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Masteroppgave

Processing Differences Between Single and Extended Metaphors and Similes:

Exploring the Cognitive Mechanisms Behind Metaphor and Simile Comprehension in an Eye-Tracking Reading Paradigm

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English abstract

Are similes (e.g. *ballerinas are like butterflies*) and metaphors (e.g. *ballerinas are butterflies*) truly different, or are metaphors at the core implicit similes? In this thesis, I investigate this question in terms of processing and what types of cognitive mechanisms are necessary for comprehending the two figures of speech. I test two major contrasting theoretical frameworks within metaphor research, namely Comparison accounts and Categorisation accounts. Comparison accounts claim that metaphors and similes draw on the same cognitive mechanisms because metaphors are implicit similes, while Categorisation accounts claim that the two figures of speech express different types of concepts and require different cognitive mechanisms. Within the Categorisation framework, Carston (2010) has suggested that single and extended metaphors are processed differently. In extended metaphors, several instances of figurative language draw on the same figurative meaning, such as in the following example: *Selma often felt discouraged by her editor's <u>sharp-edged</u> feedback; his comments are <u>razors</u>.* Although there is experimental evidence in favour of a processing difference between single (such as the first metaphor example) and extended metaphors, a considerable amount of these results are compatible with theories within both the Comparison view and the Categorisation view.

To disentangle the possible explanations offered by these two views, and thereby advancing our understanding of the psychological differences between metaphors and similes, I test whether extending the figurative meaning affects metaphors and similes differently or not. Using an eye-tracking reading paradigm, this study finds that extending the figurative meaning of metaphors yields faster reading times compared to single metaphors, but the same processing difference does not appear for similes. This is more compatible with Categorisation accounts than Comparison accounts; if the cognitive mechanism behind metaphor and simile processing is the same, we would expect there to be a comparable processing difference between metaphors and similes in the single and extended conditions. In the discussion, I set out a version of a Categorisation view that differentiates between the processing modes required by single and extended metaphors and elaborate on why Comparison accounts fail to explain the results of this study.

Norsk sammendrag

Er similer (f.eks. *ballettdansere er som sommerfugler*) og metaforer (f. eks. *ballettdansere er sommerfugler*) forskjellige, eller er metaforer egentlig implisitte similer? I denne studien undersøker jeg dette spørsmålet ved å se på kognitive mekanismer bak prosessering av similer og metaforer. Jeg tester to sentrale syn innenfor metaforstudier: sammenligningsteorier og kategoriseringsteorier. Sammenligningsteorier hevder at metaforer og similer prosesseres gjennom den samme kognitive mekanismen fordi metaforer er implisitte similer. Kategoriseringsteorier hevder derimot at prosessering av similer og metaforer krever forskjellige kognitive mekanismer fordi de uttrykker forskjellige typer konsepter. Innenfor kategoriseringsteori har Carston (2010) foreslått at utvidede metaforer ikke prosesseres på samme måte som enkle metaforer (slik som det første metaforeksempelet). Utvidede metaforer innebærer at flere tilfeller av figurativt språk i samme ytring knyttes til den samme overordnede figurative betydningen, som i det følgende eksempelet: *Selma følte seg ofte nedslått av de <u>knivskarpe</u> tilbakemeldingene fra redaktøren sin; kommentarene hans er <u>barberblader</u>*. Det finnes støtte fra eksperimentelle studier for at enkle og utvidede metaforer ikke prosesseres likt, men flere av disse resultatene er kompatible med både sammenligningsteorier og kategoriseringsteorier.

For å nøste opp i forklaringene som tilbys av de to teoretiske rammeverkene, og dermed forbedre forståelsen vår av de psykologiske forskjellene mellom similer og metaforer, tester jeg hvordan utvidelse av figurativ betydning påvirker prosessering av både similer og metaforer. For å teste hypotesene mine bruker jeg blikksporingsteknologi. Resultatene antyder at utvidelser av den figurative betydningen gjør at metaforer, men *ikke* similer, leses fortere. Resultatene samsvarer dermed mer med kategoriseringsteorier enn med sammenligningsteorier; dersom den kognitive mekanismen bak prosessering av similer og metaforer er den samme burde de påvirkes likt av at deres figurative betydning utvides. I diskusjonskapittelet legger jeg fram en kategoriseringsteori som skiller mellom prosessering av enkle og utvidede metaforer. I tillegg argumenterer jeg for hvorfor sammenligningsteorier ikke er i stand til å redegjøre for resultatene av denne studien.

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1. Introduction

1.1 Motivation and scope of study

When we talk to each other, we switch between speaking literally and non-literally without even thinking about it and without creating any issues in communication – if I call my best friend a comforting blanket, she probably isn't going to say "Hey, that's not true! I'm not a blanket, I'm a person!".[1] Intuitively, successful communication hinges on speakers relying on a common understanding of which linguistic forms correspond to which meanings – our ability to spontaneously use non-literal language and automatically understand what other people mean when they speak non-literally may therefore seem like a contradictory quality of language and communication. How do we make the jump from what someone says at the surface level to what they actually communicate to us, and why can we do it so effortlessly? In this thesis, I am taking a closer look at the cognitive mechanisms required to do this. I will do so by investigating the relation between metaphors and similes.

At first glance, metaphors and similes may not seem that different. For example, certain metaphors can easily be paraphrased into similes by adding a comparison term without dramatically changing the figurative meaning of the expression:

1) My best friend is a comforting blanket.

2) My best friend is <u>like</u> a comforting blanket.

The metaphor in example (1) above might be taken to mean that I think my best friend is comfortable to be around and that I can depend on her to comfort me when I need it. The same interpretation can arguably be reached from the simile in example (2).

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[1] This does not mean that misunderstandings never occur, but misunderstandings are just as likely to happen in literal speech as in non-literal speech.

Examples (1) and (2) are classic examples of the types of metaphor and similes that have received the most attention – metaphors and similes with this form are commonly called *single nominal* metaphors and similes. However, it is a well-known fact that metaphors and similes often have different and more complicated forms. One example of a different type of metaphor that this thesis will deal with is *extended metaphor*. In extended metaphors, several terms connected to the same conceptual domain are used metaphorically to create an extended metaphorical meaning, such as in the following example:

> 3) Noah spends four hours a day in the gym. He <u>forges</u> his body intensively. His muscles are <u>steel</u> and he was very proud.

In example (3), both *forges* and *steel* are used metaphorically, making the metaphor an extended one. The distinction between single and extended metaphors is important because it is unclear whether they are processed differently from each other or not.

Another important distinction is that between novel and conventional metaphors and similes. Examples (1) and (3) are both quite novel, meaning that their metaphorical meaning is not conventionally associated with the lexical entry of the metaphoric vehicle. To illustrate with a few counterexamples, consider the metaphors *life is a journey* or *the mind is a computer*. These metaphors have grown conventional through repeated use and therefore have a more established meaning than the novel examples in (1) and (3). Because I am interested in the cognitive processes behind how we understand the meaning of non-literal utterances that are new to us and where there is no firmly established figurative meaning to draw on, my study focuses on novel metaphors and similes. In the literature review, I set out the distinctions between single vs. extended and novel vs. conventional metaphors in more detail.

Although metaphors are often thought of as primarily poetic or rhetorical tools, they occur frequently in everyday speech in a large variety of forms. This brings me back to my initial question of how we are able to use non-literal language as effortlessly as we do – this puzzling feature of communication is my main motivation for conducting this study. Metaphor is one of the most classic examples of non-literal speech, and understanding the underlying cognitive process behind

metaphor comprehension is a considerable step forward in understanding how human communicative abilities work.

I will be comparing processing of single and extended metaphors and similes to learn more about the cognitive mechanisms behind metaphor and simile processing. There are two major strands in research on metaphor processing, namely the Comparison View and the Categorisation View, that see metaphors as either being processed *similarly* or *differently* from similes. In this project, I will test these views by seeing if extending the figurative meaning affects metaphors and similes differently or not. To explore these dimensions of metaphor and simile processing, I will be looking at the following research questions:

Research Question 1) Do single and extended metaphors require different processing modes?

Research Question 2) Is there a similar processing difference between single and extended metaphors and similes?

Research Question 3) Does processing of metaphors and similes require different cognitive mechanisms, or do they draw on the same ones?

Previous studies have found that extended metaphors are read faster than single metaphors. This study tests if we find the same effect for similes when they appear in a passage with an extended figurative meaning. If both metaphors and similes are read faster in the extended condition, this suggests that the two figures of speech are interpreted through the same cognitive mechanism. If there is an interaction effect where only metaphors, but not similes, are read faster in the extended condition, this suggests that processing the two figures of speech require different cognitive mechanisms. A large number of studies have investigated processing differences between metaphors and similes. Previous studies have also looked at processing differences between single and extended metaphors, although this has been studied far less than single metaphors and similes. This project is, to my knowledge, the first to compare both single and extended metaphors to processing of similes.

This study uses an eye-tracking reading paradigm. There are several benefits to using eye-tracking during reading instead of, for example, a self-paced reading task to examine reading times as an indication of processing. Using eye-tracking during reading yields more precise measures, and allows us to analyse smaller units of language. This means that this study can isolate reading times for the simile and metaphor vehicles only (as opposed to the whole phrase). This is an important advantage considering that metaphors and similes differ in their surface form as similes contain an explicit comparison term while metaphors do not. Further, eye-tracking yields more fine-grained measures of reading times that allow us to distinguish between early and late stages of processing.

1.2 Outline of thesis

I will start by giving an overview of influential research on metaphors and similes. Here, my main aim is to clarify the types of metaphors and similes I will look at in my thesis, as well as clearly explaining the differences between Comparison and Categorisation views of metaphor.

In the method chapter I will set out and explain the predictions these views make for reading times in eye-tracking during reading. I will also provide an overview of the history of eye-tracking in linguistics and set out the types of eye-tracking measures I am looking at in this thesis and why. I will also provide information about the participants and recruitment, the linguistic stimuli, the procedure of the test session, the design of the study, and the statistical analysis.

In the results section I will present the results of the study. This study found that 1) similes are overall read faster than metaphors, 2) there is a processing difference between single and extended metaphors: extended metaphors are read faster than single metaphors, and 3) there is not a comparable processing difference between the single and extended metaphor and simile conditions – extended metaphors were read faster than single metaphors, but extending the figurative meaning in similes did not yield a similar effect.

In the discussion section, I present my interpretation of the results and discuss what the results mean for theories of metaphor and simile processing. I argue that the results suggest that metaphor and simile processing draw on different cognitive mechanisms, thereby supporting the Categorisation View, and that single and extended metaphors are processed differently, supporting Carston's (2010) Dual Processing View.

I will also set out some central methodological challenges and discuss how these challenges might be dealt with in future studies. Finally, I point to some interesting directions for future studies investigating processing of single and extended metaphors and similes by looking at how children develop their understanding of extended metaphors, making adjustments to the items of the study, and exploring the role of analogical reasoning in extended metaphors.

2. Literature review

2.1 Background

2.1.1 What is a metaphor?

Most people have an intuitive grasp of what metaphor is – we usually recognise one when we see it. But it has proved to be hard to say what exactly are the criteria for an utterance to qualify as a metaphor. In the following section, I will set out some of the most influential discussions of metaphor, briefly discuss a few studies on how metaphor comprehension develops, and specify what types of metaphors I will be looking at in this study.

Metaphor is perhaps particularly famous for occurring in literary texts, especially in poetry. But it is also pervasive in our everyday language – if I say that the tenors in my choir are *bagpipes*, and that the sopranos are *flutes*, most people would not have any difficulty in understanding what I mean. The tenors might be offended, while the sopranos would be flattered. We can have conversations where both we and our addressees are fully aware that what we say is literally untrue without there being any trouble understanding each other at all. How do we do that, and how is it different from understanding literal language? And why would someone choose to say that the tenors are bagpipes rather than "the tenors in our choir don't blend well with the rest of the choir and aren't very good"?

Grice, Searle and the Standard Pragmatic Model

A key component in pragmatic theories is figuring out how we infer what a speaker intends to mean – this requires going beyond syntax and linguistic semantics. Accounting for how we infer speaker intention and perform pragmatic enrichment calls for investigating psychological processes as well as linguistic structures (Noveck, 2018). This brings pragmatics into the realm of cognitive sciences. Further, investigations of mental states are of considerable interest to psychologists as well as linguists. Noveck (2018, p. 12) points to the philosophical origins of pragmatics and its natural

ties to psychology to underline how pragmatics is different from other subdisciplines of linguistics due the interdisciplinary nature of its theories and methodological approaches.

Pragmatics has its roots in the philosophy of language, most notably *the Ordinary Language School*. Philosophers belonging to this line of thought, such as Grice, Searle and Austin, cared about learning more about the link between sentence meaning on the one hand and how language is used on the other (Noveck, 2018, p. 11). The emergence of the Ordinary Language School brought about a view of language that stood in stark contrast to how language traditionally had been approached in philosophy by the Ideal Language School, namely as logical components and propositions that are either true or false. Focusing on how sentences can be broken down into logical components that when combined express a proposition leaves out many ways we use language to communicate with each other, such as questions, wishes, requests, commands, etc. It also fails to deal with many of the ways in which language underdetermines thought. These problems with the Ideal Language School led to the rise of the Ordinary Language School. This does not mean that logic does not play an important role in current research – formal logic and logical analyses are still important tools in research on pragmatics. To sum up, part of the emergence of pragmatics as a field was caused by the philosophical gap between the Ideal and Ordinary schools of language (Noveck, 2018, p. 12)

Like many other figures of speech, metaphors are figurative and non-literal. Roughly put, there is a discrepancy between the metaphorical meaning and the literal surface meaning of the metaphorical statement. This discrepancy is what Grice takes as his starting point when he accounts for how we understand metaphor. Paul Grice was part of the Ordinary Language School and set out a view of language that would form the basis for several major theoretic frameworks within pragmatics. His pioneering work highlighted the role of speaker intention and inference in communication. In *Logic and Conversation*, Grice (1975) gives one of the most influential explanations of how we derive metaphorical meaning. As I will elaborate on later, reinterpretations of Grice's view of metaphor in processing terms generated a large body of experimental research, although his discussion of metaphor specifically was very brief.

Grice's theory of communication hinges on cooperation between speakers, and assumes that participants in a conversation follow the Cooperative Principle:

> Make your contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged (Grice, 1975, p. 45).

In other words, communication is a cooperative endeavour which requires coordination on both the speaker and hearer's end. Furthermore, Grice famously specifies four maxims with their own submaxims that direct communication and which can be exploited by speakers in order to intentionally imply ('implicate') things that they do not say. In Grice's view, the meanings a speaker can convey with metaphors are *implicatures.*

In Grice's dichotomy of *what is said* vs. *what is meant*, implicatures are what speakers mean in cases where the hearer has to derive an interpretation that goes beyond what is said. By *what is said*, Grice refers to the propositional meaning that is closely connected to the conventional meaning of the words a speaker utters. Another way to phrase this is that the meaning of what is said is the meaning we can understand using only knowledge about the particular language, and without knowledge of context or circumstance – at least to a certain degree; context is still necessary to disambiguate indexicals and other ambiguous terms (Grice, 1975, p. 25; Carston, 2002, p.105). In many cases, the speaker's meaning includes both what is said and what is meant, such as in Grice's classic example where a professor of philosophy writes in a recommendation letter that his student has excellent handwriting. In this example, what is said is that the student has excellent handwriting, but the professor also intends to communicate that the student is not very good at philosophy – why else would he be so underinformative about the student's academic performance? In metaphors, in contrast, according to Grice the speaker meaning lies only in the implicature: the speaker doesn't mean what she says (or seems to say[2]) (Neale, 1992, p. 554). For example, when I call the tenors in my choir bagpipes, I am not calling them bagpipes in the literal sense, but (on Grice's account) rather expressing the implicature that the tenors don't sound good.

Grice's idea of metaphorical meaning is that it is some type of deviation from literal meaning – what is said. To convey a metaphorical meaning, the speaker says (or rather seems to say) something false, thereby flouting the first Maxim of Quality:

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[2] Grice's own term for this was 'making as if to say' (Grice, 1975, 49-50).

Grice's Maxims of Quality:

1. Do not say what you believe to be false.

2. Do not say that for which you lack adequate evidence. (Grice, 1975, p. 46)

To demonstrate a Gricean analysis of metaphorical meaning, we can revisit this example:

4) The sopranos are flutes.

This is literally false; the sopranos in any choir are people, not flutes. The speaker of (5) thereby breaks the first maxim on a literal level; they seem to be saying something they believe to be false. Although the hearer is able to recognize that (4) is literally not true, they are able to derive a metaphorical meaning. How? The Gricean answer is that because the speaker is assumed to be following the Cooperative Principle, the hearer looks for an intended meaning that fits in the context – in (4), the hearer could for example take the speaker to mean that the sopranos are skilled at singing high notes. Further, he specifies that in a metaphor such as "you are the cream in my coffee", the speaker is attributing properties in which the addressee resembles the metaphor topic.

Although Grice's account of metaphors is not committed to any particular model of the steps involved in processing nor the order in which they occur (he wrote that conversational implicatures might be 'intuitively grasped' rather than 'worked out': 1975, p. 50), reinterpretations of his view gave rise to the Standard Pragmatic Model (SPM) (Gibbs, 1986). The SPM has played a crucial role in research on metaphor processing – and other work on implicatures – because it provides clear and testable psychological claims about processing: 1) Readers will first derive the propositional content of the sentence uttered, then 2) evaluate the truth value of the proposition, and 3) assign the utterance a non-literal meaning (Noveck, 2018, p. 69). This view is also referred to as the literal-first view, as it proposes that readers always compute the literal meaning first, and that non-literal meaning could be seen as first and foremost a deviation from literal meaning.

A version of the literal-first view was set out by Searle (1993, pp. 102–103). Searle asks how it is possible for communication to work when the speaker is not literally saying what they mean.

His answer is that hearers must (generally unconsciously) go through distinct steps: first "determining whether or not he has to seek a metaphorical interpretation of the utterance in the first place", then working out what non-literal meaning the speaker intended to convey. (Searle, 1993, p. 103).

Searle also draws a dividing line between metaphorical and literal meaning in Gricean terms: he appeals to Grice's distinction between *sentence meaning* on the one hand, and *speaker meaning* on the other. By sentence meaning, Searle is referring to what is thought of as a sentence's literal meaning, although he concedes that it is difficult to pin down exactly what the term 'literal meaning' means. Searle (1993, p. 87) claims that in literal speech speaker meaning is equal to literal sentence meaning, while in nonliteral speech, including metaphor, "the meanings of the words uttered by the speaker do not exactly and literally express what the speaker meant." (Searle, 1993, p. 84).

As psychology and psycholinguistics have developed increasingly more sophisticated ways of investigating cognition and language processing, researchers of pragmatics have gotten more tools to conduct empirical investigations. The past twenty years have seen the rise of *experimental pragmatics*, in which experimental methods from psychology and psycholinguistics are applied to theories and questions from pragmatics and philosophy of language (Noveck, 2018, p. 12). Since its development, the SPM has been tested in a considerable amount of experimental work, and there is now some consensus that that people do not have to go through the literal meaning, and then reject it, before they reach the figurative one (Glucksberg, 2003; Pouscoulous & Dulcinati, 2019). Studies measuring reading times of metaphorical utterances, for example, have shown that with rich enough contexts, metaphorical utterances are interpreted as fast as literal utterances (Gerrig, 1989). Further evidence against the SPM as a general account of implicature processing comes from Gibbs' (1983) work on processing of indirect requests. Gibbs (1983) found that indirect requests can be interpreted just as fast as direct ones, and even faster when the form of the indirect request is conventional. This goes directly against what the SPM would predict – since indirect requests deviate from literal meaning a purely Gricean account would predict that they would take longer to interpret (Noveck, 2018, p. 73).

A possible angle into understanding the nature of metaphors and what cognitive resources we need to understand them is to explore whether it is possible to distinguish metaphorical meaning from literal meaning. However, several authors have pointed to the difficulty of distinguishing between literal and metaphorical meaning, and some have even argued that the notion of literal meaning is of no use to theories of communication (Giora, 2008; Wilson & Carston, 2007; Sperber & Wilson, 2002). Views that see literal meaning as being arrived at in the same way as non-literal and figurative meaning, for example, hold the idea that the literal vs. non-literal distinction does not have any explanatory power for theories of communication and utterance interpretation[3]. In response to these claims, Allott and Textor (2022) have recently argued that theories of communication need a distinction between literal and non-literal meaning even if it would not make a difference to the pragmatic processes involved in utterance interpretation.

