Capturing the attention of readers?
Stylistic and psychological perspectives on the use and effect of text fragmentation in narratives*

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Abstract

This article brings together researchers from Stylistics and Psychology to study whether text fragmentation, which appears often to be used by writers as a fore-grounding device (Mukařovský 1964), is able to capture the attention of readers of narratives. We examine two types of text fragmentation: sentence fragments and mini-paragraphs. Firstly, we study the stylistic functions of fragmentation, including its cumulative use at plot crucial moments and its use for local rhetorical purposes. We then turn to psychological research on depth of processing (e.g. Sanford and Sturt 2002) and introduce a new method of testing, the text change detection method (Sturt et al. 2004). We report an experiment using this method to examine whether text fragments and very short sentences can increase the amount of detail that readers notice in a text, and then discuss the results in relation to potential applications. The work provides both a case study of the empirical analysis of foregrounding devices, and also, more generally, a case study of inter-disciplinary research across the Humanities and Social Sciences.

0. Introduction: Bridging Stylistics and Psychology – The inter-disciplinary study of text fragmentation and attention capture

Literary scholars have recognized the crucial role that a reader's attention can play in the interpretation of a text and the way in which a writer can use linguistic features to attract attention. Rabinowitz (1987: 53), for example, has suggested, in a chapter strikingly entitled "Trumpets, please!: Rules of notice" that a text has:

> […] a hierarchical organization of details: we do not attend to everything equally […] the stressed features in a text serve as a basic structure on which to build an interpretation […] we read with the prior understanding that we are more expected to account for a detail that is stressed by a rule of notice than for a detail that is not.

The idea that parts of a text can be "foregrounded" is one of the core assumptions within Stylistics (Mukařovský 1964; see also van Peer 1986 and van Peer and Hakemulder 2006). Wales (2001: 157) defines foregrounding as both (i) "the "throwing into relief" of the linguistic sign against the background of the norms of ordinary language" and (ii) "within the literary text itself linguistic features can themselves be foregrounded, or "highlighted", "made prominent", for special effects, against the (subordinated) background of the rest of the text". Most literary scholars and stylisticians either draw on their intuitions to judge what breaks the norms, or perform statistical analyses of the frequency of particular linguistic features in specific texts and/or in corpora of texts (e.g. Leech and Short 1981; Stubbs 2005). These text-based approaches take for granted that linguistic norm-breaking has an effect on readers, but do not provide any evidence that readers' attention is attracted and do not assess the amount of impact that "foregrounded" features have on readers. By contrast, our approach in this article is to supplement traditional stylistic analysis with an examination of these stylistic intuitions by testing the response of readers to unusual features in texts. Empirical research of foregrounding devices has been pioneered by Humanities researchers in the area termed the "Empirical Study of Literature" (e.g. van Peer 1986; Steen 1994), in relation to topics such as the interpretation of metaphors in poetry. The research described in this article brings together Humanities and Social Science researchers from Stylistics and Psychology to examine a specific issue, whether changes to the usual sentence and paragraph formatting of narrative texts can change the readers' alertness to details in texts. In our stylistic analysis, we focus on cases where texts suddenly become fragmented, with unusually frequent sentence or paragraph breaks. Our stylistic intuitions are that fragmentation can capture the attention of readers; the aim of our empirical work is to show whether this is really the case. Our research tests fundamental stylistic assumptions about foregrounding, and is also a case study in inter-disciplinary research across the Humanities and Social Sciences.

The stylistic discussion in the first part of this article examines the following two types of text fragmentation:

(i) Sentence fragments – These are words, phrases or clauses that cannot be classed as syntactically full sentences, but are nevertheless punctuated graphically as sentences.[1] The two final noun phrases in the following example are therefore sentence fragments:[2]

(1) It was only dinner. **One dinner. One guest.**
     (Monica Ali [2004]. *Brick Lane*, p. 19)

The interest in sentence fragments dates back to the early days of modern stylistics (e.g. Crystal and Davy 1969: 49–51; Leech and Short 1981: 214–219) where their study was part of a more general interest in the structure of sentenc-

es, particularly in relation to how the simplicity or complexity of a sentence could serve stylistic purposes. Such sentence fragments break prescriptivists' expectations about the well-formedness of sentences in written text. Nevertheless, they are used widely for rhetorical and stylistic purposes across a wide range of genres (e.g. advertising language, newspaper writing, popular science texts, literary texts and popular fiction) and have been of particular interest to researchers in speech and thought representation in fiction (e.g. Fludernik 1993: 235). They are also acknowledged in grammar books (e.g. Quirk et al. 1985: 1446; Huddleston and Pullum 2002: 944–945, 1735) and even in recent writing style guides (e.g. Allen 2002: 57 and King 2004: 13–14). In spoken discourse, the common use of fragments has been used to challenge the assumption that there is any underlying notion of sentences as we speak (e.g. Miller and Weinert 1998: Chapter 2). One significant feature of fragments is that they are generally brief. We investigate this brevity in the empirical work in Section 3.2 by testing them alongside very short sentences.

(ii) Mini-paragraphs – In this case, blocks of text are fragmented by unusually frequent paragraph breaks. In principle, a mini-paragraph is any paragraph that is exceptionally short. Clearly, statistical analysis would be necessary to ascertain the precise cut-off point for a paragraph being considered exceptionally short in a corpus and/or specific texts. Rather than perform this type of statistical analysis here, our analysis focuses almost entirely on examples which are indisputably short. These are "single item" mini-paragraphs, where the paragraph contains a single sentence or a single fragment.[3] Example 2 shows a single sentence mini-paragraph in an autobiographical narrative, and Example 3 shows a sentence fragment in a mini-paragraph in the preface of a novel:

(2) Early in the winter of 1975, I'd planned a road trip to some desert climbs in Joshua Tree National Park in southern California. Most experienced climbers headed to Yosemite in the summer, but I wasn't quite ready for its huge granite walls. For me at that stage, the smaller granite climbs in the desert would be a good first step away from the sandstone of Eldorado Springs Canyon. I couldn't wait.

    Two weeks before the trip, my father died.

    I'd known from my mother that he had throat cancer. But since leaving Greece with the rest of the family, I'd seen him only once in six years, for all of five minutes, when I was fourteen years old.
(David Breashears [2000]. *High Exposure: An Enduring Passion for Everest and Unforgiving Places*, pp. 62–63)

(3) The Scheme for Full Employment was the envy of the world: the greatest undertaking ever conceived by men and women. It solved at a stroke the problem that had beset humankind for generations. Participants had only

to put the wheels in motion, and they could look forward to a bright, sunlit upland where idleness and uncertainty would be banished forever. Planned to the finest detail by people of vision, The Scheme was watertight, and could not possibly go wrong.

Except in this country.

In this country we managed to destroy it. We destroyed the last thing that could save us from obscurity and ruin. And we did it with our own hands too, not at the behest of some errant leader whom we could obey and then blame later.

(Magnus Mills [2003]. *The Scheme for Full Employment*, unnumbered preface)

Although the role of paragraphs has been studied by academics (e.g. Longacre 1968) and is mentioned in writing style guides (e.g. King 2004: 15), there seems to have been relatively little sustained study of unusual paragraph breaks, except in bibliography studies of lay-out, authors' revisions and editing practices (e.g. Adamson 1995; Bray et al. 2000; Sotirova 2004).

