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Short Abstract: This chapter pulls together theoretical and epistemological resources for thinking about science fiction (SF) as a site of contemporary engagement with technoscience. SF can be read as a method for tracing popular constructions of science's stories about collective futures. But just as importantly SF can function as a site at which to examine how publics critically engage with scientific ideas through narrative. In this chapter we also set out concepts and methods for exploring what SF readers do with science and its futures through critical, creative reading. We supplement and challenge the tendency of studies of science and literature to focus on the science *in* literature by considering how readers navigate narrative and science together *through* the social act of reading.

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Reading Science: SF and the Uses of Literature

Amy C. Chambers and Lisa Garforth

1. Introduction

One of the most interesting places where literature and science meet is science fiction (SF), a popular genre with a rich history, a diverse archive of texts, a powerful and distinctive tradition of literary-critical and cultural analysis, and a very large and active audience. In this chapter we suggest that SF as a genre is particularly important to exploring contemporary popular engagements with science and the probable and possible futures it generates. We also argue that to understand how SF works as a meeting point for science and literature, critics and analysts need to understand more than just texts. We need to get to grips with the act of reading SF and the responses and situations of SF readers. We use this chapter, then, to pull together some theoretical, epistemological and methodological resources for thinking about fiction and technoscience that are not just about textual exegesis or the interpretations of the critic or the ideal or "implied reader" (Iser: 1978). We explore how we might put SF readers, their agency, biographies, and practices firmly at the center of contemporary studies of science and literature.

SF has been called "the literature of technoscientific societies" and is routinely credited with a distinctive capacity to speculate about human and more than human futures in rapidly changing worlds (Csicsery-Ronay: 2008, 1).[1] For over one hundred years SF has been engaging creatively with scientific ideas and technological change. SF has imagined worlds fundamentally transformed by technoscientific developments. It has responded to the hopes and fears for the future opened up by modernity's incessant change, and it has articulated and explored the human and social consequences of scientific developments. SF, then, is a product of the expansive and intensive presence of scientific rationalities and technological networks and objects in the structures and everyday life of modernity (Luckhust: 2005, 3). But SF has never been a mere reflection or celebration of scientific cultures. SF acts with and acts back on science, critically responding to its confident pronouncements, elaborating and complicating its narratives. SF can thus be read as a method for historically tracing and locating popular constructions of science's stories about our collective futures. It can help us to explore how readerly pleasures and social practices inform interpretations of and expectations of futures and future technologies. And it can

[1] See for a recent example Andrew Dincher, "'On the origins of solarpunk."

function as a way of understanding how publics critically engage with scientific ideas through narrative.

In the first half of this chapter we unpack some key aspects of SF's technofuturism, focusing on literature and examining the powerful role that is often claimed for the technological imaginary in SF critical scholarship. We begin by looking at arguments suggesting that SF, more than any other genre, has generated distinctive symbolic resources and critical epistemologies for reflecting on and navigating modern and postmodern life. For many critics, there is something about the cultural history or the formal features of genre SF that offers its readers a particularly powerful way of intervening in the co-production of science and the social (Jasanoff, 2004). SF literary criticism has focused on what is unique about the SF narrative and the act or experience of reading it, drawing on and echoing arguments from broader literary accounts of the phenomenology of reading and reader-response theory. As in these approaches, however, arguments about the distinctive effects of SF texts have too often relied on abstracted accounts of the reading act. Without explicit attention to the experiences and sense-making practices of embodied, empirical readers, their contextual uses of literature, and their diverse engagements with texts and ideas, these approaches tend to reproduce an "ideal reader" or universalise the critic's reading (Felski: 2008; Long: 2003).

What is at stake here, then, is a nuanced and socially situated sense of what multiple SF readers *do* with science and its futures through critical, creative reading – both in their individual interpretations and through the collective practices of sense-making that are increasingly enabled by the proliferation of online and face to face fan communities and spaces. In relation to SF in particular, this means thinking about the specific ways in which people are introduced to genre fiction, often by parental or other mentor figures, and how this shapes and guides their reading choices and fictional pleasures. It means thinking in creative ways about what it means to empathise and identify with fictional characters in social and technological worlds that do not, have never, and probably will not ever exist. It means exploring how these relations of identity and difference open up spaces for readers to engage evaluatively and ethically with alien social structures, future technological affordances and scientific challenges. It means understanding how readers use texts for pleasurable affects – wonder, fear, creepiness, hope – and for resonances with their own lives while at the same time speculating about how they might survive in technologically transformed futures.

In the second half of the chapter we explore arguments and approaches that can help us to think sociologically about how *readers* (plural and particular), rather than "the reader" (singular and abstract), engage with the science in SF. We aim to both supplement and challenge the

tendency of studies of science and literature to focus on the science *in* literature by considering ways of understanding how readers navigate narrative and science together *through* the socially shaped and situated act of reading. We focus on studies that start with readers rather than texts, and which understand reading as a social practice rather than a purely cognitive or critical act. We take our cues from empirical studies of readers and reading in sociology and cultural studies, and from media studies explorations of audiences, reception, and reader-response that offer new ways of understanding readers as active and creative. As we show, these approaches can help us to understand science/fiction in terms of active readers who bring texts to life in relation to their experiences, their biographies and their socially situated ways of knowing.

