

The Strawberry, the Peanut and the Cupboard

An empirical study on the interpretation of inanimate
characters in narrative contexts

Bachelor's Thesis

Linguistics

Faculty of Arts

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August 14, 2013

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Het Lieveheersbeest

Er was eens een aardbei, die rijp was om geplukt te worden. (...) Het was gewoon een aardbei, die zoals alle anderen in de struiken hing. Hij was rijp en in de verte naderden de plukkers. Er was geen aardbei die zich daar zorgen over maakte, maar juist die ene wel. Hij vond het nog veel te vroeg om het leven te laten[.] (...) Zijn leven lang had hij aan deze tak gehangen en moeilijk slechts kon hij zich voorstellen dat het geluk nu weldra zou zijn afgelopen. (...) Hij wilde weg, maar dorst daarover niet (...) te spreken en daarom deed hij maar alsof hij in zijn lot berustte; ondertussen echter dacht hij heel scherp na en probeerde plannen te bedenken om zijn lot te ontlopen. (...) ‘Het leven is vergankelijk’, dacht de aardbei. ‘Ik heb altijd geweten dat dit komen zou. Desalniettemin moet ik op een of andere manier het naderende onheil zien af te wenden.’ (...) ‘Want waarom zonder protest een einde aan je leven te laten maken? Heeft een aardbei soms geen recht?’ En naarstig keek hij in het rond om een uitweg te zoeken[.] (...) toen hij plotseling twee wandelende takken zag[.] (...) En nu schoot hem plotseling een idee in het hoofd; het beste idee van zijn leven vond hij, op dat moment. Toen de wandelende takken tot op een halve meter waren genaderd, riep de aardbei hen toe (...) ‘Hé, hé jullie daar, wandelende takken, leent mij een ogenblik uw oor. Blijf daar [onder me] eventjes goed staan (...) en zet je schrap.’ Daarop maakte hij zich snel los van zijn stengeltje en liet zich precies uitgemikt boven op de takken vallen. (...) De aardbei had zijn val precies uitgekiend. (...) ‘Snel, snel’, riep de aardbei hen toe, ‘rennen, zo hard als je kunt’ (...) Ploeterend en struikelend over de ruwe korrelige grond kropen zij voorwaarts[.] (...) Weldra waren ze op de weg naar de grote stad; ze verwachtten een grote toekomst.

From: *Slechte Mensen*, J.M.A. Biesheuvel, 1973,
Amsterdam: De Harmonie.

Abstract

In narrative fiction, inanimate objects may take the role of acting, feeling characters, seemingly in violation of all real-life constraints. It is well known that discourse contexts, such as narrative fiction, are able to influence local interpretation, with studies showing a clear and immediate effect of the preceding context in interpretation, as evidenced by e.g. a lack of an N400 response when embedding a violation in a biasing discourse. A narrative context is able to shift the interpretation of inanimate objects in one of two ways: either by causing reinterpretation of the inanimate object as an Agent or by causing reinterpretation as an Experiencer, a distinction that is reflected in the language used and the new concept thus created. The current study makes use of a cross-modal lexical decision experiment to compare the interpretation of an inanimate object in either Agent or Experiencer contexts with that in neutral controls, using features normally associated with the inanimate object. In cross-modal priming studies, local representations are assumed to be very rich, and resolving lexical ambiguity is theorised to be due to suppression of context-inappropriate features of meaning. This suppression is reflected in response times. While no significant effect on response times was observed in the current study, an alternative explanation as well as a suggestion for further research is given.

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1 Introduction

In his short story *Het Lieveheersbeest* ‘The Ladybug’ (1973), Dutch author J.M.A. Biesheuvel introduces the reader to a strawberry protagonist and its plight. As long as it can remember, the strawberry has been enjoying life in the garden, hanging from a branch enjoying the sun and the company of its fellow strawberries. Until one day, it notices the gardeners coming to pick the strawberries. The strawberry knows that it is to be its fate to be picked, but unlike the other strawberries, it refuses to accept it, the narrator informs us:

- (1) *Er was geen aardbei die zich daar zorgen over maakte, maar juist die ene wel. Hij vond het nog veel te vroeg om het leven te laten.*
‘Strawberries usually didn’t worry about [being picked], but this one did. He thought it was much too soon to leave this world.’

Later on in the story, this point of view is reiterated from the perspective of the strawberry itself, as the strawberry is given a voice of its own:

- (2) *Ik heb altijd geweten dat dit komen zou. Desalniettemin moet ik op een of andere manier het naderende onheil zien af te wenden.*
‘I’ve always known this was going to happen. Regardless, I must somehow find a way to escape this impending doom.’

This is exactly what it ends up doing, orchestrating a daring escape by enlisting the help of two passing stick insects. First, the strawberry calls out to them:

- (3) *Hé, hé, jullie daar, wandelende takken, leent mij een ogenblik uw oor.*
‘Hey, hey, you there, stick insects, lend me your ear for a moment.’

Then, after telling the stick insects to hold position under its branch, it drops itself from the branch onto the stick insects below:

- (4) *daarop maakte hij zich snel los van zijn stengeltje en liet zich precies uitgemikt boven op de takken vallen.*
‘after which he quickly untied himself from his stem and dropped himself, accurately, on top of the [stick insects].’

And together, the curious trio walks off into the sunset. The escape doesn’t quite go as planned, however, and our strawberry protagonist ends up in worse trouble than in which he started.

Inanimate characters such as Biesheuvel’s strawberry aren’t uncommon in literature. While the reader knows strawberries are inanimate, and as such should not be able to think and act, they are readily accepted as animate characters given the appropriate context. Thus, the story or *global discourse context* is able to influence the animacy of the protagonist, which is part of the *local interpretation*. The influence of global discourse context on local interpretation has been topic of much research, with the main questions being 1) at what point global discourse context is integrated into the construction of meaning, influencing local interpretation either immediately or only at a later stage (e.g. Nieuwland & Van Berkum, 2006) and 2) how semantic information is organised in the first place, given that local interpretations are flexible, i.e. does a definition of ‘strawberry’ include that it is inanimate, and if so, is this feature suppressed by the global context in the course of our story? (e.g. Hogeweg 2013; 2009; Rubio Fernández 2007).

Animacy has been a feature of specific interest in this line of research. Few features are as salient as animacy, as it determines in what way an object in the real world ought to be treated and whether or not it is able to act. After all, we would not so readily pick a strawberry if strawberries were alive in the sense that we are: thinking, feeling, and acting on their own free will. Because of its cognitive salience, animacy is also reflected in language. As a feature, it is closely correlated with syntactic position, discourse prominence and semantic roles, and insight into these correlations provides a background for attempting to figure out how real-life conventions are shattered in the case of inanimate characters.

Biesheuvel’s strawberry is clearly no longer characterised as an inanimate object. But how exactly would we characterise an animate object? Recall that the strawberry was not only able to observe and think, but also to act on its observations and thoughts. Is it the ascription of cognition to inanimate objects that makes them animate in our interpretation, or is it the ability to take voluntary action? Inanimate characters in literature are more often able to think, to experience the world around them, than to act, to influence their world as independent entities. Does the way in which the object’s animacy is expressed, either through cognition or action, influence how readily we interpret them as animate characters in literature?

The main question this thesis will try to answer is how the local representation of an inanimate object is altered by a biasing, global discourse context. This is done by means of a lexical decision experiment inspired by event-related potential research by Nieuwland & Van Berkum (2006), in which properties normally associated with an inanimate object are the target of decision immediately following a discourse context in which the

inanimate object either remains inanimate or is made animate in one of two ways, corresponding to the two ways animacy may be expressed. If the local representation is fundamentally altered by the preceding discourse, properties normally associated with the inanimate object but inconsistent with the preceding discourse should be recognised more slowly than in the control condition. Is discourse able to exert this influence, and if so, how exactly could this be explained?

Animacy and the power of discourse to influence local interpretation, as well as the precise nature of this representation, will be the topic of section 2. In section 3, the nature of inanimate characters in literature and the way in which this influences language is discussed, as well as two ways to re-conceptualise the inanimate character. Section 4 presents the lexical decision experiment and its results. A discussion of the results as they apply to the influence of global discourse on local interpretation and suggestions for further research may be found in section 5, with a conclusion in section 6.

2 Animacy and the influence of discourse

2.1 Language and animacy

Animacy takes a special place in cognition. The ability to discriminate living from non-living entities is paramount to survival, as it forms the basis for the interpretation of actions and the attribution of mental states and biological processes (Szewczyk & Schriefers 2011). For this reason, the animate-inanimate distinction is considered a conceptual primitive, or ‘building block’ of cognition that has evolved under evolutionary pressures (Nieuwland & van Berkum 2006). Indeed, the animacy categorisation is one of the first categorisations acquired by children, and one of the last categorisations lost in e.g. Alzheimer’s disease (Szewczyk & Schriefers 2011). Dahl (2008) defines animacy as an ontological type, one of the most basic categories of existence. Applying the category of animacy divides the world into animate and inanimate entities.