The stylistic functions of fragmented text will be examined in Sections 1 and 2 below. Sentence fragments and mini-paragraphs often appear to draw attention to the information they contain by segmenting off specific pieces of information from the rest of the text. To study this, we will be drawing on research in Psychology on how the attention of a reader can be "captured" (a term derived from work on visual attention [e.g. Simons 2000a; Franconeri et al. 2005]). Our research is carried out against a background of psychological work on depth of processing (as summarized in Sanford and Sturt 2002), which will be discussed in more detail in Section 3.1. This body of work provides a substantial amount of evidence that readers of texts are normally quite inattentive to the details of what they read. As will be illustrated in Section 3.1, readers often do not fully engage with specific words in a text and do not form a full semantic representation of what they read. This means that readers are generally quite poor at spotting errors and contradictions in texts. By using devices that capture the attention of readers, it is possible to increase the extent to which they process the text and improve the accuracy of their semantic representations. This aspect of the work has obvious implications for literacy research and has already been used to investigate the differences between skilled and less-skilled readers (e.g. Hannon and Daneman 2004). So far, linguistic devices such as clefting have been studied by psychologists for their ability to raise attention levels, but no psychological work has been done previously on the fragmentation devices discussed here. The fact that fragmentation has not previously been studied by psychologists is perhaps not surprising since mainstream cognitive psychologists normally base their hypotheses on artificial examples of their own creation and these examples are highly unlikely to include the types of stylistic feature discussed in this article.[4]

The shifts in attention levels studied by psychologists in depth of processing research can be quite subtle, although nevertheless crucial to readers' understanding of texts. By contrast, in stylistic studies, the interest in attention generally tends to be in cases where the text features are so obviously unusual that they can be expected to make a difference to key aspects of readers' literary interpretation of texts. Our stylistic analysis began from this perspective, with an interest in how extremely heavy cumulative foregrounding devices, such as repeated use of fragmentation, were used at crucial points in the plot of a story with the apparent intention of forcing the reader to become aware of highly significant information or objects in a story or encouraging the reader to make a key plot inference. Then, as we studied fragmentation in more detail, we looked more broadly at the range of uses of these devices in narratives, some of which may have more local stylistic and rhetorical effects of emphasis. In addition to these uses, for the purposes of this inter-disciplinary article, we are broadening our view of levels of attention further to cases where a sentence fragment or mini-paragraph may be of interest simply because its simplicity makes a difference to the amount a reader notices rather than because a writer seems to be overtly using it for the purposes of emphasis. Although this latter area may be of less direct interest to stylisticians, it may, as mentioned above, be of considerable relevance to literacy research, in areas such as Educational Linguistics, English as a Foreign Language, and Languages for Specific Purposes.

Overall, our project provides an unusual bridge between the Humanities research in Stylistics and Science research in Psychology, enabling us to bring new ideas and methods into each discipline. The research on depth of processing provides a new angle for many stylisticians since any stylistician who works by simply analysing the text can only speculate about the amount that a reader notices, particularly for the less stylistically marked examples. We are also able to draw on new testing methods, in this case a methodology developed recently by Sanford and his colleagues (e.g. Sturt et al. 2004), the text change detection method (see Section 3.2 for further details). The empirical work described in this article is only a first step to understanding how stylistic features capture the attention of the reader, but we nevertheless believe that it initiates a programme of study which will provide empirical evidence for fundamental stylistic assumptions. At the same time, studies of stylistic phenomena serve to enhance psychological theories of the process of reading. We are using our observations about narrative texts to inform the design of our empirical materials, including stylistic features in these materials that would never normally be studied by Cognitive Psychologists.

The main body of this article is divided into the following sections. In Sections 1 and 2, we focus on the stylistic analysis, providing a more detailed stylistic survey of text fragmentation. In Section 1, we examine some of the graphical features which initially captured our own attention as researchers, looking at how heavy foregrounding devices are used at key plot moments in narratives.

Section 2 broadens our observations about text fragmentation, giving a summary of some of the key stylistic and rhetorical uses of sentence fragments and mini-paragraphs across narrative texts generally. In this stylistic discussion, our speculations about the stylistic functions of fragmentation and our use of terms such as "foregrounding" and "highlighting" do, of course, prejudge the issue of whether these graphical features have any effect on readers. Our stylistic analysis is typical of the subjective approach in the Humanities, where scholars offer a plausible interpretation of how a reader might respond to a text. By contrast, the approach in Psychology is to check even the "taken for granted" assumptions about reading, providing detailed models of the psychological processes involved. In Section 3, we switch to a psychological analysis of text fragments, in an attempt to find evidence of whether fragmentation does in fact capture the attention of readers. Section 3.1 provides the theoretical background in relation to depth of processing research. Section 3.2 introduces the text change detection method and gives the empirical report of our first experiment on fragmentation. This experiment also tests the reading of very short sentences to see the effect of brevity generally on attention capture. In Section 4, we make some stylistic observations about the empirical results and discuss possible applications.

1.   Stylistic analysis (I): Cumulative use of fragmentation at key plot moments in narratives

In our discussion of narrative examples in Sections 1 and 2, we draw on literary texts, popular fiction, (auto)biographies, and embedded narrative within popular science writing. The texts from which our examples have been selected are generally reasonably conventional in their sentence and paragraph structure, but on occasions they suddenly become fragmented for specific stylistic purposes. We have deliberately chosen in this article not to examine the work of writers who have reputations for being highly innovative in their use of lay-out and typefaces (e.g. Irvine Welsh and Janice Galloway) since our interest here is in how fragmentation supplements the normal resources for writing, rather than in deliberately experimental usage of graphical features.[5]

Our stylistic analysis in this section shows the cases where text fragmentation seems most clearly to be being used by writers with the intention of capturing the attention of readers. In each of the following examples, cumulative fragmentation is used to present key plot information. In Example 4, there is a combination of a sentence fragment and a mini-paragraph. In Example 5, there is a string of fragments with an unusual paragraph break between two (almost) repeated phrases. In Example 6, there is a string of sentence fragments around a short sentence, all in mini-paragraphs. In Example 7, there are several sentence fragments used to summarize a particular episode, and the line beginning "Later" seems, in our judgement, sufficiently brief to be classed as a mini-paragraph. The fore-

grounding seems so blatant in these cases, that we refer to the cumulative use of the fragmentation and other devices as potential "attention grabbers".

(4) Everything was automatic now – down the stairs to the cellar, the light switch, the deep freeze, the hand inside the cabinet taking hold of the first object it met. She lifted it out, and looked at it. It was wrapped in paper, so she took off the paper and looked at it again.

    A leg of lamb.

    All right then, they would have lamb for supper.

(Roald Dahl [1979]. "Lamb to the slaughter", p. 25)

(5) Rebus could see a bed, a figure on the bed, [hospital] staff milling around the various machines […] There was clothing folded on a chair, a bag beneath it. As the doctor pulled out the bag, Rebus saw something. **A flat white cardboard box**.

    A white cardboard pizza box. **Clothes: black denims, black bra, red satin shirt**. **A black duffel-coat**. […]

(Ian Rankin [2000]. *The Hanging Garden*, pp. 18–19)

(6) And then, on a list dated 1992, [Kathryn] saw the name she hadn't even realized she'd been looking for, the unusual name that rose right up from the paper and traveled through her bones with a charge.

    Muire Boland.

    Flight attendant.

    Kathryn spoke the name aloud.

    Muire Boland.

She was pretty sure it was a woman's name. She wondered if it was French and whether she was pronouncing it correctly. Kathryn reached down in front of her and opened the large drawer of Jack's desk. The junk-mail envelope with the name penciled in a corner wasn't there, but she could see it just as clearly as she could see the typed name on the list she held in her hands. *Muire 3.30*, the hastily scrawled note had read. On an envelope, a solicitation from Bay Bank.

