Text world theory and situation-model research: enhancing validity and tracking world-retrievals

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Article

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Abstract: When Paul Werth invented the concept of 'text-worlds' (1999), he drew on existing psychological accounts of how the mind processes stimuli, such as the idea of the 'situation model' (van Dijk and Kintsch 1983). Yet despite the important advancements to Werth's approach that have been made in stylistics over the years, situation-model research is rarely, if ever, referenced in what is now called Text World Theory (Gavins 2007). In this article, I consult empirical research on situation models, consequently making two significant contributions: I show how empirical situation-model research bolsters the validity of Text World Theory; I propose a new concept for Text World Theory—'world-retrieval'—to account for how readers trace the interconnections between text-worlds and attempt to resolve processing difficulties. An analysis of the opening to Ray Loriga's (2003) novel *Tokyo Doesn't Love Us Anymore* demonstrates the value of the 'world-retrieval' concept.

Keywords: cognitive stylistics; Ray Loriga; situation model; Text World Theory; world-retrieval

1 Introduction

In the introduction to his posthumously published monograph *Text Worlds*: *Representing Conceptual Space in Discourse*, Paul Werth announces that "the subject-matter of this book is no less than 'all the furniture of the earth and heavens'" (1999: 17). What he means is that he is concerned with cognition and that cognitive processes are at the heart of everything we experience as our world. As he phrases it in a previously published chapter, "worlds are the product of our mental processes, even those we think of as very real and concrete" (1995: 49). What Werth proposed

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was certainly ambitious: it drew on the latest research in cognitive science, cognitive psychology, Artificial Intelligence, cognitive linguistics, text-processing linguistics, and possible worlds theories. Ultimately, Werth presented a model of communication that mapped the conceptual systems involved in discourse processing and the imaginative engagements resulting from it.

Over 20 years after its inception, Werth's model has inevitably evolved. In the first decade of the twenty-first century, its analytical apparatus were improved: Laura Hidalgo Downing (2000) fine-tuned its analysis of negation; Joanna Gavins (2001, 2005, 2007) augmented and mobilised Werth's model into what she called Text World Theory, a comprehensive cognitive stylistic framework; and, building on Gavins' account, Ernestine Lahey (2004, 2005) extended understanding of the linguistic building-blocks of text-worlds and readers' self-implications. In the second decade, refinements often developed out of ethnographic and reader response research, focusing on the experientiality of discourse processing—for instance, readers' emotional reactions (Whiteley 2010, 2011), ontological attention (Gibbons 2012: 151–4, 183–97), personal resonances (Canning 2017), and political affiliations (Browse 2018) as well as people's accounts of their identities in spoken discourse (van der Bom 2015). Such studies have certainly produced important advancements into readers' qualitative experiences. Nevertheless, given that Text World Theory explores how language expresses, reflects, and is underwritten by mental processes, it is vital that empirical research outside of stylistics continues to be consulted as a means of revisiting, reaffirming, and—perhaps, in some instances—reconsidering the foundational cognitive principles of Text World Theory. This article undertakes that consultation work by examining the central tenets of Text World Theory in relation to empirical research on situation models, which is often quantitative and experimental (for comprehensive overviews/reviews of situation-model research, see: Kurby and Zacks 2015; Radvansky and Zacks 2014; Therriault and Rinck 2007; Zwaan 2001). In doing so, this article makes two significant contributions. First, the empirical evidence in situation-model research safeguards and bolsters the validity of Text World Theory.[1] Second, in light of situation-model research on discourse processing and memory, I offer an augmentation to Text World Theory which enables it to track how readers trace the interconnections between text-worlds and attempt to resolve processing difficulties.

1 In this article, I use the term 'validity'—and its variants (e.g. valid, validate)—somewhat loosely (that is, rather than in one of the technical senses used in psychology) to denote accuracy and truth value. Thus, in relating empirical insights from situation-model research, I am concerned with investigating and evidencing the psychological realities that underpin core principles of Text World Theory.