Naturally, as language should allow us to adequately express categories in the world, the categorisation of animacy is also one of the basic principles behind language (Szewczyk & Schriefers 2011; Dahl & Fraurud 1996), so ‘pervasive in the grammars of human languages that it tends to be taken for granted’ (Dahl & Fraurud 1996). All languages make distinctions between entities based on animacy (Nieuwland, Martin & Carreiras 2013; van Bergen 2011; Dahl & Fraurud 1996), and this distinction is expressed linguistically

by means of a feature [\pm animate] (Dahl 2008). One level of language where [\pm animate] is reflected is in the lexicon, such as when different forms are used to refer to animate versus inanimate entities, e.g. in question words. In English, [$-$ animate] entities are referred to with *what*, while *who* is used to refer to [$+$ animate] entities. This is similar to Dutch, which uses *wat* and *wie*, respectively. Indefinite pronouns also take different forms depending on the animacy of the referent in both Dutch and English, where e.g. *iets* ‘something’ is used for [$-$ animate] reference, and *iemand* ‘someone’ for [$+$ animate] reference (van Bergen 2011). An example of a distinction in third person plural pronouns comes from Dutch, where *hun* ‘them’, originally an object form, is now available as a subject form for third person plural reference in addition to *ze/zij* ‘they’, provided the third person plural refer to [$+$ animate] entities (van Bergen, Stoop, Vogels & de Hoop 2011).

The distinction may also be found at the morphosyntactic level. In Dutch, relative pronouns show gender agreement with the noun they modify; *die* is used for common, *dat* for neuter gender nouns. Recently however, *die* is also used for neuter gender in spoken Dutch, presumably based on semantic criteria (e.g. *het meisje* ‘the girl’ has neuter grammatical gender, but female semantic gender). Strickers (2013) found that *die* used to refer to neuter gender nouns is more readily accepted when the noun denotes a [$+$ animate] entity than when it denotes a [$-$ animate] entity, showing that semantic criteria may overrule grammatical criteria more easily when the entity is animate. Another example from Dutch morphology pertains to quantifiers. In Dutch, the -n suffix is added to substantively used quantifiers such as *sommige/n* ‘some’ when they refer to [$+$ animate] entities, but not when they refer to [$-$ animate] entities (van Bergen 2011).

Animacy is also reflected in word order, syntax and topicality, as well as semantic roles; however, this relationship is more complex. Dahl and Fraurud (1996), among others, argue there is a relationship between animacy and syntactic function. They note that in accusative languages, subjects in transitive sentences are almost exclusively [$+$ animate], whereas objects are almost exclusively [$-$ animate]. Deviations from these prototypical roles, e.g. animate objects, are often the target of overt marking not present on more prototypical roles (de Swart 2007; Dahl & Fraurud 1996). The arguments allowed by a verb are also partly determined by animacy: e.g. ‘to frighten’ may only select a [$+$ animate] object (Dahl 2008). Nieuwland et al. (2013) show that incorrectly adding a prepositional marker to [$-$ animate] objects in Spanish produces the expected P600 effect, indicating a syntactic violation, however, failure to mark [$+$ animate] objects with the required prepositional marker produces an N400 effect instead, indicating a semantic violation.

This asymmetry related to animacy is left unexplained in Nieuwland et al. (2013), but might be related to the relative rarity of and subsequent need to differentially mark [+animate] objects to facilitate comprehension despite the atypical association of an object role with the [+animate] referent. The relationship between subjecthood and animacy is also reflected in production experiments, showing animate entities are usually produced as subjects in sentence initial position, and in processing experiments, showing a higher processing cost associated with sentence-initial inanimate entities compared to animate entities (Nieuwland et al. 2013).

Animacy is also correlated with word order (van Bergen 2011; Vogels 2009). Vogels (2009) shows that when a [+animate] bare plural noun (*kinderen* ‘children’ in *op straat spelen kinderen* ‘Children are playing on the street’) occurs as a subject it will take sentence initial position in about 50% of cases despite being indefinite, whereas a bare plural noun that is [–animate] shows a clear preference for the postverbal (i.e. not sentence-initial) position.

Subjecthood is very closely related to topicality. Topics, like subjects, also typically take sentence-initial position, as they represent given or old information which is preferably placed ahead of new information (Brunetti 2009; Vogels 2009). Vogels (2009) notes that ‘subjects are often also topics, and topics are often made subject’ (Vogels 2009). There is a strong preference to interpret the subject as the sentence topic, and to place the topic in subject position (Brunetti 2009). Brunetti (2009) claims this close relation between subject and topic is due to both being associated with similar thematic properties, i.e. semantic roles: a subject or topic will more often be an Agent (see also van Bergen 2011). This statement can be extended to Experiencer; while not Agents in the traditional sense, they do take Agent-like characteristics (Schlesinger 1992). Properties prototypical for Agents include i.a.: a) volitional involvement in the event or state and b) sentience (and/or perception) (Dowtry 1991), both of which entail animacy (van Bergen 2011; Primus 2010), accounting for the correlation between semantic roles and animacy. The belief that a true Agent and a true Experiencer are required to be animate can be traced as far back as Jackendoff (1978), and Dahl (2008) states that ‘the capacity for perceiving and acting upon the environment is more or less what one would see as the defining criterion for being animate’. Inanimate objects, on the other hand, are typical Proto-Patients and very unlikely to appear as either Agents or Experiencers (van Bergen 2011; Paczynski & Kuperberg 2011), and none of the properties associated with Proto-Patients entail animacy (van Bergen 2011; Primus 2010).

This in turn explains why subjects and topics are so often animate:

subjects and topics are ideally Agent and, to a lesser extent, Experiencer, and Agent and Experiencer are necessarily animate. How these correlations between animacy, subjecthood, word order, topicality and semantic roles came to be can be explained quite simply: as social animals, we like talking about ourselves and other animate (human) beings (van Bergen 2011; Brunetti 2009). This is perhaps unsurprising, as a major driving force behind the evolution of language has been exchanging information about your and other people’s motivations and actions, necessary to maintain and safeguard a society based on reciprocal altruism (Pinker & Bloom 1990). As we like to talk about ourselves and those around us, we talk of animate beings (animacy) and their actions and motivations (semantic roles), and this is reflected in the way we order our sentences: what we talk about is the topic (topicality), which we place near the front of our sentences (word order), preferably as the grammatical subject (subjecthood). Using ourselves as a frame of reference, we experience the world around us as events instigated by conscious actors acting upon unconscious objects (van Bergen 2011), colouring our language and the place of animacy therein.

2.2 The power of discourse

The interpretation of an utterance is influenced by many factors. Apart from the meaning of the words in the sentence and their relation to one another, other factors play a role, such as the sentences preceding the utterance and the listener’s world knowledge (Hess, Foss & Carroll 1995). The former or lexical-semantic constraints are referred to as *local factors*, the prior sentences or discourse context as *global factors* (Nieuwland & Van Berkum 2006; Hess et al. 1995). There has been much debate on when and how global factors influence interpretation at a local level (Hald, Steenbeek-Planting & Hagoort 2007; Nieuwland & Van Berkum 2006). Early models assumed comprehension occurs in distinct stages, where levels of representation (lexical, discourse, world knowledge) are processed serially (e.g. Searle 1979). These so called *two-step models* of interpretation posit that 1) first, a local, context independent meaning of the sentence is computed, then 2) this sentence is related to the prior discourse of which it is part (Van Berkum, Zwitserlood, Hagoort & Brown 2003). This implies that relating the sentence at hand to the prior discourse should occur relatively late, after an independent analysis of the sentence has been computed. As global discourse factors in this model are unable to influence the initial, independent lexical interpretation directly, the disturbance in processing caused by local semantics violations such as inanimate characters should persist, regardless

of global discourse contexts allowing for such violations (Nieuwland & Van Berkum 2006).

This model has been called into question by empirical results showing an early effect of discourse, mitigating the processing disturbances caused by anomalous content at the local level. An ERP study by Van Berkum et al. (2003) found that a neutral sentence such as ‘Jane told her brother that he was exceptionally quick/slow’ elicited no N400 effect on either ‘quick’ or ‘slow’ in isolation, yet when the sentence was embedded in a discourse context which made one of those words highly anomalous (e.g. because Jane’s brother had done something very quickly), an N400 effect was found for the discourse-inconsistent word. Similarly, Nieuwland (2013) found that counterfactuals such as ‘Dobermans would breathe under water...’ elicited larger N400 effects than statements consistent with the real world, yet when the counter-factual statement was embedded in a discourse context of an unrealistic counter-factual world (‘If dogs had gills...’) the effect disappeared. Similar results are found for the integration of world knowledge: In an ERP study by Filik & Leuthold (2008), words anomalous within the local context such as ‘chainsaw’ in ‘The cat picked up the chainsaw’ elicited the expected N400 effect, but this effect disappeared when the sentence was presented in the scenario of a Tom and Jerry cartoon. Hald et al. (2007) found that world knowledge and discourse are also able to act simultaneously, reporting results from an ERP study in which a short discourse context was either followed by a sentence consistent with world knowledge (‘The city of Venice has many canals and beautiful buildings’) or a sentence violating world knowledge (‘The city of Venice has many roundabouts and beautiful buildings’). The discourse context either supported the world knowledge consistent interpretation (‘The city of Venice is surrounded by water’) or it made the world knowledge violation more acceptable (‘The large and increasing amount of cyclists in the inner city of Venice had to be regulated’). Results showing the world knowledge violation eliciting a smaller N400 when preceded by a discourse context that shifts the focus to this interpretation lend support to the early influence of the global discourse context.