2. Science and science fiction: literature, modernity & technoscientific imaginaries

Amanda Rees and Iwan Rhys Morus note that science studies has recently become interested in "the intellectual significance of fiction, literature and the imaginary" (2019, 1). But until this recent turn, historians and sociologists of science have "largely ignored" both science fiction and the well-established field of science fiction studies (Rees and Morus: 2019, 9). This oversight means that scholars have failed to notice how SF might be understood as "a form of STS [science and technology studies] in action," one that predates science studies in exploring equivalences between human and nonhuman actors and imagining radically hybrid, fragmented and temporally complex forms of agency, and one that has "been far more effective in engaging the public imagination than has the history of science" (Rees and Morus: 2019, 14).[2]

A significant element of STS' recent interest in SF has come via Sheila Jasanoff and Sang-Hyun Kim's influential call to examine the "sociotechnical imaginaries" that contextualise and inflect scientific cultures, research programmes and national funding agendas (Jasanoff, "Future Imperfect": 2015, 1). Sociotechnical imaginaries are visions of progress characteristic of modernity which circulate in the wider (national) culture and which carry (usually implicit) ideas and ideals about collective futures and the common good. Science fiction, Jasanoff suggests, is an important "repository" of the sociotechnical imaginary, offering visions that "integrate futures of growing knowledge and technological mastery with normative assessments of what such futures could and should mean" (Jasanoff, "Imagined and Invented Worlds": 2015, 338). Stories allow us not only to map different futures but to enter politically into the very emergence of the

[2] See also Joanna Radin's recent reading of Michael Crichton's science fiction techno-thriller's as a form of STS in "The Speculative Present: How Michael Crichton Colonized the Future of Science and Technology."

future; through narrative we can change the story (Jasanoff, "Imagined and Invented Worlds": 2015, 338). SF is a particularly important space for working out and interrogating the different values and desires associated with different future possibilities. Jasanoff and Kim mention some well-known examples of SF texts to exemplify their case. Beyond this, however, they have little to say about the genre of SF: its history, its formal and aesthetic qualities, its textual functions, its reading protocols and pleasures.

To understand why SF should have a privileged place in understanding Jasanoff and Kim's "dreamscapes of modernity" (and postmodernity), we need to turn to SF literary criticism. SF scholars emphasise that it was the first and most important literary genre to "devote its imagination to the future and to the ceaseless revolutions of knowledge and desire that attend the application of scientific and technical knowledge to social life" (Csicsery-Ronay: 2008, 1). SF literature is a product of technoscientific modernity; the "literature of technologically saturated societies" (Luckhurst: 2005, 1). Its emergence depends on the embedding of scientific epistemologies across social institutions; the visible impact of technologies on everyday life, especially work; the extension of both reading and scientific literacy in the late 19th century; and the emergence of new forms of popular literature and modes of cultural and technological reproduction and circulation, particularly mass-market magazines (Luckhurst: 2005, 1; Vint: 2014, 17-18).

From Mary Shelley's *Frankenstein* (1818) to Jules Verne's *Journey to the Center of the Earth* (1864) and H.G. Wells' *War of the Worlds* (1898), SF emerged as a literary genre in the 19th century as scientists and science fiction writers "exchanged ideas" and "established knowledge and speculation" over new technologies and possible science futures (Fayter: 1997, 257). SF is defined by Darko Suvin in terms of its "interest in strange newness" that creatively extrapolates "the variable and future bearing elements" of contemporary science and technologies that are shaped by "human curiosity, fear, and hope" (Suvin: 1972, 373, 375, 381). Suvin sought to present the SF genre as a literary form worthy of critical and serious debate rather than one that might be understood as fantasy or fairytale – Suvin considered the turn away from science to space opera (adventure stories that happen to be set in space e.g. *Star Wars*) in the 1970s as "creative suicide" as it veered away from the genre's potential for serious critical engagement with science and society (Suvin: 1972, 375). As self-styled High Culture in the late nineteenth and early twentieth centuries turned away from technology or "Mechanism" to focus on the transcendent and civilized sphere of art and human experience, SF avidly got to work on the possibilities and threats of an ascendant science and technology (Luckhurst: 2005, 3). As Sherryl Vint notes, the genre distinguished itself formally by rejecting the conventions of realist fiction and

"[the] novel of bourgeois interiority" (Vint: 2014, 22). It devised instead new narrative modes for exploring material worlds and social patterns, systems and dynamics; for articulating perspectives beyond the human; and for narrating stories with spectacularly extended or compressed timescales (Vint: 2014, 1).

