CHAPTER 9

# Feedback in Reading and Disordered Eating

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Reading supplements my feelings rather than creates my feelings.
anonymous survey respondent

## INTRODUCTION

Nowhere is the impossibility of separating mind from body clearer than in an eating disorder (ED): both sicken in a reciprocal back-and-forth, and both recover that way too. Typically classified as 'mental illnesses', EDs are an excellent example of how the psychological and the physical have to be understood as interacting parts of the same system. This might seem an unremarkable statement, especially if you have already read plenty about '4E' (embodied, embedded, enactive, and extended) cognition or second-generation cognitive science or anti-computationalism in theories of the mind (e.g. Wallace, Ross, Davies, and Anderson, 2007; Menary, 2010; Kukkonen and Caracciolo, 2014). But here I want to draw attention less to the inseparability than to the constituent interactions.

In much cognitive literary work that draws on and contributes to research on 4E cognition, including most of my own (e.g. Troscianko, 2014), the emphasis has been on thinking through the ways in which our situated bodies in action are fundamental to how our minds work. What has therefore been teased out in such research is the many ways in which embodiment functions as an underlying substrate, a long-ignored but now

incontrovertible bedrock determining what we used to think of, in our more Cartesian moments, as pure reason or the intellectual act of interpretation. So, for example, we have gained insights into how embodiment structures poetic texts and readers' responses to them (Miall, 2011), or informs readers' mental imagery (Kuzmičová, 2014) or intersubjective experience (Chesters, 2014). These sorts of approaches go a long way towards mapping out the extent of the mind–body dialogue in fiction and fiction-reading, but typically they say less about its dynamics.

So in this chapter I will try to attend to the dynamics rather than the state of interconnection between the psychology and the body—though the latter will necessarily be a given. In this endeavour, I follow in the footsteps of some noteworthy work that has already moved from the foundational to the interactional stance on embodiment in reading, in contexts like the feedback between more emotional and more rational appraisal in readers' responses (Pirlet and Wirag, this volume), the feedback between brain, body, and world in literary writing (Bernini, 2014), and the feedback between constraints and affordances (Caracciolo, 2014) or between predictive models and real-world data (Kukkonen, this volume) in readers' interpretive engagements with texts. My approach will differ from these others by focusing on a particular embodied cognitive reading situation—that of having an ED—rather than dealing primarily with the kinds of dynamics that characterize cognition more generally. My focus on disordered eating is informed by my own past experience of anorexia; you can read more about that experience, in dialogue with scientific and clinical work, on my blog (Troscianko, 2009). Anorexia will feature with particular prominence in this discussion, partly because of my own experience, but mainly because as an ED that by definition involves severe malnutrition, it makes certain mind–body interactions especially salient. However, many of the same principles apply across the ED spectrum. My aim in this chapter is to understand both disordered eating and reading better, by tracing some of the recursive relationships that may mediate between the two. And the single most fundamental concept I will be relying on is feedback.

## FEEDBACK SYSTEMS AND DISORDERED EATING

Feedback occurs when the output of a system is routed back to become an input to the system. There are two basic kinds of feedback: positive and negative. Although these terms are sometimes used qualitatively to indicate appraisal or valence ('she tactfully gave him negative feedback on his essay', 'the feedback was positive: over time it made them gradually happier'), I will

be using them here in their technical, quantitative sense: positive feedback is usually self-reinforcing and unstable, leading to an ever-greater discrepancy between the starting and the end states; negative feedback is typically self-cancelling and stable, tending towards equilibrium (Mitrophanov and Groisman, 2008; Åström and Murray, 2014, p. 22). A familiar example of positive feedback is the deafening screech of a microphone picking up the sound of the speaker used to amplify it: the microphone feeds the speaker sound back to the speaker for amplification, and the speaker amplifies that sound and feeds it into the microphone, and so on until your ears hurt. The crescendo stops only when someone unplugs one or both bits of kit. A simple example of negative feedback is a central heating thermostat, which measures the actual temperature, compares it with the reference temperature it is set to, and sends a signal to the heating system to increase or reduce its output, resulting in a new actual temperature to measure. If the thermostat is working well, the fluctuations should get smaller and smaller until a balmy 21°C is reached—and then adjust quickly if someone opens an outside door.

These examples may seem a long way from human cognition, but the structures and mechanisms of feedback are the same in mechanical, electrical, and biological systems. Feedback is present in all biological systems. In the human body, homeostatic stability is the ideal state for everything from body temperature to blood pressure and metabolic rate, and it is achieved via negative feedback. Failure to maintain homeostasis is seen in heatstroke or hypothermia, in hypertension or hyperthyroidism. Although positive feedback is inherently unstable, it is not always bad: during childbirth, for example, pressure of the foetus on the cervix causes nerve impulses to be transmitted to the brain, causing release of the hormone oxytocin into the bloodstream, causing the smooth muscle of the uterus to increase the rate and force of the contractions, pushing the foetus harder against the cervix, producing more oxytocin causing more contractions. Although in experiential terms the dynamics of the positive feedback here are associated with pain and any number of other negative responses, ultimately (when all goes well) the feedback loop is broken by the birth of the baby, which is thus both the desired outcome and a self-limiting event. In most biological cases, though, positive feedback that is not embedded in a larger negative feedback loop is a sign of something having gone awry.

This observation applies equally when we take the biological to include the cognitive. No one understands precisely how the experience of being me now relates to the genetic and cellular composition and mechanisms of my body. This is the hard problem of consciousness, and even those who claim it does not exist (e.g. Churchland, 1996)—that the receptor and neuron

activity just is the mysteriously predictable thrill you get from that song you currently have on repeat—still have to explain to everyone else why an explanation that does not feel at all adequate actually is. In the absence of a solution to the hard problem, my working assumption will be that it makes sense to talk about experiential things—like thoughts, sensations, and emotions—as different from but in direct interaction with physical things like muscular contractions, hormone secretion, or nerve signalling. Of course, there cannot be any completely neat separation: all the terms on the experiential side also involve physical activity on the part of the neurons, the muscles, the receptors, and so on. And some of this activity, like the contractions of some muscles, can be directly experienced; some, like the pH regulation of the blood, cannot. The relationship between the unexperienceable physical elements, the experienceable physical elements, and the experienceable apparently nonphysical elements remains bafflingly opaque. This opacity means that the simple feedback loops I will be discussing between 'mind' and 'body' pertain only at the highest level, where they remain partially separable. Go down a little further, and the loops instantly multiply and entwine with each other so thoroughly that the mind–body distinction becomes rapidly meaningless; go down far enough, and no one knows what the loops might really look like, because no one has solved the mystery of consciousness yet. A quarter of a century ago, Dan Dennett wrote that 'human consciousness is just about the last surviving mystery' (1991, p. 21)—defining a mystery as something we don't even know how to think about yet. The same can still be said today.