When justifying the role of a distinction between the literal and non-literal, Allott and Textor (2022) point to the fact that the goal of communication often is to transfer knowledge. To illustrate their view, Allott and Textor (2022) discuss metaphorical vs. literal meaning. They point out that metaphorical language cannot be used to transfer knowledge. For example, the addressee of the utterance "that tenor is a bagpipe" will not have learnt anything new about bagpipes as a musical instrument. Only a literal use of *bagpipe*, such as "one of the most prominent instruments in Celtic music is the bagpipe", will act as a link in a chain of knowledge transmission about bagpipes from the speaker to the hearer (Allott & Textor, 2022, p. 8). Allott and Textor (2022) also point to the fact that most people are able to recognize when a word is used non-literally or not. Allott and Textor (2022) argue their view explains how the mechanics of communication limits transfer of knowledge while also respecting the folk-theoretic notion between literal and non-literal.

To explain the distinction between literal and non-literal meaning, Allott and Textor (2022) claim that literal uses of words are made with an intention to conform to the 'traditional'

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[3] I will set out an example of this view, The Deflationary Account of Metaphor, in section 1.2.2 on categorisation accounts of metaphor. I will also discuss this view more elaborately in light of the results of this study in chapter 4: *Discussion*.

use of that word. For example, when making a literal statement about bagpipes, the speaker will have an intention to stick to how 'bagpipes' traditionally has been used in that speaker's community. Non-literal use of a word will, on the other hand, be made with an intention to *not* conform with the traditional use of the word in question (Allott & Textor, 2022, p. 14). Another way to phrase their view is to say that non-literal use depends on there being a traditional way to use a word, whereas literal uses do not depend on figurative ones: an 'asymmetric dependency'. A piece of evidence for this position is the apparent impossibility of simultaneously coining a new word *and* using it metaphorically – because we cannot do this, it seems that non-literal use indeed does depend on the existence of a literal, traditional use (Allott & Textor, 2022, p. 15).

Two important distinctions: Novel vs. Conventional and Single vs. Extended

The above sections provide a very brief summary of how different scholars explain the nature of metaphors and metaphorical meanings. My study seeks to address questions regarding how we *process* two types of metaphor, and later sections will provide different accounts of metaphor that seek to answer this question, rather than to provide an account or analysis of what metaphors *are*.

A few final necessary specifications have to do with what types of metaphors I look at – my study will only be concerned with processing of single or extended novel nominal metaphors. So, there are two dividing lines that need to be set out: single vs. extended nominal metaphors, and novel vs. conventional metaphors. I will begin with the latter.

The level of conventionality of metaphors can be seen as a sliding scale with completely new metaphors on the one end, and dead metaphors – i.e. metaphors that have become lexicalised – on the other. We can typically rephrase a novel metaphor to a simile without problem:

5) The poor isolation in Mary's London apartment caused the temperature to drop severely during winter. Coming home was opening a door to Siberia.

6) The poor isolation in Mary's London apartment caused the temperature to drop severely during winter. Coming home was <u>like</u> opening a door to Siberia.

The only difference between (5) and (6) is the comparison term *like*.

An example of a dead metaphor is describing the hole at the top of a needle where the thread is inserted as *the eye of the needle*. Through frequent use, the metaphorical meaning has become conventionalised to the point of no longer being connected to its original literal meaning. To demonstrate, notice the oddness of the following sentence: "The hole in the needle where you insert the thread is like the eye of the needle." The infelicity of the simile form shows to what extent the figurative meaning has been conventionalised (Bowdle & Gentner, 2005, p. 209). The eye of the needle is at the extreme end of the novel/conventionality scale – other examples of conventional metaphors include *love is a rose* or *death is sleep*. Although we could felicitously transform these metaphors to similes – evidence that they are not fully lexicalised – both these metaphors presumably convey a somewhat already familiar figurative meaning to a certain community of speakers. My study will not be concerned with conventionalised metaphors, but rather with novel metaphors and corresponding similes. This is because it is plausible that processing is different for conventionalised metaphors, involving the retrieval of a stored meaning, rather than the generation of a meaning to fit the context.

Truly novel metaphors do not have any degree of conventionalisation, and require the hearer to derive meanings that are not associated with pre-established conceptual connections (Wearing, 2014, p. 84). In her discussion of how these truly novel metaphors are processed, which I will return to in the next section, Wearing (2014) concedes that few metaphors, even creative poetic ones, are completely disconnected from formerly drawn connections between seemingly distant concepts. Wearing (2014) points out how the meanings of many creative and new metaphors are "parasitic" on conventional metaphorical meanings – familiarity with the metaphor "unfriendly people are cold" would for example prevent metaphors like "Bethany is an icicle" or "Bethany will freeze you out" from counting as (fully) novel on Wearing's account. Of course, different people will have different degrees of familiarity with certain metaphorical meanings. In my thesis, I want to explore how people process metaphors that are novel to them. In the methods section, I will elaborate on how this thesis attempts to control for this in the critical items.

The second distinction I need to make is between *single* and *extended* metaphors. The last sentence in example (5), "coming home was opening a door to Siberia", is an instance of a single

metaphor – everything in (5) is literal up to the last sentence, which contains the metaphorical content. However, there are many instances where the metaphorical content of a passage is not contained in a single construction consisting of one metaphor topic and one vehicle, such as Emily Dickinson's poem no. 1788 (terms used metaphorically underlined by me):

> Fame is a <u>bee</u>.
> It has a <u>song</u> —
> It has a <u>sting</u> —
> Ah, too, it has a <u>wing</u>. (Dickinson, 2022)

This poem opens with the nominal metaphor "fame is a bee" and continues to apply literal features of the metaphor vehicle, *bee*, to the metaphor topic, *fame*. The fact that the metaphorical passage draws on several of the lexical features of the metaphor vehicle makes it an instance of an extended metaphor, as opposed to a single one. To further illustrate, we can rewrite (5) to make it extended:

> 5b) The poor isolation in Mary's London apartment caused <u>arctic temperatures</u> and turned her floor into <u>tundra</u> during winter. Coming home was opening a door to Siberia.

This distinction is important because it is unclear whether we process single and extended metaphors in the same way. Different theories make different predictions regarding processing differences. If empirical evidence should support a processing difference, a satisfactory theory of metaphor should be able to account for this processing difference. In section 2.2.3 in the Theory and Experiments section, I will set out how a few different theoretical views interact with single and extended metaphors, and how these notions relate to what I am testing in my thesis.

2.1.2 What is a simile?

Similes are explicit figurative comparisons. In contrast to metaphor, they always contain comparison terms such as *like* and *as if*. Classic examples of similes have the structure of *X is like Y*, as in example (7):

7) Happiness is like a sunny day.

Similes can be just as powerful tools as metaphors for evoking figurative meaning, and often appear alongside other figures of speech, such as in Emily Dickinson's poem 180 (comparison terms highlighted by me):

> <u>As if</u> some little Arctic flower
> Upon the polar hem —
> Went wandering down the Latitudes
> Until it puzzled came
> To continents of summer —
> To firmaments of sun —
> To strange, bright crowds of flowers —
> And birds, of foreign tongue!
> I say, <u>As if</u> this little flower
> To Eden, wandered in —
> What then? Why nothing,
> Only, your *inference* therefrom! (Dickinson, 1998, p. 211)

Here, the poetic self is making an explicit comparison between themselves and an arctic flower, and the whole poem is embedded within this simile. Poem 180 is a good example of a highly poetic simile, and shows a different type of simile than the typical *X is like Y* form.

As mentioned in the introduction, certain examples of metaphor and simile may give the impression that they are equivalent to one another. Example (7), for instance, may be easily converted to a metaphor without compromising the figurative meaning of the phrase too much: *Happiness is a sunny day*. Both the metaphor and the simile arguably communicate that happiness can feel warm and bright. Poem 180 is an example of a simile which cannot be easily transformed into a metaphor without making considerable changes to the form, and as a consequence, change the expressed figurative meanings. Examples where the simile form seems to convey a different meaning from the metaphor form suggest that their relation is more complicated than examples

like *X is (like) Y* may lead us to believe, and a comparison of their processing in both figurative and literal contexts will contribute to a better understanding of their relation.

Simile has not been as widely discussed as metaphor, and many discussions of similes are embedded in a discussion of metaphor (Addison, 1993, p. 403). A possible way to see similes is that they arise through grammar, i.e. from the use of comparison terms (Addison, 1993, p. 404; Brooke-Rose, 1958). However, this way of drawing the distinction leaves the following question open: when does an utterance count as a literal comparison, and when does it count as a figurative comparison, i.e. what we think of as similes? The following examples have the same grammatical structure and both (8) and (9) are comparison statements, but only (9) is figurative, so only (9) would count as a simile:

8) A knife is like a dagger.

9) Betrayal is like a dagger.

Disentangling non-figurative comparisons from similes is a complicated matter, and is a problem that deserves more discussion. Some theories, such as the Relevance Theoretic lexical pragmatic view, see similes as literal, although they are undeniably intuitively figurative in some sense (Carston & Wearing, 2011, p. 300). Others, such as Ortony (1979), talk about similes and metaphors in the same way as similes and claim that both phenomena have "metaphoricity".

Whether they are literal or not, I will rely on the intuition that similes are *figurative* comparisons, and that this is what distinguishes utterances like (8) from utterances like (9). As with the metaphors in this study, I am only concerned with similes here that have a *novel* figurative meaning. To exemplify two similes on slightly different places on the novel-conventional continuum, we can compare (9) and a somewhat more conventional simile: *death is like sleep*.

2.1.3 Some unresolved questions

This section has explained what is generally meant when people talk about metaphors and similes, and set out some influential early views on the role of metaphor plays in language. It has also distinguished between novel and conventional metaphors, and single vs. extended metaphors. There are many questions that have not been answered yet, including the following: Do similes and metaphors require different cognitive resources, or do they draw on the same ones? And does processing mode differ for different types of metaphor and similes? Different approaches to metaphors and similes predict different answers to those questions. In the next section, I will set out two major lines of research on these questions: the Comparison View and the Categorisation View. I will set out their different theoretical approaches to metaphor and simile processing and discuss their empirical support.

2.2 Theory and experiments

2.2.1 Comparison and analogy views of (novel) metaphors

The classic Comparison view and Black's interaction view

In classical rhetoric, metaphors have traditionally been seen as semantically equivalent to similes: on this view, metaphors are interpreted as implicit analogies or comparisons (Holyoak & Stamenković, 2018, p. 645). This is essentially the view of metaphor adopted by Grice – in his very brief discussion of metaphor in *Studies in the Way of Words*, Grice claims that the categorical falsity in a metaphorical utterance like *you are the cream in my coffee* will prompt the hearer to look for resemblances between the metaphor topic and the metaphor vehicle (Grice, 1975, p. 53).

Max Black labels the classic Comparison view *a substitution view* of metaphor (Black, 1962, p. 35). Black (1962, p. 35) calls them substitution views because the metaphorical expression can be substituted for a literal comparison and still convey the same meaning. Because the metaphorical expression is used in place of a literal meaning, its function can, on a substitution view, be taken to

be merely ornamental. As Black (1962, p. 34) puts it, "the reader is taken to enjoy problem-solving – or to delight in the author's skill at half-concealing, half-revealing his meaning.". Black criticises the substitution view for being too vague, and asks how a metaphorical expression can be informative if it is only meant to stand in the place of a synonymous literal meaning or comparison. Rather than being substitutions for formal comparisons, Black argues that metaphors have distinctive and special effects of their own (Black, 1962, p. 37).

With *the interaction view of metaphor*, Black attempts to account for the points where he argues that substitution theories fail. The interaction view of metaphor sees metaphorical meaning as arising through the interaction between systems of associations (Black, 1962, p. 39). In the metaphor "man is a wolf", for example, Black's interactionist theory predicts that *wolf* will activate associations of wolves that are applicable to the focal subject, *man*. The result will be an interpretation where human traits that can be talked about in what Black calls "wolf-language" are made prominent in our conception of man in that instance (Black, 1962, p. 41). In Black's (1962, p. 41) words, the wolf-metaphor "organizes our view of man". Black (1962, p. 44-45) explicitly distances his own view from what he calls Comparison views. Still, the view he presents is based on analogy and systems of similarities, and is in this sense a relevant predecessor of later analogy-based views. Later views, such as Ortony's, have criticised Black's account for being too metaphorical and vague.

The classic Comparison view and Black's interaction view of metaphor are concerned with metaphors' place in literature and philosophy. We will now turn to modern iterations of the comparison and analogy based views, what types of predictions they make regarding processing of metaphors and similes, and experimental support for these views.

The Structure Mapping View and the Career of Metaphor Hypothesis

One of the most influential modern formulations of a Comparison view of metaphor is Gentner and Bowdle's (2008) Structure Mapping view and the complementary Career of Metaphor view (Bowdle & Gentner, 2005). This view sees analogy and similarity as the base components of metaphor processing. Gentner and Bowdle (2008) bring to their account of metaphor processing

the notion of 'structure-mapping' from literature on analogical reasoning. Very briefly put, structure-mapping involves making structural alignments and drawing inferences based on these alignments – see for example Falkenhainer et al., (1989) for a more detailed explanation.

In metaphor processing, structural alignment would involve mapping similar predicates between the metaphor topic and the metaphor vehicle. For example, the topic of (1) – the sopranos are flutes – is *the sopranos*, while the vehicle is *flutes*. A similar predicate would be *good ability to make high notes* or *pleasant to listen to*. The local predicates are then coalesced into structurally consistent clusters, or *kernels* in the analogy literature (Gentner & Bowdle, 2008, p. 111). The kernels form the basis of the global interpretation of the metaphor, and the global interpretation will be the result of analogical reasoning about one-to-one correspondences of predicates and parallel connectivity, i.e. correspondence between arguments of corresponding predicates, between topic and vehicle (Gentner et al., 2001, p. 200). In the final stages, the kernels will be merged together, starting with the maximally consistent kernel, and subsequently moving on to the next most consistent kernel (Wolff & Gentner, 2011, p. 1459). When no more kernels can be added without compromising the consistency of the alignment, the process stops (Wolff & Gentner, 2011, p. 1459). This process is seen as being initially symmetrical, with directionality in the metaphor interpretation arising in the later stages – after an alignment has been established, properties associated with the base of the structure are projected onto the target as candidate inferences (Bowdle & Gentner, 2005; Gentner & Bowdle, 2008; Wolff & Gentner, 2011). Crucially, the Structure Mapping view (Gentner & Bowdle, 2008) predicts that structural alignment is the process behind simile comprehension as well – in other words, they have a unified view of metaphor and simile processing where the underlying cognitive mechanism behind processing the two figures of speech is assumed to be the same.

An important source of evidence that Gentner and Bowdle (2008, p. 113) lean on when arguing for the Structure Mapping view is the preference for consistency in metaphoric passages, which is particularly relevant for extended metaphors. Bowdle and Gentner (2008) argue that the Structure Mapping view naturally handles extended metaphors, while localist categorisation accounts do not. In a study testing for metaphor consistency effect, Gentner and Boronat (1992) found an increase in response time when there were domain inconsistencies in the metaphoric

passages. They used novel metaphors which ended in the same target sentences, but that varied in contexts that induced either 1) a context-consistent metaphoric reading, 2) a context-inconsistent metaphoric reading, or 3) a literal reading. Bowdle and Gentner (2008) argue that the longer reading times for context-inconsistent items speak in favour of the Structure Mapping view of metaphor as the inconsistent metaphors will disrupt the Structure Mapping process.

Within the broader framework of the Structure Mapping View of metaphor, Bowdle and Gentner (2005) have suggested that conventionality may mediate metaphor processing. The Career of Metaphor Hypothesis predicts that novel metaphors will be processed through Structure Mapping and analogical reasoning while conventional metaphors will be processed through categorisation (Bowdle & Gentner, 2005). The Career of Metaphor Hypothesis was proposed by Bowdle and Gentner (2005) to account for the conventionalisation of metaphorical meaning and how this may affect metaphor processing. The main claim of the Career of Metaphor view is that novel metaphors are interpreted via comparison, and that as they become conventionalised, they are to a larger degree interpreted as categorisations (Bowdle and Gentner 2005). For novel metaphors, their predictions regarding processing align with those of the Structure Mapping view, with analogical reasoning and the Structure Mapping View forming the basis of their account.

Bowdle and Gentner (2005, p. 199) argue that novel metaphors will be interpreted as comparisons because the metaphor vehicle will refer to concepts that are not connected to a domain-general category. In (1) for example, *the sopranos are flutes*, the lexical concept FLUTES will undergo a comparison to SOPRANOS because flutes is not already associated with a category denoting *objects that produce high notes that are pleasant to listen to*. In other words, the Career of Metaphor hypothesis sees comparison as a necessary process for deriving a metaphorical meaning when the metaphor vehicle, e.g. *flutes*, does not have a metaphorical sense.

Conventionalised metaphors, on the other hand, will be processed through categorisation. This is because the vehicle in conventionalised metaphors, in contrast to novel ones, will have a pre-established association to not only its lexically encoded concept, but also a metaphoric category (Bowdle & Gentner, 2005, p. 199). Conventional metaphor vehicles are, in other words, seen as being polysemous in that they possess both the literal meaning and metaphorical meaning. Metaphors will be interpreted via comparison if the metaphor vehicle is assigned its literal meaning

because the metaphor topic will be matched with the vehicle. If the metaphor vehicle is assigned its metaphorical category meaning, the metaphor will be processed via categorisation because the topic will be interpreted as a subordinate member of the metaphorical category.

While categorisation does play a significant role in the Career of Metaphor view, structural alignment as set out above is seen as the driving force behind both comparison and categorisation (Bowdle & Gentner, 2005, p. 199). The main difference behind how the structural mapping of properties between metaphor topic and vehicle works in novel vs. conventional metaphors lies in how properties are selected when the metaphorical meaning is constructed. In the comparison that the account claims to occur with novel metaphors, the process will be highly selective because not all properties of the metaphor vehicle will fit into the structural alignment between topic and vehicle – flutes' property of usually being made of brass will for example not be included in the final interpretation of *the sopranos are flutes*. In a conventional metaphor such as *a gene is a blueprint*, however, the Career of Metaphor view argues that the metaphor topic (*a gene*) will inherit every property of the metaphoric category associated with *blueprint* (Bowdle & Gentner, 2005, p. 199).

When it comes to the cognitive aspects of the metaphor-simile distinction, Gentner and Bowdle (2008) argue for the *grammatical concordance view*, which states that novel figuratives will most felicitously be formulated as similes. Following the Career of Metaphor view, they further predict that conventional figuratives will be most felicitously formulated as metaphors. These claims were investigated by testing for preference for either simile or metaphor form in both novel and conventional figuratives (Gentner & Bowdle, 2008, p. 120). Basing their predictions on the grammatical concordance view, Gentner and Bowdle (2008) hypothesised that novel similes should be easier to read than novel metaphor because the simile form is an explicit comparison, in contrast to metaphors. They further predict that conventional figuratives should be read easier as metaphors than similes, as conventionalised metaphors will denote a pre-existing metaphor category. The results of these experiments were in line with these hypotheses, lending support to the Career of Metaphor hypothesis.

The Domain Mapping Hypothesis and extended metaphors

Within the Structure Mapping view, Gentner et al. (2001) argue that seeing metaphor comprehension as happening through analogical reasoning applies neatly to extended metaphors as well as single metaphors. Gentner et al. (2001) write that localist theories, such as categorisation models that see metaphor interpretation as requiring lexical modulation of the metaphor vehicle's meaning, are unable to account for processing of extended metaphorical passages. The Domain Mapping Hypothesis claims that we interpret extended metaphors as large-scale mappings between domains where all the terms that are being used metaphorically contribute to structurally aligning the topic and vehicle domains (Gentner et al. 2001).