But if SF literature ever was simply a product or epiphenomenon of technological modernity, it seems that it has now decisively escaped the bounds of the book or popular magazine to work more actively and more ubiquitously in contemporary cultures. Istvan Csicsery-Ronay, for example, insists that to understand SF now we need to look beyond texts and even genre to a culturally widespread quality of "science fictionality." In part, the idea of science fictionality speaks to the ways in which SF now furnishes contemporary culture and media with a distinctive "thesaurus" of images, symbols and narratives, a stock of tropes for making sense of technological change and the future: the time traveler, the generation spaceship, the alien invasion, the singularity, the cyborg (2008: 3). Broderick has similarly suggested that over the years SF has accumulated into a "mutually imbricated megatext," a densely intertextual and always-evolving assemblage of images, codes, grammars, stories and protocols for making narrative sense of the new (Broderick: 1995, 59). For Csicsery-Ronay, SF has given us more than a body of texts and an accompanying megatext. It has injected into modern cultures a "mood or attitude", "a kind of awareness" that is alert to the strange, to the other, to shifts in the fabric of reality (2008, 2, 3). Science fictionality here is a mode of perception that holds open to question new technological things and scientific ideas. For Csicsery-Ronay, then, one does not have to be a fan or a close and critical reader of literary science fiction to access the science fictional imaginary. It is always-already part of our cultural equipment and sensibility; SF simply is how modern subjects make sense of a society.

As the "myth form" of an industrial and increasingly post-industrial and globalised age, SF has often been celebratory, voicing awe and wonder in the face of technological possibilities (Broderick: 1995, 8). It has sought to interpellate its readers as narrow scientific positivists or pragmatic and instrumental engineers of the future. But SF has also been the critical, doubting shadow of this techno-optimism. It has allowed readers insights into the will to power of modern science and textual spaces to explore its destructive capacities. Luckhurst characterizes SF's generic attitude towards science and technology, then, as something like ambivalence, a working through of complex disruptive ideas and material objects, a creative embrace *and* a critical examination (2005, 5, emphasis in original). For Csicsery-Ronay, science fiction opens up a "hesitation" around technoscientific novelties, creating a space for reflection on emergent

scientific and technological developments, both in terms of their plausible development, and in terms of their ethical, social and political consequences (2008, 3).

In much SF criticism, as we show below, that hesitation is framed as either an individual cognitive response or a broader cultural space for dealing with the onrush of scientific and technological change. But SF has proliferated and fragmented since its supposed Golden Age and the dominance of white male technofuturists (Vint: 2014, 66-67). We have seen the emergence of the so-called New Wave in the mid-1960s and the development of "soft" or social science fiction through the 1970s and 1980s (Vint: 2014, 75-76; Nicholls: 2011). There has been a blurring or even "evaporation" of science fiction into a wider hybridisation of speculative genres in recent years (Wolfe: 2010). There has also been multiplying diversity and contestation in the genre's writers, perspectives and concerns, as well as in scholarship and fandom. We have seen the rise to prominence of feminist voices (Vint: 2014, 113-121). There have been struggles for prestige and awards between socially conservative advocates of hard SF and social justice advocates (Oleszczuk: 2017). And there is increasing openness in the genre to post-colonial critique, indigeneities and queer expression and representation. The genre is now characterised by both formal and social difference, both aesthetic and identity politics, in ways that have created not just a single space but multiple overlapping spaces for the social critique of science and technology.

Never prediction or prophecy, SF calls up altered worlds and futures as creative spaces of exploration, speculation, and negotiation about and with science. This iterative "scatter" of "possible futures or alternative lifeworlds" functions, as Vint notes, as a constant provocation to reflect on technological change in relation to human action and social structure as they are and as they might be (Broderick: 1995, 54; Vint: 2014, 22-23). SF's futures have a strangely paradoxical relation to history and temporality. In one sense, as we have seen, SF is an unusually historically-specific fictional form. It is intimately linked to the structures and lived realities of late modern, technoscientific societies. SF belongs to worlds in states of constant, heterogeneous, plural and intense transformations linked to new knowledges, and it articulates both recurring cultural or epistemological crises and the everyday experience of mundane technological change; as Damien Broderick writes, "our social being is founded in rapid, virtually uncontrollable cognitive change, principally driven by science and technology" and provoking "a unique epistemic crisis," or, as Roger Luckhurst puts it, "in the messy, experiential world…ambivalence towards technologies is often the presiding spirit of engagement" (Broderick: 1995, xi; Luckhurst: 2005, 5). It is also a kind of historical fiction. As the SF writer Kim Stanley Robinson argues, any SF novel "will be placed in a future of ours, and you can run a track from this moment to that moment" -

even if SF "is always portraying histories that we can never know" (Heise and Robinson: 2016, 24-25). At the same time, SF is, as Vivian Sobchack has observed, peculiarly "unfixed in its dependence on actual time and/or place" for sense-making—unlike other genres, which are linked, however playfully, to a particular (albeit often imagined) historical period (the Western, the gangster film) (1987, 66). Formal criticism of SF has focused extensively on why this quality of SF texts matters and what it tells us about the reading practices and protocols of the genre. It is to these arguments that we now turn.