So, let's return to the more easily comprehensible top level. In a healthy person, physiological factors like bodyweight and energy metabolism, behavioural factors like diet, exercise, and other routines, and psychological factors like attitudes to food and the body exist in an equilibrium enabled by multiple forms of negative feedback. Just as small changes in energy intake are adjusted for metabolically (Molé, 1990) to maintain a stable bodyweight, so fluctuations in body-directed self-confidence may be absorbed by small changes to dietary or social habits. If we then imagine that a small but significant amount of weight is gained, thanks say to illness or Christmas, it is easy to see how a minor reduction in contentment with body size and shape might result in a plan to make a small increase in exercise or change in diet, or indeed how these might happen without an active decision even being required, and how habits will then revert to normal once the previous equilibrium is returned to (see Figure 9.1).

In someone with an ED, or vulnerable to developing one, things happen very differently. Figure 9.2 shows one possible way of modelling the primary high-level feedback loop in anorexia nervosa. As you can see, the

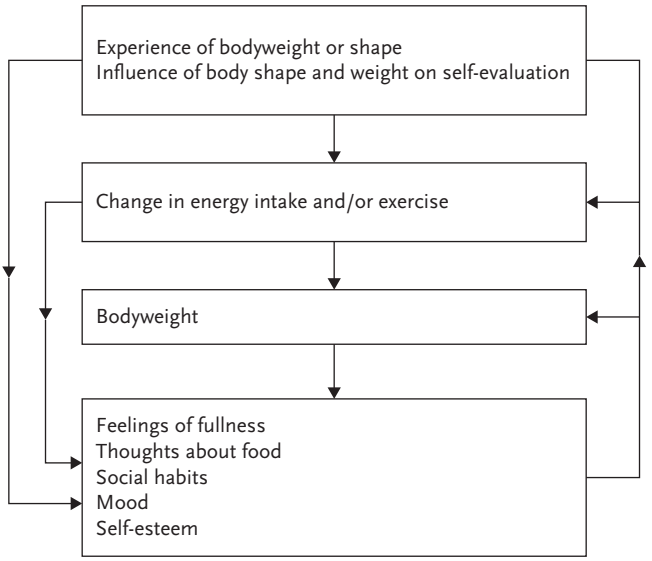


**Figure 9.1** Healthy mind–body feedback.

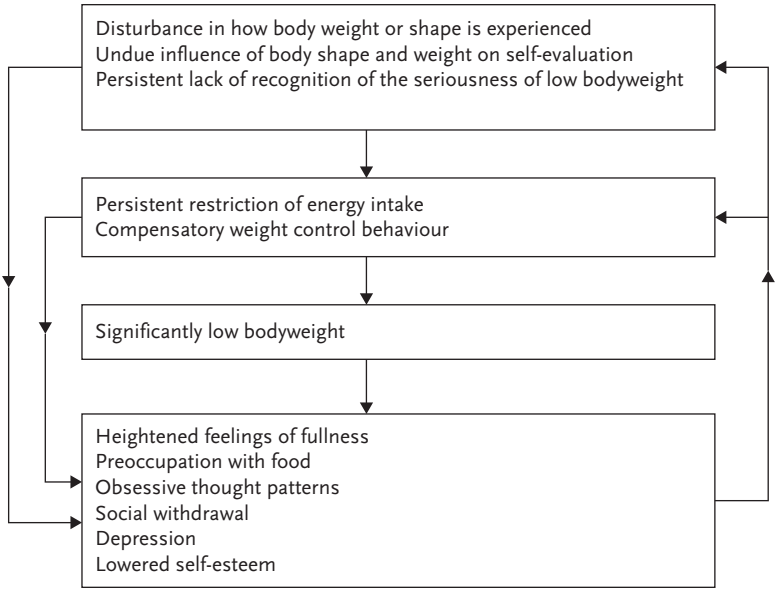


**Figure 9.2** Positive mind–body feedback in anorexia nervosa. This model is a specific instantiation of the general model presented in Figure 9.1, in which the feedback could operate in either direction. (See also Fairburn, 2008, p. 21.)

feedback here is positive rather than negative: the system moves away from equilibrium rather than maintaining it. Wherever you enter the loop (whether with unintended weight loss, or preoccupation with body shape and weight for other reasons, or a temporarily low mood), each factor exacerbates the next, and a spiral deeper into illness is initiated. The reasons why negative feedback may fail to maintain equilibrium in one particular input–output relationship in one person and not another may be genetic, biological, and/or socioculturally informed: one person might lose a large amount of weight due to a viral infection but then recover mentally and physically as soon as the infection is fought off, whereas for another this episode might be the start of a prolonged struggle with eating and their body. But the crucial point to retain is that as soon as negative feedback fails to correct a movement away from stability—that is, whenever the system is insufficiently robust to perturbations—the cycle of positive feedback kicks in.

This kind of feedback model is used to understand ED psychopathology in cognitive behavioural therapy, which emphasizes the interactions between thought, emotion, behaviour, and physical state (e.g. Fairburn, 2008). Similar models have also been developed in the context of catastrophe theory (e.g. Zeeman, 1976), where the progressive abnormality of attitudes towards food combined with ever-increasing hunger constitute positive feedback leading towards instability between the two extremes of bingeing and fasting (which depending on bodyweight might be classified as bulimia nervosa, or as anorexia binge-purge subtype). The lack of stability assumed by these models is also supported anecdotally by the tendency of ED sufferers to characterize their conditions using words and phrases like 'reinforcing', 'vicious circle', or 'spiralling out of control'. (And a quick Google search for combinations like 'bulimia spiral' or 'anorexia vicious circle' can help start to turn these anecdotes into data.)