2 Mental models, situation models, and text-worlds

Paul Werth constructed Text World Theory with awareness of existing psychological accounts of how the mind processes stimuli, including 'mental models' (Johnson-Laird 1980, 1983) and 'situation models' (van Dijk and Kintsch 1983). The likenesses between mental models, situation models, and text-worlds are apparent from their original definitions. In his book-length outline of mental models and working within a cognitive science paradigm, P. N. Johnson-Laird claims first, that "human beings understand the world by constructing mental models of it in their minds" (1983: 10) and, second, that these models are necessarily involved in "such universal processes as inference and language comprehension" (1983: 11). In Johnson-Laird's view, mental models of the world are formed from perceptual stimuli (1983: 406) but are also used for processing language. That is, "if the perception of the world is model-based, then discourse about the world must be model-based […] Discourse, however, may be about fictitious or imaginary worlds, and hence our propensity to interpret it by building models of the states of affairs it describes frees us from the fetters of perceptual reality" (1983: 407). When presenting their conception of the situation model, Teun A. van Dijk and Walter Kintsch cite Johnson-Laird's 'mental model' as one of several concepts "motivated by the same insight: that to understand a text, we have to represent what it is about" (1983: 337). Van Dijk and Kintsch's work is rooted in text comprehension research. They argue that as well as processing the textual structure of language, discourse comprehension involves "at the same time, the activation, updating and other uses of a so-called *situation model* in episodic memory: this is the cognitive representation of the events, actions, persons, and in general the situation, a text is about" (1983: 11–12; original emphasis). These descriptions resound with those used in Text World Theory, such as Werth's outline of a text-world as the "conceptualisation of a state of affairs in the memory or the imagination" that represents "the situation depicted by the discourse" (1995: 53). Text-world theorists acknowledge this text comprehension heritage when they describe their approach as a "model of human language processing" (Gavins 2007: 8) or a "discourse processing framework" (Whiteley 2010: 17). Furthermore, situation models have developed a distinctly world-like character. Rolf A. Zwaan emphasises that "situation models are not representations of the text itself; rather, they could be viewed as *mental micro-worlds*" (2001: 14,137; my emphasis) and David J. Therriault and Mike Rinck designate the situation model as "a discourse representation that captures aspects of a *micro-world created by the reader*" (2007: 311; my emphasis).

The resemblance between text-worlds, mental models, and situation models is not unexpected:[2] Werth conceived text-worlds as being affiliated with these former models (cf. Whiteley 2010: 22). He openly states, "I will assume that text worlds are in fact mental models constructed in the course of processing a given discourse" (1999: 74) and describes the situation model as the "equivalent of a text world" (1999: 67). I am not claiming, however, that mental models, situation models, and text-worlds designate self-identical constructs in contemporary research (cf. Radvansky and Zacks 2014: 17; Werth 1995: 72–74; Whiteley 2010: 21; Zwaan 2001, 14,137–8): a mental model is a broader concept, depicting "a set of circumstances that may or may not be tied to a specific event" (Radvansky and Zacks 2014: 17), that is "not restricted solely to discourse processing" (Whiteley 2010: 21); situation models relate to specific states of affairs that are conceptualised from language use; text-worlds signify much richer mental representations (Werth 1995: 73; Whiteley 2010: 21). Mental-model and situation-model research on the one hand and Text World Theory on the other hand also have different analytical motivations since their disciplinary groundings—in cognitive science and psycholinguistics or in cognitive stylistics respectively—inevitably foster different interests. Whilst mental-model and situation-model research is primarily concerned with explaining neurological and cognitive processing as well as the workings of language comprehension and memory, Text World Theory utilises knowledge about the processes of brain and mind as a means of accounting for the complex, dynamic nature of interpretation and aesthetic experience. As Sara Whiteley puts it, "Text World Theory has a broader theoretical agenda than that addressed by research on mental or situation models, exemplified through its focus on real texts in particular contexts" (2010: 22). Indeed, the two approaches focus on different types of texts: situation-model research tends to theorize based on artificial examples and 'textoids'; Text World Theory explores naturally occurring discourse, primarily in the form of written texts such as prose extracts. Despite these differences, the similarities between situation models and text-worlds allows for knowledge transfer. However, situation-model research is rarely referenced in Text World Theory.[3] Rectifying this, in the next section I explore

2 Yet another term with resemblance is "contextual frame", a concept proposed by Catherine Emmott, designating "a mental store of information about the current context, built up from the text itself and from inferences made from the text" (1999: 121). There are parallels between Contextual Frame Theory and Text World Theory, not least because some of its conceptual apparatus, such as the concepts of 'enactor' and 'repair', have been adopted in Text World Theory (see Gavins 2007).

3 An argument for why Text world Theory has largely ignored situation-model research since the former's inception is that Text World Theory may implicitly be seen, in cognitive stylistics, as an advancement in terms of its ability to capture literary experiences more holistically. To the best of my knowledge, though, no text-world theorist explicitly declares this in writing.

empirical findings in situation-model research related to the building blocks of text-worlds.

3 World-building and world-switching

In situation-model research, evidence for the creation of situation models is thought to be provided by the longer reading times associated with the first sentence of a story (e.g. Gordon et al. 1993; Haberlandt 1994). Tal Yarkoni et al. argue that such increased reading times are indicative of "the relative difficulty of constructing a situation model" due to the "foundation-laying processes associated with the initial construction" (2008: 1,422). This evidence also applies to the construction of a text-world which Werth ultimately describes as "a deictic space, defined initially by the discourse itself, and specifically by the deictic and referential elements in it" (1999: 51, 181). Text-worlds are therefore spatio-temporally discrete. Werth's use of 'initially' is motivated by his intuition that participants use pre-existing knowledge and memories to "flesh out" text-worlds (1999: 51). Similarly, van Dijk and Kintsch note that a situation model "may incorporate previous experience" (1983: 12). Resultantly, "a model may incorporate instantiations from more general knowledge from semantic memory about such situations" (1983: 12). Past knowledge is therefore recruited in readers' constructions of imagined text-worlds and/or situation models.