3. Fiction and science fiction: reading, poetics and protocols

Cultural historians insist that SF as a genre, megatext or sensibility has escaped texts to become part of everyone's cultural equipment for making sense of technoscientific societies. A different strand of SF analysis has focused more closely on specific texts and their capacities to enact socio-political critique. A formal and Marxist approach to SF, starting with the work of Darko Suvin and continuing through the influential theories of Frederic Jameson, Tom Moylan, Carl Freedman and others, sees it as the literature of cognitive estrangement and explores its particular powers to distance us from dominant social and political arrangements. Here, SF is a fiction of critique with a distinctive capacity to penetrate the ideological surfaces of capitalist technomodernity and make a transformative intervention in the consciousness of its readers. SF has less to do with representing alternative futures than it does with changing how we see our present. For Suvin, the SF novel draws readers into a text that works to estrange or alienate us from our everyday reality and to apprehend how our social worlds might be otherwise (1972). Jameson relatedly insists that SF is not really about the future. Rather, through repeated attempts to imagine difference it repeatedly shows us the power of ideological closure to truly conceive of something other than what we have: specifically, (post)modern capitalism (1982).[3]

In this reading, SF puts the science in literature in order to work through forms of critique and political intervention that are both necessary in and distinctive to technoscientific societies. For Suvin, the definitive feature of SF is the text's introduction of a "novum", a wholly new "cognitive" thing (technological object or scientific idea) with the capacity to transform the lived-in world (1979: 63). In the SF novel, the novum functions formally to disrupt the text and the reading experience. The novum forces language to articulate the new. Words and sentence structures are stretched and challenged as they wrap themselves around the novel thing. The

[3] Jameson first made these arguments in the article "Progress Versus Utopia, or, Can We Imagine the Future," which was included in Jameson's *Archaeologies of the Future: The Desire Called Utopia and Other Science Fictions*.

reader works to make sense of a world in which, to borrow well-known examples of first sentences from SF literature:

> "It was a bright day in April, and the clocks were striking thirteen" (George Orwell, *Nineteen Eighty-Four*)
>
> "They set a slamhound on Turner's trail in New Delhi, slotted it to his pheromones and the color of his hair." (William Gibson, *Count Zero*)
>
> "I slipped into my first metamorphosis so quietly that no one noticed." (Octavia Butler, *Imago*)

An intense engagement with textual otherness provokes the reader to recognise that the conventional ways in which representation and social order are made to make sense are contingent and subject to change. When we read SF, we learn to become estranged from our taken-for-granted world and to read everyday experience from a critical distance. For Suvin, alienation is SF literature's distinctive "poetics": its formal appeal and aesthetic effect (1972, 374-375). SF here is more than a generic mode for reflecting on the relationship between technoscience and society. It is a privileged form of textual critique that can generate new critical and political awareness.

These approaches to SF focus on text and semiotics as much as content and genre. They also suggest the critical (as in necessary, as in deconstructive, analytical, curious) *function* of reading SF. They help us approach the genre less in terms of its representation of technoscience, and more in terms of its capacity to engage us to think it in new ways. SF criticism has had much to say about how the genre produces creative readers who learn, navigate and deploy what the SF author and critic Samuel R. Delany calls its "protocols." These protocols, for Delany, are located in the "interpretive space" around a text and include "specific conventions, unique focuses, areas of interest and excellent…particular ways of making sense out of language" (Delany: 1980, 188; Gunn: 2006, 142). All genres have reading protocols. But they are perhaps particularly important in SF because of the referential unfixedness that Sobchack notes. The speculative character of SF, its ontological challenge, generates textual surfaces that "seem bizarrely under-determined," replete with neologisms and rhetorical strangeness (Broderick: 1995, 63). SF writing, as Delaney puts it, is worldbuilding, line by line (1980, 178). The words do not invite the reader to recognise a pre-existing reality, but rather to participate in the making of a new or altered one as they go along – and, as James Gunn notes, to actually anticipate and enjoy this mode of active and creative reading.

In these approaches, the full richness of the SF's text's "semiotic density" is only available to "native speakers" – trained readers who have apprenticed themselves in the genre (Broderick: 1995, 63). SF's megatext or intertextual qualities are particularly important – but so are skilled and active SF readers. Being able to make sense of SF depends on first learning its protocols *from* reading SF novels and then applying them *to* new texts in an iterative process. SF is a difficult literature that demands real intensity of care and engagement from its readers (Gunn: 2006, 141-148). But it also offers intense pleasures – active, co-constructive, knowledgeable, critical. Analyses of the poetics and protocols of SF then remind us that a narrow focus on SF texts and content misses some of the most important work that genre literature does on and with science and futures. This strand of literary criticism asks us to attend to the capacity of long-form narrative fiction to mobilise critical orientations towards existing social forms, and the skilled practices of readers who work cognitively, intellectually and affectively with science and its futures. In this sense we might see creative and active SF readers as partners in the genre's work of envisioning and exploring social scientific alternatives.