## INCLUDING SOCIETY AND CULTURE IN EATING DISORDER FEEDBACK SYSTEMS

Like any model at this level of generality, the model shown in Figure 9.1 is incomplete when it comes to the lower-level mechanisms of change, but it is significantly incomplete at this high level too. Given that physiology, behaviour, thought, and emotion are represented at least cursorily in the model, the main factors that are obviously missing are the contributions of social and cultural factors.

The importance of social, and particularly familial, factors in the development and maintenance of anorexia has been analysed from a systems theory perspective by Salvador Minuchin and colleagues (Minuchin, Rosman, and Baker, 1978). Their argument for understanding anorexia not as the product of the system but as one of its parts has since been further validated by the increasing popularity of and evidence supporting various kinds of family therapy for EDs (Fisher, Hetrick, and Rushford, 2010). The aim of Minuchin and colleagues' 'structural family therapy' (also used for many conditions other than anorexia) is to ameliorate the feedback dynamics of the family system, often through positive feedback that initiates a change, followed by negative feedback that sustains the new state. Their characterization of the 'psychosomatic family' in terms of 'enmeshment' and 'rigidity' (e.g. 1978, p. 30), amongst other qualities, reinforces what we have already observed about feedback systems in cognitive contexts: the basic structural features are closely bound to their experiential counterparts, and both operate at once as cause and as effect.

A wide range of cultural factors can also be understood as contributing, through feedback, to the psychopathology of anorexia. Steps in this direction have been made in research on the role of the media in body image problems (for a general review, see Grabe, Ward, and Shibley Hyde, 2008). Steven Kirsh (2010) describes a chicken-and-egg situation in which

> Youth with disordered eating seek out thin-ideal media while at the same time being influenced by the thin-ideal media that they consume. In turn, a feedback loop develops (a downward spiral), in which thin-ideal media reinforces and exacerbates eating disordered symptomatology, and disordered eating increases interest in thin-ideal media. (p. 146)

A recent study (Cohen and Blaszczynski, 2015) investigated whether female undergraduates (with no clinical diagnosis related to EDs) respond differently to images promoting a thin ideal presented via Facebook as compared with other online media, based on the hypothesis, from social comparison theory, that people are more likely to compare themselves to similar others. As expected, they found that body dissatisfaction increased as a result of appearance comparison on Facebook but not conventional media. They also found that Facebook use in life beyond the experimental intervention was higher among those at high risk of EDs than those at low risk (see also Latzer, Spivak-Lavi, and Katz, 2015). This correlation of course tells us nothing about causation (and it also neglects the potential for benefits to self-esteem through Facebook use suggested by other studies, e.g. Gonzalez and Hancock, 2011), but the two findings taken together provide

further support for the 'feedback loop whereby exposure to body-related stimuli activates and reinforces an over-concern with one's own body, which in turn reactivates attentional biases toward body-related stimuli' (Cohen and Blaszczynski, 2015, p. 9).

When feedback is present, causal relationships can be difficult to disentangle. Cohen and Blaszczynski (2015, p. 9) suggest two possible ways of interpreting the observed correlation between Facebook use and ED risk. On the one hand, frequent exposure to thin-ideal content on Facebook may reinforce body-related concerns, eliciting cognitive biases that prioritize attention to thin-ideal content on Facebook. On the other hand, people with a higher risk of EDs may be more likely to use Facebook, and given the association of EDs with selective attention for appearance-related cues, Facebook use may further reinforce ED risk via this particular vulnerability. In an ideal world, one would be able to establish which came first, but given real-world complexities, this may never be possible. But taking a feedback perspective means that deciding between hypotheses becomes less important. For any individual within a given sample, the starting point for increased body dissatisfaction may be either Facebook or a pre-existing vulnerability, or the two may be temporally and causally indistinguishable. The point is that a positive feedback loop is initiated, and once it is in place, its result is the predictable instability of a cyclical movement away from the starting state. The system dynamics rather than the initial trigger are of primary importance in understanding what is going on.

The field is thus opened up for taking a similar approach to studying the effects of other forms of cultural activity on those with disordered eating—and here, of course, I want to talk about fiction-reading.

## FICTION-READING AND THE EATING DISORDER FEEDBACK SYSTEM

As an easy point of departure, we could make the same basic claims about fiction-reading as Cohen and Blaszczynski do about Facebook use: exposure to materials that deal with body-related phenomena activates or reinforces an over-concern with one's own body, which in turn reactivates attentional biases towards body-related stimuli, which makes people seek out or notice such materials preferentially to others, which worsens the over-emphasis on the body. There are bound to be important differences here between the picture-dominated social media and the wholly linguistic nature of most adult fiction; in particular we might expect imaginative responses, including mental imagery, to be elicited in very different ways (Troscianko, 2013,

esp. pp. 187–188). Nonetheless, the same structural principles are likely to apply: in someone who already has an active ED, the pre-existing tendency to pay more attention to appearance-related stimuli may make this positive feedback all the more likely to be initiated. This is one obvious way in which reading texts of certain types, with a particular interpretive bias, may end up contributing to the positive feedback already characteristic of EDs. In Figure 9.3 you can see how the same basic structure as shown in Figures 9.1 and 9.2 can be expanded by adding in several aspects of a possible reading process.

But reading is a complex business, and the fiction people read (let alone all the non-fiction) is complex and varied too, not least in the cognitive demands it makes on readers. So we should expect that fiction-reading might have other contributions to make to the feedback loops of disordered eating. I recently collaborated with the ED charity Beat to gather data on perceptions of how reading habits and preferences may be connected with mental health, and specifically EDs. Eight hundred and eighty-five respondents took part in our online survey (773 of whom had a personal history of disordered eating), providing us with a great wealth of both quantitative

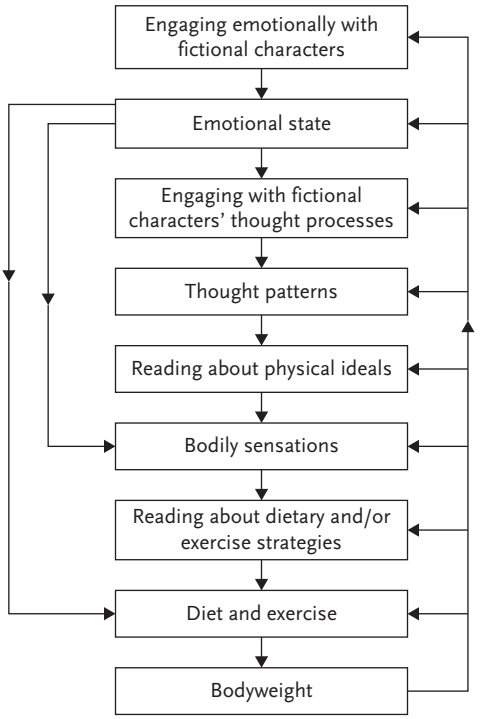


**Figure 9.3** Mind-body feedback incorporating cultural factors.

(forced-choice) and qualitative (free-response) data. Other findings from the data will be set out elsewhere (Troscianko, in preparation), but here I want to concentrate on the free-response data and the evidence they provide for the role of feedback in the relations between disordered eating and fiction-reading.