Further evidence against the two-step model comes from Hald (2003) who compared the N400 elicited by world-knowledge violations (‘Amsterdam is a city that is very new’) to that elicited by semantic violations (‘Amsterdam is a city that is very thin’), finding no difference in the time scale observed between these two violations. This indicates global factors are computed simultaneous to and in rather the same way as local factors.

Results such as these led to an alternative view, grounded in a connectionist approach to language comprehension. This view assumes that

language comprehension is a constraint satisfaction problem, using input from all levels of representation simultaneously to arrive at an optimal interpretation (Van Berkum et al, 2003). In this so called *single-step model* (Nieuwland & Van Berkum 2006), global factors are able to influence local interpretation immediately, overruling local violations before they disrupt comprehension. A study deserving special mention in this tradition is Nieuwland & Van Berkum (2006), presenting two experiments which both provide strong support for the single-step model hypothesis.

Nieuwland & Van Berkum (2006) note that local animacy violations (such as ‘the girl comforted the clock’) no longer seem strange when embedded in a context of a cartoon-like story, such as one about a clock feeling depressed. They presented participants in an ERP study short stories of six sentences in which a person was engaged in conversation with either another person (‘the therapist consoled the sailor’) or an inanimate object (‘the therapist consoled the yacht’). Gradually and implicitly, the story with the inanimate object set up a cartoon-like context in which it is not uncommon for inanimate objects to have animate properties. In this condition, the first, third and fifth sentence included animacy violations. For the first sentence of the story, the expected N400 effect elicited by the animacy violation was found for the inanimate condition; however, in the third and fifth sentence, this N400 effect disappeared entirely. This indicates that the cartoon-like context, gradually built up during the story, was able to influence the local interpretation such that the animacy violation disappeared. To discover whether a discourse context is not just able to neutralise animacy violations but to actually overrule animacy and world knowledge, a second experiment was conducted. In experiment II, participants were again presented with short stories. In this experiment, however, both conditions featured an inanimate object introduced in a cartoon-like context (e.g. a story about a peanut and his girlfriend). The story was completed with either a discourse-consistent statement (‘the peanut was in love’) or a discourse inconsistent, but world knowledge consistent statement (‘the peanut was salted’). In a two-step model, ‘the peanut was in love’ should always elicit an N400 effect as it is inconsistent with our knowledge of animacy and world knowledge. The single-step model, in which discourse context is able to influence interpretation immediately, predicts the reverse, as ‘the peanut was salted’ is inconsistent with the representation of the peanut as it emerged from the prior discourse. Perhaps not surprisingly, the latter result is what was found, showing that global discourse factors are able to overrule the locally specified animacy of the object.

2.3 Local representation

When discussing the influence prior discourse may have on our understanding of a word, it is essential to consider what is meant by ‘understanding a word’. How is meaning encoded in the local representation of a word? Before getting into the exact nature of local representation, it is important to establish that word meanings are always flexible in context (Hogeweg 2013; 2009). Consider the meaning of ‘fast’ in ‘a fast car’ and ‘a fast meal’ from Hogeweg (2013). In the first example, ‘fast’ refers to the ability of the car to move fast; in the second example, it refers to the ability for the meal to be prepared and served very quickly, as in ‘fast food’. This shift in meaning is accomplished in the context of just a single noun. Taking the example from Nieuwland & Van Berkum (2006), the meaning of ‘peanut’ is slowly transformed under the influence of global discourse context from the inanimate object we know it to be, to represent a cartoon-like being (more on this in 3.2). Even without such an extreme context, however, ‘peanut’ is already polysemous. Encyclopaedic knowledge of ‘peanut’ states that it is a legume, the fruit of the plant *Arachis hypogaea*, outwardly appearing as a bulbous, roughly 8-shaped shell. However, upon cracking the shell, we find two separate nuts. We can find these nuts, peeled and all, being sold in supermarkets also by the name of ‘peanuts’; salt optional. Whether we mean the whole peanut or the individual nuts is determined by the context.

Given that word meanings are always (subtly) different in context, we might wonder whether a very elaborate meaning is stored in the lexicon which is subsequently restricted by the context, or whether the lexicon just contains a basic, core meaning that is somehow made more specific or elaborate in context.¹ This corresponds to the two main accounts in the field: 1) Meaning is overspecified, and irrelevant features are suppressed by the context (*rich representations*) and 2) Meaning is underspecified, and this specification is enriched by the context (*poor representations*) (Hogeweg 2013; 2009).

Empirical evidence supports the former account, with various psycholinguistic studies (e.g. Hogeweg 2013; Rubio Fernández 2007; Onifer & Swinney 1981; Swinney 1979; Tanenhaus, Leiman & Seidenberg 1979) suggesting word meanings are richly represented at first, with suppression of context-

¹A third logical option exists, namely that all possible meanings are stored separately in the lexicon, with no computation involved in their interpretation. Arguments against this so called ‘Sense Enumeration Lexicon’ view may be found in Pustejovsky (1995).

inappropriate features of word meaning after some time.²

Onifer & Swinney (1981) used a cross-modal priming paradigm, in which a lexically ambiguous word is aurally presented in a context biasing one of the possible readings. Lexical decision is then requested on visually presented words either related to the meaning biased by the context, or words related to the alternative meaning. In an example from Onifer & Swinney (1981), the context ‘The dinner guests really enjoyed the specially prepared river bass, although one guest did get a *scale* caught in his throat’ was followed by either ‘fish’ (context-appropriate) or ‘weight’ (context-inappropriate) as lexical decision targets (and conversely for the context ‘The postal clerk put the package on a postal *scale* to see if it had enough postage’). It was found that lexical decision on both context-appropriate and context-inappropriate targets was facilitated compared to controls when the target was presented immediately following the context; however, after 1500 milliseconds, only the context-appropriate target word remained facilitated. Similar results were found by Tanenhaus et al. (1979), who used contexts in which words were ambiguous in meaning between a noun and a verb interpretation, e.g. ‘watch’ in contexts such as ‘I bought the *watch*’ or ‘I will *watch*’. They found that after 0 milliseconds targets related to ‘watch’ both as a noun and a verb were facilitated, while after 200 milliseconds, facilitation only occurred for the targets related to the context-appropriate interpretation.

Rubio Fernández (2007) applied the cross-modal priming paradigm to the study of metaphors. She presented participants with either metaphor-inconsistent (e.g. ‘cat’) or metaphor-relevant (e.g. ‘fast’) features of the metaphor vehicle following a metaphor prime, e.g. ‘Nobody wanted to run against John at school. John was a cheetah’. She found that at 400 milliseconds, participants were faster to recognise metaphor-inconsistent and metaphor-relevant features, compared to unrelated controls. At 1000 milliseconds, this facilitation disappeared for metaphor-inconsistent features, while it persisted for metaphor-relevant features. The existence and subsequent disappearance of the priming effect on metaphor-inconsistent features again points to a rich representation with context-inappropriate features being suppressed in context.

²While neither account makes direct empirical predictions on the processing speed associated with polysemous words in context, the *rich representations* account describes the process of polysemy resolution in terms of suppression of context-inappropriate features. This could be understood in terms of degree of activation of these features in the lexicon during on-line processing (Rubio Fernández 2007; 2005), and thus, predictions can be made for e.g. priming paradigms.

Returning to a less extreme example of lexical ambiguity, Hogeweg (2013) used the cross-modal priming paradigm to study the interpretation of adjective-noun combinations involving metonymic type coercion. In this type of construction the interpretation of the noun is influenced by the preceding adjective, e.g. in the construction ‘stone lion’, the interpretation of the noun ‘lion’ is influenced by the adjective ‘stone’. In Hogeweg (2013), participants were presented with a context-appropriate (e.g. ‘mane’) or a context-inappropriate (e.g. ‘roar’) feature of ‘lion’ following a short context in which a adjective-noun combination was introduced. Note that this example is similar to the ‘peanut’ example from Nieuwland & Van Berkum (2006) above, but in this case, the context (the adjective ‘stone’) turns the otherwise animate lion into an inanimate object. Results were again consistent with the assumption of rich specifications: At 0 milliseconds, a facilitation effect was found for both context-appropriate and context-inappropriate features compared to controls while at 400 milliseconds this facilitation effect disappeared for context-inappropriate features.

To summarise, words are always polysemous. The computation of precise meaning at a local level under the influence of (discourse) context is thought to result from suppression of context-inappropriate features, and this is reflected in priming paradigms as the existence and subsequent disappearance of a facilitation effect on lexical decision targets compared to controls.

