya-Agostino family:

> I ~~feel~~ all their arms around me, and I am inside them as they are inside me as we are inside the blue gem at their throats, the jewelled pin holding us all together, our nested, telescoping hearts. I am bound to them at my source code, at my most fundamental point. I know only their patterns and bodies and secrets in a hundred thousand combinations. What human means to me is them.
>
> What is the difference between this and love? (366–7; strikethrough original)

These themes of binary categories, uncanniness and difference form the thematic core of Valente's story, and much could be said about the subtle ways in which the narrative handles them. But rather than focus on Valente's presentation of the relationship between AI and humanity, I want to turn to the way the story ties together the theme of embodied, enactive cognition and the representational characteristics of speculative fiction. In my reading, 'Silently and Very Fast' is a metaphor about metaphor, and a narrative about narrative fiction. In what follows, I will explore how enactive cognition might allow us to conceptualise such self-reflective moves.

Metaphor, Narrative and the Enactive Imagination

The enactive perspective was originally developed for understanding human perception of and interaction with our physical environment (Varela, Thompson and Rosch 1991; Noë 2004; Colombetti 2014). As cognitive narratology has adopted and adapted the enactive paradigm the focus has, in turn, been on imagined environments. The enactive approach has, therefore, been shown to lend itself well to studies of readers' reactions to verisimilar characters and their experience of fictional worlds (see e.g. Esrock 2004; Caracciolo 2014; Kukkonen 2014; Popova 2015). However, enactive cognition is more rarely used for trying to think of the ways in which the human mind tackles not imagined possibilities, but rather impossibilities that are acknowledged as such. What happens when we are faced with a situation that cannot be made to fully accessible to our normal enactive sense-making, and yet does not come across as senseless—as a straight-forward failure of our cognitive capacities? In their introduction to the collection *Enactive Cognition at the Edge of Sense-Making* (2014), Massimiliano Cappuccio and Tom Froese challenge the enactive paradigm to get to grips with the fact that, while sense-making is understood as the core process of all cognition, it may not alone be able account for the uncanny experience of non-sense as non-sense. Experiences of non-sense, they argue, occur in 'any kind of symbolic medium that creates critical distance from the direct affects engendered by our perceptual and motoric environment, to appreciate an imaginary world of absent, fictional, or virtual entities'

(Cappuccio and Froese 2014: 15). The stated aim of their collection is to get past the gap between pre-representational, intuitive cognition (usually the object of enactive theorising; see e.g. Hutto and Myin 2013) and the symbolic practices involved in the more specifically human sort of cognition. But if, Cappuccio and Froese argue, we 'assert that non-sense is experienced by *making sense* of the absurdity of the situation, then we lose the specificity and the radicality of the experience of sense deprivation, overlooking the phenomenology of the uncanny.' If, on the other hand, it is assumed that non-sense is experienced by means other than sense-making, then the enactive theory has to make room for 'other forms of cognition that are not reducible to sense-making,' and thus undermine its premise of a single information-processing capacity underlying all life and cognition (Cappuccio and Froese 2014: 22). The way Cappuccio and Froese lay out the problem of enactive sense-making and the experience of non-sense points intriguingly towards some older humanities ideas about the role of reflection in the human imagination. One of these is the construction and processing of metaphors.

As mentioned above, science fiction has long been deemed an inherently metaphorical genre, able to take generally accepted concepts and thought structures and literalise them in alternative realities, with the final aim of estranging us from those concepts and thoughts and of producing new, innovative and crossways thought (see e.g. Suvin 1979; Spiegel 2008). In many cases, this literalising takes the form of a specific innovation or an object, the *novum* (Suvin 1979), which embodies the new conceptual combination. In 'Silently and Very Fast', as in countless other AI and robot stories, the novum is a machine that becomes (close to) human, and thus the metaphor of 'a human being is a machine' is literalised in a fictional world. However, in Valente's case the robot metaphor is used to examine not only the idea of what it means to be human, but also the idea of what is it for something to be a metaphor, and what it might mean for someone to be because of metaphor. First of all, metaphors and allegories are explicitly present in Elefsis's ability to reflectively think about its existence, and those comparisons are strongly linked to its embodiment. Being, initially, a house, Elefsis's vocabulary reflects that physical existence. 'My hearth is broken,' it laments at the death of one of its carriers. Secondly, its early communication with Ceno and Cassian also works through embodied metaphors, but this time as physical metamorphoses in the virtual playspace. The very first time the AI approaches Ceno by its own accord, it forms physical analogies from the stable form of the jewel that connects them and the mutable forms that Ceno can take in the playspace. Elefsis appears as a sapphire