The data I will be presenting come from responses to a number of survey questions in which respondents were invited to elaborate on previous forced-choice answers. The questions divide into three types.

One sequence of questions concerned the potential helpful or harmful effects of reading in general. Having answered a series of forced-choice questions on this topic (for example, indicating which of a list of possibilities fitted their experiences of finding books helpful or harmful, like 'Letting you see your eating disorder through someone else's eyes' or 'Causing you to reflect obsessively on your eating and/or exercise habits'), respondents were asked to 'Please list any authors and/or titles of books that have affected you in the ways described in the previous question, and please briefly specify which book had which effect.'

Another sequence concerned the effects of reading on general mood, self-esteem, feelings about your body, and diet and exercise habits. The questions were asked once with respect to fiction about EDs and then repeated with respect to 'your preferred type of other fiction' (the type which respondents usually read, chosen from a list including genres like fantasy fiction, romantic fiction, suspense/thriller, etc.). After each sub-section respondents were given the chance to elaborate on the forced-choice answers with a general prompt: 'If you wish, please provide more details about [the change to your eating and/or exercise habits] after reading [fiction about eating disorders] here (including authors and/or titles if applicable)'.

Lastly, at the end of the survey we asked respondents, 'Finally, is there anything else you would like to share about your reading habits or how they relate to your mood, eating, exercise habits, or similar? If so, please feel free to use the space below.'

Responses to these three question types—which constitute all the open-ended questions we asked—are included in the analysis that follows, which takes the form of a search of all responses for the presence of descriptions of feedback of any kind. Respondents were primed to employ particular words and phrases ('helpful', 'harmful', 'how you feel about your body', etc.), and were encouraged to think about possible causal relationships between mental health and reading ('affect', 'effect', 'change', 'improve', 'worsen', etc.). However, at no point were they prompted specifically to think about the more complex kind of causality manifest in feedback loops either positive or negative. All indications that such feedback might be in

play are to this extent the respondents' spontaneous reflections on their personal experience.

My own analysis, through close reading, identified 19 types of positive feedback loop in the survey responses. These loops were identified in 97 responses (of which 9 were included in more than one category, and 1 was classified in three categories) from 71 respondents, including 4 with no personal history of disordered eating; all the rest reported current or past ED experience. I have grouped them into broad categories to help give an overview, but the distinctions are by no means absolute. After each type I specify the number of times it recurred in our respondents' testimony (and note when this included anyone without a personal ED history), and give a short example. All example responses are reproduced in full in their original form, with typos and other idiosyncrasies unaltered.

#### GENERAL

1. **Feel worse → reading → feel worse *and/or* feel better → reading → feel better [26, of whom 11 mention both directions, 15 only the worsening direction]** *My mood can improve or worsen depending on my starting frame of mind. If i am hopeful they can motivate and increase willpower and self esteem. If i am in a bad place, I come away feeking worse and more likely to engage in eating disorders behaviour.*

#### MOOD, SELF-ESTEEM, AND BODY IMAGE

2. **Reading → worsened ED habits and/or worsened mood → preoccupation with ED → worsened mood [1]** *After reading Monkey Taming by Judith Fathallah it left me feeling low. I had been doing well in recovery but it sort of triggered a bit of a relapse and left me feeling very down and conscious of my eating disorder, and I found myself comparing my own experience with the character's. Thinking too much about my eating disorder puts me in a more melancholy state of mind.*
3. **Reading → worsened ED habits (e.g. desire for weight loss) → worsened mood → worsened ED habits (e.g. behaviours promoting weight loss) in attempt to ameliorate / distract from low mood [1]** *I read the book a long time ago however found it made me more determined to lose weight. My mood tended to become more low and this cemented the desire to lose weight in order to feel better about myself.*
4. **Reading → preoccupation with ED → negative self-assessment for being thus preoccupied → exacerbation of ED → preoccupation with ED [1]** *My mindset shifts toward obsessive ED thoughts, and I feel guilty, ashamed, and lonely when I have these thoughts.*

5. **Reading → exacerbation of ED → negative self-assessment of self for letting this happen → exacerbation of ED [1]** *Makes me obsessive and competitive and pushes me further into my eating disorder making me feel inferior.*
6. **Reading → lower self-esteem and/or increased shame/embarrassment → exacerbation of ED → more reading about EDs [1]** *Can't really answer this. Most reading on eating disorders, factual or othrwise, lowers my self-esteem. I'm so embarrassed to be reading about it that I don't let anyone see me with a book about eating disorders—i hide them.*
7. **Reading → worsened mood → worsened self-esteem/wellbeing → exacerbation of ED → worsened mood [1]** *I tend not to read anything that I know will negatively affect my mood, as this could then have a knock-on effect on my eating habits or general self-esteem and wellbeing. So I usually pick thoughtful but uplifting fiction. I also read a lot of non-fiction on things such as animals, travel, anything that I can focus on. Since my negative experience of reading fiction about an eating disorder (in Monkey Taming by Judith Fathallah) I have avoided anything like this again for fear of it triggering anything or just making me feel low.*
8. **Feel worse → read more → disengage from rest of life → feel worse [1]** *When I am having difficulty with my eating disorder I am more likely to seek out stories about eating disorders, particularly short stories (published or posted online) that glamourise eating disorders. I also spend more time reading any fiction, often to the detriment of other aspects of my life, and end up spending less time completing my academic readings or fulfilling my role as an editor.*