These formalist approaches to SF can certainly be challenged as "prescriptive and judgemental," as Roger Luckhurst has argued (2005, 7). They tend to focus on and reproduce a small canon of politically- and aesthetically-approved texts (Luckhurt: 2005, 7). Only disruptive, challenging, estranging texts are valued, and a respectable literary strand of SF is separated off from the unruly, cliched, popular wilds of the genre (Roberts: 2006, 11-12).[4] These critiques have merit. Yet, as we will suggest in the remainder of this chapter, such approaches have made room for analysing reading in SF in a way that more inclusive cultural histories of the genre, for all their references to "communities of practice" and fervent but all-too-brief appreciations of fans and fan studies, typically do not (Vint: 2014, 93; Luckhurst: 2005, 10-11.) SF criticism has also been more interested in readers and readerly pleasures and minds than literary criticism in general, which, as Rita Felski notes, has been sorely lacking in "rich… accounts of how selves interact with texts" (2008, 11).

Science Fiction Studies then has given us two ways of thinking about science and literature beyond the analysis of textual content as somehow representing scientific ideas or technological change. Cultural histories suggest that the genre has been a popular and at times populist response to challenges of technoscience, whose sprawling megatext and ubiquitous attitude of ambivalence (wonder vs. rejection) infuses all of our responses to science and its futures. Formalist accounts of the genre present us with a much narrower but perhaps more

[4] Roberts refers to Broderick, *Reading by Starlight*.

penetrating account of the kind of reading experience that some kinds of SF offer, their capacity to challenge and critique social realities and estrange readers.

4. Readers and reading: reception, phenomenology and social practices

What is missing in even the most sophisticated formal and cultural accounts of SF, however, is both an empirical sense of how readers make sense of texts, and the contextual and biographical ways in which reading science and literature is shaped. As in mainstream literary criticism, SF theorists have paid attention to the phenomenology of reading or the reading "act," theorising rich and complex relationships between mind and the text (Ricoeur: 191, 45; Iser: 1989, 7). But they have "generally not considered the variety and complexity of reading as a cultural practice, all too often assuming that their readings can stand for everyone else's, or that there is a homology between literary quality and worthwhile reading experiences" (Long: 2003, 221).

This is perhaps not surprising in a genre in which roles are blurred, slippery, and multiple. Readers are fans are editors are critics. Even more than other literary genres, SF is notable for its participatory audiences who construct meaning and remix and reimagine worlds via communal discussion through their knowledge and experience of the SF megatext – now predominately online. SF has always been "explicitly and recursively theorised by its practitioners" who are "highly articulate about their positions as writers and readers" (Broderick: 1995, xii). Thus while SF criticism has been particularly interested in the act of reading and the effects of texts, it has also been particularly prone to write the critic's experience and interpretation as the general one, with all the limits and blind spots that this entails. SF literature and criticism has of course lately become more expressive of women's voices, queer voices, non-cis and non-white voices; more attentive to post-colonial and non-Western experiences. Previously underrepresented writers have explored alternative, independent and self-publishing options to reach a broader audience. The genre has increasingly (though not always easily) been opened up beyond the cliché of the white male fan. But even this diversification neglects the fullest dimension of readers as individuals and communities – socially situated, embodied, affective; classed, gendered, aged and raced; unique, thoughtful and irreducibly complicated (Fuller and Sedo: 2013, 37).

If we want to work with SF as a way of understanding the cultural circulation of technoscience, we need to enrich textual analysis and accounts of reading as a rather "bloodless and disembodied" hermeneutic practice or "text-reader transaction" with sociological, historical and ethnographic studies of readers and reading (Fuller and Sedo: 2013, 39). Despite the existence of a rich field of reader-response theory in literary studies and audience studies in fields

of culture and media, James Procter and Bethan Benwell note that attention to reading as a social practice "has been comparatively neglected" (2015: 214). They identify a small set of "social studies of contemporary literary and fictional reading" (none focused specifically on SF) and highlight an influential early wave of feminist empirical studies focused on book groups. Its key theorists broke new ground in understanding reading not as a solitary or abstracted act but as a fundamentally social practice.[5] They brought home the ways in which reading takes place in specific social and spatial settings, depends on ingrained but variable cultural scripts and habits, and is maintained by relatively stable institutions and organizations.