Werth designates the deictic/referential elements in a text as "world-defining" and/or "world-building" elements (1999: 52–55, 180–190). These locate a text-world in place and time and nominate entities in the form of people—referred to, in Text World Theory, as "enactors" (Gavins 2007; cf. Emmott 1999). Werth also notes that "the entities' qualities and other relationships and functions" (1999: 181) feature in cognition. Alongside world-building elements, function-advancing propositions develop the narrative. Werth names six kinds: plot-, scene-, person-, routine-, argument-, and goal-advancing (1999: 190–194). Situation models are comparably multidimensional, constructed across five indices: space, time, causation, protagonist(s), and intentionality (e.g., Radvansky and Zacks 2014; Therriault and Rinck 2007; Zwaan et al. 1995; Zwaan and Radvansky 1998). Therriault and Rinck (2007) conduct a review of situation-model research, synthesising empirical evidence—based on participants' reading times, responses to comprehension tasks, and narrative cohesion ratings—to show that the five dimensions do not function equally. Specifically: time and protagonist are fundamental because they are consistently monitored by readers (e.g. Rinck and Weber 2003; Therriault et al. 2006; Zwaan et al. 1995); spatial location is less dominant though shifts in location are registered, particularly when accompanied by shifts in time and protagonist (e.g. Rinck and Weber 2003; Scott Rich and Taylor 2000; Zwaan et al. 1995).

Consequently, Therriault and Rinck propose that time and protagonist are "first-order dimensions", essential to text-processing, while causation and intentionality are "second order dimensions": causation acts as "a subset of the larger time dimension" and intentionality functions as an aspect of the protagonist dimension since "it is difficult to understand goals without relying on protagonist information" (2007: 317). The dimensions of situation models can be mapped onto the apparatus of Text World Theory: first-order dimensions (time, protagonist and, despite its less dominant role, space) correspond with world-building elements; second-order dimensions (causation, intentionality) are relatable to function-advancing propositions, specifically plot-advancing and person-advancing subcategories. Furthermore, the empirical evidence for the centrality of time and protagonist and, to a lesser extent, space in conceptualizing situation models consequently validates Text World Theory's attention to these as world-building devices in text-world construction.

Like Text World Theory analysis, situation modelling is the result of text-driven cognition. Accordingly, constructing situation models is easier when location and time are specified. If location is not stipulated, Rolf A. Zwaan and Gabriel A. Radvansky postulate that readers must "instantiate some 'empty-stage' to serve as the location" (1998: 180). This has an equivalent in Text World Theory in Lahey's concept of the "empty text-world": when only minimal information is given in a text concerning space, time, protagonists/enactors, and objects, readers are still required to build a mental representation, but it "is, in effect, deictically empty" (2004: 26).

Text World Theory captures narrative changes in time and space as "world-switches" (Gavins 2007: 49) while changes in protagonist perspective or modal composition result in an ontological shift to a "modal-world" (Gavins 2005, 2007: 91–108). In situation-model research, such shifts are referred to as "segmentation" at an "event boundary" (cf. Kurby and Zacks 2008; Radvansky and Zacks 2014: 29). In their book-length account of empirical situation-model research across psychology and neuroscience, Gabriel A. Radvansky and Jeffrey M. Zacks report that temporary increased brain activity is observed at event boundaries, when time, space, or protagonist change (2014: 30–31, 60–67, 89–90; cf. Kurby and Zacks 2015: 67). This is consistent when participants view events (e.g. Zacks et al. 2001, 2006), watch films (e.g. Magliano et al. 2001; Zacks et al. 2009), and read (e.g. McNerney et al. 2011; Speer et al. 2007) with reading times slowing around event boundaries (e.g. Rinck and Weber 2003; Therriault et al. 2006; Zwaan et al. 1995). Radvansky and Zacks argue that this amounts to "evidence for event boundary processing" (2014: 31), whereby people segment their experience or language comprehension into discrete events differing in time, space, and/or protagonist(s). Consequently, because Text World Theory's account of world-switches is grounded on the same assumptions as event segmentation, evidence from situation-model research supports Text World Theory's premise that spatiotemporal shifts generate world-switches.

Empirical situation-model research consequently confirms the fundamental principles of world-building and world-switching in Text World Theory. I now explain how situation-model research accounts for relationships between models.

4 Memory and model/world interrelations

While Text World Theory maps readers' changing mental representations across discourse, situation-model research considers the workings of such mental representations in memory. The relationship between different situation models is explained by Radvansky and Zacks through the "Event Horizon Model" (2014: 28–38; Radvansky 2012; Radvansky et al. 2011; cf. the preceding "Event-Indexing Model" in discussions by: Zwaan and Radvansky 1998; Zwaan et al. 1995). The Event Horizon Model comprises five principles. The first principle is segmentation, discussed above relative to world-switching in Text World Theory. This principle essentially dictates that we segment perceptions and language comprehension into discrete events, with the boundary marked by changes in dimensions, particularly those first-order dimensions of time, protagonist, and space.