#### THOUGHT AND KNOWLEDGE

9. **Reading → preoccupation with ED → more self-analysis and self-directed thought → exacerbation of ED → heightened preoccupation with ED [2—incl. 1 non-ED, implying other mental health problems]** *As it is on my mind I am more aware of habits and more likely to fall into old patterns which can set me back.*
10. **Reading → positive assessment of ED behaviours as coping mechanisms → exacerbation of ED habits → increased tendency to assess ED habits as coping mechanisms [1]** *For a few days after being exposed to ED ideas or stories I will restrict food or increase exercise. Just being reminded of them as a coping mechanism makes me want to engage in them again.*
11. **Recovery from ED → reading → increased knowledge about how to recover alone → progress in recovery [1]** *I don't feel that reading*

*unrelated fiction affects and eating disorder much other than providing an escape and a sanctuary away from the every day struggles of it. Reading about eating disorders in specific and sometimes even food can be quite triggering and effect you so I only read it during recovery to help gain advice on how to get through it alone.*

#### SELF-TRIGGERING

12. **Desire to exacerbate ED by being triggered → reading (especially in a narrowly filtered mode) → triggered response → exacerbation of ED → increased likelihood of desire to exacerbate ED [17—including 1 non-ED, describing her daughter who has an ED]** *When I am feeling 'anti-recovery' feeling fit or trying to lose weight, I tend to search for the kind of books that will trigger me. I feel for me the pathway would have to be something like . . . . Weight gain -> relapse-> seeking triggering books, magazines or documentaries out-> change in behaviour. For me, the starting point is most definitely that ED voice in my head, not the books.*
13. **Reading while exercising → (intentionally) longer / more intense exercise → exacerbation of ED → more exercise / perceived need to exercise [1]** *I tend to read ED fiction while exercising, which is royally fucked up. It encourages me to keep going.*

#### DISTRACTION

14. **Reading as a distraction from ED → action towards recovery is not taken → exacerbation of ED → greater need for distraction through reading [5—incl. 1 non-ED, referring to other life stresses]** *At the worst stage of my eating disorder, reading was my way of passing the time between meals and used as a distraction from hunger pangs. I could get lost in a book and not notice the time pass like I would otherwise. In that sense, reading was having an adverse affect. But I still love reading just as much now, and I would not blame it as any sort of accomplice to my physical deterioration. I'd much rather read than do exercise! That's how I get my endorphins.*

#### ENGAGEMENT WITH TEXTUALLY EVOKED CHARACTERS

15. **Reading focused on competitive comparisons of self with characters → preoccupation with ED, changed points of reference → validation/exacerbation of ED → reading more likely to be focused on competitive comparison [5]** *I feel more anxious and more obsessed with my weight and eating behaviour. I compare myself unfavourably to the ED*

*sufferer in the book. I feel inadequate and worried that I've been complacent and not previously realised quite how lazy, fat, etc i was being and that I need to do more to meet the eating disorder's required standards because the book just changed the goalposts.*

#### READING AS PHYSICAL/PSYCHOLOGICAL CHALLENGE

16. **ED compromises ability to sit still and/or concentrate and/or empathise needed for reading → prevention of reading → prevention of positive effects of reading → exacerbation of ED and inability to read [25]** *I find reading can offer me an escape from my eating disorder. I do find if I read for too long I can become depressed and the eating disorder voice usually starts saying I'm lazy and I should be exercising not reading.*
17. **Recovery increases ability to sit still and/or concentrate and/or empathise needed for reading → increased reading → positive effects of reading → progress in recovery [5]** *During my lowest points I really struggled with concentration so I couldn't actually sit and read a book. I found it a massive boost when I started to recover that I could re-read books and eventually read new books. Read books of my preferred genre gave me massive amounts of comfort and helped me feel detached from my problems- if only for a little while.*
18. **ED compromises ability to concentrate needed to read → worsened mood and/or self-esteem due to difficulty of reading → prevention of positive effects of reading attained → exacerbation of ED [and/or direct exacerbation from worsened mood/self-esteem] [1]** *I find it more difficult to read when I'm in the grips of my eating disorder, i've just come out of a month i hospital where the OT only had John Grisham books, and it was difficult to read due to concentration levels. While my self esteem and view of my body may not change following these works of fiction, I usually do feel worse as I'm upset at my inability to read like I used to. Regardless of content.*
19. **Finding/making time to read improves mood → increased likelihood of enjoying reading → increased likelihood of reading more [1]** *I feel good finding the time to read. I love reading about different characters and their inner and outer world.*

It is important to note that alongside quite some variation in degree of specificity—particularly between the first (very general) category and the others—not all these loops were described in their entirety; in many cases two or more of the steps were described, and the completion of the loop is trivially inferred. The illustration given for type 7 is fully articulated,

whereas an example of partial articulation is given under type 15. Here, the respondent does not explicitly say that the exacerbation of her ED makes it more likely that she will want to further exacerbate it in future, but this follows predictably from what we know about the psychopathology of EDs; in the absence of any indication that the exacerbation led, for the respondent, to heightened awareness or other change towards greater health through a specific self-limiting event (for instance, reaching such a point of physical weakness or psychological debility that change is sought out or enforced by others), it is unproblematic to infer that the exacerbation continues.

Another point to note is that not every loop is a full loop back to the starting state or event; in some, the latter acts as a feedforward element of the loop. In types 2, 3, 4, 5, 7, 9, 10, and 13 reading is an initiating event for a positive feedback loop which then becomes self-perpetuating whether or not more reading is undertaken. In such cases, the potential for reading to have significant effects may be quite independent of reading frequency, which underlines the importance of not jumping to conclusions when assessing the likelihood of certain populations being affected (whether towards health or illness) by reading encounters. As indicated by the example given for type 2, one book can be enough to make a lasting difference.

Interestingly, one respondent also described how reading led, quite simply, to the *desire* to enter into a positive feedback loop, which she expressed through the verb 'to spiral': *I feel like a failure for never reaching that low weight or find myself comparing habits. I get angry for what I've eaten that day and obsess over it. I become more determined to spiral.* The same respondent said something very similar of one of the characters in a particular TV programme (*Skins*), saying here that she found herself *desperate to spiral*.