3 Animacy in narrative fiction

3.1 The inanimate character

Inanimate objects as characters in narrative fiction are quite common in literature, and have occurred at least since the time of Pythagoras (Flint 1998). Prosopopoeia, the linguistic art of giving human qualities to abstract ideas, animals and inanimate objects (Al-Joulani 2010), is used in literature for a variety of reasons. One such reason is making an implicit comparison between the object and the person it personifies, drawing attention to some property in a metaphorical relation. An example comes from Al Galidi’s *Maanlichtmoerassen* (2006), a Dutch novel in which the main character is a toilet, striving to be something more but being held back by the disgust she encounters. The author uses this as a commentary on society’s obsession with the superficial, pleading us to look beyond the surface form. Another reason for using prosopopoeia is to present a neutral, distanced and impersonal look on society. By using an inanimate object as a narrator to

comment on society's wrongs, the case can be argued from a different perspective and with an air of impartiality, even satirically (Flint 1998). An example comes from Gildon's *The Golden Spy* (1709), in which golden coins as narrators tell us something about wealth.

In order to comment on society or present a different viewpoint on events, it is not necessary for the inanimate object to be completely human. Being able to act is not a requirement, as long as cognition is attributed. For this reason, inanimate objects in literature are more often associated with the Experiencer than with the Agent role, a distinction that is reflected in the language used.

Hogeweg, de Hoop, Stoop & Trompenaars (2013) compared two novels by Dutch author Willem Jan Otten, *Specht en Zoon* (2004) and *De Wijde Blik* (1992). In *Specht en Zoon*, the narrator of the story is a painting. It retains the physical form of a painting and all the limitations on action that this entails (being placed on an easel or facing a wall, it is unable to perceive events not directly in its line of sight nor able to influence the world around it in any way), but it is able to observe and comment on its environment. Comparing the novel to *De Wijde Blik*, which features a 'regular' animate protagonist, Hogeweg et al. (2013) found a significant difference in the type of semantic role associated with the narrator: While in *De Wijde Blik* the narrator was represented as an Agent in 50% of cases, in *Specht en Zoon* this number was much lower at about 25%. The opposite was found for Experiencer: Almost 50% of cases in *Specht en Zoon* were Experiencer whilst this percentage was only 25% in *De Wijde Blik*. This was also related to verb classes used: In *De Wijde Blik* 50% of verbs could be classified as active, whereas this percentage was again about 25% in *Specht en Zoon*. *Specht en Zoon* featured 37% verbs of cognition and 18% sensory verbs, compared to 25% and 8% in *De Wijde Blik*, respectively. A similar pattern is found in a corpus study by Fagel, Stukker & Van Anandel (2012) who analysed the novel *De Asielzoeker* (2003) by Dutch author Arnon Grunberg. In *De Asielzoeker*, the main character is animate, but distanced from society, reduced by apathy and inaction to a mere observer. Comparing *De Asielzoeker* to contemporary Dutch novels featuring more involved participants (Dorrestein's *Het duister dat ons scheidt* (2003) and Bouazza's *Paravion* (2003)), they found relatively more verbs denoting mental processes (e.g. 'think', 'feel', 'know') and relatively less verbs denoting material processes (e.g. 'do', 'make', 'paint'). These results indicate a difference in linguistic expression of the animate as an Agent versus the animate as an Experiencer.

3.2 The road to animacy

We've seen in section 2.1 that animacy is a very powerful distinction. Its influence is felt in every aspect of language, most prominently in the correlation with semantic roles. Section 2.2 showed that discourse can be equally powerful, as it guides our interpretation, constantly adjusting and transforming our understanding of locally represented words even as it unfolds. With the Agent and Experiencer roles so strongly linked to [+animate] referents, and discourse forcing these roles on referents that are inherently [-animate], something has got to give. Since the final result of this conflict is a character that is able to '[perceive] and [act] upon the environment', which Dahl (2008) states as being 'the defining criterion of being animate', this is evidently the [-animate] feature of the referent. An appropriately biasing discourse is able to bring inanimate referents to life.

How might this process take place, and what is the resulting representation? As we saw in 2.3, features that are context-inappropriate are suppressed during interpretation. In this case, this regards features that are inconsistent with 'peanut' as an animate entity, most obviously [-animate]. The literature is divided with regards to the exact nature of this suppression mechanism. In Hogeweg (2013; 2009) it is explained in terms of Optimality Theory, specifically OT semantics (Hendriks & de Hoop 2001). The specific meaning in context is derived on the basis of a process of optimisation whereby the input is the rich representation of the word and the output is the meaning that best fits the context (Hogeweg 2013; 2009). In this view, [-animate] and other features such as e.g. [salted] would no longer be context-appropriate and should not be active once the optimisation process has run its course. A different view is found in Rubio Fernández (2007), in terms of Relevance Theory (Carston 2002). In Relevance Theory, words in context may come to differ from their lexical meanings by means of concept narrowing (essentially, suppression of context-inappropriate features to arrive at a more context-specific meaning) and concept loosening (whereby a word in context might come to have an extended meaning not usually lexically coded). Consider 'princess' in 'Caroline is a princess' (example from Carston 2002, cited in Rubio Fernández 2007). When used as a metaphor, the utterance is intended to convey the meaning that Caroline is spoilt. In Relevance Theory, this shift in meaning is represented in the ad hoc concept '*princess'. This ad hoc concept is a result of narrowing and loosening of the concept 'princess': The definition of 'princess' is extended from meaning 'female royal of a certain sort' to include 'spoilt' by the process of loosening, while at the same time the process of narrowing results in 'female royal of

a certain sort' no longer being included in the definition since it does not apply to Caroline (Rubio Fernández, 2007).

While for the purposes of the current study it is possible to remain agnostic as to the underlying method by which suppression takes place – as the empirical prediction in both views is that response times should be longer for context-inappropriate features than for context-appropriate features – I believe the view from Relevance Theory has more explanatory power. A re-conceptualisation of inanimate objects in narratives requires more than just suppression of context-inappropriate features; a new meaning has to be constructed that includes features not present in even the most extensive original representation, and this might be accounted for by the process of loosening.

The process of loosening might be facilitated by familiarity with cartoon-like contexts. Expectations based on previous experience of meaning in context may carry over to novel entities and events (Nieuwland 2013; Gerrig & Murphy 1992) and specific genres of discourse influence expectations made during processing differently (Zwaan 1994). According to the Concept Formation view by Gerrig & Murphy (1992), when we encounter a novel compound noun we do not initially look for a referent in context for comprehension, but rather we look back on previous encounters with similar compound nouns to derive the meaning of the novel compound noun, e.g. understanding 'heart man' in a newspaper article to refer to the recipient of a heart transplant will facilitate understanding of e.g. 'liver woman' when such a novel compound is encountered, by analogy (Gerrig & Murphy 1992). When we encounter the novel use of 'peanut' in the context of a narrative in which this inanimate object is made animate, then, we might also compare this to previous experiences in which something not quite human was acting and experiencing as if it were; i.e. other cartoon-like contexts. The creation of the ad hoc concept, then, could be explained in part as a result of loosening enforced by the influence of prior encounters with similar ad hoc concepts.

There are different ways to bring an inanimate object to life as a literary character. Recall that both Agent and Experiencer are strongly correlated with animacy; however, these roles do not define animacy in exactly the same way. An Agent is active; prototypically possessing of the ability to move around and influence its surroundings, acting on its own motivations and needs. An Experiencer, on the other hand, need 'merely' possess the ability for cognition. In 3.1 it was observed that this distinction is represented in the language used, but is also a factor in the way we conceptualise the ad hoc concept. For the purposes of this study, the relevant distinc-

tion here is that cognition is invisible. For all we know, strawberries and peanuts are capable of thought; there is no a priori reason to reject this hypothesis based on outward appearance. Consequently, an inanimate object re-conceptualised in the Experiencer role may retain its default, inanimate form, and this is in fact the case for many Experiencer characters in literature (e.g. the painting in *Specht en Zoon*). The same cannot be said of Agents: in order to move around and consciously exert physical influence over the environment, certain adjustments in form have to be made. An inanimate character in the Agent role is sooner re-conceptualised as anthropomorphic: generally resembling a human being but with characteristics reminiscent of its original form. The distinction between conceptualisations of Agents versus Experiencers has consequences for what features are considered context-inappropriate. If turning an inanimate object into an Agent entails changing its form, and turning an inanimate object into an Experiencer does not, features denoting aspects of an object’s original physical appearance should less readily be suppressed in the Experiencer condition than in the Agent condition.

While there has been much research on the influence of (narrative) discourse on local interpretation and the nature of meaning in context, few studies explicitly use a local violation caused by a shift in animacy (with the notable exception of Nieuwland & Van Berkum 2006) and none have explored the differences between the two roads to animacy in resolving this violation. The current study attempts to fill this gap.

4 Animacy in context: A lexical decision study

4.1 Introduction

A lexical decision experiment was carried out using the cross-modal priming paradigm to ascertain the influence of different discourse contexts on the local interpretation of inanimate nouns. Inanimate nouns in neutral conditions were contrasted with inanimate nouns in either an ‘Agent’ or ‘Experiencer’ condition. For each inanimate noun in all conditions, the same feature normally associated with the inanimate noun was the target of lexical decision following a short story. The prediction is that response times on lexical decision of the target word in the ‘Agent’ and ‘Experiencer’ condition should be longer than in the neutral condition, following from the suppression of context-inappropriate features in context. A time frame of 400 milliseconds was chosen as the interval between the story and the target in which this suppression would have taken place (Hogeweg 2013; cf.