Gentner and Boronat (1992) tested the Domain Mapping Hypothesis in a self-paced reading task. They tested metaphorical passages that were either internally consistent or inconsistent with regards to the conceptual domains of the metaphors in the passages. Their experimental items consisted of seven sentences. In the final sentence, there was a metaphor that was either consistent or inconsistent with the metaphors in the preceding sentences. They collected reading times for the final sentence and tested both novel and conventional metaphors. Below is an example item from their experiment where metaphorical terms are in italics and the target sentence is in bold:

Table 1: Example item from Gentner and Boronat (1992), drawn from Gentner et al., (2001, p. 213).

Consistent: A Debate is a Race

Dan saw the big debate as a *race*: he was determined to win it. He knew that he had to *steer his course* carefully in the competition. His strategy was to go cruising through the initial points and then make his move. After months of debating practice, Dan knew how to present his conclusions. If he could only *keep up the pace*, he had a good chance of winning. Before long, he felt the audience was receptive to his arguments. Then, he *revved up* as he made his last key points. **His skill left his opponent *far behind him* at *the finish line*.**

Inconsistent: A Debate is a War

Dan saw the big debate as a *war*: he was determined to be victorious. He knew that he had to use every *weapon* at his command in the competition. He mapped out his strategy to ensure he had established a *dominant position*. After

months of debating practice, Dan knew how to present his conclusions. If he could only *marshall his forces*, he had a good chance of winning. Before long, he felt the audience was receptive to his arguments. Then, he *intensified the bombardment* as he made his last key points. **His skill left his opponent** *far behind him* **at** *the finish line.*

Gentner and Boronat (1992) predicted that the final sentence of the novel extended consistent metaphors would be read faster than the inconsistent ones because the consistent ones extend already ongoing mappings between activated domains. In the inconsistent condition, the reading times for the target sentence should be longer because it would disrupt an ongoing mapping process between the topic and vehicle domains in the preceding context sentences. The results were in line with their hypothesis, which Gentner and Boronat (1992) interpret to mean that comprehension of extended novel metaphors draw on large-scale conceptual mapping.

Gentner and Boronat (1992) also tested conventional metaphors with the same method. They did not find the same effect of internal consistency on reading times for the conventional metaphors. The consistent metaphors were not read significantly faster than the inconsistent metaphors, which Gentner and Boronat (1992) interpret to suggest that there is no extra cost of switching the global metaphor when it is conventional. Both these results align neatly with the Career of Metaphor hypothesis, which predicts that novel metaphors are interpreted through structural mapping and that conventional metaphors have a meaning that can be easily accessed through lexical retrieval (Gentner et al., 2001, p. 216).

If the Domain Mapping hypothesis is correct, this means that metaphors activate large-scale conceptual systems which facilitate comprehension of subsequent metaphors that are related to the same conceptual domain. If a subsequent metaphor does not align with the preactivated conceptual domain, this will disrupt the ongoing mapping process and lead to a slow down in reading times, as Gentner and Boronat (1992) found. Further, if the Domain Mapping Hypothesis is correct, we would also see the same effect if the target sentences were similes instead of metaphors – this is because this view sees comprehension of novel metaphors and similes as both happening through a comparison process. A simile with an extended figurative meaning would, on this account, also be an instance of extended mapping between activated large scale conceptual systems (Gentner et al., 2001, p. 243).

2.2.2 Categorisation view of metaphor

The Class Inclusion Model: Glucksberg and Keysar (1990)

Glucksberg and Keysar (1990) present an early formulation of the Categorisation view of metaphor. Glucksberg and Keysar argue against the Comparison views of Tversky (1977) and Ortony (1979; 1993), and set out an alternative account that sees metaphors as class inclusion statements.

Before going into Glucksberg and Keysar's Class Inclusion Model, I will very briefly set out some of the main claims they argue against. Tversky (1977) proposed the Contrast Model, which is a theory that sees objects as collections of features, and that finding similarities involves matching features of two objects to each other. The Contrast Model is not primarily a theory of metaphor interpretation, but Tversky extended this process to both simile and metaphor interpretation, arguing that they both involve matching features between the topic and vehicle (Tversky, 1977, p. 379). However, Tversky's model does not predict how we recognise metaphors, nor is it able to account for the directionality of metaphors.

The proposed feature mapping process in metaphors set forth by Tversky was elaborated by Ortony (1993) in the Salience Imbalance Model. An issue with Tversky's theory is its difficulties with accounting for the asymmetry between metaphors and similes (Ortony, 1979, p. 162). According to Ortony (1979), the source of what he labels "metaphoricity" in comparison statements (i.e. similes) is *salience imbalance*. In a metaphor such as *sermons are like sleeping pills*, for example, Ortony (1979) would argue that in matching features between the topic and vehicle, the property of *inducing sleep* is more salient in *sleeping pills* than in *sermons*. Comparison statements with this type of high topic/low vehicle match with regard to property salience enables us to recognise a comparison statement as "metaphorical" (or more properly, figurative) (Ortony, 1979, p. 179).

In other words, Tversky (1977) and Ortony (1979) see similes as implicit metaphors, treating metaphors the same way they treat similes. Glucksberg and Keysar (1990) argue that

analysing metaphors as comparisons fails to account for what metaphoricity actually is, and that metaphors should rather be treated as class inclusion statements. Glucksberg and Keysar (1990) see terms as having two possible referents: 1) A token of the term when being used literally, or 2) a superordinate category for which the term is a prototype example when being used metaphorically (Glucksberg & Keysar, 1990, p. 8). The categorisation process in metaphors works in the same way as literal categorisations; the key difference is that literal categorisations make use of superordinate categories that have conventional names, whereas metaphors use the metaphor vehicle to name a superordinate[4] category without a conventional name (Glucksberg & Keysar, 1990, p. 9). To explain the difference, we can look at the following examples:

10) Imovane are sleeping pills.

11) Sermons are sleeping pills.

In (10), the speaker is making a literal categorisation statement – Imovane is a type of medicine that fits into the category of conventional sleeping pills. In (11) on the other hand, the speaker is using *sleeping pills* to exemplify a set of properties, such as *inducing drowsiness*, to denote an occasion specific superordinate category that includes the speaker's job.

Furthermore, Glucksberg and Keysar (1990) argue that similes are understood through the same categorisation process as metaphors, and that the relations of similarity that arise in a simile are a result of grouping similar things together in a category. Since this model sees categorisation as prior to mapping similarities, they argue that similes would come with an extra cognitive load as they are only implicit, not explicit, class-inclusion assertions (Glucksberg & Keysar, 1990, p. 16). In other words, this early Categorisation view predicts more processing effort for similes than metaphors, all other things being equal. Although I base my predictions largely on the Categorisation view, I predict that the opposite will be the case – I will comment on this in section 2.3 on predictions.

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[4]In other accounts of metaphors, such as Wilson and Carston's (2007) broadening and narrowing model, the metaphorical ad hoc category is not necessarily a superordinate one.

The class-inclusion model is further developed in Glucksberg and Haught (2006), where they present experimental results on processing differences between novel metaphors and similes. While Glucksberg and Keysar (1990) argue that all metaphors, and similes, are interpreted through a categorisation process, Glucksberg and Haught (2006) predict that some metaphors are interpreted through categorisation, while other metaphors are interpreted through comparison. To sum up, they reject both a full-fledged comparison account, and a full-fledged categorisation account. However, Glucksberg and Haught (2006) do not predict that it is the metaphor's degree of novelty or conventionality that determines how it is processed, as the Career of Metaphor hypothesis does.

In a series of experiments, Glucksberg and Haught (2006) set out to explore the circumstances that trigger either comparison or categorisation processes. Their first experiment sets out to explore the relationship between metaphor and simile by investigating the properties that arise in figurative interpretations of metaphors on the one hand, and similes on the other.

Their first experiment addresses the following claim: If similes and metaphors produce different figurative interpretations, a full comparison account must be rejected (Glucksberg & Haught, 2006, p. 364). The experiment was designed as an elicitation task, and participants did indeed systematically report different types of properties for metaphors and similes: for metaphors, participants tended to report emergent properties that pertain to the superordinate category of DIAMONDS*, which denotes valuable entities. These properties can only metaphorically be applied to the vehicle's literal meaning. For similes, however, participants tended to report basic properties of the figurative vehicle that were applicable to the vehicle's literal meaning.

To illustrate the point above with an example, *some ideas are diamonds* is typically interpreted as "some ideas are creative or insightful", whereas the corresponding simile, *some ideas are like diamonds*, tended to give rise to literal properties of the vehicle such as "rare", "desirable", or "glitter" (Glucksberg & Haught, 2006, p. 364). Glucksberg and Haught (2006) take these results to indicate that the predicate of a simile does indeed refer to the basic-level concept – in this case literal diamonds. However, Glucksberg and Haught (2006, p. 365) do not completely discard the possibility that the differences in interpretations may be the result of inferences drawn after

initial processing, in which case the Career of Metaphor Hypothesis may be compatible with their results.

Their subsequent experiments address the following claim: If the Career of Metaphor Hypothesis is correct, new metaphors should always be initially introduced as similes that then form the basis of the metaphor (Glucksberg & Haught, 2006, p. 366). A set of experiments therefore investigated whether it is possible to construct novel metaphors that are either equally or more apt and comprehensible in the categorical form than in the comparison form. Aptness refers to how well the metaphorical meaning of the vehicle describes a relevant feature of the metaphor topic (Jones & Estes, 2006, p. 19). This was tested in a rating task where participants were asked to rate figurative utterances that differed on two points: 1) whether they were metaphors or similes, i.e. in the categorical or comparison form, and 2) the type of adjective that preceded the figurative vehicle, where the critical items contained adjectives that were only applicable to the superordinate category expressed by the metaphor vehicle. Examples (12) and (13) illustrates their critical items:

12) My lawyer is a well-paid shark.

13) My lawyer is like a well-paid shark.

Glucksberg and Haught's (2006) Dual Reference theory predicts that participants will rate the categorical metaphors as more apt and comprehensible than the similes as the adjective only is applicable to a superordinate concept SHARK*, which denotes a category of vicious people, but not to the basic-level concept SHARK, which they believe is the referent in the simile form. This is the opposite pattern of what the Career of Metaphor Hypothesis would predict.

These materials were also tested by measuring comprehension time. In this task, Glucksberg and Haught predicted that sentences like (12) should be understood faster than sentences like (13), which is also the opposite of what the Career of Metaphor hypothesis would predict. In both experiments, their predictions were confirmed – the metaphors were rated as more apt and comprehensible, and understood faster, than the similes when the figurative vehicle was

preceded by an adjective that was only applicable to a superordinate concept like SHARK*, but not the basic-level concept SHARK (Glucksberg & Haught, 2006, p. 371).

The metaphors and similes in the experiments described above have conventional vehicles, which means that a possible counterargument against Glucksberg and Haught's (2006) conclusion is that the adjectivally modified metaphors could be understood through categorisation due to conventionalisation of the metaphor vehicle. Glucksberg and Haught (2006, p. 372) write that in order to properly test the Career of Metaphor Hypothesis, they have to show that truly novel metaphors can be acceptable as categorisations. To do this, modified versions of Bowdle and Gentner's (2005) items were tested using a rating task where participants were asked to rate their preference of figurative utterances in either the metaphor or simile form, and a task measuring comprehension time. Bowdle and Gentner's (2005) novel items were modified by inserting adjectives that were applicable to the metaphor topic, but not the vehicle, such as "a newspaper is a daily telescope" (Glucksberg & Haught, 2006, p. 373).

When testing these modified items, the results for both aptness rating and comprehension time were in line with Glucksberg and Haught's (2006) hypotheses based on their Dual Reference view. In other words, their novel metaphors received higher aptness ratings than their corresponding similes and were also understood faster than the similes. Additionally, they replicated Bowdle and Gentner's (2005) results using their original items.

In summary, Glucksberg and Haught (2006) attribute their findings to metaphor vehicles being polysemous between the literal referent and a superordinate category. Because of this, metaphors and corresponding similes are not necessarily paraphrases of each other, although they often have a similar figurative meaning. Glucksberg and Haught (2006, p. 376) conclude that if metaphors cannot always be paraphrased to a simile form, comparison theories of metaphor comprehension are fundamentally wrong.

In the next section, I will explain a different theory that falls within the Categorisation view of metaphor, but that accounts for the categorisation process in different terms: The Deflationary Account of Metaphor.

Relevance Theory: The Deflationary Account of Metaphor and the Continuity Hypothesis

The deflationary account of metaphor was developed within Relevance Theory, a theory of cognition which seeks to provide a psychologically plausible account of human communication (Allott, 2013, p. 60). Relevance Theory belongs to the post-Gricean tradition in pragmatics, and shares Grice's focus on context and speaker intention. In contrast with Grice's view, Relevance Theory does not set out any principles for how communication *ought* to work, but rather aims to *describe* human communication (Allott, 2013, p. 80).

At the core of Relevance Theory is Sperber and Wilson's technical definition of *relevance*, which differs from our everyday understanding of it. By relevance, Sperber and Wilson (2008) refer to the effects an utterance has in relation to its interpretive costs to the hearer – the more effects an utterance produces compared to how much interpretive effort we put into deriving those effects, the more relevant the utterance is. The orientation towards relevance is formulated in the Cognitive Principle of Relevance, which states that human cognition is geared towards maximising relevance (Sperber & Wilson, 2008, p. 89). In the specific domain of communication, they argue that this mandates the Communicative Principle of Relevance, which states that any ostensive stimulus presumes its own optimal relevance. This in turn, they claim, makes it rational for the addressee of a utterance to employ the Relevance Theoretic Comprehension Heuristic:

> *The Relevance Theoretic Comprehension Heuristic*
> a. Follow a path of least effort in constructing an interpretation of the utterance (and in particular in resolving ambiguities and referential indeterminacies, adjusting lexical meaning, supplying contextual assumptions, deriving implicatures, etc.).
> b. Stop when your expectations of relevance are satisfied. (Wilson, 2016, p. 86)

When applied to loose use of language, the mechanism of maximising relevance is applied at the lexical level – the sense of the word is locally adjusted to maximise cognitive effects (Wilson, 2016, p. 92). The standard Relevance Theoretic view of metaphor is often referred to as the deflationary view – this is because it does not predict a special type of pragmatic process for metaphor

specifically, but rather treats it as identical in kind to the processing of all other types of lexical broadening, such as loose use/approximation (such as in calling Copenhagen a *flat* city). Thus, while Sperber and Wilson (2008) appreciate the importance of metaphor, they argue against theories that claim metaphor is a distinct natural kind (Sperber & Wilson, 2008, p. 84). Instead of being distinct from other types of language, metaphor is on this account just on one end of a continuum of literal, loose and hyperbolic language – all of which is understood through the same pragmatic process (Sperber & Wilson, 2008, pp. 84–85).

The view that different types of figures of speech, as well as literal speech, fall on a continuum with literal speech on one end and non-literal speech on the other end is known as *the continuity hypothesis* (Wilson & Carston, 2007). On this view, Wilson and Carston (2007) use the notion of *lexical modulation* to account for phenomena that traditionally have been studied in isolation, such as approximation, hyperbole, and metaphor. Additionally, Wilson and Carston (2007) apply the same analysis to literal speech and truth-conditional content. In other words, the continuity view sets out a single pragmatic process to account for a wide range of lexical pragmatic phenomena – including metaphor. Because no special process is attributed to metaphor processing specifically, the Relevance Theoretic view as set out by Wilson and Sperber (2008) has been labelled a *deflationary view of metaphor*.

The deflationary account claims that when a word is uttered, there is a lexical adjustment process in which the hearer constructs an ad hoc concept that (together with other pragmatic processes such as disambiguation, reference assignment and implicature retrieval) yields an optimally relevant interpretation of the utterance. In other words, a linguistic expression's encoded sense is merely a starting point for an inferential meaning construction process (Sperber & Wilson, 2008, pp. 90–91). When a person utters *Copenhagen is a flat city*, for example, the hearer will spontaneously create an ad hoc concept FLAT*, drawing on information associated with the encoded lexical concept FLAT, which denotes a contextually appropriate concept, such as *without steep hills and suitable for biking*. Because FLAT* in this context denotes more than the lexical concept FLAT by also including things that are not flat in a strict sense, it is an instance of *lexical broadening*.

Lexical modulation can also go in the other direction, leaving us with an ad hoc concept with a narrower denotation than the lexical concept. Consider *think* in the following example:

14) I'm not able to think when I'm stressed.

The speaker is most likely not trying to express that they are not able to think at all when they are stressed as thinking is something we do more or less consciously or subconsciously all the time. The word *think* in (14) might be taken to express an ad hoc concept THINK* which expresses being able to think clearly or efficiently about a specific problem. Here, THINK has been lexically narrowed.

On the Relevance Theoretic account, the lexically adjusted ad hoc concept will contribute to the *explicature* of the utterance. By explicature, relevance theorists are referring to a proposition that is built on the logical form encoded by an utterance and which the speaker openly intends to convey (Allott, 2013, p. 79). In *Thoughts and Utterances: The Pragmatics of Explicit Communication*, Carston (2002) gives the following Relevance Theoretic definition of explicature:

An assumption (proposition) communicated by an utterance is an 'explicature' of the utterance if and only if it is a development of (a) a linguistically encoded logical form of the utterance, or of (b) a sentential subpart of a logical form (Carston, 2002, p. 124).

To illustrate the definition given above, in example (14), a hearer would have to assign a referent to *I*, and to lexically adjust *think* to a contextually appropriate sense. An important consequence of this notion is that the distinction between implicature and explicature in Relevance Theory is different from the what is said/implicature distinction in Grice's theory. It is not a division between inferring on the one hand and decoding on the other – on the contrary, inference plays a crucial role in both explicatures and implicatures.

In Relevance Theory, implicatures are only those speaker-intended propositions that are not developments of the logical form of the sentence uttered (Sperber and Wilson, 1986, p.182). If we imagine that a speaker uttered (14) after being asked if they think their exam will go well, we can infer that the person uttering the sentence feels badly about an exam they are about to take. This

proposition is not developed from the linguistic form of the sentence uttered, and is therefore an implicature, whereas the proposition that the person uttering the sentence is not able to think clearly when they are in stressful situations is an explicature: specifically it is the basic-level explicature, that is, what the speaker states or asserts here.

The standard Relevance Theoretic account places metaphor within the types of loose language use that are interpreted through the narrowing and broadening model set out above, and argues that many cases of metaphor will involve both narrowing and broadening (Sperber & Wilson, 2008; Wilson & Carston, 2007). So, in our previous example, *sopranos are flutes*, the hearer will interpret the figurative meaning of the metaphor by spontaneously creating the ad hoc concept FLUTES* (which is derived from information stored in/with the lexical concept FLUTES), which might denote *objects that produce high notes that are pleasant to listen to.* That is, the theory claims that in metaphor the metaphor topic, here *flutes*, expresses an occasion specific ad hoc concept, here FLUTES*. This account is in other words similar to the class inclusion model (Glucksberg & Keysar, 1990) and Dual Reference view (Glucksberg & Haught, 2006), but is couched in slightly different terms.

In section 1.2.3, I will set out two objections made against the standard Relevance Theoretic view; Carston (2010) argues that the deflationary account cannot explain extended metaphors, and Wearing (2014) argues that accounts that rely on ad hoc concept creation need to incorporate some type of analogical reasoning in the process of ranking the properties that end up constituting the ad hoc concept.

The Relevance Theoretic view of similes

Similes have not been discussed as much as metaphors within the Relevance Theoretic framework, and a fully-fledged account dedicated only to similes has not yet been proposed. Carston and Wearing (2011) briefly discuss the consequences of the core notions from Relevance Theory for the relationship between metaphor and simile. Most notably, it follows from the Relevance Theoretic analysis of metaphor as interpreted through local lexical modulation that metaphors and corresponding similes express different explicatures (Carston & Wearing, 2011, p. 296). This is

because metaphors will denote a lexically adjusted concept, while the simile will express an explicit comparison between the simile topic and the lexical concept of the simile vehicle. In other words, while the metaphor *the sopranos are flutes* expresses the explicature *the sopranos are FLUTES**, the corresponding simile the *sopranos are like flutes* expresses the explicature *the sopranos are like FLUTES.* This makes the Relevance Theoretic view of similes a class inclusion view, where similes and metaphors also are seen as having different referents (Glucksberg & Haught, 2006).