(Anita Shreve [1999]. *The Pilot's Wife*, p. 182, Shreve's italics)

(7) 'In our garden,' says Linda. 'A couple of years after she was married, I think. She [Kath] dropped in, quite out of the blue – off to see friends in Cornwall. But I gathered she'd just had that nasty little upset, poor dear, so she was rather under par.' Linda gives Elaine a furtive look – regret, and complicity. 'Such a shame –'

    [One page of text omitted]

    Later, she hears Linda again. That nasty little upset. Under par.

    But later is on hold until after six, when the garden empties, the customers and the cars depart, Jim and his nephew pile into the red truck, Pam goes off to the pub with an admirer from the village. Alone, Elaine checks the ticket

sales and is quietly pleased with visitor levels, locks up the shop, goes into the silent house. Only then does that other aspect of the afternoon come bustling in. Cousin Linda hangs around all evening, saying that again. **And again.**
(Penelope Lively [2004]. *The Photograph*, p. 161 and p. 162)

In each of these examples the text fragmentation is used for a piece of information which ultimately has key plot significance, but which might not appear important at the point of reading unless highlighted in some way (see also Emmott [2003] for a discussion of how these types of feature can add to a plot). In the Dahl story (Example 4), the leg of lamb subsequently becomes the murder weapon in the story. This provides the crux of the "twist in the tale" since, ironically, the policemen investigating the crime later eat the leg of lamb whilst deliberating over the whereabouts of the unidentified weapon. In Example 5, from a detective story by Ian Rankin, the mention of the pizza box provides a key clue which identifies a previously unidentified character. In the Shreve story (Example 6), readers of the previous part of the novel will know that there are reasons for Kathryn to suspect that her dead husband, a pilot, may have had an affair with one of his colleagues. As she scans a list of staff who worked with him and notices the name "*Muire Boland*", she remembers unexplained personal jottings that she has previously found in his belongings, including the reminder "*Muire 3.30*". In the Lively story (Example 7), the mention of "that nasty little upset" and Kath having being "under par" could just refer to some minor ailment, but the "furtive look" of the speaker suggests that there is more to it than this. Later, we find that this is a euphemistic way of referring to a miscarriage, an event that is significant since it provides an explanation for Kath's suicide.

The foregrounding has different purposes in these narratives. In the Dahl story (Example 4), the reader is not aware until shortly after this extract that the leg of lamb will be used as a murder weapon. This extract (together with the title of the story) highlights an object that is about to become of crucial importance. In Examples 5 and 6, the foregrounding provides sufficient information for crucial inferences to be made by readers of the full stories up to these points. In Example 5, the Rankin detective novel, the mention of the pizza box tells the reader that Rebus is looking not at an unidentified accident victim, but at his daughter, who was last seen by him carrying a pizza box. In the Shreve novel, the reader of the story has already been given sufficient information for it to be possible to start drawing inferences about the role that Muire Boland had in the dead husband's life as the stretch of text in Example 6 is read. In the Lively novel, the mention of "that nasty little upset" in Example 7 provides a sense of mystery throughout the following pages until the nature of the "upset" is explained.

In these types of plot-crucial examples, the cumulative fragmentation does not occur in isolation, but is accompanied by linguistic features that are characteristic of these heavily foregrounded text extracts, as follows:

(i) Italics

Example 6 shows the use of italics in addition to fragmentation. (See also Emmott et al. (2003: 22) for a very similar example from detective fiction where the combination of fragmentation and italicisation is used to highlight a crucial clue in the story.) Italics are well known as a graphical device that can be used for the purposes of emphasis. Previous research in Sanford's laboratory (McAteer 1989, 1992) has shown that italics can have an effect on readers and, more recently, we have used the text change detection method described in Section 3.2 to show that italics can alter the extent to which readers notice and remember details in a text (Alison J. S. Sanford et al. in press).

(ii) Under-specification

Under-specification relates to cases where there is a lack of identifying information about a referent. The notion of under-specification is an idea currently being explored in Cognitive Science (in areas such as Psychology and Computing) which is in line with classic work within Literary Theory, such as Ingarden's (1973) "spots of indeterminacy", Iser's (1978) "gaps" or "blanks", and Barthes' (1974) "enigmas". Under-specification may sometimes occur simply because a character or object is of such minor importance that extra details are irrelevant or because the focalizing character is unaware of or does not remember the full information (see Emmott 2006 for examples). On other occasions, under-specification may combine with explicit statements of significance or textual foregrounding devices to create interest in the missing information[6]. Examples 4–7 all use under-specification to a greater or lesser extent. Example 7 is the most obvious since the main fragmented detail ("That nasty little upset.") is itself under-specified. In Examples 4, 5 and 6, there is a delay before the relevant objects are identified, with the items being initially under-specified as "the first object", "something", and "the name … the unusual name", respectively. It may be that under-specification has the potential to focus the reader's attention on the item being referred to, while the reader awaits further specification.

(iii) Repeated references to the same item without any significant narrative development

In all these examples there is repetition, with the narrative lingering on specific details with little or no narrative development. In Example 4, the under-specified item ("the first object … it … it … It … it") is eventually named in the fragment "A leg of lamb." and then the final line refers again to "lamb". In Example 5, the near-repetition in the sentence fragments "A flat white cardboard box." and "A white cardboard pizza box." serves both to highlight this crucial item and also to add a new piece of information (that it is a pizza box) to make the

clue directly link in with a previous description of the same item many pages earlier. In Example 6, there is repetition of the reference to the discovered "name" ("the name", "the unusual name", "the name", "a woman's name" and "the typed name"), in addition to repetition of "*Muire Boland*". In Example 7, the fragments "That nasty little upset." and "Under par." are echoing the previous conversational utterance. This last example includes an odd slowing and re-iterating of the narrative presentation, since we are told that the re-play happens "Later", but then that "later is on hold". When "later" occurs, the repetition of "again" iconically represents the repeated echoing of the phrase in the character's mind.

In Examples 4–7, the foregrounding techniques are clearly closely linked with the representation of the focalizers' thoughts. If we assume that the ultimate purpose of these passages is to highlight plot-crucial information for the reader, the fact that the linguistic devices can also be interpreted as showing the characters' thought processes can add to the plausibility of the passages. In Example 4, the highlighting of the leg of lamb might seem very heavy-handed if it were not for the fact that the presentation also shows the perceptual process of the character as she gradually recognizes this item in her freezer. Focalization may also make clearer that the graphical features are indicating significant information. There may be explicit statements of the considerable importance of the relevant object/information to a character and therefore to the reader, as in Example 6 in the description of the shock that Kathryn experiences as she reads the name that "travel[s] through her bones with a charge". More subtly, the preoccupation of the focalizer with the discovered item (as represented by the lingering repetition described above in Examples 5, 6 and 7, in particular) may also serve to show that the item is highly significant to the character and therefore to the reader too.

The cumulative use of fragmentation, often coupled with the above additional linguistic devices, appear to serve as "attention grabbers", which we might assume to prompt a very high level of attention capture. In the above examples, these devices seem to be emphasizing information which otherwise could easily be overlooked since there is no explicit statement in any of these cases of why the information is of any particular relevance to the focalizer (e.g. in Example 6, we have to infer that the Muire Boland was the focalizer's husband's lover). We will see in Section 2 that text fragments can also occur individually, but then they may be emphasizing local details (Section 2.1) or may provide additional highlighting for more explicitly-stated globally-relevant information (Section 2.2). One hypothesis stemming from our stylistic analysis is that it may be necessary to use fragmentation devices and other highlighting devices cumulatively in order to increase attention in cases where the reader needs to infer the global significance of information. In such cases, heavy cumulative use of graphical features may hint to the reader that the text has greater importance than may appear at first sight.