Rubio Fernández 2007).³ A further prediction, one based on the fact that Experiencer does not entail changes in the object’s physical appearance, is that the response times should be faster in the ‘Experiencer’ condition when compared to the ‘Agent’ condition, as features related to form are not necessarily context-inappropriate in Experiencer contexts and as such should not show suppression to the extent expected in the Agent contexts.

4.2 Method

4.2.1 Participants

39 Faculty of Arts students from the Radboud University of Nijmegen (26 female, mean age 20.9) participated in this study. All participants were native speakers of Dutch without dyslexia and with normal or corrected-to-normal vision. Linguistics students with knowledge of psycholinguistics were excluded from the study. Participants were awarded 5 Euro for their participation.

4.2.2 Materials

36 experimental stories were constructed, 12 for each condition. The conditions used were ‘inanimate’, ‘Experiencer’ and ‘Agent’. The main character in each condition was an inanimate noun, e.g. *kast* ‘cupboard’. In the ‘inanimate’ condition, the discourse context was such as might be expected with an inanimate noun, describing features of the object or the way the object is handled/used. In the ‘Experiencer’ and ‘Agent’ conditions; however, the discourse guided a listener to conceive of the inanimate noun as being animate. In the ‘Experiencer’ condition, this was accomplished by using experiencer verbs (e.g. ‘think’, ‘feel’) resulting in the interpretation of the inanimate noun as an animate, cognitive entity, whereas in the active condition, active verbs (e.g. ‘go’, ‘say’) were used resulting in an interpretation of the inanimate noun as an animate, acting entity.

Each story consisted of 6 sentences in order to provide a sufficient context in which to transform the inanimate object into an animate entity. The

³As metaphors provide an extreme example of flexible word usage, the interpretation of metaphors is generally understood to be a more demanding process than metonymic type coercion or other types of lexical reinterpretation (e.g. Hogeweg 2013; Onifer & Swinney 1981; Swinney 1979; Tanenhaus et al. 1979), and this presumably accounts for the extended time frame observed in Rubio Fernández (2007) (Hogeweg 2013). Since the reinterpretation of the inanimate noun in Nieuwland & Van Berkum (2006) and the current study is not based on this extreme metaphoric resolution but rather resembles the earlier studies mentioned, the 400 millisecond interval should also apply here.

inanimate noun was always introduced as the main character in the first sentence, and appeared as the final word of the final sentence, so that it could be immediately followed by the target word without interference. In either the second or third sentence and the fourth or fifth sentence, the inanimate noun was repeated to achieve a greater facilitation effect. This resulted in 4 occurrences of the inanimate noun in each story. Other references to the inanimate object were covered by anaphoric expressions. In standard Dutch, the masculine pronoun *hij* ‘he’ is used for anaphoric reference to inanimate subjects (Audring 2009). For this reason, anaphoric reference in our stories was almost exclusively (in the case of the ‘inanimate’ condition, exclusively) realised using *hij*. In order to immediately immerse the listener into the respective discourse contexts, the experiencer or active verbs were introduced no later than the second sentence in these conditions.

An example story in each of the three conditions (with approximate translations from Dutch) is given in (5), with cognitive and active verbs highlighted in bold:

- (5)
- a. *Er staat een kast in de kamer. De kast is al heel oud. Hij is zelfs nog van opa geweest. Maar hij staat nu wel in de weg. Misschien dat we de kast toch maar weg moeten doen. Jammer, ik hield heel erg van die kast.*
 ‘In the room is a cupboard. It is very old. It used to be granddad’s. But now it is in my way. Perhaps we should get rid of the cupboard. Too bad, I really loved that cupboard.’
 - b. *In de kamer staat een kast. De kast voelt zich al heel oud. Hij heeft het gezin zien opgroeien. Hij is erg verbonden met het huis, en het gezin. De kast vermoedt echter dat het gezin hem kwijt wil. Daarom gaat het nu niet zo goed met de kast.*
 ‘There is a cupboard in the room. The cupboard is **feeling** old. He has **seen** the family grow up. He **feels** very attached to the house, and the family. However, the cupboard **thinks** that the family wants to get rid of him. This is why the cupboard is not **doing very well** at the moment.’
 - c. *Vandaag is de kast uit het huis vertrokken. De kast gaat voor lange tijd op vakantie. Hij heeft zijn rugzak gisteren al ingepakt. Vanochtend nam de kast afscheid en ging naar het vliegveld. Hij zal de hele wereld over reizen. We missen de kast.*

‘The cupboard **left** the house today. The cupboard is **going** on holiday for a long time. He already **packed** his backpack yesterday. This morning the cupboard **said** his goodbyes and **went** to the airport. He is going to **travel** all over the world. We miss the cupboard.’

For each inanimate noun a target word was selected: features highly associated with the inanimate noun, e.g. *kast* - *deur* ‘cupboard - door’. The strength of association of the inanimate noun with the feature was pretested by means of an on-line questionnaire (n = 34), in which participants were requested to rate how well they thought the feature was associated with the inanimate noun on a 7-point scale. Fillers used in this pretest included animate nouns with highly-associated features (e.g. *kikker* - *groen* ‘frog - green’), as well as both inanimate and animate nouns with unrelated features (e.g. *naald* - *adem* ‘needle - breath’, *vlinder* - *tas* ‘butterfly - bag’). Features with an association rating of less than 5 were disqualified. Only one item, *paddenstoel* - *stip* ‘mushroom - dot’, was found not to reach the required strength of association and was subsequently removed. The resulting experimental stories with their associated targets can be found in Appendix A.

In addition to the experimental stories, 18 filler stories were constructed; 14 in which the main character was animate and 4 in which it was inanimate. For 4 of the filler stories within the animate condition a highly-associated feature was selected as a target, while the other stories were matched with pseudo words. This way, inanimate stories were balanced out with animate stories, while ensuring stories with animate nouns were not always mapped to a negative response, and stories with an inanimate noun were not always mapped to a positive response. For the filler stories, the discourse context was always neutral, i.e. stories with an animate noun guided towards an animate interpretation, and stories with an inanimate noun guided towards an inanimate interpretation. Like the experimental stories, the filler stories always consisted of 6 sentences, but unlike the experimental stories, the animate or inanimate noun occurred *about* 4 times, with the final occurrence of the noun not necessarily as the final word of the final sentence. The filler stories with associated targets can be found in Appendix B.

The stories were recorded by a 20-year-old male native speaker of Dutch, who was instructed to maintain a normal speaking rate and intonation. The recorded materials were edited using Praat (<http://www.praat.org/>).

4.2.3 Design

The 12 experimental stories were divided into three lists, such that each story only occurred in one condition and all conditions were represented by 4 stories in each list in a Latin Square design. To each list the same 18 fillers were added, for a total of 30 stories per list. Participants were divided equally between lists, resulting in 13 participants for every condition. Stories were presented in random order.

4.2.4 Apparatus and procedure

The experiment was built using E-prime 2.0 (Psychology Software Tools, Pittsburgh, PA), installed on a windows XP desktop computer. Participants were seated in front of the computer monitor flanked by two loudspeakers. The stories were aurally presented while a black fixation symbol (+) was presented in the middle of the screen, and 400 milliseconds after the story had ended the associated target (pseudo) word was presented at the location of the fixation symbol. At the start of this 400 millisecond interval the fixation symbol turned red in order to prepare participants for their response. Responses to the target (pseudo) word were made by means of a button-box.

Participants were asked to listen carefully to the stories while keeping their eyes on the fixation symbol. They were told a string of letters would appear, and they were to judge whether this string of letters constituted a Dutch word by means of pressing the corresponding buttons on the button-box; left for a positive answer, right for a negative answer.

These instructions were on screen prior to the experiment and elaborated upon by the experimenter if needed. The experiment was preceded by two practice trials consisting of two neutral stories featuring an animate noun, with one associated target word and one pseudo word, respectively. If the participant had no questions following the practice trials, the experiment started.

Total experiment time was approximately 15 minutes, including instruction and practice trials. Response time as well as accuracy was recorded.

4.3 Results

All 39 participants saw 4 stories from each of the 3 conditions, resulting in 468 cases. Out of 468 cases an incorrect response was made on the lexical decision task in 2 cases; once in the 'Experiencer' and once in the 'inanimate' condition, by different participants. These 2 cases were excluded from further analysis. Furthermore, due to the facilitation effect being temporally

bound (Hogeweg 2013; Rubio Fernández 2007), response times over 2000 milliseconds were very likely not influenced by the preceding context and subsequently also excluded from further analysis. This was the case for 2 responses, both from the ‘Agent’ condition. Response times below 200 milliseconds are unlikely to be true reaction times due to the nature of visual processing and were also to be discarded; however, no cases met this criterion. The remaining 464 cases were log-transformed. For every participant, response times over 2 standard deviations from the log-transformed mean of that participant were removed. This resulted in the loss of 11 cases (5 in the ‘inanimate’ condition, 4 in the ‘Experiencer’ condition, and 2 in the ‘Agent’ condition), or 2.4% of the remaining data. Descriptives for the remaining 453 cases are given in table 1.

