Original Research

Language and cognition behind simile construction: A Python-powered corpus research

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Despite the recognised role of similes in cognitive and communicative processes, there is a limited understanding of their construction and use in specific contexts, such as online food reviews. The study aims to explore the use of the 'like + gerund' simile pattern within the Extrinsic Food-Related Frame (FrF) – comparisons with inedible objects – in online food reviews and to understand the cognitive mechanisms guiding this specific form of simile construction and interpretation. To that end, the study addresses three research questions. How do reviewers use 'like + gerund' similes within the Extrinsic FrF to express their perceptions and experiences? What cognitive mechanisms underpin this specific form of simile construction and interpretation? Do these hyperbolically contrastive similes function as a form of aggressive narrative? The study employed a Python-powered corpus analysis of the Amazon Fine Foods Reviews dataset, focusing on 'like + gerund' simile detection, refinement, and frame detection, followed by cognitive mechanism identification, allowing for a systematic exploration of the cognitive mechanisms behind simile construction within the Extrinsic FrF. Study findings suggest that reviewers often use these similes to express striking or unexpected comparisons with inedible objects, emphasising their perceptions and experiences in an engaging and memorable way. Further, the analysis identified several cognitive mechanisms underpinning this unique form of simile construction and interpretation, suggesting a complex interplay between language, cognition, and personal and cultural experiences. The study also found that these hyperbolically contrastive similes can potentially function as a form of aggressive narrative. Such linguistic aggression, however, is not viewed as necessarily harmful or negative, as it is often a tool used by reviewers to express their experiences more vividly and persuasively. Study results have exposed how figurative language, particularly similes, shape our cognitive and communicative processes, expanding our understanding of the interplay between language, cognition, and consumer behaviour in specific contexts. This has both theoretical implications for cognitive linguistics and metaphor theory, and practical implications for narrative construction in online reviews.

KEYWORDS: *simile, metaphor, conceptual metaphorisation, gerund, online discourse, cognitive linguistics, corpus linguistics, computational linguistics, framing, speech aggression, Python*

1. INTRODUCTION

The role of figurative language, particularly similes, in shaping our cognitive and communicative processes has been a topic of interest for researchers across various disciplines. Similes offer a unique lens through which to explore the relationship between language and cognition, as they involve the comparison of different entities or concepts, often bridging between the familiar and the unfamiliar.

Given the multifaceted nature of similes, we argue that the path towards their all-encompassing exploration lies in the adoption of a restricted approach that implies building on both domain- and grammar-specific limitations. Hence, in this study the domain of our research is limited to online food reviews as a specific arena of unrestrained opinion exchange which we deem as a convenient and illuminative source for data harvesting, while

grammatical limitations are projected in our focus on the 'like + gerund' construction as the only pattern eligible for analysis. In the context of cognitive linguistics, focusing on the 'like + gerund' pattern is justified by a number of arguments that make it particularly suitable for the current research.

1. *Action-based.* Gerunds, being verb forms, are inherently action-based. They denote activities or states, making them particularly suitable for conveying experiential information. When used in similes, the 'like + gerund' pattern allows reviewers to compare food experiences with other action-oriented scenarios, providing rich metaphoric observations.

2. *Vivid imagery.* Similes with the 'like + gerund' pattern often generate more vivid imagery than other forms of similes. This is because they involve actions or processes, which are dynamic and engaging, rather than static comparisons.

3. *Experiential semantics.* In cognitive linguistics, there is a focus on semantics as being experiential and context-dependent. The 'like + gerund' pattern aligns with this focus, as it often connects the food being reviewed to a wider range of experiences, beyond the mere taste or look of the food.

4. *Cognitive mechanisms.* Analysing the 'like + gerund' pattern may open up unique observations explaining the cognitive mechanisms behind simile creation and interpretation. This pattern might reveal how reviewers map characteristics from one conceptual domain (the domain of the gerund's action) onto another (the domain of the food being reviewed), a fundamental process in cognitive linguistics known as 'conceptual metaphorisation'.

5. *Pragmatic considerations.* Focusing on one specific pattern is a pragmatic choice that allows for more in-depth analysis. The 'like + gerund' pattern is an interesting choice due to its potential to reveal the interplay between action, experience, and food description.