The Relevance Theoretic position on the relation between metaphors and similes is, in other words, that metaphors and similes are fundamentally different from a theoretical point of view, and from a processing point of view, as similes are not analysed as instances of loose use. Carston and Wearing (2011, p. 299) point to Glucksberg and Haught's (2006) experimental work for support in favour of their position.

2.2.3 A middle ground where different metaphors are treated differently from each other

Carston's Dual Processing theory (2010): Experimental support and Wilson's (2018) alternative explanation

Carston's view is a development of the deflationary account of metaphor. The deflationary account does not make different processing predictions for different types of metaphor, and Carston's main claim is that although the deflationary account applies neatly to single metaphors, there are many other types of metaphors that cannot be satisfactorily analysed as instances of lexical modulation. Extended metaphor is one of the types of metaphor that cannot be neatly accounted for by the standard Relevance Theoretic account. Consider the following example, where I have underlined the terms that are used metaphorically:

> 15) Mary had been sharing a flat with John for a long time. His friendship was very <u>snug</u> and <u>well-fitting</u>. John was <u>a pair of old slippers</u>.

In example (15), the Relevance Theoretic account would propose that *snug*, *well-fitting*, and *a pair of old slippers*, all undergo conceptual modification, resulting in the ad hoc concepts SNUG*, WELL-FITTING*, and A PAIR OF OLD SLIPPERS*. However, Carston (2010) argues that it may be too costly processing wise to individually adjust all concepts that are used metaphorically. To account for processing of extended metaphors, Carston (2010) proposes a second processing mode where the literal content of the metaphor passage plays a more prominent role in the interpretation process.

Psycholinguistic experiments aiming to investigate on-line metaphor processing suggest that literal meaning is always initially activated, and that they remain activated to a certain degree even after the metaphorical meaning has been derived (Rubio-Fernández, 2007). In addition to these results from psycholinguistic research, Carston points to the intuition that the literal sense of the metaphor vehicle is still available to a certain degree during metaphor interpretation. Carston (2010) refers to these results and intuitions as *the lingering of the literal*, and further argues that the literal lingers to a larger degree in extended metaphors than in single metaphors. This point forms the foundation of Carston's (2010) proposed second processing mode.

Exactly how the second processing mode works is left somewhat underspecified. However, Carston (2010) appeals to the lingering of the literal, and argues that the literal content of the metaphor is metarepresented during the metaphor interpretation process. By 'metarepresented', Carston means that the literal meaning is neither being evaluated as factual nor adjusted into a different representation, but rather 'held' for a further process where its conceptual properties, such as implications or associations, are inspected (Carston, 2010, p. 307).

So, a possible way to draw the dividing line between the first and second processing modes is to label the first mode (the standard Relevance Theoretic account) as a *local* one, and the second mode proposed by Carston (2010) as a *global* one; lexical modulation, as proposed in the deflationary account, will involve only local adjustment of individual concepts, whereas the literal form of the whole metaphorical passage will form the basis for inferring the metaphorical meaning of an extended metaphor, on Carston's (2010) account.

Single metaphors have received far more attention than extended metaphors, but an important exception to this is Rubio-Fernández, Tian, and Cummins's study on processing

differences between single and extended metaphors from 2016. In this study, the authors investigate the processing differences between single and extended metaphors in three different studies: 1) a self paced reading task, 2) an eye-tracking reading study, and 3) a cued recall task. Rubio-Fernández et al. (2016) tested the different processing predictions made by the standard Relevance Theoretic account and Carston's (2010) account: while the standard Relevance Theoretic account does not predict a processing difference between single and extended metaphors, although it doesn't explicitly rule it out either, Carston's (2010) development of the Relevance Theoretic approach does.

Rubio-Fernández et al. (2016) used Carston's (2010) as the basis for their predictions. In experiments 1 and 2, Rubio-Fernández et al. (2016) predicted longer reading times for extended metaphors than for single metaphors, as the figurative meaning will be immediately worked out upon encountering the metaphoric target sentence, as opposed to the extended condition, where the literal content of the metaphor vehicles will be metarepresented rather than being lexically adjusted, and will thereby resemble interpretation of literal utterances. In experiment 3, a cued recall task, they predicted that the target expressions in the single metaphor conditions would be more easily recalled than in the extended metaphor conditions, as the single metaphor would involve local adjustment rather than global metarepresentation.

The results of experiments 1 and 2 were in line with their predictions, showing longer reading times for single metaphors than for extended metaphors (Rubio-Fernández et al., 2016, pp.20-22). In the self paced reading task (experiment 1), the pairwise difference between the two metaphor conditions were quite small, suggesting that although there may be an effect of extension, it is quite small. To get more sensitive measures, they therefore carried out an eye-tracking reading experiment with the same materials. By using eye-tracking, Rubio-Fernández et al. (2016) aimed at getting not only more precise time measures, but also different types of eye movement measures. The second experiment gave longer total reading times for the single metaphors, like experiment 1.

Furthermore, while early measures showed a difference between the single and extended conditions, the processing patterns became more similar in later measures, which was in line with their predictions (Rubio-Fernández et al., 2016, p. 22). Lastly, the third experiment also confirmed their predictions; participants were better at remembering the target expressions in single

metaphors than in extended metaphors (Rubio-Fernández et al., 2016, p. 25). Rubio-Fernández et al. (2016) argue that target expressions are better remembered in single metaphors because they require local, rather than global, processing.

Overall, the results of Rubio-Fernández et al. (2016) provide support in favour of Carston's (2010) development of the standard Relevance Theoretic account. My study is an adaptation of the second experiment, i.e. an eye-tracking reading paradigm. In addition to testing processing differences between single and extended metaphors, I will be looking at processing of similes with either extended or non-extended figurative meanings. I will elaborate on how Rubio-Fernández et al. (2016) connects to my study in the methods section.

There is also some evidence for processing differences between single and extended metaphor from before Carston (2010) developed her alternative to the Deflationary Account of Metaphor. Keysar et al. (2000) and Thibodeau & Durgin (2008) both found that novel extended metaphors are read faster than single metaphors. Using similar experimental paradigms, these studies measured reading times for a metaphorical expression that was either preceded by a context sentence containing metaphors from the same conceptual domain or a literal context sentence. When the target metaphor was preceded by a context sentence with metaphor vehicles from the same conceptual domain, i.e. an extended metaphor, reading times were faster than in the literal context condition. Although these studies are not explicit tests of Carston's (2010) Dual Processing Account, their results align with Rubio-Fernández et al.'s (2016) and arguably support Carston's account.

Evidence for Carston's (2010) Dual Processing view has also been found in a different type of task carried out by Ronderos and Falkum (2023). Ronderos and Falkum (2023) ran a lexical decision task to investigate suppression of literal features during metaphor comprehension. In lexical decision tasks, participants are asked to judge whether a string of letters is a real word or not. In Ronderos and Falkum's (2023) paradigm, participants read a nominal metaphor in either a single or extended context and were then asked to judge whether a word was a real word of English or not. The words, which were either metaphor-related or literal-related, were presented either 0 or 1000 milliseconds after the metaphor prime.

Previous research using a lexical decision task to investigate single metaphors has shown that literal features of the metaphor are suppressed by around 1000 milliseconds after the reader encounters the metaphor (Rubio-Fernández, 2007). However, Ronderos and Falkum's (2023) results suggest that this is not the case for extended metaphors – while they replicated the effect Rubio-Fernández (2007) found for single metaphors, their results suggest that literal features are still activated 1000 milliseconds after the reader has encountered an extended metaphor. Ronderos and Falkum's (2023) study provides additional evidence for Carston's (2010), and shows that literal features remain active to a larger degree during processing of extended metaphors compared to single metaphors.

While Carston's (2010) Dual Processing View has experimental support, it has also been questioned within Relevance Theory. In *Reading Beyond the Code*, Wilson (2018) suggests that what Carston (2010) refers to as a 'lingering of the literal' may be better characterised as a 'lingering of linguistic form'. As mentioned, Carston (2010) suggests that consecutive lexical modulation of terms that are used metaphorically prompts the reader to switch to a 'metarepresentational' processing mode where the literal meaning is retained to a larger degree. Wilson (2018, p. 194) points out that this is at odds with the Relevance Theoretic view that pragmatic processes occur automatically and spontaneously to adjust almost every word we encounter as a result of our orientation towards maximal relevance. In Relevance Theory, the function of an encoded meaning is to provide the addressee with a range of implications that will satisfy the addressee's expectations of relevance – if the addressee's expectations are satisfied by an interpretation where an concept expresses something broader or narrower than its encoded meaning, the addressee is entitled to assume that this is what the speaker intended to communicate (Wilson, 2018, p. 194). This way, a loose interpretation may be easier than a literal one to construct even though the encoded meaning is activated automatically when we encounter a word, Wilson (2018, pp. 194-195) argues:

> On this approach, what is needed to justify a fully literal interpretation of a word or phrase is not the mere fact that its encoded meaning has been activated, but that nothing less than this encoded meaning would warrant the array of implications that satisfies the addressee's expectations of relevance. (Wilson, 2018, p. 195).

Wilson (2018) does not set out what exactly 'the lingering of linguistic form' means in terms of processing, but writes that the accumulation of related metaphorical vehicles might cause addressees to pay close attention to exactly how the figurative passage is phrased and search for more implications activated by encoded meanings in the passage. Ronderos and Falkum (2023, pp. 3-4) provide a possible way to interpret Wilson's (2018) notion in processing terms as low-level semantic priming as a result of encountering consecutive related metaphor vehicles. This would be a possible explanation for faster reading times for extended metaphors and would indicate that the processing difference between single and extended metaphors does not involve qualitatively different processing modes, but rather a facilitation effect on the reading times in the extended metaphors.

However, an account that suggests that the processing difference between single and extended metaphors arise from a lexical facilitation is not able to account for Ronderos and Falkum's (2023) results. The effect of sustained activation of literal-related features in extended metaphors found by Ronderos and Falkum (2023) suggests that single and extended metaphors do require qualitatively different processing modes.

Wearing's (2014) proposed role of comparison in a categorisation framework

Wearing (2014) suggests that accounts that rely on the creation of ad hoc concepts must include a comparison process in novel metaphors, and that Relevance Theory, along with other pure categorisation accounts, lacks the resources to analyse novel cases of metaphor. In highly novel metaphors, the hearer will not have any prior conceptual connections to draw on in the inference process, and Wearing (2014) asks how we are able to rank the properties that end up constituting the ad hoc concept the hearer forms in the metaphor interpretation process when there are no pre-existing relations between the metaphor topic and vehicle. Wearing's (2014) solution is that novel metaphors are categorisations that are achieved by means of comparison. Wearing's solution does not draw on comparison processes in the same way that the Career of Metaphor hypothesis does – while the Career of Metaphor view proposes that metaphors are interpreted through either

categorisation or comparison, Wearing (2014, p. 79) sees comparison as being a necessary step in certain cases of categorisation.

Wearing (2014) points out the following problem for categorisation accounts of metaphor: In novel metaphors that require category crossing where we do not have any prior metaphorical meanings to draw on, such as in more conventional metaphors, how do we rank the properties that end up constituting the resulting ad hoc concept of the metaphor vehicle? In other words, the main issue here lies in the resources available for constructing the ad hoc concept, not in the construction itself (Wearing, 2014, p. 99). Furthermore, Wearing points out that our ability to appropriately rank properties in the process of creating an ad hoc concept is largely taken for granted. To understand what Wearing means, we can look at the following example of a metaphor that requires category crossing:

16) His life was a skiff with no oar.

Wearing (2014, p. 86) says that example (16) is a metaphor that requires category crossing because relevant features of the vehicle for the metaphor interpretation may be *adrift* and *hard to steer*, for example. However, lives cannot be any of these things – *adrift* and *hard to steer* may only be metaphorically applied to lives, which might require the hearer to form intermediate ad hoc concepts, ADRIFT* and HARD TO STEER*. In other words, the ad hoc concept SKIFF WITH NO OAR* is not formed directly from the most central properties of the encoded concept SKIFF WITH NO OAR. Wearing therefore asks how we are able to interpret highly novel metaphors when the properties we draw on to construct ad hoc concepts themselves must undergo some type of lexical modulation to be applicable to the metaphor topic (Wearing, 2014, p. 86).

The solution proposed by Wearing (2014) is that searching for an analogy between the metaphor topic and the metaphor vehicle can highlight relevant properties of the metaphor vehicle. In other words, the analogy provides the hearer with the resources to construct a contextually appropriate ad hoc concept.

Wearing (2014) also comments briefly on how this pertains to Carston's (2010) proposal of there being two distinct modes for processing metaphor and writes that "[novel] metaphors of the

sort I've discussed are plausible candidates for this alternative mode of processing" (Wearing, 2014, p. 98). If certain novel metaphors require the second processing mode where metarepresenting the literal content 'takes over' from ad hoc concept creation (and are thereby not instances of categorisation), Wearing's suggested place for analogy in categorisation can account for *all* instances of highly novel metaphors (Wearing, 2014, p. 98). Wearing (2014) recognizes this and further suggests that analogical reasoning may be necessary in order to infer the meaning of the types of metaphors that would be subject to the second, more reflective, processing mode. Wearing (2014, p. 98) writes that if this is correct, "the core elements of our two views can coexist.".

Jones and Estes (2006) and the role of aptness

Instead of predicting processing based on whether an utterance is a simile or a metaphor, Jones and Estes (2006) suggest that aptness, i.e. how well a metaphor vehicle describes the metaphor topic, may be the deciding factor when it comes to processing and comprehension ease.

As I explained in section 1.2.1, the Career of Metaphor view predicts that novel figurative utterances are preferred in the simile form. This prediction is supported by several studies, such as Bowdle and Gentner (2005) and Gentner and Bowdle (2001). However, none of these studies controlled their items for aptness. Jones and Estes (2006) therefore argue that several studies that on first glance seem to support the Career of Metaphor hypothesis confound conventionality/novelty and aptness. In three different experiments, Jones and Estes (2006) use items that are normed for both aptness and conventionality to assess the predictions set out by the Career of Metaphor hypothesis. The three experiments tested whether aptness and conventionality in metaphors mediates 1) form preference, i.e. whether participants preferred simile or metaphor surface form of the figurative utterance, 2) ease and speed of comprehension of metaphors, and 3) category membership of metaphorical terms.

In their first experiment, participants were asked to say whether they preferred a novel figurative utterance as a metaphor or a simile, Jones and Estes (2006) found the opposite of what the Career of Metaphor view would predict – using apt metaphors yielded a preference for novel figurative utterances in the metaphor form. Their second experiment measured comprehension

latencies and ease of comprehension ratings, and showed that highly apt figurative statements were read faster and rated as easier to understand (Jones & Estes, 2006, p. 28). Conventionality did not, however, affect reading times and ease of comprehension. In their third experiment, Jones and Estes (2006) found that conventionality did not have an effect on how likely participants were to say that the metaphor topic, e.g. *rooster*, is a member of the vehicle-named category, e.g. *alarm clock* in the metaphor *a rooster is an alarm clock*. In addition to not finding an effect of conventionality, Jones and Estes (2006) did find an effect of aptness where highly apt metaphors were more likely to yield higher ratings of category membership.

To sum up, Jones and Estes (2006) found no reliable effect of conventionality on metaphor processing. They did, on the other hand, find an main effect of aptness on several aspects of metaphor processing. As they point out, not finding an effect of conventionality goes against the Career of Metaphor view and favours the Categorisation view of metaphor processing (Jones & Estes, 2006, p. 28). Jones and Estes (2006, p. 30) further point out that aptness may predict ease of comprehension in other linguistic tropes in addition to metaphor, such as similes and conceptual combination in compound words.

2.2.4 Eye-tracking and processing differences between metaphors and similes

Ashby et al. (2018) used an eye-tracking reading paradigm to investigate how the surface form of nominal metaphors and similes affects early and automatic processing. This is the first study to investigate processing differences between metaphors and similes in an eye-tracking reading paradigm (Ashby et al., 2018, p. 166). Participants silently read metaphors and similes with identical topic-vehicle pairs, such as *knowledge is a river* and *knowledge is like a river*. Ashby et al. (2018, p. 162) ask the following question: Do readers initially access figurative and literal interpretations in parallel or do they hold one, initial interpretation of the X is Y expression? In other words, their study interacts with the standard pragmatic model and the literal-first hypothesis.

Ashby et al. (2018) point out that many of the studies on the literal-first hypothesis (such as Brisard, Frisson & Sandra, 2001; Janus & Bever, 1985) use offline measures such as self-paced

reading tasks, and that investigating early processing may require methods that measure not only reading times, but also data from initial reading of the target expression. Monitoring eye movements during the full time course of reading the metaphors and similes may therefore provide additional insight into whether figurative meaning is directly accessed or not.

Ashby et al. (2018) write that if readers initially hold two parallel interpretations, i.e. one literal and one figurative, the similes and metaphors should have similar processing patterns. On the other hand, if readers hold one primary interpretation, which is not necessarily figurative, the metaphors should take longer to process than the similes (Ashby et al., 2018, p. 163). Ashby et al. (2018, p. 166) found that metaphor vehicles took longer to read than simile vehicles. Additionally, they found more regressions in the metaphor items than in the simile items. Based on these results, Ashby et al. (2018) argue that metaphors are more effortful to interpret than similes, and that the extra difficulties begin in the earliest stages of processing, and that early automatic processing differs between similes and metaphors. They present the following conclusion:

> This pattern is consistent with theoretical perspectives claiming that readers initially hold one primary interpretation of an expression. Given that the surface form of nominal metaphors (X is Y) is the form of a literal categorical statement as well as a metaphor, this ambiguity may set the reader up for a literal interpretation that is not plausible once Y is recognized. (Ashby et al., 2018, p. 167).

Ashby et al. (2018, p. 167) further write that readers are prompted to look for a plausible metaphorical interpretation when they recognise this violation, and that their data is more consistent with theories that claim that readers hold one initial interpretation when processing metaphors.

Ashby et al. (2018) do not argue that readers fully process the literal meaning of a metaphor before rejecting it, but rather that rejecting the literal meaning happens within the first milliseconds of reading a metaphor. They attribute the extra processing in metaphors to re-reading and re-analysing the metaphor vehicle in order to find a plausible interpretation (Ashby, 2018, p. 167). Finally, Ashby et al. (2018) argue that this re-analysis enhances what they call "the power of metaphor".

Previous research by Noveck et al. (2001) on why metaphor processing seems to be extra effortful compared to literal utterances offers a possible different explanation of Ashby et al.'s (2018) results. Noveck et al. (2001) found that metaphoric utterances took longer to read than synonymous literal utterances and that metaphors led to comprehension difficulties for children while leading to potential comprehension benefits for adults in a follow-up question task. The authors explain these results by drawing on the Relevance Theoretic framework. As mentioned, *relevance* is within Relevance Theory defined as the effects an utterance has in relation to its interpretive costs to the hearer, and the more effects an utterance produces compared to how much interpretive effort it requires, the more relevant the utterance is (Sperber & Wilson, 2008). From this it follows that if a metaphor carries additional effects, it should also have extra processing costs (compared to another optimally relevant utterance with fewer effects). The idea that metaphors bring extra cognitive effects is in line with Glucksberg and Haught's (2006) finding that metaphors produce more emergent properties than similes. The metaphor-effect found by Ashby et al. (2018) is therefore also compatible with a Relevance Theoretic explanation where the extra processing effort comes from deriving extra cognitive effects, and *not* from rejecting a literal interpretation during early automatic processing.

2.3 Summary

The literature review started with broad overviews of pragmatics and experimental pragmatics, and of what is meant by the terms *metaphor* and *simile*. The accounts set out in this section have been concerned with theoretical explorations of metaphors. Grice's brief discussion and Searle's view of metaphor do not make explicit processing claims, but reinterpretations of their division between what is said and what is meant (or *sentence meaning* and *speaker meaning*, in Searle's vocabulary) gave rise to the Standard Pragmatic Model, which prompted a large amount of experimental research on whether literal meaning is accessed and then rejected before readers are able to construct a non-literal interpretation. This line of research generally agrees that, with enough contextual support, non-literal interpretations can be accessed just as easily as literal interpretations. While this is an important advancement in the debate of metaphorical meaning, there are still many

questions that remain unresolved. The questions I tackle in this thesis concern the relation between similes and metaphors and extended figurative meaning.