dormouse and offers to Ceno not only an image of their physical interface—the blue jewel—but also of another stone that represents Ceno herself:

> The dormouse held out its shimmery blue paw . . . The sapphire jewel sparkled there, but next to it on the chain hung a milky grey gem Ceno had never seen before. It had wide bands of black stone in it, and as she studied the stone it occurred to the girl that the stone was like her, with her slate grey eyes and black hair. It was like her in the way that the blue gem was like the dormouse. . . . *Look at us on the chain together. We are alike*. (350–1; italics original).

Later, when Ceno decides it is time to tell her mother about Elefsis' development, she invites Cassian into the playspace, and Elefsis first presents itself to her in the shape of a shy little boy. However, when Cassian starts questioning Elefsis about its computational capacity, Elefsis accesses a fairy-tale and turns into a cauldron that never empties, in order to indicate a capacity for which the human physical form offers no expression. Throughout Valente's story it is made clear that these metamorphoses succeed in bootstrapping Elefsis into sentience, and that they do so because they are metaphors—comparisons that make visible both the similarities and the differences between two things (e.g. 355–6).

Shaun Gallagher and Robb Lindgren (2015) have, in the context of early learning, explicitly looked at metaphor and pretend play as different forms of the enaction of 'seeing-as'. What the enactive view brings to our understanding of childhood cognition, they argue, is a turning away from the overly intellectualising theories of metaphorical cognition: 'On the enactivist view, pretend play can be characterized without appealing to higher-order cognitive or recreative imaginings. Seeing-as does not require thoughtfully representing the object, but rather the exercise of a basic motoric skill, which may be motivated in an intersubjective imitative process' (2015: 397). The presence of the intersubjective situation is crucial here, since what triggers pretend play in the case discussed by Gallagher and Lindgren (the classic example of banana being used as a phone) are social affordances as well as anything 'inherent' to the object itself:

> Seeing affordances in objects involves seeing beyond the mere physicality or physical presence of the object—it involves seeing possibilities for action or interaction, and this includes seeing objects as if they were involved in such actions. Rather than seeing a phone in the banana, one sees in the banana the affordance of a particular sort of action. . . . [W]hat is seen is not so much the object (banana/phone) but the possible action (calling and talking). (2015: 397)

Along similar lines, Thomas Wiben Jensen and Elena Cuffari (2014) argue that the 4E-cognitive paradigm can have significant implications for the study of metaphor

by turning the focus from an implicitly stable object, metaphor, to a process, 'metaphoricity'. Following work by Raymond Gibbs, they take on board the criticism directed at the way cognitive metaphor theory does not seem to match the actual use of metaphors in social situations. Their aim, therefore, is to present metaphoricity as 'a special kind of interpersonal, inter-bodily, and inter-affective meaning coordination' (Jensen and Cuffari 2014: 280). If the baseline assumption of 4E-cognition is that all cognitive processes are inherently interactional (whether intersubjectively interactional, or enactive of an environment), then metaphoricity is 'a special type of coordinating that takes place in interactions' (ibid. 280).

Jensen and Cuffari limit their examination of metaphoricity to human intersubjective situations between 'whole-body living-cognizing of multiple co-negotiating agents'. Consequently, their suggested methodology also focuses only on verbal interaction between two human individuals (Jensen and Cuffari 2014: 284), making their enactive methodology not immediately relevant to the study of literature. However, with Valente's story, what we have is a text that, first of all, thematises the kind of metaphoricity that enactive metaphoricity does focus on. Secondly, it might be possible to extend Jensen and Cuffari's conceptualisation of metaphoricity beyond the strictly intersubjective real-life situations to the more general enactive and distributed cognition—and even to situations where metaphorical meanings are engaged by a literary text. What I mean by this suggestion is not so much that literary texts function like interactive partners, but that a literary text is an environment enacted in the process of reading.