Table 1: Average response times by condition

Condition	N	Minimum	Maximum	Mean	Sd.
Agent	152	350	1842	720.5	278.7
Experiencer	151	362	1983	705.4	281.2
Inanimate	150	352	1930	713.8	293.8

A mixed model analysis was carried out on the data with condition as a fixed factor and participant and item as random factors. To ascertain whether the mean response times differed significantly on any given condition compared to the other two conditions a multiple comparison test was conducted based on Estimated Marginal Means, Bonferroni corrected. These results can be found in table 2.

Table 2: Pairwise comparisons of response times by conditions

Condition	*Condition	Mean Diff.	SE	df	Sig.
Agent	Experiencer	24.536	17.921	400.973	0.515
	Inanimate	16.496	17.957	401.067	1.000
Experiencer	Agent	-24.536	17.921	400.973	0.515
	Inanimate	-8.040	17.987	401.027	1.000
Inanimate	Agent	-16.496	17.957	401.067	1.000
	Experiencer	8.040	17.987	401.027	1.000

Table 2 shows no condition differed significantly from any other condition, with the biggest difference being found between the Agent and Experiencer

condition. Condition as a whole turned out to be not significant ($F_{2,401} = 0.975, p = 0.378$), indicating no effect of condition on the response times observed.

5 Discussion

The purpose of the lexical-decision experiment was to ascertain whether a global discourse context guiding the listener to an animate interpretation of an inanimate object was able to overrule the animacy violation at a local level, and whether a difference could be observed for Agent versus Experiencer contexts. This was accomplished by creating two contexts in which the animacy violation occurred; one in which the inanimate object was capable of cognition, one in which it was capable of action, in contrast to a neutral context in which the inanimate object remained inanimate. The prediction was that recognition of features associated with the inanimate object would be slower in the animate than in the inanimate conditions, as the global discourse context would have overruled the local animacy violation leading to suppression of context-inappropriate features. However, differences in response times between conditions failed to reach significance, with the biggest difference found between ‘Agent’ and ‘Experiencer’. At first sight, these results appear to contradict those found by Nieuwland & Van Berkum (2006), who showed an N400 effect for features normally associated with an inanimate object following a discourse context in which the inanimate object was transformed into an animate entity. This was not observed in the current data, with response times on the features associated with the inanimate object being roughly equivalent across conditions, indicating discourse had no effect on the local representation.

However, several theoretical and methodological concerns prevent drawing this conclusion on the basis of the current study. First of all, and most importantly, while the N400 effect found by Nieuwland & Van Berkum (2006) indicates listeners were surprised by hearing the discourse-inconsistent sentence (‘the peanut was salted’), it is unclear what causes this surprise. Referring to the peanut as being salted in this context might simply be strange because the statement has little bearing on the discourse topic at hand, not because ‘salted’ is no longer recognised as a feature of the peanut at a local level. Did listeners create a different concept of an animate ‘peanut’ as the cartoon-like discourse context progressed, leading to reduced associative strength for features related to the inanimate object, or was the N400 effect simply a reflection of a violation of discourse expectation? If this is

indeed what caused the N400 effect observed in Nieuwland & Van Berkum (2006), this fundamentally alters the predictions for the current study. A cross-modal priming paradigm is not the right method to find converging evidence if the previous results were not based on feature suppression, but rather on discourse expectations.

Secondly, the criteria used to select the target words may not have been exhaustive. The only criterion used in the current study was strength of association with the prime, as rated in an on-line pretest; however, empirical results from the study of metaphors indicate salience to be a factor in suppression as well (Giora 2008). Highly salient features related to either the literal or metaphorical meaning of a word will persist longer even when inappropriate in context, compared to features that are less salient. Since target words were selected on the basis of ‘the first property of the object that comes to mind’, they could be argued to be highly salient and thus likely to be suppressed more slowly. Furthermore, suppression occurs when features are incompatible with the context, but it could be argued that this was not always the case here; target words were often less relevant in, but not necessarily incompatible with, the preceding context. Possibly, this explains why suppression did not occur in the ‘Agent’ and ‘Experiencer’ conditions in the current study as expected, and why it may also not have occurred in Nieuwland & Van Berkum (2006). To resolve these concerns, a follow-up study would have to be conducted, which will be outlined next.

Response times in a self-paced reading (SPR) paradigm are not contingent on the cause of the N400 effect observed in Nieuwland & Van Berkum (2006), and as such an SPR study could provide an opportunity to find converging evidence for Nieuwland & Van Berkum (2006), evidence for the difference between Agent and Experiencer, as well as resolve some of the other methodological concerns in the current study, such as the amount of additional variation introduced by the different contexts, the number of primes, inconsistent introduction of other discourse referents and predictability of the experimental material.

An SPR study might present similar stories to those in the current study, followed by short, self-paced sentences rather than target words, e.g. the story of the cupboard in (5) would not be followed by ‘door’, but by ‘the cupboard has a door’, in all conditions. In this regard, it would be similar to the material in Nieuwland & Van Berkum (2006) in which short stories were concluded with e.g. ‘the peanut was salted/in love’. In contrast to Nieuwland & Van Berkum, however, it would still be the discourse context that is varied, rather than the target. The reason for this is that we would still be interested in the effect of Agent versus Experiencer, which requires

two types of discourse in addition to a neutral control. The variation in the discourse was a methodological concern in the current study: Using three different discourse conditions entails necessary sentence variation, and with a total of six sentences, the variation can be excessive. While efforts were made to control sentence length and structure as much as possible, narrative conventions force certain templates on the stories which made this quite difficult. The relatively major variation in discourse contexts may have presented a confound that might cause the relatively small predicted effect to be lost in the noise. Possibly, the stories could be made shorter in an SPR experiment. It might also work to contrast each ‘inanimate’ condition with *either* an ‘Agent’ *or* an ‘Experiencer’ condition, although in that case care must be taken to counterbalance any tendency for certain inanimate objects to make more ideal Agents or Experiencers, respectively.

Further methodological issues that might be resolved are the number of primes, the inconsistent introduction of other discourse referents, and the predictability of the experimental material in the current study. In each story, the prime was explicitly referenced exactly four times over six sentences. Possibly this number was too high, reinforcing the features including those that are context-inappropriate to such an extent that suppression of context-inappropriate properties was hampered. In Nieuwland & Van Berkum (2006) experiment I, six sentences were presented, with the prime included in every sentence; in experiment II, the prime was presented five times over the course of a five-sentence story, again occurring once every sentence. For a cross-modal lexical-decision experiment such a high number of primes seems excessive. In an SPR experiment the number of times the prime is explicitly mentioned could be reduced, replaced instead by anaphoric reference. In several stories, a discourse referent was introduced that wasn’t the inanimate prime. This concerns e.g. ‘I’, ‘we’ and ‘the family’ in the ‘cupboard’ example in (5). As these were almost exclusively animate, they made good sentence topics (van Bergen 2011), possibly distracting from the inanimate noun (which was the discourse topic). This effect could be controlled for in an SPR experiment by consistently introducing one discourse referent for every prime across conditions, preferably of female gender. This ensures anaphoric reference is unambiguous; *hij* ‘he’ would be used for anaphoric reference to the inanimate noun (see Audring 2009), *zij/ze* ‘she’ for anaphoric reference to the female discourse referent, again similar to Nieuwland & Van Berkum (2006). As to the last concern, predictability of the experimental material, all experimental items in the current study required a positive response on the lexical-decision task as a consequence of the nature of the experiment, but this positive response

was relatively predictable given that only in the experimental stories a shift from inanimate to animate referents occurred. From exit interviews it became clear that some participants were quick to recognise the correlation between cartoon-like contexts and a required positive response. While the shift in animacy only occurred in 8 out of 30 stories, possibly the number of filler stories was still insufficient to distract from this correlation. Since SPR is not contingent on a true/false decision, this concern would no longer be an issue.

6 Conclusion

Inanimate characters are relatively frequent in narrative fiction, and they present interesting insights into the power of discourse to influence interpretation. Animacy is a powerful distinction, yet the violations caused by turning inanimate objects into characters with human characteristics do not cause the language system to grind to a halt. This is a problem for two-step models of language comprehension that assume local representations are computed first, with discourse only able to exert its influence at a later stage. In single-step models, the global discourse context is immediately brought to bear on the interpretation. The evidence is in favour of single-step models: not only has it been shown that discourse is able to influence local interpretation immediately, an appropriate discourse context is even able to reverse the N400 effect usually associated with local violations: when a feature normally consistent with the inanimate interpretation is presented embedded in a discourse in which the listener was guided towards conceiving of the object as being animate, an N400 effect occurred. The first aim of the current study was to find converging evidence for this finding. Animacy is also related to semantic roles. Two semantic roles strongly associated with animacy are Agent and Experiencer. Both entail animacy, and we are unable to conceive of Agents or Experiencers that are inanimate. Discourse somehow manages to find a way to get around this by turning the concept of an inanimate object into a concept of an animate entity, but this re-conceptualisation may differ for Agents compared to Experiencers, and this is reflected in language. The second aim of this study was to ascertain whether there is a difference in the readiness to re-conceptualise the inanimate noun as an Agent versus as an Experiencer. To answer these questions, a cross-modal lexical decision paradigm was used. This paradigm is based on response time predictions following from the mechanism of suppression of context-inappropriate features in context; (targets related to) context-inappropriate features are recognised

more slowly compared to context-appropriate targets. Following aurally presented short stories, participants were requested to decide whether a visually presented target constituted a word. The stories consisted of short narratives of six sentences, in three conditions ('inanimate', 'Agent' and 'Experiencer'), targets consisted of features usually associated with the inanimate object. Differences in response times failed to reach significance. An alternative explanation was provided, as well as a suggestion for further research that should also resolve possible methodological concerns.