2.   Stylistic analysis (II): Text fragmentation from a broader perspective

Section 1 shows the plot-central use of cumulative sentence fragmentation and mini-paragraphs which first attracted our stylistic interest, but our study has since broadened to look at each of these features in their range of uses in a survey of 30 narratives (novels, biographies, short stories and narrative embedded in popular science texts). For reasons of space, we present here only a selection of examples from this study, discussing only some of the more common uses that we found (see Emmott et al. 2006 for many more examples of sentence fragmentation and for a wider range of categories).

There are several reasons for extending the stylistic analysis in this way. Firstly, this broader perspective shows that fragmentation has a far wider range of purposes than the plot-central foregrounding discussed in Section 1, hence indicating that the study of fragmentation is of more general interest than just at narrative climaxes. Secondly, although we will again see examples of cumulative fragmentation, a significant number of our examples will include individual instances of fragmentation, so we can explore whether such individual instances also appear to have a foregrounding role. Thirdly, a broader range of examples provides an indication of the different ways that fragmentation can be integrated into a text (e.g. showing how fragments can echo or expand on the previous text). In Section 2.1, we focus on key uses of sentence fragmentation and in Section 2.2, we examine some of the main functions of mini-paragraphs.

2.1.   *Sentence fragmentation*

The following list gives some of the common uses of sentence fragmentation. In many of these cases, both the brevity of the fragment and the fact that it is split off by punctuation could be argued to be a strategy for placing local emphasis on the information in the fragment. If so, then we might expect these forms to capture the attention of readers, as will be investigated by the empirical work in Section 3.2.

(i) Repetition and paraphrase

(8) His face worked relentlessly, writhing with anger and dread. **Mostly anger**.
     (Paul Broks [2004]. *Into the Silent Land*, p. 18)

(9) But standing there, she suddenly had the sense that Robert Hart was always observant. **Always watching**.
     (Anita Shreve [1999]. *The Pilot's Wife*, p. 167)

Sentence fragments commonly echo words that have occurred in the preceding sentence. The fragment may repeat a word or phrase, often with additional intensification (Example 8), or provide a paraphrase (Example 9). The content it-

self may provide emphasis (i.e. by re-iteration and intensification), but the fragmented form also serves to make the information stand on its own, arguably highlighting this material further.

(ii) Additional detail and greater specificity

(10) Then she remembered, her stomach lurching, the twice-yearly training sessions in London. **Two weeks each**.
(Anita Shreve [1999]. *The Pilot's Wife*, p. 226)

(11) Catching sight of me she smiled, and at that moment the boy turned and glanced back at her. He had floppy, blond hair and sad, drooping eyes. **Connolly**.
(Zoë Heller [2004]. *Notes on a Scandal*, p. 158)

The fragment can add extra detail which might otherwise have appeared in the previous sentence (Example 10). Sometimes, initial underspecification of the referent can be followed by a more precise label, such as a name, often simulating the thought processes of a character as he or she gradually discovers information (Example 11). Here, we might hypothesize that by placing the additional information alone in the sentence fragment, it might highlight the information more than if it had been included within the previous text. This is not just a matter of the length of the fragment, but syntactic structure can also be relevant. If "two weeks", in Example 10, was embedded inside the earlier noun-phrase (e.g. "the twice-yearly two-week training sessions"), then we might expect the embedded information to have less prominence by contrast. We will return to this point about embedding in the discussion of depth of processing in Section 3.1.

(iii) Fractured structures

(12) And I, with the eventual support of my parents, went back to Syracuse. **Alone**.
(Alice Sebold [2002]. *Lucky*, p. 88)

(13) Money was just a score, that was all, the mark of your ingenuity. **And luck**.
(Louise Dean [2004]. *Becoming Strangers*, p. 185)

(14) Only an inattentive daughter could fail to see. **A disrespectful daughter**. **Who fully deserved the lashing, verbal or otherwise, that followed such dereliction of duty**.
(Monica Ali [2004]. *Brick Lane*, p. 205)

In Examples 12 and 13, words which appear to belong to the end of the previous sentence occur as fragments, as if the previous sentence has been fractured into two. In Example 14, the relative clause in the second fragment could have occurred as a post-modifier of the preceding noun phrase, but the whole phrase has

been fractured into two. These "fractured structures" are recognized in the leading grammar books. Quirk et al. (1985: 1446) suggest that the made-up example "I saw Miriam. And Walter." gives the impression that Walter is either being mentioned as an afterthought or that the sight of him is being given special or dramatic significance, depending on the prosody attached to the fragment in silent reading. Huddleston and Pullum (2002: 1735) create the example "He had broken the vase. Deliberately.", suggesting that the punctuation might give extra importance to the fragment in the same way that prosody could set it apart in speech.

(iv) Evaluations and conclusions

(15) There were two Marthas, and there was nothing to bridge them. **Failure**. **Complete failure**.
(Doris Lessing [1966]. *A Proper Marriage*, p. 164)

(16) The great, sun-dried dead church, the dead portales, the hopeless covered market-place, where, the first time she went, she saw a dead dog lying between the meat stalls and the vegetable array, stretched out as if for ever, nobody troubling to throw it away. **Deadness within deadness**.
(D. H. Lawrence [1996]. "The woman who rode away", p. 39)

Fragments can also embody evaluations, as in Example 15, or can provide conclusions, as in Example 16. These particular examples are notable for their rhythmic qualities in the original texts. Example 15 is part of a longer stretch of text which alternates short fragments and a short sentence with longer sentences. In Example 16, the fragment rounds off the paragraph, providing a short final summary after the lengthy preceding sentence.

(v) Negatives and repairs

(17) Most Autograph Men have given up the hope of ever getting one. **Not Alex**.
(Zadie Smith [2003]. *The Autograph Man*, p. 66)

(18) Connor mentioned the wife, and the three children and the dog, fairly soon after he and Julie met. **Well, not met**. **Slept together**. It was almost the same thing.
(Margaret Atwood [1992]. "The bog man", p. 88)

The fragment can provide a contrast with the previous sentence, for example to show the difference between a general situation and a specific case (Example 17). Fragments can also provide repairs, sometimes following a negation (Example 18). Arguably, placing the negative or repair in a fragment alone may put more emphasis on the negation or the repaired information than if a longer structure had been used (e.g. with the negation fronted in the fragment in Example 17 rather than longer statements such as "Alex had not given up hope." or "Alex had not.").

(vi) Orientation and topic management

(19) **Tijuana**. **The border**. **A three-hour wait at Customs**. The landscape chang-
      es again […]
      (Kenneth A. Brown [1994]. *Cycles of Rock and Water: Upheaval at the Pa-
      cific Edge*, p. 34)

(20) **And Clare, always Clare**. Clare in the morning, sleepy and crumple-faced.
      Clare with her arms plunging into the papermaking vat, pulling up the
      mold and shaking it so, and so, to meld the fibres. Clare reading, with her
      hair hanging over the back of the chair, massaging balm into her cracked
      red hands before bed. Clare's low voice is in my ear often.
      (Audrey Niffenegger [2005]. *The Time Traveler's Wife*, p. 4)

So far, the fragments discussed have echoed or interacted with the previous text,
but it is also possible for them to preface what is to follow. Fragmentation can be
used to set the scene at the start of an episode, as in Example 19. Listing the tem-
poral-spatial information in fragments can be argued to put more emphasis on
those orientational coordinates than if they were "diluted" by placing these de-
tails in longer narrative sentences (e.g. "We arrived at Tijuana."). In Example 20,
the initial fragment provides a "header" for all the statements that follow.