It is also worth stressing that positive feedback need by no means be associated exclusively with detrimental effects. In three of the feedback types listed above (types 1, 11, 17, and 19), positive feedback has beneficial effects by amplifying benefits that alone would be much less powerful. The prevalence of positive feedback structures in these data also does not at all mean that negative feedback, tending towards stability, never features. Although it is found in significantly fewer responses (19 as opposed to 97, from 18 different respondents, 1 with no personal history of disordered eating), four basic types are identifiable, the first (and most general) by far the most frequently occurring:

1. **Feel bad → read → feel better [13—including 1 non-ED]** *If I feel very low I like to read my favourite childhood or teenage books and this always makes me feel happier.*

2. **Low mood → thoughts about body → reading → distraction from thinking about body → improved mood [1]** *It's a distraction so I'm not thinking about my body. Also thinking about my body is connected to low mood—I usually only do it when depressed. So cheering up means I think less/less negatively about my body.*
3. **Temptation to restrict eating → reading → reduced anxiety, increased likelihood of eating [1]** *I am more likely to prepare myself a snack or a meal after reading. Sometimes when I am tempted to restrict I read for half an hour before a meal to get myself into the mood. Often I read at table as a way to counter anxiety and distract myself from the fact that I'm eating.*
4. **In recovery → reading → compromised recovery [4]** *Eating disorder fiction always negativly effects my recovery. I should not read them but I always do. I have this sick fascination that draws me into them. I like to live vacarisly through the characters because I cannot have my eating disorder.*

The first three of these forms of feedback offer concrete avenues for developing therapeutic strategies involving fiction-reading. The positive potential suggested by the most common negative feedback structure, the simple progression from feeling bad to reading to feeling better—centring on mood as the initiating and the altered variable—is supported by quantitative data from this survey. An improvement to mood is reported by a majority of respondents as a result of reading their preferred type of 'other fiction' (i.e. fiction not about EDs): of the 465 respondents with a history of disordered eating who reported having read other fiction (68 said they had not, and 240 did not answer this question), 336 (72%) reported a positive effect on general mood resulting from it. This result combined with the beneficial negative feedback loops identified here together testify to the possibility of displacing the often dangerous positive feedback in the relationship between EDs and reading by stability-promoting negative feedback, perhaps particularly with mood as a mediator. This means that reading may be seen not just to offer benefits where none would otherwise be available, but even more significantly to offer the potential to replace structurally dangerous effects of reading with structurally stabilizing effects.

Further work along these lines might also start to identify more specific features of the observed feedback structures which are likely to have a bearing on stability. Two such features are the sensitivity with which changes in input are detected by the feedback system, and the aggressiveness with which input changes are adjusted for by the system 'controller(s)' through outputs from the system. There is always a trade-off between the two: the more aggressive the controller (attempting to control for

even small perturbations very quickly through excessive compensation), the greater its sensitivity to errors in input measurement and the greater the likelihood of overshooting the required response. This balancing act has been identified as a distinctive feature of ED pathology (Smith, 2002, p. 96). In anorexia, for example, over-frequent self-weighing often leads to unnecessary adjustments in food intake (reduced) and exercise (increased) when a small increase in bodyweight is observed. On the other hand, when weight loss is observed, it usually leads either to no behavioural change at all (more of the same), or to further adjustments in the same direction (more exercise, less food), now spurred on by evidence of 'success'. In both cases, rather than behaviour being appropriately geared to real trends in bodyweight change, the 'noise' of transient fluctuations is amplified by obsessive self-weighing and the feedback control that is too aggressively calibrated to the input data from the scales. This results in a bodyweight that has natural day-to-day fluctuations (i.e. is stable within given bounds), but is unstable (i.e. constantly reducing) on a timescale of weeks and months. In some of the survey data presented here, we can see that reading fiction, especially ED fiction, has the potential to further heighten the oversensitivity of the system, for example: *Often, it can trigger that loop of obsessive thinking, remind you to keep a food diary and weigh in*. More specifically, this reciprocal ratcheting-up of sensitivity and aggressiveness may occur through comparison of one's own body and/or dietary intake with the character's:

> *If I read about someone who is very anorexic (either states weight or graphic description) I feel fat and ugly. When i was anorexic and the author weghed more than me I felt good, but inevitably they would describe losing weight and weiging less than me, and then I felt fat and ugly. Sometimes I feel inspired to lose weight.* (see also the example under loop type 15 above)

This last example leads on to a second feature of interest: the possibility of feedback loops being short-circuited. In the ED context, this often happens by way of cognitive biases, of which the best-known is body dysmorphia (in the popular—and exaggerated—cliché, the emaciated woman looks in the mirror and sees a fat person). Here feedback is operating, but is acting on incorrect input signals due to perceptual distortion. A specific variant of this is a phenomenon known as 'thought-shape fusion' (TSF), in which just thinking about a 'forbidden' food increases someone's estimate of their body size, shape, and/or weight (Shafran, Teachman, Kerry, and Rachman, 1999). In some of the survey responses we see an interesting variation on TSF which we might call 'inverse TSF': here it is not thoughts

about eating, but thoughts about someone else not eating that have the distorting effects. This is potentially all the more dangerous, because the sufferer need not think directly about food, but may think about it at two removes: about (1) someone else (2) not eating it. Of course, this might happen just as easily with other real people as with fictional characters, but as an activity where the immediate task demands of normal life are suspended, reading does offer a very good opportunity for uninterrupted comparisons, as well as for comparisons made on the basis of even more inadequate evidence than in direct social encounters. ED fiction, of course, also offers easy access specifically to protagonists who eat unhealthily, but while the not-eating is in these texts pathological, not-eating can figure more or less innocuously in all kinds of 'literary' and 'genre' fiction, where eating gets in the way of plot, conflicts with the evocation of a particular type of character or situation, or is otherwise not the kind of subject matter deemed quite worthy of inclusion. When as a reader one has cognitive biases resulting from an ED, even the harmless absence of mentions of mealtimes could create a reliable supply of false feedback about characters and their relation to one's own body and eating habits.

## FEEDBACK SYSTEMS IN THE READING PROCESS

I hope now to have shown how important feedback is for understanding the relationship between reading and disordered eating. The question now is how this relationship can most effectively be studied. In the more basic examples of feedback structures reported by our survey respondents, one could imagine that many other cultural artefacts (like music or film, say) might have similar effects: cheering you up, distracting you, forcing you to sit still, making you realize you can't concentrate. Another set of effects could easily be attributed to ED-specific non-fiction material online, whether letting yourself be almost deliberately 'triggered' into emulating new ED behaviours, or conversely gathering information to help with recovery. (One respondent gestures towards this medial equivalence: *I wanted books on the in's and out's of a 'successful' eating disorder. Especially before I discovered the pro-ana community online*.) Many of these factors could be meaningfully investigated using the methods of psychiatry, sociology, and/or media studies, as in the research on the mass media I discussed above.