Acknowledgements

First of all I would like to thank Helen de Hoop. She has been a great inspiration to me even since before we met. I am convinced that without her performance on DWDD that fateful day I would not have entered the field of Linguistics, and come to enjoy it as much as I did. As my first supervisor she allowed me the freedom to pursue my own ideas, but always made sure to keep me on track. Her helpful suggestions and (incredibly fast) comments on earlier drafts made the process of writing this thesis a very pleasant experience, and her trust and encouragement were instrumental in getting it done. In crafting the experimental stories, she not only proved to be a good supervisor, but also showed a remarkable talent as a children's book author. I never knew a story about a hot air balloon could be so engaging. Thank you Helen, for being an amazing first supervisor and for making me feel like a proper scientist.

Secondly, I would like to thank Lotte Hogeweg. She went above and beyond her role as second supervisor and was there every step of the way. Her help in setting up the E-prime experiment as well as offering suggestions on the statistics has been indispensable. Thank you Lotte, for always finding something positive to say and spinning every disappointment into a challenge to be solved.

I would also like to thank the organizers of the 2013 Faculty of Arts workshop *Perspectives on Narrative* at the Radboud University Nijmegen and all those present, for allowing me to present the aims of my research and making me feel right at home. Your suggestions and encouragement were of great benefit to this work and to me personally.

In preparing and running the experiment, there are two people in particular without whom this would not have been the nice experience that it turned out to be. Thanks first to Irene Strikkers, whose great sales pitch and promises of candy no doubt attributed greatly to the number of partic-

ipants I was able to test, and whose company made the long hours cooped up in the small, air-conditionless MMS booth running the experiment more bearable; even enjoyable. Thanks also to Nander Speerstra, who brought the inanimate to life by lending his voice to our stories.

I am also grateful to Geertje van Bergen and the members of the research group Grammar and Cognition for helpful comments and suggestions throughout, especially Peter de Swart for his assistance with the apparently not so trivial task of getting the E-prime fixation symbol to behave the way I wanted it to, and Vera van Mulken for editing my translations of the story fragments into slightly more passable English as well as sending the occasional participant my way.

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Appendix A - Experimental materials

Schilderij - verf

Er hangt een nieuw schilderij in het museum. Het schilderij was van een oude meester. Het werd gekocht als waardevolle aanvulling op de collectie. Helaas was het schilderij wel beschadigd. Dat is erg jammer. Er wordt op dit moment restauratie gepleegd aan het schilderij.

In het museum hangt een nieuw schilderij. Het ging helaas niet zo goed met het schilderij. Hij had namelijk geen vrienden. Dat kwam omdat hij nog moest wennen aan zijn nieuwe omgeving. Inmiddels heeft het schilderij wel nieuwe vrienden gemaakt. Nu gaat het weer beter met het schilderij.

Er loopt een nieuw schilderij het museum binnen. Het schilderij is een nieuwe medewerker. Na binnenkomst gaat het schilderij op zoek naar het caf. Hij neemt daar een drankje. Hij geeft een flinke fooi. Dat is netjes van het schilderij.

Kast - deur

Er staat een kast in de kamer. De kast is al heel oud. Hij is zelfs nog van opa geweest. Maar hij staat nu wel in de weg. Misschien dat we de kast toch maar weg moeten doen. Jammer, ik hield heel erg van die kast.

In de kamer staat een kast. De kast voelt zich al heel oud. Hij heeft het gezin zien opgroeien. Hij is erg verbonden met het huis, en het gezin. De kast vermoedt echter dat het gezin hem kwijt wil. Daarom gaat het nu niet zo goed met de kast.

Vandaag is de kast uit het huis vertrokken. De kast gaat voor lange tijd op vakantie. Hij heeft zijn rugzak gisteren al ingepakt. Vanochtend nam de kast afscheid en ging naar het vliegveld. Hij zal de hele wereld over reizen. We missen de kast.

Boek - pagina

Er ligt een boek in het klaslokaal. Het boek wordt door de kinderen vaak gelezen. Het gaat over ridders, en prinsessen. In het boek staan veel plaatjes. Omdat het zo vaak gelezen wordt, is het inmiddels versleten. Zonde van

zo'n mooi boek.

In het klaslokaal ligt een boek. Het boek weet dat de kinderen van hem houden. Hij wordt namelijk erg vaak gelezen. Dat vindt hij natuurlijk erg fijn. Het boek hoopt dan ook dat hij nog lang kinderen blij kan maken. Ik hoop het ook voor het boek.

Op school is n medewerker erg populair. Deze medewerker is het boek. Het boek loopt hier constant over op te scheppen. Hij is geen minuut stil. Het boek vertelt het ene na het andere verhaal. De andere medewerkers krijgen zo langzamerhand een hekel aan het boek.

Schoen - veter

Op straat ligt een verlaten schoen. Waar de schoen vandaan komt weet niemand. Hij ligt er echter al een lange tijd. Gek, want de schoen ziet er erg duur uit. Wat zou er mee gebeurd zijn? Van wie is toch die oude schoen?

De oude schoen was niet blij. Hij is door zijn eigenaar verlaten. Waarom, dat weet de schoen niet. Hij is toch altijd aardig geweest voor zijn eigenaar? De schoen klaagde nooit over de lange dagen die zijn eigenaar maakte. En hij was nog steeds in de mode. Wie doet nou zoiets met zon trouwe schoen?

Een schoen kwam de winkel binnengewandeld. De schoen was op zoek naar een nieuwe telefoon. Hij vroeg de verkoper om hulp. Hij vertelde haar wat hij nodig had. Uiteindelijk heeft de schoen niks kunnen vinden. Teleurgesteld vertrok de schoen.

Cake - slagroom

Bij de bakker staat een cake. De cake is rijk versierd, en bestemd voor een bruiloft. Het is een cake met alles erop en eraan. Drie lagen, strikjes van marsepein, en een bruidspaar bovenop. Ik krijg er nu al zin in. Dat is een lekkere cake!

In de etalage bij de bakker stond een cake. De cake had het ontzettend naar haar zin in de etalage. Vanuit haar plekje voor het raam zag de cake veel mensen voorbij komen. Ze hoopte dat niemand haar zou kopen. Ze wilde niet opgegeten worden. Maar helaas, dat werd toch de bestemming van de cake.

Over straat liep een cake. De cake genoot van de zon. Ze had een dagje vrij op haar nieuwe werk, en was net op bezoek geweest bij haar nichtje. Lekker gekletst over haar nieuwe baan. Nu was de cake weer op weg naar huis. Dat was een gezellig dagje voor de cake.

Radio - antenne

Mijn oom heeft nog z'n oude radio. De radio is na al die jaren wel wat versleten. Maar hij doet het nog prima. Hij geeft een erg mooi, authentiek geluid. Mijn oom wil van de radio af, omdat hij zo oud is. Maar dat is zonde van z'n mooie radio!

Op de plank stond een oude radio. De radio vroeg zich af waarom hij nooit meer werd gebruikt. Hij was een beetje jaloers op de televisie. Maar hij hield altijd hoop. Hij wist zeker dat er op een dag weer van hem zou worden gehouden. Ik hoop het ook voor de radio!

Vorige week had de radio zijn laatste dag op school. De radio geeft les in geschiedenis. Uren kan hij vertellen over de meest interessante onderwerpen. Zijn leerlingen houden van zijn lessen. Maar nu heeft de radio lekker zomervakantie. Na de zomer begint het werk weer voor de radio.

Boot - zeil

Er vaart een boot op zee. De boot is al 5 dagen onderweg. Hij is zwaar beladen met containers. Daardoor gaat hij minder snel. Over 3 dagen zal de boot bij zijn eindbestemming arriveren. Daar halen havenmedewerkers de containers van de boot.

In de haven ligt een boot. De boot is moe van zijn zware reis. Hij heeft 3 weken op open zee moeten varen. Hij voelde zich erg eenzaam gedurende die tijd. Nu de boot weer thuis is voelt hij zich weer op zijn gemak. Gelukkig maar voor de boot!

Op de kade loopt een boot. De boot is hier net aangekomen. Hij lust nu wel wat te eten en te drinken. Hij gaat de eerste de beste kroeg binnen die hij ziet. De boot bestelt een jenever en een gehaktbal. De barman begint een praatje met de boot.

Klok - wijzer

In het klaslokaal hing een klok. De klok was gestopt met tikken. De leraar heeft toen de batterijen verwisseld. Nu doet hij het weer. De klok hangt weer op zijn oude plek in het klaslokaal. Iedereen kan weer zien hoe laat het is op de klok.

Aan de muur hangt een klok. De klok voelt zich al een tijdje overbodig. Hij beseft dat niemand hem meer nodig heeft om de tijd te weten. Dat maakte hem verdrietig. De klok zou willen dat er wat meer naar hem gekeken werd. Maar helaas is dit het lot van de klok.