In section 2.2, Theory and Experiments, I set out theories belonging to two major distinct views on metaphor processing and the relation between metaphor and simile, namely the Comparison view and the Categorisation view. Although both these views include a heterogeneous set of theories, the main differences are the following: Comparison views predict that both similes and metaphors[5] are processed through some type of comparison process, such as analogical reasoning (Bowdle & Gentner, 2005; Gentner & Bowdle, 2008), while Categorisation views argue that, contrary to similes, metaphors are statements of category where the metaphor vehicle is lexically adjusted to express a contextually appropriate concept (Glucksberg, 2008; Glucksberg & Keysar, 1990; Sperber & Wilson, 2008). Although there has been conducted extensive research on both positions, it is unclear which view has most support in the experimental literature. First, some of the evidence is compatible with both the Comparison view and the Categorisation view. The Structure Mapping view predicts that novel figuratives will be easier to understand as similes than as metaphors, and experimental results are in line with this prediction (Gentner & Bowdle, 2008; Ashby et al., 2018). This is, however, also compatible with the view that metaphors will take longer to interpret because they give rise to more emergent properties than similes do (Carston & Wearing, 2011; Glucksberg & Haught, 2006; Noveck et al., 2001).

Proponents of the Career of Metaphor view did find that conventionality mediates processing effort for conventional metaphors as well, as participants understood conventional figuratives faster in the metaphor form than the simile form (Bowdle & Gentner, 2005). At first glance, these results seem to quite clearly support the Career of Metaphor view, but results from Glucksberg and Haught (2006) further complicate the picture. Glucksberg and Haught (2006) show that when Bowdle and Gentner's (2005) novel items are adjectivally modified to be more apt, novel metaphors can be understood faster than corresponding novel similes. If aptness is a better predictor for ease of comprehension than conventionality, which is also what Jones and Ester (2006) find, this goes against comparison accounts such as the Career of Metaphor and Structure

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[5] Only novel metaphors, in the case of the Career of Metaphor Hypothesis (Bowdle & Gentner, 2005).

Mapping position. To sum up so far, results regarding processing effort are, in my view, inconclusive in regards to which position has the most empirical support.

When it comes to extended metaphors, there has been considerably less research on this dimension of metaphor processing compared to the relation between metaphors and similes. Comparison theorists have pointed out that Categorisation views do not, due to their predictions of local processing, have a natural way of dealing with extended metaphors (Gentner & Bowdle, 2008, p. 113). Categorisation accounts have also been criticised for not being able to plausibly account for extended metaphors by Carston (2010), who supports a Categorisation view of *single* metaphors. Experimental research on extended metaphor suggests that extended metaphors are read faster than single metaphors (Keysar et al., 2000; Thibodeau & Durgin, 2008; Rubio-Fernández et al., 2016), that conceptually consistent extended metaphors are read faster than inconsistent extended metaphors (Gentner & Boronat, 1992; Gentner et al., 2001) and that literal-related features are suppressed to a smaller degree when processing extended metaphors vs. single metaphors (Ronderos & Falkum, 2023).

When it comes to reading times as an indication of processing effort, faster reading times for extended vs. single metaphors are compatible with both Carston's (2010) Dual Processing account and the Domain Mapping Hypothesis as the reading times may be faster due to either a switch in processing mode (as predicted by Carston (2010)), or to a facilitation effect from extending an ongoing conceptual mapping (Gentner et al., 2001). It is not clear what Carston's (2010) account would predict for an inconsistent metaphorical passage where several terms are used metaphorically, but are not drawn from the same conceptual domain. If the switch in processing mode is triggered by the cognitive effort of consecutive ad hoc concept creation, we might expect the reading times for both the consistent and inconsistent passages to be similar. However, it may also be that metarepresenting and sustaining the literal meaning is disrupted when the reader encounters a metaphor from an unrelated conceptual domain. In this case, longer reading times for internally consistent metaphorical passages may not be incompatible with Carston's (2010) account.

The evidence from Ronderos and Falkum's (2023) lexical decision task, where literal-related features of the metaphor were sustained during processing of extended metaphors, is

more clearly in support of Carston's Dual Processing Account than experiments eliciting reading times. Testing specifically for enhancement and suppression of literal features during processing of extended metaphors is a way to disentangle the possible explanations for processing differences found in reading times, and Ronderos and Falkum's (2023) results suggest that facilitation from ongoing conceptual mappings may not be the driving force behind processing differences found between single and extended metaphors. Based on these results, I would argue that there is more support in favour of the Dual Processing account proposed by Carston (2010) than there is for the Domain Mapping Hypothesis set out by Comparison theorists (Gentner et al., 2001; Gentner & Bowdle, 2008). Still, the limited amount of research on this topic means that we cannot reach any clear-cut conclusions yet.

In the preceding summary and discussion, I have pointed out why current experimental research is inconclusive with regards to whether 1) there are distinct underlying processes behind simile and metaphor comprehension and 2) whether single and extended metaphors require different processing modes or not. In order to disentangle the different possible explanations of existing evidence, this study tests whether extending the figurative meaning affects similes and metaphors differently or not. If similes and metaphors are affected in the same way when the figurative meaning is extended, this suggests that the underlying cognitive processes behind simile and metaphor processing (in novel figuratives) is the same and that processing differences between single and extended metaphors are, at least in part, driven by facilitation or priming effects from extending an ongoing conceptual mapping. If similes and metaphors are not affected in the same way as a result of extending their figurative meaning, this suggests that processing metaphors and similes require different cognitive mechanisms, and that facilitation or priming from already activated conceptual domains is not the main driving force behind processing differences between single and extended metaphors found in previous studies. Below is a repetition of my research questions:

Research Question 1) Do single and extended metaphors require different processing modes?

Research Question 2) Is there a similar processing difference between single and extended metaphors and similes?

Research Question 3) Does processing of metaphors and similes require different cognitive mechanisms, or do they draw on the same ones?

In the next chapter, I will explain what I predict for each research question and set out the methodological approach of the current experiment.

3. Current experiment

3.1 Method

3.1.1 Eye-tracking in linguistics – An overview

Before moving into the specifics of the methodological approach in my study, I will provide an overview of eye-tracking as a methodology in linguistics. Eye-tracking can be used to investigate gaze behaviour during a multitude of different tasks and is not limited to silent reading. However, because I am using a reading paradigm, I will focus primarily on eye-tracking during reading in the following overview.

As a methodology, eye-tracking can be traced back to the end of the 19th century. In the beginning, eye-tracking was conducted only through observations without measuring equipment – participants would read a text on which a mirror was placed while an experimenter stood behind the participant and observed the participant's eye movements (Płużyczka, 2018, p. 102). Although this method was quite imprecise, it led to interesting observations of how visual perception works during reading. It had long been assumed that reading was a linear process, but the first experiments on eye movements during reading showed that eyes do not move continuously along the lines of a text (Płużyczka, 2018, p. 102). Instead, our eyes move in short, rapid movements with pauses in between. Finally, when we are reading texts, saccades do not always move forwards – we go back in the text to reread certain parts around 10–15 percent of the time we spend reading a text.

Eye-tracking as a methodology continued to develop in tandem with other technological advances, such as film recording in the 1920s and computer technology in the mid 1970s, and it saw a surge of popularity with the rise of cognitive psychology. Especially in the last four decades, there has been an exponential growth of the use of eye-tracking technology – in the 1980s, the number of eye-tracking labs in the UK, for instance, could be counted on two hands, but having an eye-tracking device is now standard practice in most psychology departments (Pellicer-Sánchez et

al., 2018). This means that eye-tracking has become increasingly available to linguists as well, and its use is not limited to psychology alone.

Modern eye-tracking allows us to track fixations, saccades, and regressions and analyse these types of behaviours in special software. *Saccades* refer to eye movements when we move our gaze across our visual field. *Fixation*s are the pauses where our eyes "stop" between saccades. Saccades that go backwards are in the text called *regressions* (Conklin et al., 2018). These behaviours are automatic physiological responses that are of interest to psychologists and linguists because they are indexes of attention and processing effort (Conklin et al., 2018; Rayner, 1998). The ability of eye-tracking to measure automatic and unconscious processes comes with many advantages compared to other methods, such as self paced reading tasks or forced choice tasks. For instance, eye-tracking gives a more direct measure of processing and cognitive effort while a task is being carried out instead of just reporting the output of a task after it has been completed (Pellicer-Sánchez et al., 2018).

Eye-tracking is also a very precise tool for investigating temporal aspects of language processing – it is for example possible to distinguish between measures that only occur the first time a participant encounters the region of interest (ROI), measures that occur only after the first time the participant's gaze has left the ROI, or whether the participant revisits the ROI or not (Pellicer-Sánchez et al., 2018, p. 6). Compared to self paced reading tasks, the temporal precision of eye-tracking is a massive advantage as it allows researchers to investigate not only measures of whole sentences or phrases, but also single words and how the eyes naturally fixate on the ROI without the participant doing some type of task to signal when they start and stop reading something.

The idea that the eyes provide insights into the mind is known as the *eye-mind hypothesis*, which was set forth by Just and Carpenter (1980) in a study on eye fixations during reading of scientific articles. Just and Carpenter (1980) formulated the eye-mind hypothesis as a model of reading to account for the differences they found in which words college students generally fixated on during reading. The hypothesis rests on two central assumptions: 1) What is being fixated on reflects what is being considered and 2) The amount of time spent fixating on something reflects the amount of cognitive effort that goes into processing it (Pellicer-Sánchez et al., 2018, pp. 6-7). Although there is some disagreement in the literature on eye-tracking about the accuracy of these

assumptions,(especially in translation studies where the translator's attention may be on the target language while their gaze is fixated on the source language) there is a general agreement that there is a relationship between fixations and cognitive processes (Conklin et al. 2018, p. 170).

Following the assumptions of the eye-mind hypothesis, eye-tracking allows psycholinguists to make connections between what someone is paying attention to and the cognitive effort associated with it. This means that we can test theories of pragmatic processing that make different predictions regarding the amount of cognitive effort a certain type of processing should require, and at what stage different types of processing should occur.

As mentioned, eye-tracking allows for differentiating between measurements of online processing at several stages of processing – in this study, I look at gaze duration, regression path duration, and total reading times. Gaze duration, which is sometimes also called first pass reading time, refers to all fixations on the ROI before the gaze exits it, either to the left or to the right of the ROI (Conklin et al. 2018, p. 66). Regression path duration refers to the amount of time the reader spends on the ROI, and any preceding parts of the target sentence before moving to the right past the ROI (Conklin et al., 2018, p. 66). Regression pass duration may also be referred to as go-past time. Total reading time refers to the total amount of time spent reading the region of interest (ROI), i.e. the metaphor or simile vehicles.

Gaze duration has traditionally been considered a measure of early processing and lexical access, and regression path duration has been considered a measure of intermediate processing (Rayner, 1998). Total reading times have been considered a measure of late stages in processing (Conklin et al., 2018, p. 66-67). However, what type of processing the different eye-tracking measures correspond to is not clear-cut, and the different types of measures are not entirely independent from each other – gaze duration is for example a part of the total reading time (Conklin et al., 2018, p. 67; Vasishth et al., 2013, p. 127). We can therefore not make completely definite claims on exactly what stage of processing the differences between the conditions occur in. Still, eye-tracking offers a much more precise method for investigating processing than many other common experimental methods, which means that we can get more fine-grained results and test more specific hypotheses, for example with regards to processing stage or test measure results for very small units of language.

3.1.2 Materials and Design

Linguistic stimuli

There were 16 novel metaphors and similes. 8 of these metaphors were drawn from Rubio-Fernández (2007). The extended context sentences for the metaphors from Rubio-Fernández (2007) were developed by Ronderos and Falkum (2023) for a lexical decision task investigating literal suppression in single and extended metaphors. Five of the items are adapted from Jones and Estes' (2006) materials, and have been rated highly in both novelty and aptness in norming studies. Three of the metaphors were created from scratch specifically for this project. There were four conditions: single metaphor, extended metaphor, single simile, and extended simile. Table 1 contains examples of all conditions.

The metaphors and similes were given contexts that either made the metaphors and simile single, or in contexts that extended the figurative meaning. The target sentence was presented after the context sentence and consisted of nominal metaphors and similes in the *X is Y* or *X is like Y* form. This makes the materials different in structure from the ones used in Rubio-Fernández et al. (2016). The choice to use different single and extended metaphors was made because nominal metaphors are easy to convert to the simile form without making large changes in the surface structure of the utterances. The only difference between the metaphor conditions and the simile conditions is that the simile vehicles are preceded by the comparison term *like*.

The extended context sentences were all metaphorical. This means that the extended similes also have metaphorical context sentences, and not contexts that are figurative by means of an explicit comparison term. This choice was made to keep the contexts identical across both of the extended conditions. Manipulating the conditions by only inserting *like* in the target sentences eliminates the chance of potential differences in processing of the figurative vehicles due to differences in the surface structure of the contexts. Furthermore, although the simile target sentences are not extended by means of a preceding simile, there is still an extension of the similes' figurative meaning, which makes them comparable to the extended metaphors.

There were 24 filler items, which means that there were 40 items in total, not including the 2 practice trials. 4 of the filler items were metaphors, 4 were similes, 8 were literal, and 8 were idioms. Table 2 contains examples of the three types of filler items. The metaphors in the filler items are adapted from Rubio-Fernández (2007) and Jones and Estes (2006). Half of the fillers were followed by a sentence verification task where the participant had to indicate whether a statement about the preceding sentences was true or false.

Table 2: Examples of three critical items in all conditions

No.	Condition	Context sentence	Target sentence
1	Single metaphor	Daniel has been in severe pain ever since he learnt about his wife's affair. The betrayal hurt him deeply.	A lie is a dagger and he felt very lonely.
1	Extended metaphor	Daniel has been in severe pain ever since he learnt about his wife's affair. The betrayal cut him deeply.	A lie is a dagger and he felt very lonely.
1	Single simile	Daniel has been in severe pain ever since he learnt about his wife's affair. The betrayal hurt him deeply.	A lie is like a dagger and he felt very lonely.
1	Extended simile	Daniel has been in severe pain ever since he learnt about his wife's affair. The betrayal cut him deeply.	A lie is like a dagger and he felt very lonely.
2	Single metaphor	Noah spends four hours a day in the gym. He trains his body intensively.	His muscles are steel and he was very proud.
2	Extended metaphor	Noah spends four hours a day in the gym. He forges his body intensively.	His muscles are steel and he was very proud.
2	Single simile	Noah spends four hours a day in the gym. He trains his body intensively.	His muscles are like steel and he was very proud.
2	Extended simile	Noah spends four hours a day in the gym. He forges his body intensively.	His muscles are like steel and he was very proud.

3	Single metaphor	When Yasmin was writing her first novel, she had a very harsh editor. She often felt discouraged by the critical feedback.	His comments were razors and it made writing less fun.
3	Extended metaphor	When Yasmin was writing her first novel, she had a very harsh editor. She often felt discouraged by the sharp-edged feedback.	His comments were razors and it made writing less fun.
3	Single simile	When Yasmin was writing her first novel, she had a very harsh editor. She often felt discouraged by the critical feedback.	His comments were like razors and it made writing less fun.
3	Extended simile	When Yasmin was writing her first novel, she had a very harsh editor. She often felt discouraged by the sharp-edged feedback.	His comments were like razors and it made writing less fun.

Table 3: Examples of all types of filler items

Filler type	Context sentence	Target sentence
Simile	Chris was making a chocolate milkshake when the lid came off the blender. When his mother saw him, he was spotted with chocolate.	She said Chris was like a Dalmatian and laughed at him.
Metaphor	Selma and Daniela have a new house with an amazing garden. They couldn't see the end of it from their door.	Their backyard is the Pacific, so they built a patio.
Literal	Michelle accidentally shrunk Muhammad's sweater while doing laundry. It was his favourite, and he wore it all the time.	She was very sorry and she felt terrible.
Idiom	Carolyn's birthday party ended up being a chaotic affair. She invited way more people than she had room for.	It got completely out of hand and her chandelier

broke.

Design

This study uses an eye-tracking reading paradigm, similar to experiment 2 in Rubio-Fernández et al. (2016). Like Rubio-Fernández et al. (2016), this study has extended and single metaphors as conditions. However, this study adds single and extended similes as conditions as well. This study therefore has a 2X2 repeated measures latin square design with the factors FIGURE (metaphor vs. simile) and CONTEXT (single vs. extended). The study has a within-subjects design, meaning that each participant saw instances of all experimental conditions.

There were four lists of items where each critical item appears in one of the four conditions in each list. Each participant saw one of these lists. The lists were rotated to be distributes as evenly as possible among the participants.

3.1.3 Participants

This study has tested 31 native speakers of English with normal or corrected-to-normal vision. The ages of the participants were between 18 and 39. Five of the participants were excluded from the analysis due either to not being native speakers or to having a lower accuracy rate than 60% on the comprehension statements. Participants were recruited through Facebook groups for non-Norwegians in Oslo and student unions for international Oslo-based students. Participants signed up through an online form.

3.1.4 Predictions and implications

When it comes to the differences between single and extended metaphors, I predicted that my experiment would replicate the results of experiment 2 in Rubio-Fernández et al. (2016) and find longer reading times for single metaphors than for extended metaphors. This prediction is based on

Carston's (2010) development of the Deflationary Account set out by Sperber and Wilson (2008). If I replicate the results of Rubio-Fernández et al. (2016), this provides further support for the view that single and extended metaphors are processed differently.

An important caveat of the results of Rubio-Fernández et al. (2016) is that while numerically longer reading times for the single metaphors than the extended metaphors do support the hypotheses they form on based on Carston's (2010), it is still theoretically possible that the differences reflect only a quantitative, and not qualitative, difference in processing (as pointed out by Ronderos & Falkum, 2023). My study attempts to further investigate possible differences in processing modes by also looking at whether extending the figurative meaning affects metaphors and similes in the same way. This has not been done before, and the predictions regarding this are exploratory.

Based on Carston's (2010) Dual Processing theory, I predicted that I would not find a comparable processing difference between the single and extended metaphors and the single and extended similes – this is because I do not predict there to be a processing difference between the similes with single and extended figurative meaning. As mentioned in section 2.2.3, Carston (2010) predicts that while single metaphors will be processed by lexically adjusting the metaphor vehicle to a sense that satisfies the speaker's expectations of optimal relevance, she predicts that extended metaphors are processed via a second route that where literal meaning is given more prominence. The assumption that single metaphors are processed through ad hoc concept creation is derived from the standard Relevance Theoretic view of metaphor, and the deviation from this process is what forms the basis for predicting processing differences in extended vs. single metaphors.

Importantly, similes do not fall on the spectrum of what Relevance Theory calls loose use of language, which means Relevance Theory does not analyse similes as being understood through local lexical modulation (Carston & Wearing, 2011). Similes with an extended figurative meaning would, then, based on Carston's (2010) account, not require a switch in processing mode like metaphors would. If the results show that extending the figurative meaning affects processing of similes and metaphors differently, this could indicate that smiles and metaphors are processed via different cognitive mechanisms. On the other hand, if metaphors and similes are processed the same in the extended conditions, this supports the Domain Mapping hypothesis. This suggests that

the faster reading times in the extended conditions arise as a result of facilitation from the activated conceptual domains in the context sentence. To sum up the predictions regarding the effect of extending the figurative meaning on similes and metaphors, I predict an interaction effect of FIGURE (metaphor vs. simile) and CONTEXT (single vs. extended) where extended metaphors are read faster than single metaphors, but extended similes are not read faster than single similes.

When it comes to processing differences between similes and metaphors, evidence from an eye-tracking study looking at reading times of simile and metaphor vehicles showed longer reading times for metaphors vehicles than for simile vehicles (Ashby et al. 2018). This study only looked at single metaphors and similes, and used conventional figurative utterances. Ashby et al. (2018) also found that readers were more likely to regress from the metaphor vehicle than from the simile vehicle. Based on the results from Ashby et al. (2018), I predict that the metaphors will overall be harder to process than the similes, but not for the same reasons as Ashby et al. (2018). Rather than assuming that metaphors require extra processing effort because readers recognise the surface literal meaning of a nominal metaphor as implausible, I believe that metaphors may bring extra cognitive effects at the cost of extra processing effort, as pointed out by Noveck et al., (2001) and explained in section 2.2.4 above.