The overall trajectory of the study thus centres around exploring they ways in which figurative language is used by reviewers to frame their experiences and opinions related to food. Framing, as used in this context, implies detection of different categories, or frames, within the dataset, whereby the allocation of each frame is attributed to different linguistic and cognitive mechanisms fuelling the process of simile construction. In this study, such frames will be referred to as Food-Related Frames (FrFs). Leaping ahead, dataset analysis ultimately prompted us to allocate five FrFs.

1. *Intrinsic FrF* includes comparisons made strictly within the same class of objects, in our case – the realm of food (comparing one food with another in terms of taste, smell, texture, colour, etc.).

2. *Extrinsic FrF* includes comparisons with inedible objects, as a direct juxtaposition to the Intrinsic FrF.

3. *Conceptual FrF* includes comparisons that convey the experience of taste or texture by bringing up analogies with related experience, often in a figurative and picturesque way.

4. *Experiential FrF* includes comparisons driven by narrowly personal, subjective contextual experiences overtly hinging upon references to an individual's background and memories derived from lived sensations (making references to temporal, geographical, physical, sensory, interpersonal, domestic and other lived experiences).

5. *Referential FrF* includes comparisons that involve references to cultural and commonly familiar subjects, as they rely on shared cultural understanding and emphasise shared knowledge rooted in cultural awareness of broadly recognised references (well-known people, brands, etc.).

Given the broad nomenclature of detected frames, this study will only focus on the Extrinsic FrF in the context of online food reviews to narrow down its scope of inquiry for the benefit of a more detailed investigation of the issue at hand. Extrinsic FrF involves comparisons with inedible objects classified as categorically extraneous to food items proper and used by reviewers

to express their perceptions and experiences related to food. Ultimately, the study aims to explore the ways in which similes of the 'like + gerund' pattern falling within the Extrinsic FrF are employed by reviewers as figurative linguistic tools to frame their experiences and opinions related to food. The central research questions driving our investigation are as follows.

1. How do reviewers employ 'like + gerund' similes within the Extrinsic FrF to express and reinforce their perceptions and experiences?

2. What cognitive mechanisms guide this specific form of simile construction and interpretation in food reviews?

3. Given the hyperbolically contrastive nature of the Extrinsic FrF, can such similes be viewed as a form of aggressive narrative?

By delving into these questions, we aim to identify the key linguistic and cognitive attributes that guide simile construction and use in this specific context.

2. MATERIAL AND METHODS

To address the research question, this study employed Python-powered corpus analysis, which involved five key steps geared towards its ultimate research objectives.

1. *Simile Detection.* The data corpus used in this study is sourced from the extensive Amazon Fine Foods Reviews dataset (Stanford Network Analysis Project, 2023) available on Kaggle, boasting 500,000 reviews. Our focus was on the detection of the 'like + gerund' pattern within this sample, which was administered using Python programming language, harnessing the potential of regular expressions (regex) to isolate instances of the targeted simile pattern within the body of reviews.

2. *Simile Refinement.* Following the detection step, we manually refined the list of similes by removing false positives. This quality control process was necessary to ensure validity and reliability and fortify the analysis by mitigating the risk of misleading interpretations.

3. *Frame Detection.* The refined list of similes subsequently underwent frame detection. This entailed discerning the underlying FrFs that the reviewers tapped into while crafting their similes. This step was pivotal in comprehending the broader context and the latent motivations that directed the choice of similes by the reviewers. As mentioned in the Introduction, the resulting list of FrFs included Intrinsic, Extrinsic, Conceptual, Experiential, and Referential FrFs, of which the Extrinsic FrF shall be the focus of this particular study.

4. *Cognitive Mechanism Identification.* Finally, based on the correlations established in the previous step, we identified the predominant cognitive mechanisms guiding simile construction.

The cumulative results from these sequential stages were systematically documented in an Excel file, with distinctive sheets allocated for each simile pattern. By leveraging the power of computational linguistics, we are able to provide a novel perspective on how language and cognition intersect in the formation of similes within the Extrinsic FrF, thereby enriching our understanding of figurative language use.