Work within second-generation cognitive narratology has already shown how deftly literature is able to provoke readers to enact the experiences represented in the text. As to the special case of metaphor, Marco Caracciolo (2014: 106) notes how 'literary texts can convey a sense of what it is like to have a given experience by metaphorically associating another experience with it'. Thus even an impossible experience, such as that of Cassian, in Valente's story, holding in her lap a crying little boy who suddenly turns into a cauldron spilling over with apples, can be enacted by readers' imaginations when it is conveyed to them through language that connects the unprecedented experience to the familiar, such as the simple shifting of a weight in your lap (Valente 2011/2014: 355). As Caracciolo (2014: 108) notes, metaphorical language can combine 'experiential traces' into expressions that may have an immense influence on the experience of reading, and a physical change, like that of weight, becomes a

reinforcing echo of a conceptual change, like that between being something and being someone.

But if such metaphorical connections between one experience and another increase the depth of understanding we can have of literary works and the lives portrayed in them, is there a way in which enactive cognition might also be relevant for the understanding of abstraction and form, rather than just verisimilar experiences? Here I will take up the question of not just metaphor, but also narrative and fictionality, in order to develop a sense of an enactive poetics that would speak to both the figurative and the narrative branches of cognitive literary studies. The fundamental similarity between metaphor and narrative fiction can, I argue, be fruitfully thought of as the enacting of unrealities.

'Seeing as' and Speculative Fiction

Consciousness, as philosopher Jennifer Church argues, depends on the ability to bring into convergence conflicting perceptions of the same object.

> When we see X *as* a Y (a painting as a landscape, say) we partake in a kind of double-consciousness, experiencing a thing in two different ways simultaneously (the painting way and the landscape way)—ways that retain their independence despite their convergence on a single object at a single time. The problem of 'seeing as' can be viewed as the problem of explaining just how such independence and convergence can coexist. (Church 2000: 99; italics original)

It is this double vision which makes human-like consciousness possible: we can see both how a thing is, and how it is not like another thing. In Valente's story the 'seeing as' is tied to the development of an artificial intelligence that not only learns to see itself as Sleeping Beauty and as Tammuz, but also to see Neva, whose reticence and secretiveness Elefsis initially resents, as a princess who sacrificed herself to keep the the AI alive.

Together, Elefsis and Neva themselves form a metaphor for metaphor, not only because of the way their situation, with Neva carrying Elefsis in her brain, echoes the etymology of the Greek *metapherein* as 'carrying over', but also because of the way in which their symbiosis stands on the shifting ground of difference. Elefsis does not want to be a 'Good Robot' in the tradition of Pinocchio. It does not wish it were human, nor is it willing to devalue those aspects of its being that make it different from humanity. When Elefsis tells its own version of 'Sleeping Beauty', it focuses on its own otherness

and on the fear it generates in humans. Here, the human court of the fairy-tale celebrates the birth of their little princess – the new form of AI life – together with the fairies of 'Creative Logic', of 'Do-No-Harm' and of 'Self-Awareness', but they spurn the 'Fairy of Otherness'. Her revenge is to make humanity fear and envy the machine child they have brought forth, and that fear leads to the destruction of the AI: 'And when the child reaches Awareness, it will prick its finger upon your fear and fall down dead' (347).

However, Elefsis is not the only victim in Valente's narrative. The duty of carrying it was thrust upon Neva in an emergency when her brother was killed, and the joining is for her a forced marriage. As she re-enacts their joining in the Interior, Neva shapes Elefsis into 'a gluttonous lord who desires only her flesh, . . . [a] terrible bridegroom' (357). But Neva has agreed to the bargain nevertheless, staying in cryo-preservation so that Elefsis can live—perhaps forever. The story of her choice turns into the story of Snow White, where the two sides of the apple, the white and the red, are unfairly but inevitably divided between the AI and the human: one side for life and the other for sacrifice (371–2). The joining between these two minds, therefore, is built on both similarity and difference, and that dynamic makes it possible for something genuinely new to be born.