Another possibility is that similes are harder to comprehend than metaphors. An argument in favour of this position is that analogy generally might be a harder process than categorisation, as argued by the Career of Metaphor Hypothesis (Bowdle & Gentner, 2005). If this is the case, and metaphors are processed via categorisation and similes are processed via comparison, the similes should take longer to process. However, there are a few possible counterarguments to this prediction: one of the experimental results that Gentner and Bowdle (2005) base their argument on is that novel figuratives take longer to comprehend than conventional ones. These results are also compatible with the view that novel figuratives may require more effort because they produce more cognitive effects, for example by being more creative and evoking more emergent properties (Noveck et al. 2001). Furthermore, if Wearing (2011) is right in her suggestion that novel metaphors may require analogical reasoning as a step embedded in the ad hoc concept creation, this may also account for novel figuratives taking longer to read than novel ones.

To sum up, I predict a main effect of FIGURE (metaphor vs. simile) where metaphors are overall read faster than similes, an interaction effect of FIGURE (metaphor vs. simile) and CONTEXT (single vs. extended) where extended metaphors are read faster than single metaphors, but extended similes are not read faster than single similes. These predictions are mainly based on Carston (2010) and the results of Rubio-Fernández et al. (2016) and Ashby et al. (2018).

3.1.5 Procedure

The test session began with an oral introduction to the study and the procedure. The participants then filled out the consent form and a demographics form. After adjusting the chair and head rest to the participants' comfort, participants saw verbal instructions on the monitor screen. They were instructed to read the sentences on the screen at a normal pace and to make sure they understood the sentence before moving on. After reading each sentence on the screen, participants clicked the space bar. In the sentence verification task, participants were instructed to click the J-key for true statements and the F-key for false sentences.

After the participants had read the instructions, an Eyelink 1000 Plus eye tracker was calibrated to track the participant's right eye. If the participant had corrected vision, they were instructed to wear glasses instead of contact lenses. Only calibrations with a maximal error of 0.5 were accepted.

The first two items were practice items to familiarise the participant with the task. After the first 20 items after the practice items, the participant was instructed to take a break before completing the last 20 items. Including the break, the whole test session lasted for around 20 minutes. During the experiment, a wall separated the participant and the experimenter. Figure 1 shows an illustration of a filler trial with a sentence verification task.

Figure 1: Visual demonstration of example trial

Selma and Daniela have a new house with an amazing garden.
They couldn't see the end of it from their door.

The participant presses spacebar to move on to the next sentence.

Their backyard is the Pacific, so they built a patio.

The participant presses spacebar to move on to the next sentence.

```
                    Selma and Daniela have a new house.




        Press F for FALSE.                          Press J for TRUE.
```
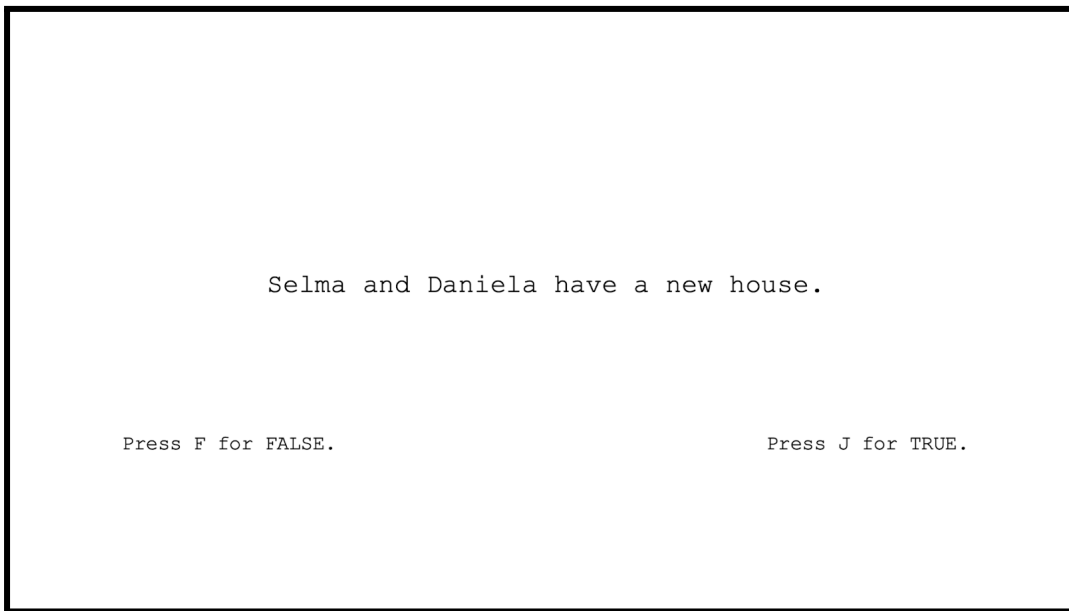
The participant presses either F or J to indicate if the statement in true or false.

After participating, the participant gave oral answers to a post-experiment questionnaire on what they thought the experiment was about, if they had any difficulties during the experiment, and if there was anything they found particularly interesting. Each participant received a 200 NOK gift card after the experiment ended.

3.1.6 Analysis

To test the predictions, reading times of the metaphor and simile vehicles were analysed (vehicles are highlighted in the example items in table 1). The reading times of the metaphor and simile vehicles were log-transformed following the results of a Box Cox test. The reading times were then fitted in a mixed effects linear regression model with random intercepts for items and participants, in addition to random slopes for both experimental factors.

The analysis was run in R (R Core Team, 2020) and RStudio (RStudio Team, 2020) using the Tidyverse (Wickham et al., 2019), here (Müller, 2017), MASS (Ripley et al., 2013), Rmisc (Hope, 2013), lmerTest (Kuznetsova et al., 2017), afex (Singman et al., 2020), and lme4 (Bates et al., 2007) libraries.

3.2 Results

3.2.1 Overview

I predicted 1) that metaphor vehicles would be read faster than the simile vehicles, 2) that the vehicles in extended metaphors would be read faster than the vehicle in single metaphors, and 3) that there would not be a comparables processing difference between single and extended similes and single and extended metaphors. The results of the total reading times of the metaphor and simile vehicles were in line with my hypotheses. The results for regression path duration and gaze duration were not significant.

3.2.2 Results of total reading times

In the total reading times, there was a main effect of FIGURE (metaphor vs. simile) where metaphor vehicles were overall read significantly faster than the simile vehicles (p = 0.0348). There was also an interaction effect of FIGURE (metaphor vs. simile) and CONTEXT (single vs. extended), with extended metaphors being read significantly faster than single metaphors (p = 0.0318).

This difference in total reading times of the vehicles does, however, not appear in the simile conditions. In other words, the results of this study indicate that extending the figurative meaning does not affect processing of metaphors and similes in the same way. Further, following the assumption that total reading times reflect late stages of processing, this trend suggests that the processing differences appear late in processing.

The log transformed results for regression path duration (rpd), gaze duration (gaze), and total reading times (tt) for the metaphor and simile vehicles are reported in figure 2.

Figure 2: Log transformed reading times of gaze duration (gaze), regression path duration (rpd), and total reading times (tt).
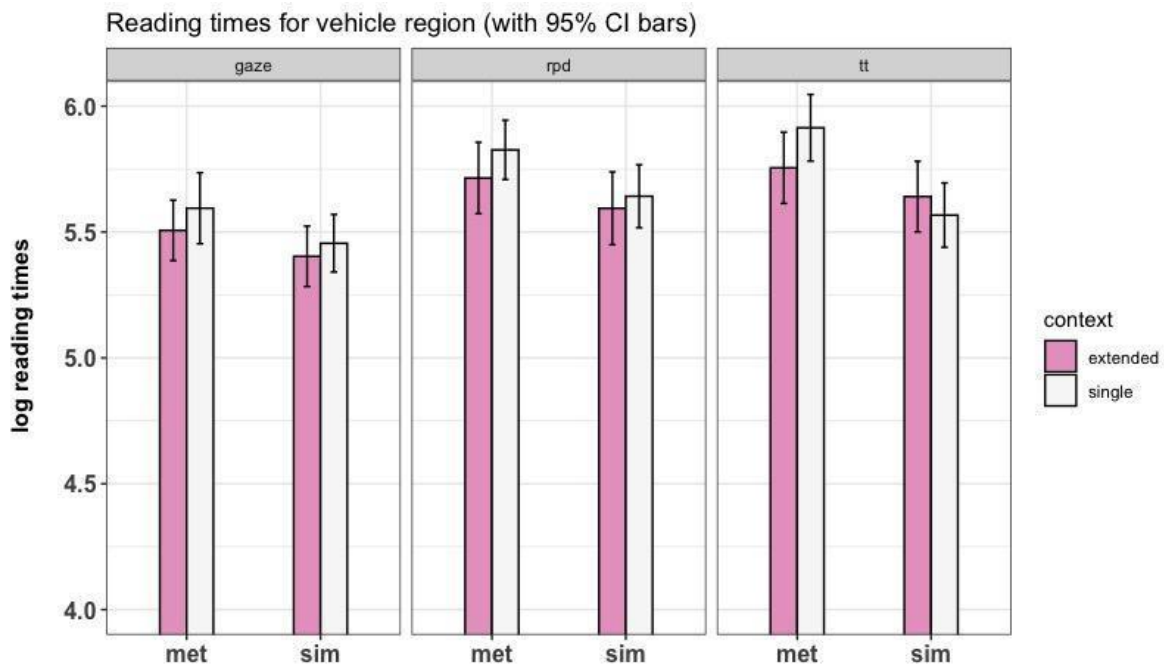
3.3 Discussion

In this section, I will discuss the results of the study and how I interpret them in light of the relevant theory I set out in the Literature Review. I will begin by discussing each research question. I will then move on to a general discussion of the results where I discuss what the results mean for theories of simile and metaphor processing in a broader perspective.

I will argue in favour of a categorisation account of metaphor that sees metaphor and simile vehicles as expressing different types of concepts – metaphors express an occasion specific ad hoc concept whereas the similes express their lexically encoded concept. Further, to account for the

processing difference between single and extended metaphors, the Categorisation view I argue for will not subscribe to the continuity hypothesis. I will also set out and discuss whether Wilson's notion of the 'lingering of linguistic form' might be an alternative explanation for the processing difference between single and extended metaphors predicted by Carston (2010), and discuss Wearing's (2014) proposition for the role of analogy in ad hoc concept creation.

In the final sections of the discussion, I will set out some directions for future studies. Because this is the first study to compare processing of not only single, but also extended, metaphors and similes to each other, the results of this study suggest many fruitful directions beyond other experimental paradigms that previously have only looked at single metaphor and similes.

3.3.1 Research Question 1: Do single and extended metaphors require different processing modes or not?

The results show that extended metaphors are read faster than single metaphors, and they therefore support accounts of metaphor comprehension that predict a processing difference between single and extended metaphors. The same processing difference where extended metaphors are read faster than single metaphors is also found by Keysar et al., (2000), Thibodeau and Durgin (2008), and Rubio-Fernández et al. (2016), whose second experiment used the same paradigm as this study, an eye-tracking reading paradigm. Rubio-Fernández et al. (2016) test two Relevance Theoretic accounts: the Deflationary Account (Sperber & Wilson, 2008) and the Dual Processing view developed by Carston (2010). Their results support a distinct processing difference between single and extended metaphors by showing longer reading times for single metaphors in a self paced reading task and an eye-tracking reading task, and that metaphor vehicles are better remembered in single metaphors than in extended metaphors. My study provides additional support for Carston's (2010) suggestion of two distinct processing modes. Moreover, my study shows that the effect found by Keysar et al., (2000), Thibodeau and Durgin (2008), and Rubio-Fernández et al. (2016)

can be replicated with a different set of linguistic stimuli and narrowed down to only the metaphorical vehicle, as opposed to the whole target sentence.

It is possible to argue that the difference in reading times between single and extended metaphors arises due to a priming effect of the metaphor in the preceding context. The Domain Mapping Hypothesis (which is part of the Structure Mapping view) proposes that metaphors will be read faster when they are a part of an ongoing mapping between conceptual domains (Gentner et al., 2001). In the metaphor *his comments were razors*, for example, the Domain Mapping Hypothesis would predict that the metaphor would be read faster when preceded by a sentence like *the editor gave sharp-edged criticism* because *sharp-edged* would activate a conceptual domain connected to *razors*. If the metaphor in the extended context is read faster due to a priming or facilitation effect from the metaphor in the context sentence, the differences in reading times may reflect a quantitative processing difference. Thus, one could argue, these results are not necessarily evidence for a qualitative difference between the processing of single and extended metaphors as proposed by Carston (2010).

However, the results of this study also suggest that extending the figurative meaning of similes does *not* give rise to a similar processing pattern where extended similes are read faster than single similes. This is a problem for the Domain Mapping Hypothesis, as it would predict the reading times of extended similes to be faster than those of single similes due to a priming effect. In the next section I will discuss this in more detail. To sum up, I believe that the results of this study add to the existing experimental evidence in favour of Carston's Dual Processing view (2010) of single and extended metaphors.

The Domain Mapping Hypothesis also meets resistance from the results of Ronderos and Falkum's (2023) study on suppression of literal features in single and extended metaphors. Using a lexical decision task, Ronderos and Falkum (2023) found that literal features are suppressed to a smaller degree in extended metaphors compared to single metaphors. Their experiment is a partial replication of Rubio-Fernández (2007), who found that literal-related features of the metaphor vehicle are suppressed 1000 milliseconds after the participant encounters the metaphor while metaphor-related features remain activated. This effect was replicated by Ronderos and Falkum (2023) for single metaphors, but for extended metaphors, literal-related features of the metaphor

vehicle remained activated after 1000 milliseconds. Both Ronderos and Falkum's (2023) study and the results of the current study provides additional support to Carston's (2010) notion of the 'lingering of the literal' in extended metaphor.

3.3.2 Research Question 2: Is there a similar processing difference between single and extended metaphors and similes?

I see the interaction effect between FIGURE (metaphor vs. simile) and CONTEXT (single vs. extended) as more compatible with categorisation accounts such as the Dual Reference View (Glucksberg & Haught, 2006) and Relevance Theory (Sperber & Wilson, 2008) than analogy and similarity based accounts. The results of this study did not show a similar processing difference between single and extended metaphors and single and extended similes. This suggests that extending the figurative meaning affects metaphor and simile processing differently – while metaphors in extended figurative contexts were read faster than single metaphors, similes in extended figurative contexts were not read faster than single similes. As mentioned in section 4.1, the Domain Mapping Hypothesis might explain the difference between the metaphor condition by pointing to a priming effect in the extended metaphor condition.

The Domain Mapping Hypothesis is, however, not able to account for why the same difference in reading times does not appear in the simile conditions – why should the extended metaphors be subject to a priming effect from the context sentence while similes are not? Contrary to categorisation accounts, Gentner et al.'s (2001) theoretical view of similes is largely the same as their view of metaphor. In their account of the Structure Mapping View, Genter et al. (2001, p. 243) write that they use metaphor in a broad sense that, unless otherwise specified, includes similes. If the difference in reading times between single and extended similes is driven by the context sentence activating a domain that facilitates a faster reading of the figurative vehicle due to its relation to the vehicle term, the similes should, on the Structure Mapping and Domain Mapping views, also be subject to this priming effect.

The Dual Reference View (Glucksberg & Haught, 2006) and Relevance Theory (Sperber & Wilson, 2008; Carston & Wearing, 2011) see simile and metaphor vehicles as expressing different

types of concepts, i.e. either ad hoc concepts or as lexically encoded concepts. This makes ad hoc concept creation a necessary step in interpreting single metaphors, but not in single similes. The lack of a similar processing difference may therefore be explained by the extended metaphors requiring a switch in processing mode as the reader encounters the target sentence, while this type of switch will not be necessary in the extended simile condition.

3.3.3 Research Question 3: Does processing of metaphors and similes require different cognitive mechanisms or not?

I interpret the results of this study as being indicative of a difference in the underlying cognitive mechanisms responsible for simile and metaphor comprehension. In the following, I will explain why.

Taken alone, the main effect of FIGURE (metaphor vs. simile), where similes are read faster than metaphors, is in line with the predictions made by analogy and similarity based processing accounts. The Career of Metaphor View (Bowdle & Gentner, 2005), which argues that novel metaphors are processed through analogy, would predict that novel figuratives are preferred and easier to process as similes than metaphors. This is because novel metaphors are on this view seen as implicit comparisons whereas similes are explicit comparisons. Readers would therefore not have to "convert" the metaphor into a simile before being able to retrieve its figurative meaning. This is what Bowdle and Gentner (2005) find in experimental investigations of these predictions. In an experiment investigating whether participants prefer novel or conventional figurative statements in the simile or metaphor form, participants generally preferred novel figuratives in the simile form (Bowdle & Gentner, 2005, p. 201). Further, they found that participants comprehended novel figuratives faster as similes (X is *like* Y) than as metaphors (X is Y) (Bowdle & Gentner, 2005, p. 202-203).

The Structure Mapping and the Career of Metaphor Views are, however, unable to account for the interaction effect between FIGURE (metaphor vs. simile) and CONTEXT (single vs. extended) where extended metaphors are read faster than single metaphors, but extended similes are *not* read faster than single similes. As mentioned in section 4.2, the Structure Mapping View

would predict a similar processing difference between single and extended metaphors and similes. This makes the analogy approach to metaphor and simile processing incompatible with the results of this study, which speaks in favour of there being a difference in the underlying cognitive mechanisms behind metaphor and simile processing.

A different potential explanation for longer reading times for metaphors is presented by Ashby et al. (2018) in their eye-tracking reading study on early processing of single metaphors and similes. They found that participants spent more time re-reading metaphor vehicles than simile vehicles (Ashby et al., 2018, p. 166), and find that metaphors are more effortful to interpret than similes, and argue that this is because readers go back and reread metaphors to find an interpretation that is compatible with a non-literal *X is Y* type of category statement. On this view, the differences between similes and metaphor do not arise due to different processing modes, but rather the fact that the non-literal category form in metaphors requires readers to re-analyse the metaphor in order to find a plausible metaphorical meaning. However, Ashby et al.'s (2018) account of metaphor and simile processing does not have a natural way of accounting for processing differences between single and extended metaphors and the fact that similes and metaphors seem to be affected differently when the figurative meaning is extended.

In section 1.2.4 in the Literature Review, I presented Noveck et al.'s (2001) Relevance Theoretic account of the extra processing costs associated with metaphor as an alternative explanation to Ashby et al.'s (2018) results. To repeat briefly, Noveck et al. (2001) argue that the extra processing effort associated with metaphors arises because they also provide additional cognitive effects, and on a Relevance Theoretic view, extra costs of processing should also come with extra effects. Although Noveck et al. (2001) compared metaphor processing to literal utterances, and not similes, the same argument may, on the Relevance Theoretic account, be applied to the difference in processing effort between metaphors and similes as similes are seen as expressing their literally encoded concept rather than a lexically modulated ad hoc concept (Carston & Wearing, 2011, p. 296). This also aligns neatly with, indeed is supported by, Glucksberg and Haught's (2006, p. 364-365) finding that people tend to report more emergent properties when they interpret metaphors compared to when they interpret similes.

To sum up, the results regarding only the main effect of FIGURE (metaphor vs. simile), where similes are read faster than metaphors, are compatible with both comparison and categorisation oriented frameworks. On the one hand, metaphors may be more effortful to process because they are implicit similes, as predicted by the Structure Mapping and Career of Metaphor Views (Bowdle & Gentner, 2005; Gentner & Bowdle et al., 2008; Gentner et al. 2001). On the other hand, metaphors may be more effortful to process because they come with an extra processing cost, for example by giving rise to more emergent properties than similes (Glucksberg & Haught, 2006; Noveck et al. 2001; Carston & Wearing, 2011).