The second principle—working models—stipulates that the model currently being experienced/processed has privileged status with its contents foregrounded in working memory (Radvansky and Zacks 2014: 31). As evidence, Radvansky and Zacks (2014: 32) cite a study by Arthur M. Glenberg et al. (1987) in which participants read short narratives over the course of which an object either remained associated with the protagonist or was dissociated. For example, after the sentence "John was arranging a bouquet for the table": the associated condition was "He put the last flower in his buttonhole, then left the house to go shopping for groceries"; the dissociated condition was "He put the last flower in the vase, then left the house to go shopping for groceries". The act of leaving the house signals a second scenario: thus, the spatial shift results in segmentation and the creation of a new situation model as working model. The key difference between the two conditions is whether or not John takes the flower with him into the new working model. Longer response times to the word 'flower' for the dissociated condition in Glenberg et al.'s study suggest greater difficulty in retrieving information not part of the current working model. Equally, faster responses to the associated condition imply that, even though the flower was not explicitly mentioned after the event boundary, readers nevertheless infer and track it in the working model.

Zwaan and Radvansky (1998) distinguish the current working model from the integrated model and the complete model: the working model represents the cognitive focus of a reader in the moment-by-moment processing of a text; "the integrated model is the global model that was constructed by integrating, one at a

time [all], the models that were constructed" during a discourse-processing event (1998: 165); and "the complete model is the model that is stored in long-term memory after all the textual input has been processed" (1998: 166). The current model can be mapped onto the text-world occupying a reader's present attention; the integrated model captures the network of text-worlds that a reader constructs during a literary experience; and the complete model is akin to what—in cognitive stylistics—Jessica Mason refers to as a "narrative schema", a reader's subjective version of the totality of a narrative experience (2019: 69).

Changes in situation models and their dimensions are seen to "exert cumulative effects on the process of updating a working model or on the probability of replacing the model altogether" (Radvansky and Zacks 2014: 66). Radvansky and Zack's references to 'updating' and 'replacement' imply that the Text World Theory concepts (Gavins 2007: 141–143) of 'repair'—when readers correct or revise erroneous or inconsistent information in a text-world representation (cf. Emmott 1999: 224–225)—and 'replacement'—when readers have to overwrite an existing text-world with a new one due to unresolvable inconsistencies or conflicts in information—have counterparts in situation-model scholarship. Additionally, Radvansky and Zacks (2014) follow Johnson-Laird (1983) suggestion that if a reader realises information stored across two (or more) models actually relates to the same situation, "these separate models are blended together to form a new, integrated model. This blending occurs through an alignment of information along the relevant dimensions" (Radvansky and Zacks 2014: 34). In Text World Theory, Gavins (2007: 146–164) draws on Gilles Fauconnier and Mark Turner's (2002) concept of conceptual integration to propose that readers blend text-worlds when processing metaphors. Consequently, although the emphasis is different (correlation of scenarios vs. metaphor), developments in situation-model research and Text World Theory are once again complementary.

The third principle refers to the causal network, specifying that links between models based on causal relations are held in long-term memory. While readers track the sequence of models, causal connectivity influences the recall and cognitive accessibility of previous models. Radvansky and Zacks argue that a preceding model with causal connectivity to the working model is "designated as being more important, and is better remembered" (2014: 36; cf. Radvansky and Copeland 2000). This is not explicitly captured in Text World Theory, but means that prior text-worlds causally related to the current text-world should be recognised in terms of the influence they may have on interpretation.

The final two principles—noncompetitive attribute retrieval and competitive event retrieval—relate to the cognitive accessibility of information across the integrated model (Radvansky and Zacks 2014: 36–38, 145–147). When a feature of the working model recurs noncompetitively with previous models—for instance, a

protagonist sequentially shifts location—"memory traces act in concert rather than in competition" (Radvansky and Zacks 2014: 37). The segmentation and boundary help to organise information and enhance recall. Contrastingly, a cognitive interference occurs when models act competitively. For example, in Radvansky and Zacks' (1991) study, participants were presented with multiple sentences about a single object in differing locations (e.g. "The cola machine is in the hotel"; "The cola machine is in the public library"). Thus, participants necessarily created separate models for each sentence and respective scenario. When participants were subsequently asked to identify if a given sentence was in the previously presented list, longer response times correlated with increased associations over more preceding models. Thus, "the more models there are, the greater the interference, and retrieval worsens accordingly" (Radvansky and Zacks 2014: 146).