Even in cases like these, however, incorporating insights from cognitive literary studies would arguably help give appropriate weight to the relationships between textual and psychological factors, especially where the texts include metaphor, conspicuous rhetorical devices, the use of fictionalized

perspectives, and so on. But in many of the examples above, the case for bringing a cognitive-literary perspective to bear can be made cogently and with precision. One way to think about the usefulness of cognitive literary studies to research on the possible detrimental and therapeutic effects of reading in an ED context is to identify one salient element of the feedback structure and then try to clarify its role with reference to existing cognitive-literary findings and debates.

For example, respondents' testimony about their engagement with fictional characters may be elucidated with reference to Don Kuiken and colleagues' (2004) investigation of different kinds of resonance established between readers and fictional situations or characters. They make a distinction between identificatory acts based on simile and on metaphor. In our data here, both can be found: *I find this a reminder that I should not be eating as a woman who is stressed with uni work etc* (simile); *Books in which other people face struggles, not necessarily eating disorders are also helpful as they highlight that you are not the only one who suffers/struggles and allows you to gain some clarity/perspective* (metaphor). The authors' suggestion that the metaphorical form of connection-making might have more potential for changing readers' sense of self ties in closely to our concern here with the readerly changes, both beneficial and detrimental, that can be effected through reading.

The mental health context bears some similarity to that of bereavement, which has also been investigated in connection with reading by Kuiken and his colleagues: dissociative experiences, for example, in which people feel distanced from their own feelings and actions, are common in both. Links have been suggested between loss and dissociation, 'sublime disquietude' (depth of self-perception combined with feelings of discord and release), and insight (including inclination to change) in reading; and connections have been observed between physical and psychological well-being, identification, and self-efficacy in the modulation of sadness when watching films (for a summary, see Kuiken and Oliver, 2013).

In a broader sense, however, one might also identify important structural parallels between the feedback loops found to operate in reading in the ED context and feedback loops identified as relevant to the reading process more generally. The wide range of processes that come under the heading of 'interpretation' all involve important forms of feedback. At the level of text comprehension, the decoding of letters and words, which is driven substantially by the physiology of eye movements and fixations, drives semantic comprehension, which in turn has effects back on the way the text is perceptually processed. For instance, a sentence-completion study and a self-paced reading study by Rohde and colleagues (Rohde, Levy, and Kehler,

2011) indicated that, contrary to what had previously been believed, pragmatic expectations and inferences about discourse coherence can influence low-level syntactic processing, contributing to disambiguation as quickly as do lexical, morphological, or syntactic cues. At a higher level, aspects of cultural knowledge as well as individual differences in goals, expertise, and experience drive interpretive choices that may also affect strategies at the level of comprehension if not decoding. In these senses, reading can be seen as one manifestation of the predictive processing that has been argued (by e.g. Clark, 2013) to structure cognition as a whole: very broadly speaking, we make predictions about what we are reading, which are either confirmed or disconfirmed by the text itself, causing the prior model to be either strengthened or updated. We might think of ourselves as 'Bayesian readers' who make optimal decisions based on the available information (Norris, 2006).

This basic structure is obviously subject to variation depending on the type of text. For example, Richard Walsh (2006; and personal communication, 19 January 2016) has argued that fictional and non-fictional narrative can be understood as different forms of semiotic feedback loop (see also Carney, 2008, on lyric and catastrophe theory, and Rinaldi, 2008, on dynamical systems in Petrarch's love poetry). In what began as a productive misreading of Walsh's argument, I would suggest that we can think of fiction as tending to create a positive feedback loop between textual content and interpreted meaning, whereas non-fiction creates negative feedback because it refers more straightforwardly to things outside the text. In non-fiction, broadly speaking, the role of the language is to point towards a real-world referent, such that readers' interpretive expectations are progressively narrowed down towards identity with the textual references and their real-world referents. In fiction, by contrast, where the essence of the textual communication is as much significance as referentiality (the ratio, insofar as it can be categorically established at all, will depend on genre), more noise is present in the system. Here, the reader is more likely to include a wider set of possible interpretations for every linguistic element, and the text is more likely to encourage such interpretive openness; so convergence between readerly expectations and textual reference does not necessarily occur (see Figures 9.4a and 9.4b). The fictional structure would leave much more space for the kind of highly filtered readerly engagement reported by some survey respondents, driven as much by attitude as by the text itself: *Its hard to blame the books or the authord. I feel it's more than your ED screens out that information about pain and suffering and focuses on the success, the control and power.*

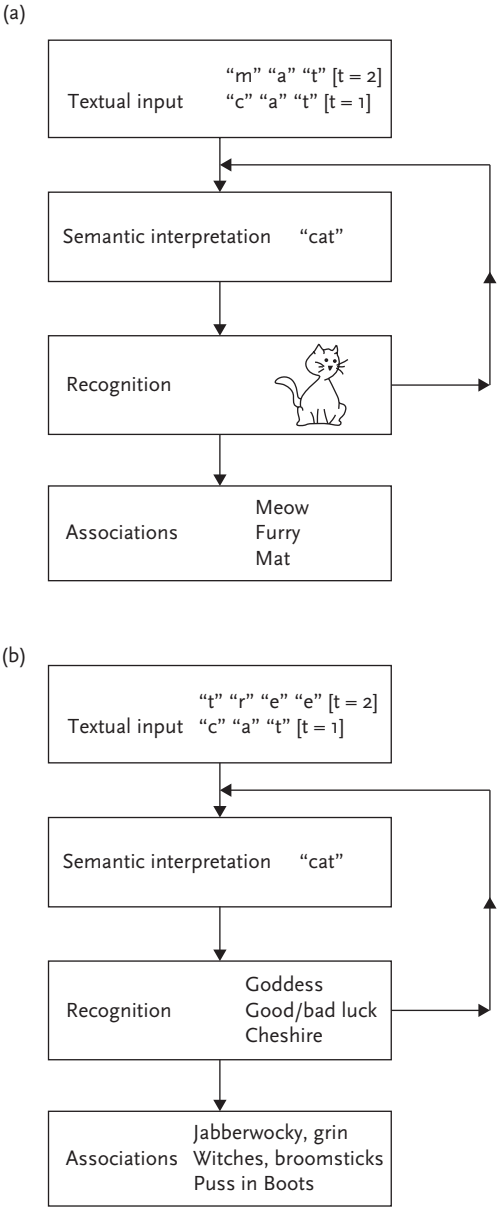


**Figure 9.4** (a) Text-interpretation feedback in non-fiction. The interpretive process and the textual inputs are typically constrained and convergent. (b) Text-interpretation feedback in fiction. Here both the interpretation and the textual inputs are more likely to be heterogeneous and therefore also divergent.