   In all of the above examples, a case can be made for fragmentation provid-
ing emphasis. In types (i)–(v), the fragment arguably puts more focus on the
information than if the information had just been included in the previous sen-
tence. In type (vi), the fragment provides a means of concentrating on the key
orientation and topic words, arguably giving them more prominence than if
they had been in a longer sentence. Writers may, nevertheless, use fragments
for a variety of purposes, not all of these necessarily being for reasons of em-
phasis. Fragmentation is frequently used in direct speech to show elliptical re-
sponses and may then simply be mimicking the fragmented nature of real
speech.[7] Another very common use is for the fragments to embody a list of
items or a list of impressions.[8] Also, in iconic representations, the purpose of
the sentence fragments may be to echo physical effects such as speed of move-
ment, as shown in Example 21.

(21) The city shattered. Everything was in pieces. She knew it straight away,
      glimpsed it from the painful-white insides of the ambulance. **Frantic neon
      signs**. **Headlights chasing the dark**. **An office block, cracked with light**.
      These shards of the broken city.
      (Monica Ali [2004]. *Brick Lane*, p. 117)

The fact that writers may not always be using emphasis as a deliberate stylistic
device does not, however, undermine the psychological investigation of frag-
mentation as a potential attention-capturing device. Even in cases where pro-
viding emphasis does not seem to be the main intention of the writer, psycho-

logical methods can still be used to test whether the fragmentation has the secondary effect of making information in the fragments more noticeable to readers and/or more memorable. This might be useful for applications such as testing the readability of texts in literacy research.

2.2.   *Mini-paragraphs*

Mini-paragraphs have specific features which may explain why writers often appear to be using them with the intention of highlighting particular lines in a text. Firstly, their brevity may be a significant factor, particularly since the lay-out may have a physical effect on readers. Where there are very frequent paragraph breaks, it might be the case that this serves to slow down the reading process, but that would need to be empirically tested. Likewise, it is possible that the extra white space itself serves to capture the attention of the reader, but again this needs to be tested (see Section 3.2). Secondly, the mini-paragraph (particularly the "single item" mini-paragraph) may often express just one idea, rather than bringing together several ideas as we might normally expect in a paragraph, with the possible effect of emphasizing the information in the mini-paragraph.

Previous examples show two reasons why writers may use mini-paragraphs: plot relevance and rhetorical shifts. In Section 1, we saw in Examples 4–7 that cumulative fragmentation could be used to present plot-crucial details, apparently emphasizing the text so that plot inferences could be made and/or key information highlighted for later use. Even one instance of text fragmentation, such as a mini-paragraph containing a full sentence, can be used to highlight plot information. In Example 22, the mini-paragraph highlights information that is of obvious importance to any reader of the full novel, the discovery that the main protagonist's husband had had a son by another woman.

(22)   The baby in Muire Boland's arms, despite the different sex, despite the slightly darker hair colour, was precisely the baby that Mattie had been at that age – five months old, Kathryn guessed. The realization created dissonance, a screeching in her ears, as though this woman she had never met were holding Kathryn's child.

　　Jack had had a son.

　　The dark-haired woman turned and left the hallway for a sitting room, leaving Kathryn to follow. The child in the hallway, a beautiful girl with enlarged pupils and a cupid mouth, picked up a handful of construction blocks, pressed them to her chest, and, eyeing Kathryn the entire time, edged along the wall and entered the sitting room, moving closer to her mother's legs. The girl looked like her mother, whereas the boy, the son, resembled the father.

(Anita Shreve [1999]. *The Pilot's Wife*, pp. 212–213)

Examples 2 and 3 (in the Introduction) showed rhetorical shifts. In Example 2, the reader has to infer the discontinuity, assuming that the death of the narrator's father would significantly affect his plans to carry out his intended trip. In Example 3, there is a specific indicator of discontinuity ("Except"). The paragraphing is unusual in this case because the first paragraph ends on a positive note and we would normally expect the paragraph break to signal a switch to a new topic. Instead, the concessive phrase suddenly provides a reversal. Arguably, the paragraph break makes the change in direction more surprising than if the phrase "except in this country" had been part of the preceding paragraph.

Mini-paragraphs are also used for text which has a range of other functions, often reflecting a shift in hierarchical level where there is a comment on the previous text or a prediction of how the narrative will continue. This applies particularly to cases where a mini-paragraph appears as a coda, a final comment or statement at the end of an episode and/or a chapter (Labov 1972). In Sue Townsend's (1989) *Rebuilding Coventry*, for example, one chapter describes the narrator desperately and unsuccessfully begging for food from a shopkeeper, then seeing the shopkeeper just throw the food away. The chapter ends with the mini-paragraph coda "He could have given it to me after all." (p. 62). The mini-paragraph can also set specific events in a broader context. In Michael J. Fox's (2003) autobiography, *Lucky Man*, he ends a chapter with the coda, "The ride, it turned out, was only beginning." (p. 112), predicting the direction that the remainder of the narrative will take. Even within an episode, a mini-paragraph can provide a switch from specific events to a more general comment. In Lance Armstrong's (2001) autobiography, *It's not about the Bike: My Journey back to Life*, he describes how he repeatedly dismissed the pre-diagnosis signs of cancer, providing a mini-paragraph comment from his subsequent more knowing standpoint, that "I had an excuse for everything." (p. 8). The mini-paragraph can also be used for heavily evaluative comments which set specific events in the context of the narrator's lifetime experiences, as in the following example:

(23) Next morning, at 5:30 A.M., Jangbu violently shook my tent and said, "David, David, get up, you must come to Rob's camp." In the blue dining tent that doubled as Adventure Consultants' communications tent, Ed and I found a distraught Finnish climber named Veikka Gustafsson. Like Ed, he had a close friendship with Rob and had climbed other Himalayan peaks with him. Veikka had been up all night monitoring the radio for any further news. He told us that an hour earlier, Rob had broken the terrible silence to ask, "Won't somebody come and help me?"

    It was one of the most chilling moments of my life.

    Rob was a powerful man. He was eminently capable, organized, and widely experienced. He functioned superbly at high altitude. If anyone belonged on this mountain, it was Rob, always in command of himself.

And yet he'd lost control.
(David Breashears [2000]. *High Exposure: An Enduring Passion for Everest and Unforgiving Places*, p. 263)

In all of the above examples in this section, the mini-paragraphs might be argued to emphasize crucial information or a key comment on the preceding text. Mini-paragraphs may also be used simply for iconic purposes. In the following example, Philip K. Dick uses a mini-paragraph to reflect the slowness and difficulty of movement as a character struggles to climb a staircase, as each action drains him of his life. The mini-paragraph in Example 24 does not emphasize key information, but instead echoes the nature of the action described.