Referential pronoun ambiguity provides a good example of the interaction between working memory and noncompetitive and competitive retrieval in long-term memory. Brain activity shows that pronouns with clear referents (e.g. "Ronald told Emily that she … ") elicit different responses to pronouns for which the referent is ambiguous (e.g. "Ronald told Frank that he … ") (Nieuwland and van Berkum 2006; Nieuwland et al. 2007). Specifically, activation patterns for referentially ambiguous pronouns suggest a processing cost for readers who must employ a problem-solving strategy, trying to determine a suitable, coherent referent for the pronoun amongst the competing referents (cf. Nieuwland and van Berkum 2006: 162; Nieuwland et al. 2007: 1,000). Referentially failing pronouns (e.g. "Rose told Emily that he … ") exhibit qualitatively distinct brain activity again, indicating further cognitive effort. Readers appear to consider the possibility of textual error (the pronoun is incorrect) before concluding that a referentially failing pronoun refers to an unknown antecedent (Nieuwland 2014: 17; Nieuwland et al. 2007: 1,001). Mante S. Nieuwland et al. (2007: 1,001) argue that pronoun-referential ambiguities and failures therefore require reprocessing of episodic memory traces.

Semantic contradictions in texts also influence recall processes. Herre van Oostendorp (2001: 9,580) outlines how textoids comprising semantically less-related sentences and sentences with a semantically less-related word cause longer reading times, signifying greater processing effort (e.g. Cairns et al. 1981; van Oostendorp 1994). Relatedly, Tal Yarkoni et al. found that reading sentences which formed coherent stories yielded different brain activation patterns to reading what they call "scrambled stories" (2008; cf. Radvansky and Zacks 2014: 59). Yarkoni et al. understand their data as reflective of the "narrative-level use of situation models" (2008: 1,419); in the coherent condition, situation models tend to be updated and elaborated whilst "when sentences are disconnected, an entirely new situation model must be created for each sentence" (2008: 1,422). Moreover, "coherent stories often lead to better memory than do disconnected sentences" (Yarkoni et al. 2008: 1,419).

Much of the situation-model research discussed in this section reinforces existing analytical practices in Text World Theory, with conceptual counterparts found across the two approaches. The research on semantic contradictions and pronoun-referential ambiguities alongside the situation-model principles of noncompetitive and competitive retrieval explain how readers resolve textual uncertainty by making connections between models. Although Text World Theory includes 'world-repair' and 'world-replacement', these concepts designate changes to the working-model text-world, rather than connections between it and previous text-worlds. In contextual frame theory—wherein contextual frames are roughly equivalent to text-worlds and situation models—Catherine Emmott's term 'frame-recall' (1999: 150–154) denotes readers' 're-priming' of a past frame; in other words, the straightforward bringing back of a previous model to become the working model. It does not capture retrieval as a *process*, particularly competitive retrieval through which readers revisit several past models/frames without a clear resolution or a single model/frame being re-primed. Emmott also considers pronominal reference (1999: 197–235), claiming that readers make sense of pronouns by consulting their existing mental representations of enactors/characters, sometimes involving frame-recall. However, even though she discusses character/enactor ambiguities (1999: 212–215), she focuses on these within the context of a current frame. Consequently, there is no equivalent in Text World Theory for the situation-model account of the relationship between the working model and preceding models, particularly in the case of competitive retrievals. In the next section, I incorporate these insights into Text World Theory analysis.

5 Augmenting Text World Theory with "world-retrieval"

In its current form, Text World Theory can plot the text-world architecture of a text but cannot explicate how readers make connections and experience memory traces between text-worlds in their integrated model. The situation-model account of causal connectivity, noncompetitive and competitive retrieval, and semantic contradiction is therefore invaluable for investigating readers' attempts to obtain narrative meaning. I propose the incorporation of a new concept—"world-retrieval"—into Text World Theory. World-retrieval describes the way in which readers experience conceptual traces between the text-world acting as the working model and preceding text-worlds. World-retrievals can be the result of causal connectivity between worlds and/or noncompetitive attribute retrieval, allowing readers to identify narrative threads and resonances through their integrated model of the discourse.

Contrastingly, world-retrievals resulting from semantic contradiction and/or competitive event retrieval will cause interference patterns in reading.

To demonstrate the value of my world-retrieval concept, I analyse the opening to Ray Loriga's (2003) *Tokyo Doesn't Love Us Anymore*. The novel is set in an unspecified future, in which memories can be deleted and common, excessive drug-taking leaves lasting neurological damage. Critics interpret the texture of the novel as an iconic representation of the drug-addicted narrator's amnesic experience: Diana Palardy outlines how the novel's "writing style mimicked the ephemeral nature of his memory" (2018: 47) and Susan Salter Reynolds describes the book as "a portrait of a disintegrating mind" (2004). These interpretations emerge precisely because the style of *Tokyo Doesn't Love Us Anymore* works to prevent coherency. This is precisely why the novel has been chosen for analysis, since the concept of world-retrieval is designed to show how—by making connections between text-worlds—readers construct narrative meaning at the level of their integrated model, even for seemingly difficult, incoherent texts. The opening of *Tokyo Doesn't Love Us Anymore* exemplifies the narrator's amnesia, with semantic connections between sentences and narrative episodes being hard to comprehend.