3. THEORETICAL BACKGROUND
3.1. Linguistic-cognitive background of simile research

A simile, in essence, is a rhetorical device that creates an explicit comparison between two distinct items. This comparison is typically signalled by the use of the word 'like' or 'as'. For instance, in the phrase *Truth is like a torch*, 'truth' is the item being described (known as the target, or topic), and 'torch' is the item it's being compared to (known as the source, or the vehicle). The statement highlights a shared attribute between the two, which may not be explicitly stated but rather inferred from the context.

Unlike a straightforward comparison, similes usually draw parallels between items from entirely different domains. These elements might seem unrelated or incompatible, but the simile highlights a single shared aspect, resulting in an unexpected yet insightful comparison. While at first, the juxtaposition between truth and a torch may seem incongruous, it is intended to underline a shared characteristic, suggesting that both are illuminating. Thus, unlike direct comparisons, similes frequently connect objects from dissimilar realms, emphasising one common aspect and leading to a creative and insightful analogy.

However, the structure of a simile is not entirely interchangeable, as the comparison cannot be reversed without altering the meaning. *A torch is like truth* does not convey the same idea as the original simile. This asymmetry indicates that the target and source hold different roles within the comparison.

The structure of similes can vary, but they typically follow one of three configurations: (1) Noun Phrase is like Noun Phrase, (2) Noun Phrase is like Clause, or (3) Clause is like Clause. These formats allow for more intricate sources, providing a richer description of the target. For example, in *A politician making promises is like a child making sandcastles*, the simile incorporates a complex source and a complex target to amplify the comparison within the 'Clause is like Clause' configuration.

Expanding on the analysis of similes, several linguistic and cognitive research studies have provided deeper groundwork unravelling the nature and functioning of similes.

Kittay and Lehrer (1981) propose that similes work as an 'analogy engine', boosting comprehension by creating a cognitive bridge between the target and the source. This resonates with Bowdle and Gentner's (2005) theory of career of metaphor, which also sees analogy as the core of simile comprehension. The strength of their argument lies in the acknowledgment that similes are cognitive tools enabling learners to connect new information to their existing knowledge, underscoring Vygotsky's (1962) theory of learning as a social process.

Bredin (1998) emphasises the conversational utility of similes as predicative comparisons, in which the predicate describes the subject. His perspective aligns with Sperber and Wilson's (1986) Relevance Theory, which suggests that the figurative language seeks to optimise relevance to the listener. It is also not unusual for similes to be utilised to add humour or irony to the narrative (Hao & Veale, 2010; Veale, 2013; Tartakovsky et al., 2019), hence enhancing the texture and interest of the dialogue.

This observation, underpinned by the pragmatic functions of language, suggests that similes aren't merely cognitive tools but also serve to foster social connections and enrich conversations (Akopova, 2016).

Marhula (2018) explores the explanatory power of similes, resonating with the spotlight model of attention (Posner, 1980) which suggests that attention works like a spotlight, highlighting specific information for processing and working as an explanatory tool. This perspective aligns with functionalist views of language, arguing that similes accentuate specific aspects of a subject, thereby increasing their salience. This stance confirms the ability of similes to facilitate a more profound and nuanced understanding of the target.

Kao (2022) dives into the cognitive mechanisms of similes, positing that they are a form of analogical reasoning contributing to creativity. His view echoes the structure-mapping theory of Gentner (1983), which argues that understanding arises from identifying relational similarities. The underlying argument posits that the speaker's mental representations and the context play a crucial role in the interpretation of similes, illustrating the role of individual cognition and environmental factors in language comprehension.

Cuenca and Romano (2022) adopt a discourse processing perspective on similes. Their approach aligns with the construction-integration model of discourse understanding (Kintsch, 1988) that posits the comprehension process as an active construction of mental models. They argue that similes engage readers or listeners actively in the interpretative process, thus presenting similes as a tool for fostering cognitive engagement within discourse.

Veale (2019) sees similes as a form of 'conceptual blending', a term coined by Fauconnier and Turner (1998) to describe the cognitive operation in which elements from different mental spaces are blended into a new space. His study suggests that similes can bring together disparate domains to generate novel insights, thereby promoting creativity and innovation.

Carston and Wearing (2011) examine similes from a semantic-pragmatic perspective, focusing on their capacity for dual reference. Their work foregrounds the intricate interplay between literal and figurative meanings within similes, thus emphasising their multifaceted nature.