(24) His last labored actions governed by a tropism. An orientation urging him toward death, decay and nonbeing. A dismal alchemy controlled him; culminating in the grave.
    He ascended another step.
      I'm going to make it, he realized. The force goading me is feasting on my body; that's why Wendy and Al and Edie – and undoubtedly Zafsky by now – deteriorated physically as they died, leaving only a discarded husklike weightless shell, containing nothing, no essence, no juices, no substantial density. The force thrust itself against the weight of many gravities, and this is the cost, this using up of the waning body.
    (Philip K. Dick [2001]. *Ubik*, p. 184)

As discussed in the previous section, even in cases where fragmentation does not have the rhetorical function of providing emphasis, psychologists can test whether the use of fragmented structures, such as the mini-paragraph here, increases the attention that a reader pays to the information in the structure (in terms of making the details more noticeable). This may have implications for judging the readability of a text and/or understanding the creation of iconic effects.

3.   Psychological analysis: An empirical investigation of text fragmentation

In the previous sections, we have presented a stylistic analysis of some of the key functions of short sentence fragments and mini-paragraphs used in narrative texts. In many (but not all) these cases, it can be argued that a writer appears to be using fragmentation to provide emphasis, thereby aiming to attract the attention of readers. In this section we look at how the assumptions underlying this stylistic analysis can be tested empirically, using techniques from experimental psychology. We present our first foray into the problem, describing an initial experiment which tests the following hypotheses. This experiment examines whether sentence fragments can increase the amount of attention that a reader pays to a text, in terms of the amount of detail that the reader notices.

In addition to sentence fragments, our data included some very short sentences (3–5 words), since we felt that brevity generally might be a significant factor in explaining attention capture. Our experiment also examines whether cumulative use of these devices, in the form of a short fragment/sentence plus a mini-paragraph, has a greater effect on the reader's attention, again in terms of the detail noticed, than a short fragment/sentence alone.

3.1.   *Psychological research on attention: Depth of processing*

The possibility that structures such as sentence fragments, very short sentences, and mini-paragraphs may raise the level of attention complements previous work on attention by psychologists. In cognitive psychology, it is generally thought that when something is attended to, it requires more substantial processing. For example, if we pay attention to a particular word, then its meaning will play a greater role in our ongoing interpretations. Within Psychology, this area of study is called "depth of processing".

Depth of processing researchers have found that readers are often remarkably unobservant about what they read, although to rather different degrees depending on the syntactic and semantic complexity of the reading materials. Readers see the words in a sentence, but they do not necessarily draw all the inferences that could be drawn. The full semantic information does not seem to be being utilized in such cases and this is referred to as "shallow depth of processing".

Shallow depth of processing has been studied particularly in relation to semantic anomalies in sentences such as the following[9] (e.g. Erickson and Matteson 1981; Barton and Sanford 1993; Sanford 2002; Sanford and Sturt 2002):

(i)   After an aircrash, where should the survivors be buried?
(ii)   Can a man marry his widow's sister?
(iii) How many animals of each sort did Moses put in the Ark?

Readers often try to answer these questions, failing to spot that they are nonsensical or erroneous because (i) survivors are not usually buried (ii) a man who has a widow must be dead and so cannot marry, and (iii) it was Noah rather than Moses who put the animals in the Ark.[10] For question (i), for example, readers often answer "bury them where their relatives want" and for question (iii), readers frequently answer "two" rather than "none". It seems that readers are aware of the plausibility of a particular word being used in a particular situation (e.g. the word "survivors" is likely to occur in a piece of text describing an aircrash), since they notice more changes when a word is used that is quite inappropriate to the context (van Oostendorp and de Mul 1990) or when the context is changed to make a particular word less plausible (Barton and Sanford 1993). Nevertheless, readers are "shallow processing" in the sense that they are often not attending to whether every semantic feature of a word fits the context exactly (i.e. survivors are alive and so are unlikely to be buried). This shows that

many people do not retrieve from memory the full details of the relevant word (survivors, Moses, etc.), i.e. what the word denotes.

From the point of view of our current research, a key point is that certain types of syntactic structure can make semantic anomalies more observable. Hence cleft structures, as in (ii) below, can focus the reader's attention on the erroneous information and lead to a higher error detection rate than for (i) below (e.g. Bredart and Modolo 1988):

(i)   Moses put two of each sort of animal in the Ark. True or false?
(ii) It was Moses who put two of each sort of animal in the Ark. True or false?

The typical (though not inevitable) answer to question (i) is "true", with people often not noticing the anomaly, as discussed above. For question (ii), however, very few people say that the sentence is true. The sentence in (ii) is effectively an answer to the question "Who was it that put two of each kind of animal on the Ark?", that is, Moses is asserted and not presupposed. In contrast, (i) has much broader focus, being an answer to a question like "What happened?", and Moses is presupposed, not asserted. Focus is a way of manipulating what is attended to most in a sentence and clearly influences the degree to which a critical word is processed. (For related work exploring this idea in greater detail, see Sanford and Sturt 2002 and Sturt et al. 2004.)

Depth of processing can also be decreased by embedding information in subordinate clauses. This has the effect of making anomalies less detectable. In the following sentences containing erroneous information about the liver being found only in humans, the anomaly was more difficult to detect in the subordinate structure in (i) than in the main clause position in (ii) (e.g. Baker and Wagner 1987):

(i)   Is the following true or false? The liver, which is an organ found only in humans, is often damaged by heavy drinking.
(ii) Is the following true or false? The liver, which is an organ often damaged by heavy drinking, is found only in humans.

Our current work contributes to this body of research on depth of processing, testing whether sentence fragments, very short sentences, and mini-paragraphs can increase the attentiveness of readers. This is a simple hypothesis, but if supported by the experiments, it has the potential to provide an insight into the way that attention works and add to the above body of work on how readers respond to the complexity of sentence structure. Just as cleft structures can make readers more attentive to certain parts of a text, the graphical features presented in this article may be able to do the same. Fragmentation, by its very nature, allows items to appear in isolation that would otherwise have occurred in longer grammatical structures. Sometimes this may be a case of separating an item from other clause elements that the item would normally have oc-

curred with. A fragment may also be an element that might otherwise have appeared as a modifier in a phrase, or a subordinate clause that would otherwise have occurred embedded in a phrase or another clause. In Example 14, for instance, the relative clause "Who fully deserved the lashing, verbal or otherwise, that followed such dereliction of duty." is extracted from what would otherwise have been an embedded position in a noun phrase. The depth of processing research described above has shown that embedding can make readers process in a shallower fashion, probably because embedded information is typically presupposed and so is uncontentious. By contrast, it may be that processing is deeper when a structure that would otherwise be embedded occurs as a separate fragment.

3.2.   *Report of the experimental investigation: The text change detection method in relation to text fragmentation*

Our experiment used the new technique of text change detection, developed by Sanford and his colleagues (e.g. Sturt et al. 2004). The idea for this method came from earlier use of the change detection method in vision research, where subjects were tested to see how easily they could spot differences between almost identical pictures in order to assess how much attention they were paying to details in the pictures (see reviews of this work in Simons and Levin 1997 and Simons 2000b). Often changes were not spotted and the phenomenon was referred to as "change blindness". Instead of pictures, the text change detection method uses pairs of texts which are either identical or identical apart from a change of one word, in order to test whether readers notice that a change has occurred. In the experiment described below, by using versions of the text which have different graphical formats, we can test the extent to which the graphical format makes a difference to noticeability of a change.

Using this method, participants read pieces of text through once, then re-read either the same text (about 50% of the time) or the same text with just one word changed (the remainder of the time). The very simple idea is that if readers were attending to a particular word in detail, they would recognize that a change had occurred more often than if they were not attending.