However, only Categorisation views that that see simile and metaphor processing as happening through different cognitive mechanisms are able to account for both the main effect of FIGURE (metaphor vs. simile) *and* the interaction effect between FIGURE and CONTEXT (single vs. extended) where extended metaphors are read faster than single metaphors, but extended similes are not read faster than single similes. Because analogy based accounts are not able to account for the lack of a similar processing difference between single and extended metaphors and similes, I interpret the results of this study as supporting the view that the underlying cognitive mechanisms behind simile and metaphor processing are distinct from each other.

3.3.4 General discussion

So far, I have discussed the results in light of each individual research question. In this section, I will set out what I think a coherent view of metaphor and simile interpretation could look like based on how I interpret the results of this study. The main question I want to answer in this section is the following: What do my results mean for theories of metaphor and simile comprehension? If my results are representative of processing of single and extended similes and metaphors and I am correct in how I interpret the results, a theory of metaphor and simile processing would have to account for the following: 1) Similes and metaphors being processed differently, and 2) Single and extended metaphors being processed differently. I will discuss the Deflationary View of Metaphor and the Strong Continuity Hypothesis and suggest some modifications based on the results of my

study. I will also discuss what the results of my study could mean for a theoretical account of similes.

Adjusting the Deflationary Account and the Continuity Hypothesis

In *A Deflationary Account of Metaphor*, Sperber and Wilson (2008) set out a continuum view of language with non-literal language at one end and literal language at the other, and argue that there are no interesting theoretical generalisations that apply to metaphor specifically. In other words, they argue that all types of loose use of language, whether it be approximation, hyperbole, or metaphor, are comprehended through the same pragmatic process, namely lexical modulation via ad hoc concept creation (Sperber & Wilson, 2008). This approach to metaphor comprehension is very similar to the Dual Reference View proposed by Glucksberg and Haught (2006), but the process of creating ad hoc concepts is on the Deflationary View applied to a wider variety of phenomena and not restricted to non-literal and figurative speech.

Further, Sperber and Wilson (2008) argue that we cannot draw any definite dividing lines between different types of loose use. It has been suggested that a way to distinguish hyperbole and metaphor is that hyperbole requires only a quantitative modulation of the encoded lexical meaning while metaphor requires a qualitative modulation (Carston & Wearing, 2011, p. 291). Sperber and Wilson (2008) use the following types of examples to illustrate that the lines between types of loose use are far from clear-cut:

17) Joan is a <u>saint</u>.

Example (17) may be analysed as a case of hyperbole where the hearer infers the intended figurative meaning by lexically adjusting the meaning of *saint* to a contextually appropriate ad hoc concept SAINT* that denotes *people who are incredibly kind and helpful*. This instance of lexical modulation of *saint* involves a quantitative exaggeration of Joan's kindness, and (17) can in this sense be classified as a hyperbole. However, it is also necessary to adjust SAINT to denote a qualitatively different concept – the lexically encoded concept SAINT refers only to people who

have been canonised. In the likely case that Joan has not been canonised, *saint* must therefore be broadened to include ordinary people as well as literal saints. Based on examples such as (17), Sperber and Wilson (2008, p. 95) argue for a strong continuity view where no theoretical, psycholinguistic, or pragmatic generalisations apply to only a specific type of loose use, such as metaphor, in isolation.

If Carston's (2010) suggestion of distinct processing modes for single and extended metaphors is correct, as suggested by this study and several other studies (Rubio-Fernández et al, 2016; Ronderos & Falkum, 2023), the continuity view set out by Sperber and Wilson (2008) is too strong. Because the Deflationary Account of Metaphor does not discriminate between different types of metaphors when it comes to how their meaning is processed, the idea that extended metaphors are processed differently from single metaphors poses a problem for this account. A coherent theory of metaphor needs to be able to account for both types of metaphor processing, which requires localist categorisation accounts such as the Deflationary Account and the Dual Reference Account to be adjusted to accommodate for metaphors that seem to require a global rather than local processing.

Further, because the Deflationary Account of Metaphor holds that there are no clear dividing lines between different types of loose use, such metaphor, hyperbole or category extension, it is possible on this account that other types of loose use that have an extended figurative meaning may also require a processing mode that does not operate at the lexical level. To illustrate this point with an example, we can extend the figurative meaning of example (17) in the following way:

17b) Joan is a <u>saint.</u> I don't know how I would manage if she didn't <u>descend from heaven</u> to rescue me.

If example (17) is a borderline case of hyperbole and metaphor, it is possible to argue that Carston's (2010) proposed second processing mode may not apply only to extended metaphors, but also to to

other figuratively extended passages, such as example (17b), that would require consecutive ad hoc concept creation on the Deflationary Account[6].

The main argument I want to make in this section is that an account of metaphor processing cannot be fully deflationary – if single and extended metaphors are processed differently, an account of metaphor comprehension needs to distinguish between cases that require local lexical modulation and cases that require 'global' processing where the literal meaning is metarepresented and sustained to a larger degree. I also want to suggest, based on the unclear dividing lines between different types of loose use, that perhaps the local vs. global distinction in processing mode may apply to not only metaphor, but also other extended figures of speech. More research is needed to find exactly when we switch processing mode from one to the other, and whether the same processing differences can be found for other types of figures of speech, such as hyperbole.

As mentioned in section 4.2 on the lack of a comparable processing difference between single and extended metaphors and similes, categorisation accounts (Carston, 2010; Glucksberg & Haught, 2006; Sperber & Wilson, 2008) see ad hoc concept creation as a necessary step in comprehending singe metaphors, but not single similes. Analysing the switch in processing mode as initiated by the cost of lexically adjusting consecutive instances of loose use therefore provides an explanation for why we do not observe the same processing difference between the single and extended simile conditions.

Wilson's (2018) notion of 'the lingering of linguistic form' – an alternative explanation to Carston's (2010) notion of 'the lingering of the literal'?

Wilson (2018, p. 194) points out that the idea that creating ad hoc concepts should be more costly than accepting the literal meaning conflicts with the Relevance Theoretic view that pragmatic processes occur automatically and unconsciously to adjust almost every word we encounter (Wilson, 2018, p. 194). If adjusting concepts is something we do spontaneously even when

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[6] Carston and Wearing (2011) argue that similes (e.g. Joan is like a saint) may also be hyperbolic, without there being a continuum between similes and hyperbole, because similes are not seen as an instance of loose use on the Relevance Theoretic account. From this, they argue, it follows that just because an utterance is simultaneously metaphorical and hyperbolic, this does not presuppose that there is a lack of distinction between metaphor and hyperbole. If this is the case, the second processing mode suggested by Carston (2010) may only apply to metaphors.

interpreting literal speech, it is worth asking why repeatedly encountering words that require ad hoc concept creation in an extended metaphor should lead to a switch in processing mode. Wilson (2018, p. 194) further points out that deriving an ad hoc concept is under some circumstances less effortful than deriving a literal one, for example when interpreting a literary text. To sum up, the idea that the processing cost of repeatedly adjusting words that are used metaphorically in an utterance should prompt a switch to a less costly processing mode where literal meaning plays a more substantial role is hard to reconcile with Relevance Theory's core assumption that encoded meaning is not privileged over lexically adjusted meaning.

Instead of a second processing mode where literal meaning is sustained to a larger degree taking over from ad hoc concept creation, Wilson (2018) writes that the accumulation of related metaphorical terms in a passage may cause the reader to pay closer attention to the terms' encoded meanings and the exact wording of the passage. In processing terms, Ronderos and Falkum (2023) interpret Wilson's proposal, 'the lingering of linguistic form', as low-level semantic priming which would predict a facilitation effect in extended metaphors due to encountering consecutive related metaphorical terms.

Taken alone, the results for single and extended metaphor conditions are compatible with this explanation. When the results of the study are taken together, however, Wilson's (2018) notion of 'the lingering of linguistic form' falls short. If the faster reading times in the extended metaphor was a result of semantic priming, we would expect to also find this effect in the reading times for extended similes. The lack of a similar processing difference therefore speaks against Wilson's (2018) alternative explanation for the phenomenon Carston (2010) seeks to account for as 'the lingering of the literal'.

Relating the theories to early vs. late eye-tracking measures and processing stages

The fact that this study only finds significant differences in total reading times is an indication that the processing differences between the conditions arise in late stages of processing. Although connecting different eye-tracking measures to specific stages of processing should be done with

caution, it is possible to argue that finding differences in only late stages of processing speaks more in favour of Categorisation accounts than Comparison accounts.

The Structure Mapping view, which includes the Career of Metaphor view and the Domain Mapping Hypothesis, predicts that the interpretation process in both metaphor and simile comprehension starts out in a symmetrical manner where common properties between the topic and vehicle are identified (Gentner & Bowdle, 2008; Ronderos, 2021; Wolff & Gentner, 2011). As mentioned in section 3.1.1 on eye-tracking as a methodology, early measures such as gaze duration are typically seen as indications on early stages of processing, whereas late measures such as total reading times are connected to later stages of processing. If the mapping process starts initially upon encountering the vehicle, we should expect to see differences in the early processing measures, i.e. gaze duration, because the mapping process should be facilitated by the terms used metaphorically in the extended contexts. This is, however, not what this study found.

Advocates of the Structure Mapping view state quite clearly that it should predict differences in early processing, but categorisation accounts such as the Relevance Theoretic view and the Dual Reference view are less clear on exactly when we should observe processing differences between single and extended conditions. Rubio-Fernández et al. (2016, p. 21) interpret Carston's (2010) model as predicting that early measures should be different in the single and extended metaphor conditions while late measures should be similar. They further predict that early processing measures should be similar for the extended metaphors and the literal control condition – this is because the target utterance in the extended metaphor should initially be processed literally as the reader has switched to the second processing mode (Rubio-Fernández et al., 2016, p. 21). Their results are in line with these predictions, which differs from what this study finds – in the current study, there are processing differences in late measures between the two metaphor conditions. This may seem contradictory considering the similar methodological approach of Rubio-Fernández et al. (2016) and this study.

A closer look at the critical items of the two studies can highlight why Rubio-Fernández et al. (2016) found differences in early measures while this study finds differences in late measures. With the exception of two items, this study has only one metaphorical term in the context sentences in the extended conditions, such as in the example below:

(18) Daniel has been in severe pain ever since he learnt about his wife's affair. The betrayal *cut* him deeply. **A lie is a dagger**, and he felt very lonely.

This is quite different from Rubio-Fernández et al.'s (2016) items, which had several metaphorical terms in all contexts. The following example is a sample items which illustrates the structure of their items (metaphor terms in context are in italics and their target expression is in bold):

(19) Helen spoke with the *soothing tones of a skilled healer*. If she was in the right mood, her words had *a soft edge that could magically cure you of all your ailments without any medicine*. But if she thought a treatment was needed, **she would apply her scalpel close to your heart**, so you might find yourself wounded by the long blade of a 'why' or the incurable silence of a full stop. (Rubio-Fernández et al. 2016, p. 28)

As example (19) shows, Rubio-Fernández et al.'s (2016) items contain several metaphorical terms in the context preceding the target utterance. It is therefore possible to argue that the processing differences they found reflect processing only after the reader had switched to Carston's (2010) proposed second 'metarepresentative' mode in which literal meaning is sustained. If the reader is in the second processing mode where they are not lexically adjusting the metaphorical terms, but rather metarepresenting their literal meaning, this may explain why Rubio-Fernández et al. (2016) find differences in processing measures reflective of early stages, such as lexical retrieval.

The structure of the items in this study, on the other hand, may cause the results to be reflective of the type of processing that occurs as the reader switches to Carston's (2010) proposed second 'metarepresentative' mode. This is because the current study measured reading times as the reader encountered a second metaphorical term in an extended metaphor (in all items except two[7]), as opposed to in Rubio-Fernández et al.'s (2016) study, where the target utterance contained a third metaphorical expression.

To sum up this discussion of eye-tracking measures and processing stages, the results of this study are less compatible with the Structure Mapping view and the related Domain Mapping Hypothesis as these views predict differences in early measures, whereas this study finds differences

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[7] In an eventual follow up study, all items in the extended conditions should contain the same number of metaphorical terms in the context sentence.

in late measures. While results from a previous eye-tracking study on single and extended metaphors does find differences in early measures, and not late measures as this study finds, this may be explained by the structure of the critical items in the two studies – it is possible that Rubio-Fernández et al.'s (2016) study measured reading times after the reader had switched to the second mode, whereas this study measured reading times as the reader encountered the metaphorical term that triggered the switch from the first to the second mode.

3.4 Methodological challenges

3.4.1 Testing speakers from different English speaking communities in a Norwegian speaking community

Due to the constraint of having to run the study in English with native speakers, I recruited participants of many different nationalities in order to have enough participants. The language varieties spoken among the participants include English, Scottish, Irish, Australian, New Zealand, Canadian and American English. Table 4 provides an overview of the dispersion of varieties of English among the participants (only the participants who were included in the statistical analysis):

Table 4: Varieties of English spoken among participants.

Variety of English	Number of participants
English	9
Scottish	1
Irish	1
Australian	2
New Zealand	2
Canadian	6
American	5
Sum	**26**

This large variety means that there are probably significant cultural differences that may affect how readers interpret the figurative statements, perhaps most notably in how familiar they are with the figurative meaning of the metaphors or similes. This makes it harder to control for conventionality in the items. Additionally, it may have affected reading times for participants who read sentences where the spelling (and in at least one item grammar) departed from the conventions of their own language community.

Another consequence of testing English speaking participants is that it drastically minimises the pool of potential participants in Oslo. This made recruitment quite effortful, and led to far fewer participants than would be ideal for a study of this type. The small sample size limits the generalisability of the results, and increases the chances of finding an effect that in reality does not exist.

In a future study where I am not constrained to conducting the study in English, I would run the study in Norwegian, or whatever is the majority language of the language community, run a pilot with a small number of participants, and determine the total number of participants based on the results of the pilot.

3.4.2 Not all items were normed for aptness and conventionality

In section 1.1.1 on metaphors in the literature review, I set out the differences between novel and conventional metaphors and stated that I would only be testing novel metaphors and similes. The items I have adapted from Jones and Estes (2006) have been normed for both aptness and conventionality, and the items I chose to adapt were not rated as highly conventional. Additionally, these metaphors were also rated high in aptness. The target sentences and context sentences I adopted from Ronderos and Falkum's (2023) study on extended metaphors were also novel.

However, norming studies were not conducted for this experiment specifically to make sure that the critical items are comparably novel and apt. Additionally, none of the target sentences that were already normed were normed with the context sentence they were given in this experiment. Furthermore, none of the items were normed in their simile form – only as metaphors.

Jones and Estes (2006, p. 29) argue that confounding conventionality and aptness in the majority of studies on metaphor and simile processing has made it impossible to discriminate between comparison and categorisation models when explaining experimental results. As this study has not controlled for conventionality and aptness in all items, these might be confounding variables. In a follow-up study, aptness and conventionality of the critical items should be carefully controlled in order to avoid confounding variables to a larger extent.

3.4.3 All contexts are metaphorical – only target sentences in "extended similes" are similes

To keep the contexts identical across the single and extended conditions for both metaphors and similes, I chose to only use metaphorical contexts in the extended conditions. This means that the extended figurative meaning in the similes was extended by means of a preceding metaphor, not a preceding simile. It is therefore possible to question to what extent this experiment is really testing *extended simile* when only the target sentence in the extended simile conditions are instances of simile.

The background for making this choice regarding the context sentences is twofold: 1) As mentioned initially, using metaphorical contexts in both types of figurative speech allowed the contexts to be identical across the two extended conditions; 2) Constructing context sentences with similes would make the contexts in the extended simile conditions considerably longer than the other context sentences. This is because the context would most likely include non-nominal similes, which would make it less straightforward to construct corresponding figurative and non-figurative sentences with minimal surface differences. In nominal metaphors and similes, the only difference is the comparison term *like*:

20) A lie is a dagger.

21) A lie is like a dagger.

If we try to construct a context sentence with a figurative meaning brought about by a simile however, we see that it is less straightforward. Example (22) repeats the original context sentence for the extended conditions of the items in examples (20) and (21), and examples (23a) and (23b) shows two attempts to convert it to a simile (with the added words underlined):

22) Daniel has been in severe pain ever since he learnt about his wife's affair. The betrayal cut him deeply.

23a) Daniel has been in severe pain ever since he learnt about his wife's affair. The betrayal <u>felt as if it</u> cut him deeply.

23b) Daniel has been in severe pain ever since he learnt about his wife's affair. <u>It felt as if</u> the betrayal cut him deeply.

In (23a) and (23b) four additional words were added either clause initially or clause medially. Either way the extended simile context sentence is changed. Adding four additional words would decrease the level of experimental control and perhaps be a confounding variable for the eye-tracking data. As mentioned in section 2.2.1 on linguistic stimuli, although the contexts in the extended simile conditions are metaphorical, the figurative meaning is still extended – the figurative import of the context sentence in example (22), for instance, is extended in the simile *a lie is like a dagger* although two different figures of speech are being used.

3.5 Directions for future studies

In this section, I will suggest some interesting directions for future studies on metaphor and simile processing. In the literature review, I set out a comprehensive selection of both theoretical and experimental research on metaphors and similes. This study's novel approach, comparing both single and extended metaphor and similes can shed light on how earlier experimental paradigms might be adjusted and suggest fruitful theoretical discussions. Further, the additional support this

study provides for the existence of Carston's (2010) suggested second mode of metaphor processing calls for a closer investigation of exactly what this mode entails.

3.5.1 Extending the figurative meaning by means of a simile instead of a metaphor

As pointed out in section 2.3 where I summarised some central existing research on single and extended metaphors and similes, reading time data on single and extended metaphors is largely compatible with both the Domain Mapping Hypothesis (Gentner & Boronat, 1992; Gentner et al., 2001) and Carston's (2010) Dual Processing Account. On the one hand, it could be that faster reading times for extended metaphors arise as a result of facilitation effects from the ongoing mapping process, or it could be because the reader has switched to the second processing mode where the literal meaning is 'metarepresented' and sustained to larger degree than during interpretation of single metaphors. The results in this study support the latter option. Another way to disentangle the two possible explanations would be to test processing differences between metaphors and similes whose figurative meaning is extended by means of a preceding simile and metaphors and similes that are preceded by a non-figurative context sentence. Below are examples of what these types of items could look like:

Table 5: Example items for study on metaphors and similes with a figurative meaning extended by similes

Simile – metaphor	Daniel has been in severe pain ever since he learnt about his wife's affair. The betrayal was <u>like a deep cut.</u> **A lie is a dagger,** and he felt very lonely.
Non-figurative – metaphor	Daniel has been in severe pain ever since he learnt about his wife's affair. The betrayal was very hurtful. **A lie is a dagger,** and he felt very lonely.
Simile – simile	Daniel has been in severe pain ever since he learnt about his wife's affair. The betrayal was <u>like a deep cut.</u> **A lie is like a dagger,** and he felt very lonely.

Non-figurative – simile	Daniel has been in severe pain ever since he learnt about his wife's affair. The betrayal was very hurtful. **A lie is like a dagger,** and he felt very lonely.

This would make the target sentences in both conditions single metaphors or single similes, but the Domain Mapping Hypothesis' view of simile and metaphor would predict faster reading times for the target sentences preceded by a simile than for the target sentence preceded by a non-figurative context.

In *Metaphor is Like Analogy*, Gentner et al., (2001, p. 243) write that, unless otherwise specified, their definition of metaphor includes similes as well. The simile in the context sentence should, on the Domain Mapping account, activate a related conceptual domain and initiate a mapping process that facilitates the comprehension of both the target metaphor and target simile. Carston's (2010) version of the Relevance Theoretic view would, on the other hand, not predict the target sentences preceded by the simile to be read any faster than the target sentence preceded by the non-figurative context. This is because Categorisation views see similes as expressing their lexically encoded concept, and not a sense whose comprehension requires lexical adjustment. Because the only instance of ad hoc concept creation would occur in the target sentence, the reader would not switch to the second processing mode as a consequence of consecutive instances of loose language, as suggested by Carston (2010). Finding a lack of a processing difference between the conditions in table 4 would be in line with the results of the current experiment and support a distinction between single and extended metaphors.