Ethnographic and discursive studies of small-scale book (reading) groups have recently been extended and complemented by studies of larger "Mass Reading Events," and by a growing understanding of the complex ways in which fiction reading is becoming part of a wider media culture.[6] All these approaches offer resources for exploring science and literature beyond reading science in the text and towards a model that opens up how social readings and diverse readers actively navigate science and narrative together. They challenge "the primacy of the literary text as an object of study" and "the imagined and ideal readers who are often constructed from or 'read off'' the text within the discipline of literary studies" (Fuller and Sedo: 2013, 37). These studies reposition reading as active, social, biographical and situated. They are particularly interested in the differences between professional-critical and lay reading. The former is usually distanced, sceptical and deconstructive; lay reading, by contrast, is more often immersive, connected and constructive.[7]

Making sense of science and literature, then, might mean acknowledging that our own critical readings are only one part of the story of reception. Felski calls for us to "engage seriously with ordinary motives for reading," to attend to its multiple and diverse purposes and pleasures in everyday contexts (2008, 14). This means reflecting on the intimate entanglement of fiction reading with desires for knowledge, longings for escape and possibilities of recognition and fantasy that she suggests have been ignored or unvalued in literary criticism in the name of political critique. Eve Kosofsky Sedgwick offers the idea of "reparative" reading as different from (but not necessarily separate from or in opposition to) the "paranoid" stance of the professional critic (2001, 150-151). Reparative reading speaks to what we do with fiction in the name of

[5] See Janice A. Radway, *Reading the Romance: Women, Patriarchy, and Popular Literature*, and Long, *Book Clubs*.

[6] On mass reading events, see Fuller and Sedo, *Reading Beyond the Book*. On the wider story of proliferating entanglements between traditional fictional forms and more recent forms of media and digital culture, see Henry Jenkins, *Convergence Culture: Where Old and New Media Collide*.

[7] See John Guillory, "The Ethics of Reading," in Marjorie Garber et. al. (eds.), *The Turn to Ethics* (New York: Routledge, 2000), Felski, *Uses of Literature*, and Procter and Benwell, *Reading Across Worlds.*

escape, self-care and love. Sedgwick opens up the range of affects, desires and epistemologies that the reader might bring to the genre and the "many ways in which selves and communities succeed in extracting sustenance from the objects of a culture," especially selves and communities whom that culture has not always seen (2001, 1510-151).

Sedgwick's work resonates with empirical studies that emphasise readerly pleasure and reveal multiple "uses" — of "literature," in Felski's title, and of "reading", in Long's. The predominately middle-class female book club members in Long's ethnographic study, for example, "are stubbornly attached to reading as 'equipment for living'" (2003, 220; see also Long: 2003, 131). Like de Certeau's textual poachers, Long's readers are greedily "raid[ing] books for what they find interesting" and using what they find to do creative identity work, both individual and collective (Long: 2003, 220).[8] They read to find new versions of themselves and to understand their social and political worlds. They prefer texts that invite open-ended and multiple takes, books that allow them to move between their own social experience and the situations and characters they encounter (Long: 2003, 145-9). Long's and Sedgwick's accounts of social or reparative reading suggest a mode of textual engagement that is both more decadent and more instrumental than the methods of "schooled readers" (Long: 2003, 220). Reading is done for enjoyment, involving immersion and escape; but it is also put to practical use in making sense, collectively and individually, of social life as we experience it, desire it, imagine it (Long: 2003, 201).

5. Meeting readers: online encounters, ethnographies and interviews

In this last section of our chapter we come to the practical and methodological dimensions of adding reading practices and pleasures into accounts of science and literature. Previous waves of qualitative sociological and cultural studies research have not for the most part focused on SF readings and readers (with the notable exception of Penley's fan study/cultural history *NASA/TREK*[9]). More recent work on the online lives of fans and readers offers crucial clues to where and how we might meet SF readers where they make sense of science fiction and the

[8] Long refers to the concept of textual poaching, first developed in Michel de Certeau, *The Practice of Everyday Life* (eg. 166), and popularized by Henry Jenkins, who defines "textual poaching" as "an impertinent raid on the literary preserve where fans take away only those things that are useful or pleasurable" (2013, 9).

[9] *NASA/TREK* is study of gender, fandom and desire in science and technology explored through non-traditional/academic, fanfiction-inspired prose. Penley argues that in American culture the NASA space program is shorthand and focus for public interest in science and technology and that fiction is used to supplement the disappointments of real-world science. NASA and *Star Trek* are inextricably linked in the US public imagination and its negotiation of the role and place of science and technologies in our day to day lives (1997).

science fictional. Here we draw on some of that literature in relation to our own ongoing sociological research with SF readers to return to the questions and issues that we have raised in the preceding sections in relation to the empirical challenges and dilemmas of working with readers. Our own concerns focus on a cluster of related issues. We are interested in how reading and engagement are framed biographically: where and from whom, for example, do young readers discover and learn to enjoy non-mainstream fiction? How might sharing the pleasure of a sometimes overlooked genre with a parent or teacher (or discovering it alone) shape interpretive practices? We want to know about the particular pleasures of playing in alternate technoscientific worlds, the affective as well as the cognitive encounters with transformed worlds and people. We are exploring the insights and ideas that readers bring back to their lives and their reflections on contemporary science, society, history, and culture from their reading encounters. We are interested in how readers make sense of texts individually in the social contexts and experiences of their own lives; and we are interested in how readers come together to interrogate SF texts and expand their readings collectively.