In het bos wandelt een klok. De klok schopt her en der een takje weg. Hij had vandaag geen zin om te werken. Hij heeft net zijn baas gebeld om te zeggen dat hij niet kwam. Maar morgen is het weer een gewone werkdag voor de klok.

Bloem - blad

Er staat een bloem in de vaas. De bloem is paars met wit. Hij staat er al een dikke week. Hij is nu wel een beetje verwelkt. De bloem zal een dezer dagen wel weggegooid worden. Maar eerst wordt nog het water ververst van de bloem.

In de winkel staat een bloem. De bloem is bang dat hij niet meer verkocht gaat worden. Hij is zelfs al sterk afgeprijsd. Hij wordt met de dag zenuwachtiger. De bloem voelt zich ongewild en overbodig. Laten we hopen dat het goed afloopt voor de bloem.

In de bar zit een bloem. De bloem begint een gesprek met zijn buurvrouw. Hij vertelt haar over zijn carrière. Daarna vraagt hij haar ten dans. De bloem en de buurvrouw dansen de chachacha. Het is een succesvolle avond voor de bloem.

Luchtballon - mand

In de lucht zweeft een luchtballon. De luchtballon komt steeds dichterbij. Als hij maar niet tegen de toren van de fabriek botst! Net op tijd buigt de luchtballon naar links. Hij mist de toren maar net. Daar gaat de luchtballon.

Er was eens een luchtballon met hoogtevrees. De luchtballon was altijd bang. Elke dag hoopte hij dat hij niet de lucht in hoefde. Op een dag raakte hij lek. De luchtballon begreep dat hij nu altijd aan de grond mocht blijven. Dat was mazzel voor de luchtballon.

In de trein zit een luchtballon. Hij heeft een dagje vrij. Daarom heeft de luchtballon een kaartje gekocht. Hij gaat vandaag zijn familie opzoeken. De luchtballon kijkt uit het raam als de trein stopt. Tijd om uit te stappen voor de luchtballon.

Tafel - poot

Al jaren stond er een eiken tafel in de antiekzaak. We vonden het een leuke tafel. Maar blijkbaar waren we de enigen. Niemand kocht de tafel. Op een dag besloten we hem dan toch maar zelf te kopen. De verkoopster was blij. Ze zei dat we veel plezier zouden hebben van de tafel.

Er was eens een tafel met een slecht geheugen. Op een dag vergat hij zelfs wie hij was. De tafel dacht lang en diep na. Eerst bleef het nog lang mistig in zijn hoofd. Maar ineens wist de tafel het weer! O ja, hij was de tafel.

Er fietst een tafel naar de universiteit. De tafel fietst heel hard. Anders komt hij te laat voor het tentamen. Maar halverwege krijgt de tafel een leuke band. Hij laat de fiets staan en begint te rennen. Nog net op tijd arriveert de tafel.

Auto - wiel

Er kwam een auto onze straat in rijden. Maar het is een doodlopende straat. De auto kon dus niet verder. Maar de bestuurder wilde blijkbaar niet keren. Dus reed de auto het weiland in en kwam vast te zitten in de modder. Wat een pech voor de auto.

Er was eens een auto verschrikkelijk gefrustreerd. Hij moest elke dag hetzelfde stukje rijden. Daar baalde de auto enorm van. Op een dag besloot hij het gewoon niet meer te doen. Dus werd de auto naar de garage gesleept. Dat was een heel avontuur voor de auto.

Er kwam eens een auto aan de deur. Hij vroeg of de schoorsteen nog geveegd moest worden. Daarna ging de auto het dak op. Hij veegde de schoorsteen

helemaal schoon. Maar zelf was de auto toen helemaal vies. Dat was niet zo slim van de auto.

Appendix B - Filler materials

Directeur - baas

Het kantoor heeft een nieuwe directeur. De directeur heeft al kennis gemaakt met het personeel. De directeur is een rare man. Hij zou zijn ontslagen bij zijn vorige baan. Niemand weet precies waarom. Over de directeur wordt nog steeds veel geroddeld.

Meisje - vlecht

We hadden een nieuw meisje in de klas. Ze had mooie lange vlechten. In het begin was ze een beetje verlegen. Later begon ze zich wat meer op haar gemak te voelen. Nu heeft ze heel veel vriendinnen. Ze is zelfs het populairste meisje van de klas.

Duif - veer

Er zit al weken een duif op het dak. De duif maakt iedere ochtend erg veel lawaai. Dat maakt me steeds wakker. En dan poept ze ook nog eens mijn hele auto vol. Ik zou willen dat die duif zou vertrekken. Weg met dat beest!

Paard - hoef

Er was eens een paard. Het paard rende wat rond in de wei. Op een dag liet iemand het hek open staan, en het paard ontsnapte. Het paard wilde de straat oversteken. Maar toen kwam er een vrachtwagen de weg in gereden. Dat liep niet goed af.

Schildpad - flem

In de dierentuin ligt een schildpad. De schildpad is oud en ziek. De schildpad is het enige nog levende lid van zijn soort. Tenminste, dat dacht men. Op een ver eiland zijn nog meer exemplaren gevonden. Hopelijk komen die niet in de dierentuin terecht.

Muis - bitek

In de kelder slaapt een muis. Iedere nacht komt de muis naar boven en steelt ze onze kaas. Mijn huisbaas was het zo zat dat hij vallen zette voor de muis.

Maar daar trapte ze niet in. Behendig at ze de kaas uit de muizenvallen, zonder ze te laten dichtslaan. Wat een slimme muis!

Timmerman - spuker

De timmerman heeft een vrije dag. Hij besluit een dagje uit te gaan met zijn gezin. De timmerman neemt zijn gezin mee naar een pretpark. Ze hebben veel plezier, en de tijd vliegt. Het is al laat als ze weer naar huis vertrekken, maar met een goed gevoel. Behalve de timmerman, hij moet morgen weer om 5 uur opstaan.

Leraar - fieb

Voor de klas stond een nieuwe leraar. Hij had een baardje en een bril op. De klas lette totaal niet op de leraar. Tot hij ineens vreselijk begon te schreeuwen. Toen werd de klas muisstil. En de leraar kon met de les beginnen.

Vogel - blun

Er woonde een vogel in de klimop. De klimop groeide tegen het raam. s Nachts sliep de vogel daar, lekker warm. Maar op een dag werd het raam vervangen. De klimop ging dood. En de vogel moest op zoek naar een nieuwe slaappleats.

Kip - woet

Er kwam een nieuwe kip op de boerderij. Ze maakte de hele tijd ruzie met de haan. De haan pikte de kip helemaal kaal. Bovendien legde de kip geen eieren. De boer snapte er niks van. Toen bleek dat de kip ook een haan was.

Slang - mup

Op een dag was het hok van de slang leeg. De familie was in rep en roer. De slang was namelijk giftig. Niemand durfde die avond te gaan slapen. En dat was maar goed ook. Want de slang bleek in een van de bedden te liggen.

Spin - soter

Er liep een spin op de tafel. Hij had nog maar 7 poten. Maar daar had hij niet zoveel last van. De spin rende als een speer van de ene naar de andere

kant van tafel. Hij kon alleen niet meer op tijd remmen. De spin kukelde van de tafel.

Gorilla - stieket

In de dierentuin woonde een gorilla. Elke dag kwam er een vrouw bij hem op bezoek. De vrouw trok gekke bekken naar hem. Op een dag brak de gorilla uit zijn kooi. Hij rende de vrouw achterna. Pas uren later kon de gorilla weer gevangen worden.

Bakker - glotse

Er is een bakker naast ons komen wonen. Elke dag staat hij om 4 uur op om verse broodjes te bakken. Dan vertrekt hij met zijn motor naar de zaak. Soms word ik dan even wakker. Dan ben ik blij dat ik de bakker niet ben. Maar zelf vindt de bakker zijn beroep gelukkig erg leuk.

Helikopter - kenin

Op de oude basis stond een helikopter. Niemand wist meer dat de helikopter daar stond. Vorige zomer werd de basis gesloopt, en kwam de helikopter tevoorschijn. Tot ieders verbazing was de helikopter nog in prima staat. Er is die zomer zelfs nog mee gevlogen. Wie had dat gedacht van z'n oud ding.

Bal - tofel

We zagen een bal in de boom. Niemand wist hoe de bal daar terecht was gekomen. We probeerden hem uit de boom te schudden. Toen gebruikten we een lange stok. En ja hoor, daar viel de bal uit de boom. Nu is de bal van ons.

Broek - hosbu

Ik kocht een nieuwe broek in de winkel. De broek was rood met met groene strepen. Toen ik de broek thuis aantrok vond ik hem toch wel erg bont. Ik ging weer terug naar de winkel. Maar de broek kon niet worden geruild. Nu houd ik hem maar voor carnaval.

Kapstok - dorg

We hebben een nieuwe kapstok gekocht. Hij staat bij ons in de gang. De

kapstok bleek alleen iets te groot te zijn. Nu kan niemand er haast meer langs. Bovendien kleurt hij ook niet mooi bij het behang. Hopelijk kunnen we de kapstok nog ruilen.