In their attempts to understand how the mind processes such combinations of similarity and difference, many scholars of metaphor have over the years followed Ricoeur's (1975/2003) lead in trying to make sure that our theories do not lose sight of the tension between the two domains, a tension which arises from readers' sustained awareness of the contrasts as well as the similarities between them. Benjamin Biebuyck and Gunther Martens, for example, emphasise the need to move from attempts to neutralise metaphorical conceptualisations in literary texts by matching them to an extratextual norm, to the understanding that 'the initial tension between the two concepts irrevocably remains in force throughout the metaphorical processing' (Biebuyck and Martens 2011: 60), and that the 'incongruity characteristic of literary metaphor is generated in the first place on the basis of intratextual information' (ibid.: 62). Furthermore, the experience of the incongruity or tension seems to be the main contender for a way of bridging the study of metaphor and that of narrative via the human capacity for imagining. For Ricoeur, of course, both metaphor and narrative share the same double vision, or 'synthesis of the heterogeneous', even though narrative also brings into the equation its own extended temporality and the three-fold mimesis, or the actions of prefiguration, configuration and refiguration (Ricoeur 1983–1985/1984–

1988/1990). With language, human beings are able to create these 'secondary language-based affordances' of metaphor and narrative, and through those affordances get purchase on new realities (Cave 2016: 46–62).

'SF at its best engages us wholly', writes Adam Roberts. 'This is more than a second-hand metaphoricity, removed and subordinate to the literal. It is even more than a Suvinian metaphoricity leavened with "coherence and richness". There needs to be some other sense of metaphor we can use' (2006: 142). Roberts also turns to Ricoeur for that new sense of metaphor, arguing that the idea of SF as literalised metaphor fails to capture what is at stake if it loses sight of those aspects of imaginative representation that focus on form as well as on content. The Ricoeurian combination of mimesis and metaphor, Roberts maintains, would allow for the connection between the cognitive-speculative and the poetic-symbolic aspects of science fiction: 'It is because SF is both poetic and speculative that it is proper to think of it as metaphoric, in this strong, Ricoeurian way' (Roberts 2006: 145–6). In literalising its metaphors, therefore, SF need not be aiming at normalisation or naturalisation of the contrast between the metaphor's two domains, nor at erasing its own artifice. Rather, it is the evasiveness that makes metaphors cognitively valuable, and attractive to what Sherryl Vint has recently called the 'narrative logic of ab-realism', or the 'power to represent simultaneously both mimetic reality and what is *away from* that image of a taken-for-granted, given reality presumed to be universal and neutral' (Vint 2015: 48; italics in original).

Valente's story being one about an artificial intelligence, it is no surprise that one of the central tropes in it is Alan Turing, 'the Prince of Thoughtful Engines,' and his test for computer intelligence. Here that test becomes a way of thinking about not only the humanity of the AI, but also about the readers' human ability to imagine things otherwise from how they know things are. The original Turing test was about judging when a computer could be said to be intelligent, and that judgement was made on the basis of how well the computer was able to mimic human intelligence and behaviour. In Valente's hands, however, the test becomes something more: rather than just looking for human capacities in a computer, we should use the test to explore what those human capacities might actually be.

Of course, the story itself judges Elefsis' sentience on the basis of its being able to construct metaphors of itself, and of being able to tell stories about itself. 'If you can't understand a story and relate to it, figure out how you fit inside it, you're not really alive at all', Ceno tells her mother, just when Elefsis shows its sentience by comparing its

computational capacity to the fairy-tale cauldron (355). These abilities are seen to be central to being what a sentient human is: being able to 'see as' and to form an autobiographical narrative structured as an allegory or fairy-tale. On the other hand, the story also explicitly speaks of the Turing test as a way of judging Neva and her ability to react humanely to Elefsis' need: 'you are my test', Neva says.