Virtual and real-world sites of readerly activity, which have been multiplying in recent years, present us with a plethora of places for encountering active SF readers. With the increasing "digitisation of social life" readings can travel further; dispersed readers can meet and share their ideas; and the very idea of book groups becomes more complex (Recuber: 2017, 47). Even face-to-face social groups are now often organized and enhanced with virtual discussions on platforms including Facebook and constructed through online organising tools like Meetup. Readers are now more likely to engage with other readers on sprawling multi-member book discussions sites, such as Goodreads, than in the traditional book clubs that are discussed in the core texts concerning the sociology of reading groups.[10] This discourse also occurs online in blogs, podcasts, Wikis, Tumblrs, BookTube videos (YouTube curated book clubs) and via Twitter. When readers meet in person to make sense of fiction together, this is as likely to be at book festivals, SF conventions, and mass reading events as in intimate reading groups.

Working with readers in the early twenty-first century, then, offers new promises for the researcher – but also new challenges. Meeting readers in person can become more difficult as readers and reading discussions disperse and even fragment across a spectrum of readerly spaces both on and offline. Participation in discussions of texts can occur simultaneously across

[10] See: Radway, *Reading the Romance*; Long, "Women, Reading, and Cultural Authority: Some Implications of the Audience Perspective in Cultural Studies," "Reading Groups and the Postmodern Crisis of Cultural Authority," "Textual Interpretation as Collective Action," and *Book Clubs*; and Jenny Hartley, *Reading Groups*.

a variety of platforms, with readers/users potentially engaging in multiple conversations. For example, a live chat on Youtube can be accompanied by discussions on Twitter, Facebook, Goodreads, and in the video's comments.[11] In our own work we have discovered that while fan conventions are sites of collective activity and interpretation, they are also spaces in which readers vociferously disagree about genre definitions, take up and contest they ways in which academics might identify them as fans, and mobilise together to defend the value of their reading pleasures against literary criticism. We have found that online SF groups can be very intimate spaces in which small groups of friends and intellectual kindred spirits come together regularly to interrogate a chosen book in depth, build a collective negotiated reading, and use fictional texts to open up journeys into wider theoretical and philosophical debates. Such groups might use a variety of online media (Skype, discussion boards, blogs) to proliferate modes of communication within a self-selecting and relatively bounded group. We have also seen, however, how online book groups such as those on Goodreads can be text-only spaces that are open to more distanced, occasional and *ad hoc* contributions from globally dispersed participants, who might read a text like *Parable of the Sower* both in relation to national political histories and individual prospects for survival in the dystopic future world of broken infrastructure, environmental racism and climate collapse that Octavia Butler's text depicts.[12]

Social and reading interactions multiply and challenge SF scholars to make sociological sense of the huge volume of unsorted data that can be gleaned from virtual spaces. This data requires new methodologies, as researchers are predominately observers who harvest (rather than generate) data in collaboration with readers. There are also ethical considerations when contemplating consent and navigating public versus private settings for collecting and using material posted to openly accessible virtual spaces, including videos and podcasts as well as comments and forum discussions (Recuber: 2017, 48). Researchers must consider the lived

[11] For example, the *Vaginal Fantasy Book Club* (2012-2018, URL: <http://vaginalfantasy.com/>), hosted by actress and web series creator Felicia Day, used the Google/Youtube Hangouts on Air to livestream their book club, consisting of a discussion among the host, Veronica Belmont, Bonnie Burton, and Kiala Kazebee. Viewers/readers/users were encouraged to read the book in advance of viewing the video and could comment on the video, respond to and make comments on Twitter, Facebook, and Google+, and join and participate in the associated Goodreads forum, which had over 16,000 followers, and attend real-world local meet-ups organised by individuals through Goodreads. Discussions have included science-based texts, including: *Fortune's Pawn* (Rachel Bach, 2013); *In the Black* (Sheryl Nantus, 2014); and *Binti* (Nnedi Okorafor, 2015).

[12] This paragraph discusses research with readers conducted by the authors as part of the project "Unsettling Scientific Stories" (2016-18, AH/M005534/1). Research with online reading groups in the second phase of that project was led by Miranda Iossifidis. For more on the reading groups mentioned here see Iossifidis (forthcoming) "Uses of science fiction: everyday online readers, ambiguous hopefulness, and environmental justice," and Iossifidis (2018) "Uses of science fiction," paper presented in the Visual Cultures Public Programme, Goldsmiths College London, November 15th 2018.

experience of online interactions, rather than assuming that online personas and confessions are equivalent to real-world interpersonal discussions of science and literature. More conventional qualitative methods—interviews and participation observation—thus remain extremely valuable for exploring biographical and personal dimensions of fictional reading experiences with individuals. At the same time, digital social interactions must be considered as part of everyday life, as identities are formed and performed in ways that might have been, as Steve Jones suggests, "limited in physical space" (1999: xxii).