The succeeding analysis explains the text-world structure of the opening to *Tokyo Doesn't Love Us Anymore* (Loriga 2003: 3–4). My numbered annotations on the below extract show when and which specific text-worlds act as the working model (e.g. T-W#). Additionally, I use subscript annotation to indicate which preceding text-worlds are subject to world-retrieval but do not become working models (e.g. $^{TW\#}$). This latter annotation is a new addition to Text World Theory analysis, enabling the mapping of world-connectivity and world-retrievals across a reader's integrated model. Moreover, when text-worlds become blended, I signal this in the annotation through slash punctuation (e.g. T-W#/#).

[T-W1] It wasn't [T-W2] snowing [T-W1].

It really was snowing [T-W2] but it was pretend snow. Astrud Gilberto was singing in front of a Christmas Tree [T-W3] and that's why there was pretend snow [T-W2/3]. And then the song finished.

Ever since [TW-4] the newspapers started saying [TW-5] that the world is going to end, songs have seemed shorter and the days longer. I called in at your house but they told me [TW-6] that you weren't [TW-7] there [TW-6], that you were somewhere else, in Tokyo [TW-8].

She left years ago [TW-9$^{[TW6\&7]}$]. That's what they told me [TW-6]. I wouldn't [TW-10] be surprised if it were true [TW-11].

I watched *The Girl from Ipanema* on the classic movie channel [TW-12$^{[TW2/3]}$]. Astrud Gilberto was singing almost without moving, the artificial snow, the daiquiris, the band, the young ladies lined up next to the small stage [TW-2/3/12].

Last week, at the fair [TW-13], they[TW6] sold two old cars. We [TW-13or14?] were in Phoenix, Arizona and your[TW6,7&9] mother wrote something on the window, on the windowpane and then rubbed it out before we could read it.

What do you [TW-15[TW6,7,9,14?]] think they're[TW6] all doing now that you're not [TW-16[TW7]] there[TW6]? They share out your things amongst them, they mimic your gestures, they strip your bed [TW-17[TW6]].

In the hotel room [TW-18] there were plastic flowers, two hundred TV channels[TW2/3/12], green carpets covered with fish and all sorts of crazy designs. I was tired and my eyes were closing, and so I slept for 3 hours and then I woke up, opened the curtains and watched the planes until dawn.

I bumped into your[TW6,7,9] mother in Phoenix [TW-13 or 14] and she said we should [TW-19] take you flowers and I said no, we shouldn't [TW-20] [TW-19]. Then I went up to my hotel room[TW18]. I had a bath [TW18 or 21?]. I slept for a while and afterwards I stayed there watching the planes[TW18].

Your mother[TW13 or 14] only gambles on roulette and she swears that she looks good for a woman who has tried her luck in five different continents and who now only gambles in Phoenix, Arizona, and writes things on windows with her finger and then rubs them out with her fist. A fine woman, your mother, and good-looking, nice tits as well, a real laugh, lively. She places her bets and wins, great, isn't it?

Let's get back to sleep darling [TW22] and look at the planes[TW18].

No [TW23] need for flowers [TW22].

Goodnight.

The style and story of *Tokyo Doesn't Love Us Anymore* moves rapidly between different scenarios. As Palardy describes, "there is not much of a plot" (2018: 30): in the novel as a whole and in the opening, the narrator "relays a series of seemingly unrelated experiences" (2018: 41). Through my analysis, and using the concept of world-retrieval, I explain how readers attempt to make sense of *Tokyo Doesn't Love Us Anymore*.

Readers must initially create an empty text-world (TW-1), signalled by the dummy subject "It", lack of spatio-temporal grounding or protagonist, and immediate syntactic negation. In Text World Theory, negation is a world-creating feature, signalling a shift in the modal parameters of a text-world (Gavins 2007: 102; cf. Hidalgo Downing 2000; Werth 1999: 249–257). Consequently, as well as text-world 1 in which it "wasn't snowing", the opening triggers a fleeting negative-world wherein readers conceptualise the snow (TW-2). The narrator's subsequent assertion that "It really was snowing" creates semantic contradiction with text-world 1. According to situation-model research, the trace of the negative-world in the network enables readers to revisit text-world 2, making it once again the working model; in the

process, the status of this text-world changes from negated to actualised. However, the following coordinated clause "but it was pretend snow" conflicts the narrator's adverbial insistence ("really"), so readers must repair text-world 2 to contain only "pretend snow". When "Astrud Gilberto" is introduced, this new protagonist and cited location of sorts ("in front of a Christmas tree") prompt the construction of text-world 3. The narrator's reasoning about the 'pretend snow' subsequently causes readers to blend text-worlds 2 and 3 due to information alignment. Although "the song finished" could be seen as unrelated, the connector "And" implies a causal relationship so readers update the blended-world with this information. For readers with prior knowledge, this blended-world can be fleshed out to resemble the scene from the 1964 film *Get Yourself a College Girl* in which Brazilian singer Astrud Gilberto sings 'The Girl from Ipanema'. Readers without this knowledge may nevertheless need to repair the blended-world's modal status if they interpret the reference to the song as implying that the events are not actually happening in the narrator's physical environment but represent a filmic scene.