(i) *Method*: We created 36 short passages, each of which appeared in three versions. These passages included the types of stylistic features found in our analysis of examples from literary texts, popular fiction, (auto)biographies and narrative embedded in popular science writing. Each of the three versions for one of these passages is shown below. These different graphical formats comprise the different conditions of the study. In each case, the bracketed material (($\rightarrow$ white)) indicates the word that would be changed in a second

presentation in order to test whether readers noticed changes to a greater or lesser extent in the different conditions.

In the first condition, the critical region ("a brown (→ white) envelope"), was presented assimilated into an earlier sentence:

> *Condition 1: Assimilated into an earlier sentence*
> Peter had tried hard not to go over details of the interview in his mind. He tried not to rephrase his answers, tormenting himself with things he should have said. He tried hard especially not to listen out for the postman every morning, but at last there it was, a brown (→ white) envelope.
>
> He examined it for a while, before summoning the courage to look inside at his fate.

In the second condition, the critical region was presented as a separate sentence fragment or very short sentence, but did not have its own mini-paragraph:

> *Condition 2: Short fragment/sentence, no mini-paragraph*
> Peter had tried hard not to go over details of the interview in his mind. He tried not to rephrase his answers, tormenting himself with things he should have said. He tried hard especially not to listen out for the postman every morning, but at last there it was. A brown (→ white) envelope.
>
> He examined it for a while, before summoning the courage to look inside at his fate.

In the third condition, the critical region was presented as a separate sentence fragment or very short sentence in its own mini-paragraph:

> *Condition 3: Short fragment/sentence, mini-paragraph*
> Peter had tried hard not to go over details of the interview in his mind. He tried not to rephrase his answers, tormenting himself with things he should have said. He tried hard especially not to listen out for the postman every morning, but at last there it was.
>
> A brown (→ white) envelope.
>
> He examined it for a while, before summoning the courage to look inside at his fate.

Three computer files were constructed, each containing all 36 experimental passages. Within each file, one third of the passages appeared in each of the three conditions described above. For a given passage, the text appeared in one of the conditions in the first file, in a second condition in the second file, and in a third condition in the third file. In this way, each passage appeared only once in each file, but taking all three files into account, each passage appeared in all conditions. By showing only one file to a given participant, we could thus guarantee that the participant only saw a given passage once, but saw 12 passages in each condition.

To each file we added 112 "filler" passages, comprising three or four sentences. These were designed to dilute the experimental passages so that participants would not come to expect their particular structures, which might then influence their reading. In the filler passages, changes to a word occurred in 68 of the 112 passages. These changes were distributed over the sites where they occurred in the passages, ranging from a word early in the first sentence to a word late in the last sentence, again to avoid participants spotting where changes might occur. To facilitate this, 20 of the fillers had very obvious changes in widely distributed places so that they were easily detected. Finally, a simple comprehension question was added after the second version of each of the passages to facilitate reading-for-meaning.

Twenty-four University of Glasgow undergraduates took part. Eight participants saw the first file, eight the second, and eight the third. The passages were presented on a screen by computer. Participants first fixated their eyes on a fixation cross (positioned where the start of the passage would appear), and when they were ready pressed a button on the response box to call up the first passage. Reading was entirely self-paced. They were instructed to read the passage naturally, and when they had finished, to press the button again. After a 500 milli-second delay,[11] the passage was presented for the second time, either with a word change or not. Participants read the passage again, pressing the button when they had finished. At this point, the screen went blank. The participants then pressed a button on the response box to indicate whether or not they had detected a change. They were also instructed that if they had noticed a change to report verbally to the experimenter what they thought this change was. To start the next trial, they pressed the button again when they were ready.

Results: The critical measure is the proportion of changes detected under the three conditions, and this is shown as a function of condition in Figure 1.

Statistical analysis, using analysis of variance, showed that there were reliable differences in detection rate over these conditions, by participants [F_1 (2, 46) = 4.392, MSe = 361.829, p<.05] and materials [F_2 (2, 70) = 6.320, MSe = 366.384, p<.01].[12] Newman-Keuls tests were used to examine this main effect in more detail, revealing that changes were detected significantly less often in the condition where the critical item was made part of the earlier sentence (Condition 1 = 25.28%) than they were when the item was made to stand alone, either in the same paragraph (Condition 2 = 41.53%) [q_1=4.19, p<.05; q_2=5.01, p<.01], or in its own mini-paragraph (Condition 3 = 34.17%) (although this reached significance in the analysis by items only) [q_1=2.29, p>.05; q_2=2.90, p<.05]. There was no reliable difference between the two stand-alone conditions, i.e. Conditions 2 and 3.[13]
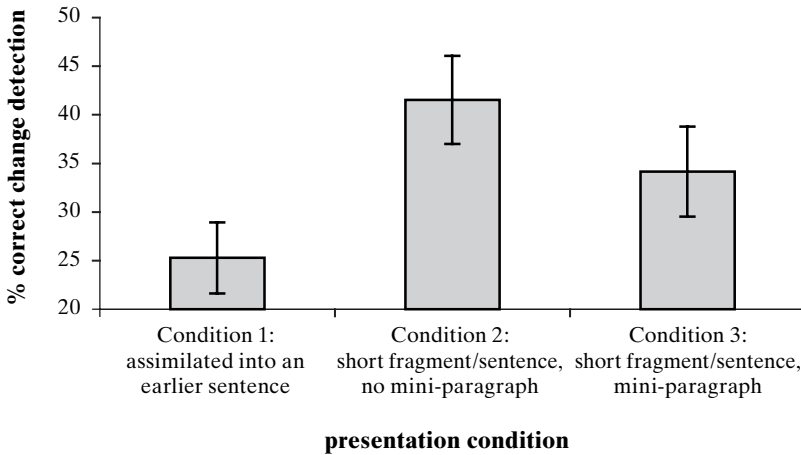
Figure 1. *% correct detection of changes to targets in the critical regions under the three conditions, including standard error bars*[14]

Psychological discussion: These results show that when sentence fragments or very short sentences are introduced towards the end of short texts (Conditions 2 and 3), they enhance detection of changes to words, compared with the same item appearing as part of the preceding sentence (Condition 1). We can conclude that more careful, deeper, processing is occurring for short stand-alone items, just as we have generally been assuming in the stylistic analysis. It is interesting that we did not find an even greater enhancement of processing in the "mini-paragraph" position, considering the use of the mini-paragraph as a stylistic device. One possibility is that simply putting the text into its own sentence fragment or very short sentence may be enough to maximize attention, bringing it to a peak. Alternatively, it might be suggested that the result is an artefact of the method, because the change detection task is not sensitive enough to detect any additional capture of attention – however, we think this explanation is unlikely because the detection rates were not at 100%, even in the conditions where detection was boosted.[15] If there genuinely is no increase in attention capture in the mini-paragraph case, what role could the mini-paragraph serve? One possibility which will be the focus of future investigation is that a mini-paragraph may increase reading time duration. This may give rise to further effects, such as increasing the long-term memorability of the item (Waugh 1963).

4.   Stylistic discussion

The above experimental results support our earlier stylistic analysis in relation to our assumption that sentence fragments were being used by writers to draw

the attention of readers towards specific parts of texts. This may be due to the fact that these fragments are usually brief,[16] an assumption supported by the fact that the very short sentences had the same effect as the fragments. It might also be because a fragment effectively "unembeds" information that would otherwise be embedded in or part of a longer structure (as discussed in Section 3.1), a finding that would complement existing psychological work on the contrasting phenomenon of readers' low levels of attention for embedded information.