Contemporary readers can reveal as much or as little about themselves as they wish online and respond to fiction via multiple personae and roles (critic, commenter, fan, etc.) Virtual spaces offer a certain anonymity in which boundaries of age, race, gender, class, disability, geography, and expected expertise are blurred. Online book groups "tend to be ephemeral, imagined, and geographically distributed" (Gruzd and Sebo: 2012). This openness and potentially radical anonymity can facilitate discussions of issues that may not be covered by books selected by face-to-face book groups, both social and commercial. Readers can use these spaces to resist or disrupt stereotypes concerning race, gender, sexuality, and expertise about SF readers—and also to promote and engage with texts and authors who do not align with or appear within the traditional SF literary canon. For example, Nnedi Okorafor's *Binti* trilogy (2015, 2017, 2018), Becky Chambers' *The Long Way to a Small, Angry Planet* (2014) and Larissa Lai, *Salt Fish Girl* (2002) feature as increasingly popular choices for reading groups as they offer raced, queer and other underrepresented viewpoints. For even in the most feminist moments of the SF genre's history, it is still so often the white male writer who dominates. Therefore in order to break through the canon alternative methods of reaching readers (self-publishing, crowd-funding, and direct online engagement) have been employed. SF offers a potentially radical space for intersectional, indigenous voices with new technologies, modes, and virtual spaces allowing them to gain traction and popularity.[13] As Danielle Fuller and DeNel Sedo argue, "[the] urge for people to be social through their reading has not died in the face of technological change" (2014, 15). Rather, virtual spaces offer new opportunities to discuss texts with an intimacy that is not constrained by local or global barriers. Virtual spaces have allowed for communities of readers to build around

[13] adrienne maree brown and Walidah Imarisha's 2015 short story anthology *Octavia's Brood: Science Fiction Stories from Social Justice Movements* was originally crowd-funded and intended to be self-published (it was eventually published by the AK Press). The collection was written and workshopped by activist-writers. It explores "the connections between radical speculative fiction and movements for social change" (AK Press description, https://www.akpress.org/octavia-s-brood.html). Joan Haran uses the compound term "imaginactivism" in her discussion of this text to explore how people can be inspired by the "possibility of creating a new cultural intervention" and the radical potential of the science fiction genre to offer creative spaces for those who have been historically mis- and underrepresented (2017).

specific genres, subgenres, and interests, making the exchange of ideas and experiences almost instantaneous compared to the slower (but equally social) SF fan practices earlier in the twentieth century, including correspondence with fanzines and newsletters and the search for fellow readers.

Finally, we want to emphasise that the proliferation of SF reading practices online does not translate straightforwardly into access to those readers for researchers. If we are going to include readers in our understanding of science and literature, our challenge is to work *with* them, not on them, and to find ways of engaging in a genuine two-way dialogue. Above all, this means approaching SF readers as skillful readers of science and culture who are reflexive about their pleasures and interests. They are not objects of study, but co-constructors of knowledge about reading science in science fiction. At the same time, SF readers often have strong personal definitions of the genre and a powerful sense of the place and value of science within the texts they enjoy. SF readers are particularly quick, as we have found in our own research, to identify and respond to the labels that well-meaning but inadequately informed researchers may place on them. The readers we observed and interviewed often resisted being characterised as experts, for example, and sceptically examine their identification as fans. Expertise, for many SF readers, is a hard-earned claim about scientific knowledge, not about readerly skills of interpretation and critical revelation. Some SF readers are fans, but not all fans are SF readers. They may engage with the megatext, but not be active fans in the sense of creating and occupying literary storyworlds. Negotiating and unpacking these categories and characterizations with SF readers is one way of entering into their reading worlds and starting to read science in fiction from the inside out.

6. Conclusion

Studies of reading can help us to understand it as a "transitive" act, linking literature and personal experience in an iterative and under-determined way (Long: 2003, 29). In empirical research with readers, we do find that reading is critical and transformative—an ethical engagement, a political act. But it does not (only) operate in the mode of radical cognitive estrangement that Suvin suggests. Its powers are more everyday and mundane than that, more rooted in biography, personal experience, and reading contexts. Literary critics, as Felski remarks, "love to assign exceptional powers to the texts they read," to identify texts' capacity to mobilise social change or shift subjectivities (2008, 18). But Radway reminds us pointedly that textual meaning is not a linear process, emanating in the creativity of the author and

communicated via the book to the reader (in Long: 2003, 21).[14] Reception or reading is not an end point; it can be a starting point for new acts of creative and critical imagination. Reading experiences are replete with multiple pleasures and opportunities for new modes of understanding and insight, which are inseparable from specific reader biographies, social and historical situations, and reading formations.

Engaging with readers and reading acts is not intended to displace critical scholarly readings of science and/in literature, but to also ask how they can be complemented by an understanding of lay modes of reading. From this point of view, understanding SF and science and literature more generally cannot be reduced to critical readings of specific scientific texts or projections of ideal and implied readers. It can also involve working with all sorts of readers sociologically, both as objects of study and resources for understanding the complex ways by which readers make sense of technoscientific societies through narrative.

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[14] See also Radway, "Reading is Not Eating: Mass-Produced Literature and the Theoretical, Methodological, and Political Consequences of A Metaphor."

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