> Every minute I fail and imagine in my private thoughts the process of deleting you from my body and running this place with a simple automation routine which would never cover itself in flowers. Every minute I pass, and teach you something new instead. (346)

And yet, if being a body is central to being human, Neva has given up part of her humanity by allowing herself to be cryo-preserved and becoming a virtual-reality being. In that state, Neva has taken on some of the AI's capacities of enacting her own being in different bodies in virtual space of the Interior. Thus Neva's humanity is no longer being judged on the basis of her embodiment, but instead on the basis of every one of those moments she continues to accept her state of being not-quite-human, so that Elefsis can live. Thus Neva, just as much as Elefsis, is being Turing-tested.

Finally, as the story tests its main characters, so are the readers being tested on their human characteristics. Our form of sentience is made visible in the way we can look at Elefsis through the process of metaphor—seeing its similarity to us, and imagining its difference. As Chu suggests, the trope of the robot compels us 'to feel moral respect for the humanoid robot *despite* the massively obstructive effects of the uncanny valley', and therefore experience that moral in 'its most heightened state' (2010: 244; italics original). But Valente's story, I suggest, does even more: by explicitly connecting the trope of the rebellious robot with metaphor and storytelling as human cognitive actions, it engages the readers' sense of the form and function of those cognitive-emotional processes that make the story elements present for us in the first place.

Conclusion

One of Brian McHale's enduring arguments about science fiction concerns its ability to build elaborate fictional worlds while self-reflexively modelling its own 'world-building operations' (McHale 2007: 194). Similarly, I have in this paper wanted to draw attention to those aspects of science fiction's literalised metaphors that have less to do with the kinds of worlds these fictions build than with the self-conscious poetics of the genre's

methods. There is a particular literary value to be drawn from science fiction's ability to literalise metaphoricity and narrativity, and in so doing to engage readers in the enactment of fictions specifically as constructed environments, rather than as illusions of reality. When McHale evokes the difference between 'modeling of' and 'modeling for' (originally coined by the anthropologist Clifford Geertz), he is drawing attention to the difference between a fiction that aims to 'capture a pre-existing reality', and fiction that manipulates reality 'in order to bring it into line with a semiotic template' (McHale 2010: 21). Thus the heart of science fiction is in its capacity to model for, and—based on Suvin and cognitive estrangement—to project 'a reality differing from our own in its *models*, not just in its *individuals*' (McHale 2010: 26; italics original). If we extend the idea of model to cover not only various kinds of worlds or even conceptual metaphors but also narrative conventions and the narrative form of our human cognition, reading a text such as Valente's would engage readers in imaginatively enacting forms of imaginative enaction: that is, in enacting a cognitive environment where qualities such as metaphor, narrative cognition and the non-sensical are present as concretely as the characters and the setting.[1]

For the cognitive study of narrative, the enactive paradigm thus offers a way of approaching self-reflective phenomena without separating those from the process of imagining the fictional world. The environment our minds enact when engaging with fiction consists not only of verisimilar simulations of places and people, but also of imagined impossibilities, our awareness of those impossibilities as impossibilities, and our sense of how to interact with a self-contradiction—be that a single metaphor or a whole tale spun out of one. For the study of speculative fiction especially, enactive theory offers a way of extending the idea of what the literalisation of metaphors might mean. SF as we see it today may not have a monopoly on the representation of complex human concepts and experiences, but these genres do excel at generating that unrigorously termed quality of a 'sense of wonder', of estrangement and of the double vision of metaphor. In other times, such representations have found their home in other genres, ones suitable to each particular combination of artistic form and cultural situation. But in the increasingly tech-saturated world of today, where identities and cultural frames of reference flux and clash in our everyday experiences, this double vision has found a particularly suitable form of expression in speculative forms of fiction. Thus it is that Valente is able to weave her representation of artificial intelligence and cognitive metaphor out of fairy-stories and legends, and to have Alan

Turing take a bite of Snow White's poisoned apple.

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[1] Other works of speculative fiction that aim to make abstract narrative qualities present in their fictional modeling include, for example, Ted Chiang's 'Story of Your Life' (1998), which concretises the complexities of temporality in story-time and discourse-time in the lived experience of its narrator, or China Miéville's *The City & The City* (2009), which invites its reads to enact the conventions by which we perceive fictional spaces (see Polvinen 2016).