Alongside the specifics of text type, the nature of the reading situation may also be expected to affect the probability of unstable positive feedback developing in the reading process. If we consider the distinction between solitary and group reading, for example, it is clear that the former allows much more scope for interpretations that diverge from what is given in the text to multiply unchecked, whereas the latter provides an inbuilt mechanism for correction, or control, from the rest of the group; group discussion, including perhaps criticism of a particular line of interpretation as implausible or not supported by the textual evidence, can thus fulfil the function of a feedback control mechanism. Where there is no such mechanism, self-regulation is less likely, and 'solipsistic interpretation and error' more likely (Majkut, 2014). Similar considerations may apply to professional (traditional literary-critical, exegetical) reading versus reading for pleasure. For scholarly readers, the pressures are primarily towards finding readings that diverge from existing ones and are superior to them in detail and ingenuity, skewing the selection pressure in favour of divergence from textual reference. For recreational readers, the general aims of distraction or escapism, or reading for plot, may encourage convergence between the primary semantic associations of the words on the page and interpretive possibilities that readers entertain. These kinds of factors, of course, make designing experiments difficult, since even small changes in setting (testing room versus living room, during the working day or in the evening) are likely to be significant.

When it comes to the structures of fictional plot and fictional worlds, Karin Kukkonen (2014) has suggested that a feedback model is needed to account for their relationship with readers' expectations, or predictive models; readers may well find themselves with competing probabilistic models for a given fictional world, and 'as readers move through the narrative, they revise their beliefs about the shape of the fictional world and (usually) get a progressively better grasp of its probabilities' (p. 725), using any and all textual evidence at the fine grain of words and phrases to the coarser grain of plot structure to contribute to the loop between prior hypotheses and new observations. Fiction here differs from the real world, and from non-fiction, in being designed expressly 'to enable constantly new, unpredicted observations and thus reconfigure the probabilities of the fictional world' (p. 725).

Also importantly for our purposes here, this kind of model makes space not just for narrowly 'intellectual' inference but also for embodied emotional responses and the wider patterns of appraisal they contribute to, whether directly plot-related emotions like suspense and surprise, or the

broader range of emotional responses we may have to other elements of a text, including the feeling of being 'immersed' or 'transported' into its world (e.g. Gerrig and Mumper, Jacobs, and Polvinen, all this volume). The appraisal theory of emotion (e.g. Frijda, 2007) posits the idea that emotional responses result from the appraisal of what a given object or situation means to me now, with respect to my current goals and expectations, and that this initial appraisal can be subject to further elaborative appraisals, as part of a feedback loop also involving physiological and behavioural changes (Pirlet and Wirag, this volume). This adds another layer to the structures through which a small anomaly in evaluative priors can result in a wide-ranging distortion in the cognitive landscape during the act of reading.

It is easy to see how the contextual specifics of the ED psychopathology could slot into this concatenation of recursive loops by virtue of the particular pressures and probabilities it creates. Andy Clark reports on evidence that offers a twist on his global model of predictive processing to account for deviations that occur in mental illness. He focuses specifically on conditions that involve alterations in the dopamine system; these are suggested to lead to false generation and high weighting of prediction error signals that then drive maladaptive learning. In the case of schizophrenia, the 'false errors' propagate throughout the hierarchy of perceptions and beliefs, creating a self-entrenching process in which the influence of new beliefs 'flows back down so that incoming data is sculpted by the new (but now badly misinformed) priors so as to "conform to expectancies". . . . False perceptions and bizarre beliefs thus form an epistemically insulated self-confirming cycle. This, then, is the dark side of the seamless story . . . about perception and cognition' (2013, p. 17; see also Brisch et al., 2014).

In the ED case, the 'false perceptions and bizarre beliefs' may be less surreal than in schizophrenia, but they are no less self-perpetuating: my tummy is still too fat, I ate too much today, if I eat less it makes me a better (stronger, purer, more moral) person. Disturbances to the dopaminergic reward system have been implicated in ED psychopathology (Kaye, Frank, and McConaha, 1999; Méquinion et al., 2013), and although it is hard to establish whether these abnormalities are cause or effect (or both), the increased dopamine release during fasting (Bergh and Södersten, 1996) means that dopamine acts in anorexia and other EDs involving periods of dietary restriction as a 'learning signal' in a way comparable to its role in substance addiction. Steven Hyman discusses the short-circuiting that occurs when the signal that dopamine release sends—'better than

expected'—is sent repeatedly by direct pharmacologic action, bypassing the usual controls that compare the current circumstance with prior experience (Hyman, 2007). The short-circuiting is not as extreme in restrictive EDs as in most drug use, but the overlearning and overvaluation that are lastingly inscribed through misweighted prediction errors have similar implications for how we think about the relationship between interpretation and mental health.

We can understand the excessive significance that may be given to particular aspects of a text—like the body size or shape of the protagonist, for example—as part of a complex series of feedback loops that structure all elements of the reader's interaction with the text, from the decoding and semantic processing of the words on the page or screen, to the engagement with plot, character, and genre, to the contextual effects of physical and psychological state, motivations and intentions, mood, and setting. Acknowledging the power of feedback for both good and ill at the many contact points between reading and mental health can help us understand and perhaps ultimately prevent or treat EDs more effectively. I hope to have shown here how significant a contribution fiction-reading can make to these feedback loops as a mediator of cultural causes and effects—some common to other cultural forms, some specific to fiction. Unravelling the details of this contribution, and developing new therapeutically valuable models in which reading may act as a control mechanism to modulate feedback in beneficial ways, requires an ambitious cognitive literary science able to talk and listen to literary studies, the medical humanities, psychology and psychiatry, as well as disciplines more apparently distant like systems and control theory.

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