The change in temporal parameters ("Ever since") in the third paragraph creates a world-switch in Text World Theory terminology and/or an event boundary in situation-model vocabulary. It therefore prompts the construction of a new text-world (T-W4), as does the reporting clause metaphorically animating the newspaper (T-W5). This world is quickly segmented by the perceptual shift back to the narrator ("I called") and a world-switch (TW-6) to the new location "your house". Referentially failing pronouns "you" and "they", for which there are no suitable antecedents in the preceding discourse, incur a processing cost for readers, before they are added to text-world 6 as novel enactors. The negation of "they told me you weren't there" then creates a negative text-world in which "you" is present (TW-7), while the alternate locations in "they told me you were somewhere else" and "Tokyo" become world-builders in text-world 8. Another referentially failing pronoun in "She left years ago" ultimately results in the creation of text-world 9. This is a new text-world due to the perceptual shift, but the action of leaving allows readers to causally connect "she" to the "you" of text-worlds 6 and 7 through world-retrieval. This interpretation is boosted by the anaphoric demonstrative in "That's what they told me", which retrieves text-world 6 as the working model because of noncompetition between "they" protagonists in these text-worlds. The narrator's surprise is then briefly conceived via a negative-world (TW-10) before it is translated into a lack of surprise in a modal-world signalled by the conditional use of "if" (TW-11).

In the fifth paragraph, the narrator's act of watching TV seems semantically unrelated to text-world 11 so creates a new working model (TW-12). Next, through noncompetitive world-retrieval, the reference to Astrud Gilberto reactivates blended-world 2–3, which all readers now understand as a description of the film scene. Because the details of the scene align with information given earlier, readers

now integrate blended-world 2–3 with text-world 12, creating a new blend to understand that the narrator is watching the song on TV.

The temporal-spatial shift opening paragraph six ("last week, at the fair") triggers a world-switch to new text-world 13. In search of a referent for "they", readers are likely to retrieve text-world 6 in which "they" told the narrator about "you". This incurs processing effort and since the interpretation is unsatisfactory (there is no clear correspondence between these two "they"s which therefore function competitively), this new "they" will eventually be added to text-world 13 as a novel enactor. Readers' understandings of the remainder of paragraph five will depend on whether they perceive a causal relationship between the two sentences in the paragraph. The decisive factor is the interpretation of the plural pronoun "we": taken anaphorically as the narrator with the most recent "they", this elaborates text-world 13 as the working model; understood cataphorically as the narrator with "your", it generates text-world 14. The latter interpretation also involves world-retrievals of the text-worlds in which 'you' appears (TW6&7, and potentially also 9). In either text-world 13 or 14, the new "mother" enactor is added.

The rhetorical question about cognition ("think") in paragraph seven instigates a shift to a new modal-world (TW-15). The narrator's question directly addresses "you" who, through noncompetitive attribute retrieval, connects with those in text-worlds 6, 7, 9, and 14. The phrase "you're not there" recalls the words of "they" in text-world 6 while the negation generates a fleeting negative-world (TW-16) and retrieves negative-world 7 of which it is reminiscent. Because "they"'s subsequently described actions provide a hypothetical answer to the question, they exist in another new modal-world (TW-17).

The spatial shift to "the hotel room" opening paragraph eight segments another text-world boundary (TW-18). Here, the narrator tires, sleeps, wakes, opens curtains, and watches planes. There is a 'three to 4 hour' time-change, but the connective "and" allows the episode to be interpreted continuously. Additionally, the reference to the "two hundred TV channels" intimates the narrator's mention of "the classic movie channel" showing the film with Astrud Gilberto, reactivating traces of blended-worlds 2/3/12.

In paragraph 9, "your mother in Phoenix" cues world-retrieval of either text-world 13 or 14 (depending on readers' prior interpretation) as the working model. Subsequently, the shifts of modal properties in the mother's deontic "should" and narrator's responding negation each prompt additional text-worlds (TW-19&20). The narrator then goes to their "hotel room". Whilst the spatial location and subsequent acts of sleeping and watching planes retrieve text-world 18, the new action of taking a bath is inconsistent. Consequently, text-world 18 and the working model act competitively. To resolve the conflict, readers either recall text-world 18 as the working model, repairing it to include the act of taking a bath, or conceptualise a new

text-world (TW21). The reference to "Your mother" at the start of paragraph 10 again retrieves either text-world 13 or 14. The remainder of the paragraph entails person-advancing propositions, providing more information about the mother character.

As the extract draws to a close, the narrator's request "Let's get back to sleep darling and look at the planes" causes more confusion. The identity of the narrator's "darling" cannot be anaphorically resolved by retrieving information from any of the preceding text-worlds. Moreover, since it is a suggestion or instruction, it cues another new modal-world (T-W22). However, the reference to "planes" re-activates text-world 18 in readers' memory network, causing competitive interference. Following this, a negative-world (T-W23) is produced, in which readers fleetingly experience the flowers as needed, before the closing 'Goodnight' appears as an utterance directed towards the "darling" in text-world 22.