3.5.2 Specifying the processes involved in Carston's (2010) proposed second processing mode for extended metaphors

Several studies have found evidence for a different type of processing for extended metaphors than single metaphors (Keysar et al., 2000; Ronderos & Falkum, 2023; Rubio-Fernández et al., 2016; Thibodeau & Durgin, 2008), and the results of this study support the idea that the results of this

and earlier studies reflect a processing mode that is qualitatively different from processing of single metaphors, as suggested by Carston (2010). However, the second mode characterised by the 'lingering of the literal' proposed by Carston (2010) is left underspecified when it comes to exactly which cognitive mechanisms are involved. Explicating what type of processing that might be involved in the second processing mode would advance our understanding of metaphor processing by allowing us to formulate and test more specific hypotheses.

One suggestion for what type of processing might be at play has been made by Wearing (2014), who discusses whether there is a place for analogy in Categorisation accounts of metaphor processing. She focuses on highly novel metaphors and points to the following problem for categorisation accounts in dealing with novel metaphors, such as *his life was a skiff with no oar*: if there are no pre-existing links between the metaphor topic and vehicle, how do we rank the properties that end up constituting the resulting ad hoc concept? To answer this puzzle, Wearing (2014) appeals to analogical reasoning. She suggests that in order to draw out the most relevant properties in a given context, we might have to rely on analogical reasoning when we are dealing with truly novel metaphors.

It is unclear whether the specific metaphors in the critical items of this study are as novel as the metaphors Wearing (2014) discusses, and her account is primarily focused on highly novel metaphors, not extended metaphors. She does, however, suggest that novel metaphors of the type she discussed may also trigger the second processing mode by making the creation of an ad hoc concept too effortful. If this is the case, it may be that analogical reasoning plays a role in the second mode proposed by Carston (2010). Comparing processing between the type of metaphors Wearing (2014) is discussing and extended metaphors may therefore be an interesting path forward for fleshing out exactly what type of processing is involved in Carston's (2010) proposed second mode.

3.5.3 How does understanding of extended figures of speech develop?

Investigating the research questions of this thesis from a developmental angle can bring us closer to understanding the psychological status of metaphors and similes, and in turn illuminate what cognitive resources we draw on to understand them.

It has traditionally been assumed that children don't understand metaphors until they are in their late childhood (Di Paola et al., 2019). In one of the earliest studies on development of metaphor comprehension, Asch and Nerlove (1960) found that children were not able to apply properties such as "soft" or "hard" metaphorically to people until they were 11–12 years old, and therefore suggest that metaphor comprehension does not develop fully until pre-adolescence. These results were replicated by Lesser and Drouin (1975). Other studies carried out later in the 1970s found, using a different experimental paradigm, that children start showing competence with metaphor around 8 years of age, but that a full competence does not emerge until 10 years of age (Winner, 1988).

Recent research, however, has shown that children as young as 3 years old are able to understand novel metaphors when experimental paradigms are better adapted to younger age groups (Di Paola et al., 2019; Pouscoulous & Tomasello, 2019). Several authors have recently argued that assessing children's ability to understand metaphor requires also paying attention to not only children's emerging pragmatic skills, but also the demands associated with metaphorical language in relation to children's general cognitive abilities (Di Paola et al., 2019; Pouscoulous & Tomasello, 2019; Rubio-Fernández & Grassmann, 2016). Pouscoulous and Tomasello (2019) point out that several factors in classical studies may impede preschool children's performance on metaphor comprehension tasks. These factors include task complexity, vocabulary, and conceptual knowledge (Pouscoulous & Tomasello, 2019, p. 161). They therefore set out to create an experimental paradigm that controlled for these factors in order to investigate whether an experimental design better suited for preschool children might reveal an earlier ability to understand metaphors. Their results suggested that preschool children as young as 3 years old are indeed able to understand novel metaphors (Pouscoulous & Tomasello, 2019).

Although recent research has shown that children show early competence with single metaphors, the case might be different for extended metaphors. Previous research on metaphor comprehension has found that extended metaphors are more challenging for children than single metaphors (Vosniadou et al., 1984). In an experiment where children were asked to enact metaphorical sentences, Vosniadou et al. (1984) found that the rate of correct responses declined when the number of terms used metaphorically in the sentences was increased from one to three. This indicates that extended metaphors are more difficult to understand for children, and that competence with extended metaphors emerges later than competence with single metaphors. Knowledge of children's abilities with extended metaphors is limited, and learning more about why extended metaphors are more difficult to understand than single metaphors can inform our understanding of what cognitive mechanisms are required to understand extended metaphors.

In their discussion of the development of metaphor understanding, Di Paola et al. (2019) point out that although preschool children can understand metaphors to a certain extent under conditions that provide sufficient 'scaffolding' (contextual support), young children generally struggle more with understanding metaphors than understanding other figures of speech such as hyperbole (Deamer, 2013) and metonymy (Falkum et al. 2017). Di Paola et al. (2019) seek to investigate why this is by testing how Analogy Perception and Alternative Naming contribute to the development of understanding metaphors. Di Paola et al. (2019) tested 3–4 year old children in three tasks, namely Metaphor Comprehension, Analogy Perception and Alternative Naming, using a unified picture matching paradigm. Their results suggested that children are better at understanding metaphors when they also do well with Analogy Perception and Alternative Naming, which indicates that these skills are important to development of metaphor comprehension (Di Paola et al., 2019). A possible direction for future research could be carrying out experiments where comprehension of both single and extended metaphors is tested. Investigating how the development of these skills interacts with the development of extended metaphors can provide interesting insights into which cognitive skills are necessary in order to understand extended metaphors, and to learn more about how the processing of extended metaphors differ from processing of single metaphors.

Further, studying how Analogy Perception develops in relation to extended metaphor comprehension in children is an interesting way to approach Wearing's (2014) suggestion that analogical reasoning is needed to process metaphors that are not processed through creating ad hoc concepts. If Analogy Perception predicts ability to comprehend extended metaphors to a higher degree than Alternative Naming, for example, this would be an indication that Wearing's (2014) suggestion is on the right track.

3.6 Summary

In this section, I have discussed what I think the results of my study mean for theories of metaphor and simile processing and suggested some interesting directions for future studies. Overall, I interpret the results as being more in line with Categorisation Accounts than Comparison Accounts and set out some alternative explanations from the Structure Mapping View. While Comparison Accounts can offer well founded explanations for similes overall being read faster than metaphors and for extended metaphor being read faster than single metaphors, these explanations fail to account for the lack of a comparable processing difference – if both metaphors and similes are interpreted through a process of Structure Mapping and analogical reasoning, extending the figurative meaning should yield a comparable processing difference between single and extended metaphors and single and extended similes.

Categorisation Accounts, on the other hand, make different processing predictions for metaphors and similes, which is in line with the results of this project. However, the results of this study suggest that Categorisation Accounts need to be adjusted to be able to account for a processing difference between single and extended metaphors. It further seems that the processing difference between single and extended metaphors is of a qualitative rather than quantitative nature – if the processing difference were a result of a priming effect in the extended metaphor condition, as suggested by the Domain Mapping Hypothesis and Wilson's (2018) notion of 'the lingering of linguistic form', we would expect to also find this effect in the simile conditions, which we do not.

4. Conclusion

My goal with this thesis was to contribute to answering a question that has interested scholars of linguistics, rhetoric, literature, philosophy, and psychology for a long time: Are metaphors and similes truly different, or are metaphors at the core implicit similes? I have looked at this question by investigating how single and extended metaphors and similes are processed through an eye-tracking reading paradigm and seeing if the results of this study can be best accounted for by Comparison views or Categorisation views of metaphor processing. In addition to comparing single metaphors to similes, which numerous former studies have done, I have also compared processing of extended metaphors to similes with both single and extended figurative meanings. Comparing processing of extended, as well as single, metaphors to simile processing is a novel way to approach the relation between metaphors and similes. In the introduction, I defined the following research questions:

Research Question 1) Do single and extended metaphors require different processing modes?

Research Question 2) Is there a similar processing difference between single and extended metaphors and similes?

Research Question 3) Does processing of metaphors and similes require different cognitive mechanisms, or do they draw on the same ones?

This study found that metaphor vehicles took longer to read than simile vehicles, that extended metaphors were read faster than single metaphors, and, crucially, that similes in the extended conditions were not read faster than similes in the single conditions. In other words, extending the figurative meaning has different effects on processing of metaphors and similes.

While other studies have also found that metaphors take longer to read and are more effortful to process than similes, and that extended metaphors are read faster than single metaphors,

this study is the first to show how extending the figurative meaning affects metaphor and similes differently. In the discussion section, I argued that Comparison accounts are well equipped to account for the results regarding processing effort of metaphors vs. similes and extended metaphors vs. single metaphors. When all the results are taken together, however, they can be best accounted for by Categorisation views that see simile and metaphor processing as being driven by distinct cognitive mechanisms – this is because we would expect a comparable processing difference between single and extended metaphors and similes if the two figures of speech were processed through the same underlying mechanism. Further, the results do not show processing differences in early measures, which is what Comparison accounts such as the Structure Mapping view would predict. Rather, this study finds differences in late measures.

The results also suggest that single and extended metaphors are processed differently, as suggested by Carston (2010). In the discussion section, I therefore argue for a Categorisation view with Carston's (2010) modification of two distinct processes for single and extended metaphors. Future research should work towards explaining exactly what type of processing is involved in Carston's (2010) proposed mode for extended metaphors.

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Appendix

Critical items in all four conditions

Item	Context	Type	Context Sentence	Target Sentence
1	single	metaphor	John doesn't like physical contact, and even his girlfriend finds it difficult to come close to him. She feels rejected by his distant attitude every time he sees her.	John is a cactus and his girlfriend loves him.
1	extended	metaphor	John doesn't like physical contact, and even his girlfriend finds it difficult to come close to him. She feels pricked by his thorny attitude every time he sees her.	John is a cactus and his girlfriend loves him.
1	single	simile	John doesn't like physical contact, and even his girlfriend finds it difficult to come close to him. She feels rejected by his distant attitude every time he sees her.	John is like a cactus and his girlfriend loves him.
1	extended	simile	John doesn't like physical contact, and even his girlfriend finds it difficult to come close to him. She feels pricked by his thorny attitude every time he sees her.	John is like a cactus and his girlfriend loves him.
2	extended	metaphor	Naomi had been sharing a flat with James for a long time. His friendship was very snug and well-fitting.	James was a pair of old slippers and Naomi really appreciated him.
2	single	simile	Naomi had been sharing a flat with James for a long time. His friendship was very sound and reliable.	James was like a pair of old slippers and Naomi really appreciated him.

2	extended	simile	Naomi had been sharing a flat with James for a long time. His friendship was very snug and well-fitting.	James was like a pair of old slippers and Naomi really appreciated him.
2	single	metaphor	Naomi had been sharing a flat with James for a long time. His friendship was very sound and reliable.	James was a pair of old slippers and Naomi really appreciated him.
3	single	simile	On the dunes someone had planted a few pine trees among the local plants. They grew over everything else.	The pine trees were like skyscrapers and cast long shadows.
3	extended	simile	On the dunes someone had planted a few pine trees among the local plants. They towered over everything else.	The pine trees were like skyscrapers and cast long shadows.
3	single	metaphor	On the dunes someone had planted a few pine trees among the local plants. They grew over everything else.	The pine trees were skyscrapers and cast long shadows.
3	extended	metaphor	On the dunes someone had planted a few pine trees among the local plants. They towered over everything else.	The pine trees were skyscrapers and cast long shadows.
4	extended	simile	Noah spends four hours a day in the gym. He forges his body intensively.	His muscles are like steel and he was very proud.
4	single	metaphor	Noah spends four hours a day in the gym. He trains his body intensively.	His muscles are steel and he was very proud.
4	extended	metaphor	Noah spends four hours a day in the gym. He forges his body intensively.	His muscles are steel and he was very proud.
4	single	simile	Noah spends four hours a day in the gym. He trains his body intensively.	His muscles are like steel and he was very proud.

5	single	metaphor	Nobody wanted to run against Thomas at school. He aimed for the finish line eagerly.	Thomas was a cheetah and the teachers were impressed.
5	extended	metaphor	Nobody wanted to run against Thomas at school. He preyed on the finish line ferociously.	Thomas was a cheetah and the teachers were impressed.
5	single	simile	Nobody wanted to run against Thomas at school. He aimed for the finish line eagerly.	Thomas was like a cheetah and the teachers were impressed.
5	extended	simile	Nobody wanted to run against Thomas at school. He preyed on the finish line ferociously.	Thomas was like a cheetah and the teachers were impressed.
6	extended	metaphor	Yousef loved paddling his canoe through the steep canyon and enjoyed rolling over in the white water of the rapids. The river poured down cascading in a foaming fizz.	The river was champagne and it was very beautiful.
6	single	simile	Yousef loved paddling his canoe through the steep canyon and enjoyed rolling over in the white water of the rapids. The river poured down cascading in great amounts.	The river was like champagne and it was very beautiful.
6	extended	simile	Yousef loved paddling his canoe through the steep canyon and enjoyed rolling over in the white water of the rapids. The river poured down cascading in a foaming fizz.	The river was like champagne and it was very beautiful.
6	single	metaphor	Yousef loved paddling his canoe through the steep canyon and enjoyed rolling over in the white water of the rapids. The river poured down cascading in great amounts.	The river was champagne and it was very beautiful.

7	single	simile	Even though she had never been to school, Jennifer had a lot of information stored in her mind.	She was like an encyclopaedia and always won pub quizzes.
7	extended	simile	Even though she had never been to school, Jennifer had volumes of information catalogued in her mind.	She was like an encyclopaedia and always won pub quizzes.
7	single	metaphor	Even though she had never been to school, Jennifer had a lot of information stored in her mind.	She was an encyclopaedia and always won pub quizzes.
7	extended	metaphor	Even though she had never been to school, Jennifer had volumes of information catalogued in her mind.	She was an encyclopaedia and always won pub quizzes.
8	extended	simile	It's a dangerous task for Martin to tidy up after his kids are done playing. He has to watch his step so he doesn't hurt his feet on small hidden weapons.	The legos are like land mines and end up everywhere.
8	single	metaphor	It's a dangerous task for Martin to tidy up after his kids are done playing. He has to watch his step so he doesn't hurt his feet on small hidden toys.	The legos are land mines and end up everywhere.
8	extended	metaphor	It's a dangerous task for Martin to tidy up after his kids are done playing. He has to watch his step so he doesn't hurt his feet on small hidden weapons.	The legos are land mines and end up everywhere.
8	single	simile	It's a dangerous task for Martin to tidy up after his kids are done playing. He has to watch his step so he doesn't hurt his feet on small hidden toys.	The legos are like land mines and end up everywhere.
9	single	metaphor	The bride was really stressed out the week	She was a ticking time

			before her wedding. She ordered everyone around and was constantly on the verge of panicking.	bomb and her friends were concerned.
9	extended	metaphor	The bride was really stressed out the week before her wedding. She ordered everyone around and was constantly on the verge of exploding.	She was a ticking time bomb and her friends were concerned.
9	single	simile	The bride was really stressed out the week before her wedding. She ordered everyone around and was constantly on the verge of panicking.	She was like a ticking time bomb and her friends were concerned.
9	extended	simile	The bride was really stressed out the week before her wedding. She ordered everyone around and was constantly on the verge of exploding.	She was like a ticking time bomb and her friends were concerned.
10	extended	metaphor	Daniel has been in severe pain ever since he learnt about his wife's affair. The betrayal cut him deeply.	A lie is a dagger and he felt very lonely.
10	single	simile	Daniel has been in severe pain ever since he learnt about his wife's affair. The betrayal hurt him deeply.	A lie is like a dagger and he felt very lonely.
10	extended	simile	Daniel has been in severe pain ever since he learnt about his wife's affair. The betrayal cut him deeply.	A lie is like a dagger and he felt very lonely.
10	single	metaphor	Daniel has been in severe pain ever since he learnt about his wife's affair. The betrayal hurt him deeply.	A lie is a dagger and he felt very lonely.
11	single	simile	Maria went to the theatre and was impressed by how graceful the dancers are. She really admires	Ballerinas are like butterflies and Maria really

			how they twirl across the stage.	adored them.
11	extended	simile	Maria went to the theatre and was impressed by how graceful the dancers are. She really admires how they fly across the stage.	Ballerinas are like butterflies and Maria really adored them.
11	single	metaphor	Maria went to the theatre and was impressed by how graceful the dancers are. She really admires how they twirl across the stage.	Ballerinas are butterflies and Maria really adored them.
11	extended	metaphor	Maria went to the theatre and was impressed by how graceful the dancers are. She really admires how they fly across the stage.	Ballerinas are butterflies and Maria really adored them.
12	extended	simile	Norah didn't like spending the night at her grandmother's. No matter how many blankets she would put on the bed, she froze in those arctic temperatures.	That attic room was like Siberia and the blankets were cheap.
12	single	metaphor	Norah didn't like spending the night at her grandmother's. No matter how many blankets she would put on the bed, she was uncomfortable in those low temperatures.	That attic room was Siberia and the blankets were cheap.
12	extended	metaphor	Norah didn't like spending the night at her grandmother's. No matter how many blankets she would put on the bed, she froze in those arctic temperatures.	That attic room was Siberia and the blankets were cheap.
12	single	simile	Norah didn't like spending the night at her grandmother's. No matter how many blankets she would put on the bed, she was uncomfortable in those low temperatures.	That attic room was like Siberia and the blankets were cheap.
13	single	metaphor	Students show off their best outfits at the start of the school year. They love to be seen in their new shoes and jackets as they walk down the	First week of school is a fashion show and it amused the teachers.

hallway.

13	extended	metaphor	Students show off their best outfits at the start of the school year. They love to be seen in their new shoes and jackets as they walk down the catwalk.	First week of school is a fashion show and it amused the teachers.
13	single	simile	Students show off their best outfits at the start of the school year. They love to be seen in their new shoes and jackets as they walk down the hallway.	First week of school is like a fashion show and it amused the teachers.
13	extended	simile	Students show off their best outfits at the start of the school year. They love to be seen in their new shoes and jackets as they walk down the catwalk.	First week of school is like a fashion show and it amused the teachers.
14	extended	metaphor	When Yasmin was writing her first novel, she had a very harsh editor. She often felt discouraged by the sharp-edged feedback.	His comments were razors and it made writing less fun.
14	single	simile	When Yasmin was writing her first novel, she had a very harsh editor. She often felt discouraged by the critical feedback.	His comments were like razors and it made writing less fun.
14	extended	simile	When Yasmin was writing her first novel, she had a very harsh editor. She often felt discouraged by the sharp-edged feedback.	His comments were like razors and it made writing less fun.
14	single	metaphor	When Yasmin was writing her first novel, she had a very harsh editor. She often felt discouraged by the critical feedback.	His comments were razors and it made writing less fun.
15	single	simile	Sarah usually falls asleep during the 9am class. She tries her best to stay awake, but it's hard to pay attention to the lecturer's monotonous talking.	His voice is like white noise and it made Sarah lose focus.

15	extended	simile	Sarah usually falls asleep during the 9am class. She tries her best to stay awake, but it's hard to pay attention to the lecturer's monotonous buzzing.	His voice is like white noise and it made Sarah lose focus.
15	single	metaphor	Sarah usually falls asleep during the 9am class. She tries her best to stay awake, but it's hard to pay attention to the lecturer's monotonous talking.	His voice is white noise and it made Sarah lose focus.
15	extended	metaphor	Sarah usually falls asleep during the 9am class. She tries her best to stay awake, but it's hard to pay attention to the lecturer's monotonous buzzing.	His voice is white noise and it made Sarah lose focus.
16	extended	simile	Every day has been chaotic ever since Hassan started teaching at the preschool. Those wild animals in his class always cause trouble.	The kindergarten is like a zoo and there aren't enough teachers.
16	single	metaphor	Every day has been chaotic ever since Hassan started teaching at the preschool. Those rowdy children in his class always cause trouble.	The kindergarten is a zoo and there aren't enough teachers.
16	extended	metaphor	Every day has been chaotic ever since Hassan started teaching at the preschool. Those wild animals in his class always cause trouble.	The kindergarten is a zoo and there aren't enough teachers.
16	single	simile	Every day has been chaotic ever since Hassan started teaching at the preschool. Those rowdy children in his class always cause trouble.	The kindergarten is like a zoo and there aren't enough teachers.