These findings have important implications. Depth of processing is a key concept because it challenges the traditional psychological idea that readers form a fully-specified representation at each level of text processing. A fully-specified analysis would necessitate understanding the full meaning of every word in a sentence, then combining these words into an interpretation of a sentence. By contrast, the psychological evidence for shallow processing shows that a reader can proceed through a text with anomalous words going unnoticed, although this is less likely to be the case when "attention capturing" features, such as clefting, and sentence fragmentation are used. From a practical point of view, this type of research could be used to show how information can be buried in complex structures (for example, in the analysis of how politicians can bury details in political texts, as studied within Critical Discourse Analysis) or can be used to show how writers bring details to the forefront of attention in texts such as in advertisements[17] and newspaper articles, since these texts commonly make use of fragmentation. Whether or not writers are deliberately using particular syntactic or graphical formats, the research also has considerable potential to be used to show the readability of a text and/or to show how attentively readers of different abilities read formats of different types. Barton and Sanford's (1993) work on depth of processing has already been tested by applied psychologists. Hannon and Daneman (2004) found differences between individual readers. Both skilled and less-skilled readers formed plausible representations of particular scenarios, but skilled readers were much better at integrating the semantic detail embodied in specific words into their representation of the scenario. In terms of the materials discussed in Section 3.1, this would mean that we would expect both skilled and less-skilled readers to be able to recognize that the word "survivors" fits an aircrash scenario, but less-skilled readers would be particularly poor at noticing that the essential semantic property of aliveness did not match the verb "buried".[18]

The results for sentence fragments and very short sentences are, therefore, a significant step forward, but the results for the placement of these items in a mini-paragraph are not as predicted. We expected the mini-paragraph to raise attentiveness further and this did not happen. The results of the change detection study show no difference between the two conditions where the critical item stands alone (i.e. appearing in a mini-paragraph or not). Superficially, the implication would be that it makes no difference to readers whether, say, Roald

Dahl (in Example 4) had placed the phrase "A leg of lamb." on a separate line or not. However, it seems strange that a graphic device like putting an item in its own paragraph does not enhance detection. If there really is no difference, many writers are using an ineffective device and a very fundamental assumption of stylistic analysis is open to question. However, an alternative possibility is to look more carefully at the nature of attention and at what the text change detection method actually tests. The text change detection method has been very successful for showing how much attention readers are giving to specific words in a text, but the reader's attention can also be directed towards the significance of a whole statement. As we saw in Section 2.2, mini-paragraphs in natural text are often used to show a change in rhetorical direction, a change in the pattern of events, or a shift to a different hierarchical level. In Example 2, for instance, the sentence "Two weeks before the trip, my father died." provides a sudden change in the expected pattern of events. If the attention of the reader is focused on the impact that this piece of information is likely to have on the narrator's plans, then it is possible that it may make little difference to the reader whether the death occurred two weeks or, say, three weeks before the trip (although we would expect a difference if it had read "Two years before the trip…"). Indeed, if the reader's attention is on the overall significance of the mini-paragraph, then it may even be that small changes of this type are less noticeable. This is, of course, just speculation, but it provides the basis for further work on this topic.

5.   Conclusion

Our work in this article provides a case study in inter-disciplinary research. We have shown how we have added fresh perspectives to both our stylistic and psychological analyses by bringing together ideas and methodologies from these very different disciplines. The empirical research has been prompted by our stylistic analysis and the results add to a significant body of psychological work on depth of processing. As discussed above, depth of processing research is of theoretical importance in understanding how we read and it has significant practical applications in areas such as literacy studies and stylistic/rhetorical analysis. We have shown here how the reader's attention can be captured by placing information in short sentence fragments or very short sentences. Our work is also a major step forward in terms of making psychologists more aware of the importance of style in the design of empirical materials. However, the case study also makes clear that this type of inter-disciplinary collaboration does not always readily produce empirical results which easily mesh with our stylistic intuitions. The mini-paragraphs require additional testing by other methods before we can provide any real answer to how this particular graphical feature affects readers. This latter result may, nevertheless, be revealing in the long term about

the nature of attention. The finding for mini-paragraphs suggests that we may need to develop a more complex model that accounts for both the reader's ability to notice local details and the reader's awareness of how the presentation of a text can affect the more global rhetorical shape of that text. Although this initial experiment has rather mixed results, we therefore see it as an important first step in developing a programme of inter-disciplinary research which we hope will provide major insights into the way that readers attend to specific features in texts in the process of reading.

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Notes

1. By "sentence fragment" we mean simply that the fragment is punctuated as a sentence would be, not that there is any underlying sentence. Some analysts use the term "minor sentence" (e.g. Crystal and Davy 1969: 49–51) for fragments, but we prefer to see the fragments as below the level of the sentence, rather than as types of sentence.
2. Sentence fragments and mini-paragraphs, where applicable to our discussion, are indicated by our added bold throughout the article.
3. The 3-item "mini-paragraph" ("Later …") in Example 7 provides an exception. In that case, we judge the paragraph to be unusually short, but statistical analysis would be necessary to confirm how far it deviates from the average paragraph length in the relevant text and/or in a corpus.
4. See Emmott (1997: Chapter 3) for further discussion of this point.
5. See Short (2004) for a stylistic analysis of unusual graphical features in experimental writing.
6. See Toolan (2004) for similar comments about how withholding information about an event or an individual can create narrative interest. Toolan uses continuation tests to explore these reader expectations.
7. See Emmott et al. (2006) for examples.
8. See Emmott et al. (2006) for examples.
9. These examples are commonly referred to as "Moses-type illusions" by psychologists, named after the best-known example of this type (see (iii) below in the main text).
10. In this depth of processing research, the experimenters check the general knowledge and linguistic knowledge of the experimental subjects. Hence, they ensure that subjects are eliminated from the statistical analysis if they have insufficient biblical

knowledge to know who put the animals in the Ark, or if they do not know the meaning of key words such as "survivor".

11. This is a standard procedure in most text change detection tests, in order to stop participants spotting a change purely on the basis of surface visual characteristics. Although experimenters try to make changed words the same length as the original words, this is not always possible and, if a second text is presented immediately, participants may notice a slight flicker as the length of line changes. Also a "flicker effect" can occur simply because everything has stayed the same apart from the changed word. The 500 milli-second delay is intended to prevent this occurring.

12. Statistics were carried out by examining reliability across subjects (how well the effect generalises to all participants), indexed by F_1 and q_1, and by materials (how well the effect generalises to all materials), indexed by F_2 and q_2.

13. Since the error bars of the final two columns overlap in Figure 1, the two columns are interpreted as not being reliably different.

14. The error bars are a statistical calculation of the margin of error and hence show the range over which results might be expected to occur if the experiment were replicated.

15. Failures to detect changes were in fact quite high. The absolute values obtained in change detection experiments depend upon a variety of factors, including the size of the change in meaning from initial word to new word (Sturt et al. 2004). In the present experiment, semantic changes were kept quite small.

16. Although fragments are usually brief, they are not necessarily so (e.g. the relative clause in Example 14 is not particularly short).

17. Sanford and colleagues have previously conducted some empirical work in relation to the style of writing used in product information. Sanford et al. (2002) show differences in processing product information depending on the manner of presentation of quantifier information. Hence descriptions such as "95% fat free" put the focus on the large amount of non-fat in a product, whereas "5% fat" puts the emphasis on the fat content, even though these two expressions denote the same percentage of fat.

18. Hannon and Daneman (2004) used different materials, but this is in line with their general finding.

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