As this analysis demonstrates, reading the opening of *Tokyo Doesn't Love Us Anymore* involves building a significant number of text-worlds. This is because the extract is more like a scrambled story, built of semantically less-related sentences, than a coherent narrative. The many text-worlds of the opening are rarely elaborated; when they are, they are short-lived before a spatio-temporal shift, semantic contradiction, or reference to a protagonist not present in the current working model demand segmentation and a world-switch to another text-world or shift to a new modal-world. These frequent switches emulate the narrator's own jumbled consciousness whilst the lack of sustained focus on any working model means that none of the text-worlds develop into detailed representations for readers. This explains the opaque reading experience of *Tokyo Doesn't Love Us Anymore*, whereby readers do not experience prolonged immersion in any text-world; instead, their attention fluctuates between sparse constructions with their memory recall for the narrative adversely affected.

Several text-worlds have shared attributes, such as those concerning the protagonist "you", the "hotel room" location, and the act of "watching planes". The text-worlds involving "you" are the most frequently reactivated and retrieved across the extract. Consequently, "you" acquires what Peter Stockwell refers to as "resonance": it has an "aura of significance" and leaves a "lasting impression" (2009: 18, 54), even though "you"/"she" is absent, "not there", "somewhere else", in "Tokyo". Details about "you" are nevertheless hard to ascertain, both in the extract and the novel as a whole, though in the latter readers gradually surmise that "you" is a previous romantic partner of the narrator. In her reading of Loriga's novel, Palardy observes that the narrator's drug-induced amnesia "permits neither standard patterns of memory development nor conventional methods of memory retrieval. His most arborescent and meaningful long-term memory is his recollection of his experience in Tokyo with his ex-girlfriend" (2018: 47). She also notes that his "emotional attachment to her is so deeply engrained […] even though it is the most suppressed of

his memories" (2018: 47). This attachment is borne out in the reading experience, not through narrative explanation but instead because repeated world-retrievals between the text-worlds of "you" work to emphasize the significance. In the case of the 'hotel room' and plane-watching, although these text-worlds overlap their inconsistency means that they compete, generating semantic and narrative anomalies that the reader cannot easily or straightforwardly resolve. Palardy argues: "Hotels become indistinguishable for the protagonist" (2018: 38). The concept of world-retrieval explains why readers also experience this sense of distortion, as interferences between text-worlds occur due to competitive attribute retrieval.

Reading *Tokyo Doesn't Love Us Anymore* is an activity in which noncompetitive attributes allow just enough coherence for readers to trace themes and recurrences, but ample competitive retrievals lead readers ultimately to experience the novel as opaque, resistant to vivid imagination and easy comprehension. While the style of the novel "mirrors the inner mind of the protagonist" and "reiterations and redundancies draw attention to the protagonist's memory loss" (Palardy 2018: 42), augmenting Text World Theory to include the concept of world-retrieval elucidates how and why the reading experience replicates the narrator's own neurological short-circuits and amnesic disorientation.

6 Conclusion

Engaging with empirically-based situation-model research, I have enhanced the validity of Text World Theory by showing that many of its guiding assumptions are corroborated by experimental evidence. I have also augmented Text World Theory: by adopting the concepts of causal connectivity, noncompetitive and competitive retrieval, and semantic contradiction from situation-model research, Text World Theory analysis can explain how readers process the interrelationships between text-worlds. Existing concepts in Text World Theory, such as 'world-repair' and 'world-replacement' denote changes to a working-model text-world, while 'world-recall' (from Emmott's frame-recall) captures the unproblematic repriming of a previous text-world. However, Text World Theory has not previously accounted for readers' mental processing in terms of making connections between text-worlds. My concept of "world-retrieval" captures the ways in which readers revisit previous text-worlds through competitive and non-competitive traces between pre-existing worlds in the integrated model and the text-world acting as the current working model. World-retrieval will be particularly valuable in thinking about how readers experience and navigate difficult texts like Ray Loriga's *Tokyo Doesn't Love Us Anymore* as well as other amnesia novels. Additionally, time-travel texts often revisit scenes and places, thus making world-retrieval a necessary strategy for readers.

More broadly, world-retrieval will be useful for analysing recurrent episodes or flashbacks as well as tracking how previous text-worlds exhibit influence on readers' interpretations of a text-world acting as the working model.

My review of situation-model research reveals that it has developed analogous concepts to Text World Theory, such as the empty stage/empty text-world and the processes of updating/repairing, replacing, and blending. Despite their different disciplinary groundings, situation-model scholarship and Text World Theory are therefore highly complementary. In this article, I have focussed my comparative account on the two frameworks' basic tenets. It has, inevitably, not been possible to review and relate to Text World Theory all of the insights of situation-model research. This article demonstrates that empirical situation-model research is a fruitful area for text-world theorists to continue to explore in the future.

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