Dancygier (2021) explores the emotive function of similes, elaborately building on the theory of emotion as a communicative tool and emphasising that similes serve to express the speaker's emotions subtly. This not only highlights the expressive power of similes, underlining their utility in conveying attitudes and sentiments, but also brings into focus the role of contextual modulation in simile interpretation aligning with Recanati's (2005) contextualism that argues that the meaning of a simile isn't fixed but is influenced by the broader linguistic and situational context.

In summary, these studies collectively underscore the diverse functions and mechanisms underlying similes, illuminating their cognitive, communicative, and expressive roles. The re-

search spans a wide range of perspectives, illustrating that the comprehension of similes is a complex process contingent upon individual cognition, discourse dynamics, and contextual factors.

3.2. The intricacies behind simile vs metaphor debate

An investigation into similes as a subject of linguistic and cognitive inquiry is bound to bring up the issue of simile vs metaphor differentiation. Similes and metaphors are related yet distinct figures of speech: while both draw parallels between different items, the way they are understood, perceived and used can vary significantly. For the purposes of ensuring clarity and sufficiently substantiating the premises of this research, this paragraph will deal with the key arguments pertaining to the issue of simile vs metaphor differentiation.

As has been pointed out and soundly justified in the previous studies, metaphors categorise one item as another, creating a direct substitution *(My job is a jail)*, while similes highlight similarity without total substitution *(My job is like a jail)*.

Another point of difference between the two rhetorical devices are their cognitive and communicative implications. Similes tend to be more assertive, stating a likeness, whereas metaphors offer a more impactful way of categorisation. Both figures of speech have specific functions, and speakers often choose one over the other depending on their intent and the degree of similarity or familiarity they wish to convey. Thus, similes might be preferred when illustrating less 'apt' similarities, or when the comparison is novel or less conventional. Metaphors, on the other hand, are often used for more conventional and/or descriptive and picturesque comparisons. With repeated use, metaphors might even evolve from a novel comparison to a conventional categorisation – a process termed the 'career of metaphor' (Bowdle & Gentner, 2005).

In their 2004 study, Croft and Cruse (2004) delve into the subject of 'mappings' that exist between the source and the target, which they identify as the primary distinguishing element between similes and metaphors. They suggest that similes, typically in the form of 'A is like B', present a more limited mapping across the two domains, while metaphors propose more extensive mappings. It's important to note, however, that this general rule applies most fittingly to more conventional examples, and less conventional similes might also display expansive mappings akin to those found in metaphors. A notable factor affecting their conclusions is the nature of the data being analysed – whether it is artificial or natural.

Research into simile mappings has been an active field in cognitive linguistics, with a variety of studies adding to our understanding of the subject. Building on the groundwork set by Croft and Cruse (2004), subsequent research has explored the intricacies of these mappings in greater detail. One such study is by Yang and Loewenstein (2019), who argued that similes and metaphors both employ similar processes allowing for selective mappings based on shared properties and subject to variations in perspective change. However, they argue that while metaphors encourage more abstract and interpretive mappings, similes are

more literal and straightforward in their comparisons. Hao and Veale (2009) take this discussion into the realm of computational linguistics. They developed an algorithm to identify and understand creative similes in English, relying on a process that recognises the mapping between the source and target. In doing so, they provide a concrete example of how understanding these mappings can have practical applications. Studies like these underscore that simile mappings, especially in creative or unconventional examples, can demonstrate considerable depth and complexity, suggesting the potential for further research in this area.

In the realm of empirical psychological studies Glucksberg and Keysar (1990) and Glucksberg and Haught (2006) strive to demonstrate that metaphors and similes differ in terms of both 'interpretability' and 'meaning'. Their research offers a comprehensive review of various findings in the field, leading to certain key deductions. Firstly, when participants in Glucksberg and Keysar's (1990) study were asked to associate characteristics with both figures of speech, they conjured basic-level properties in the case of similes but associated inherent properties of the superordinate category in the case of metaphors. This means that a simile such as *Her eyes are like stars* will by and large invoke properties like 'shiny', 'bright', and 'distant'. However, should the same be expressed metaphorically, as in *Her eyes are stars*, the associated properties are most likely to be linked to descriptive figurative entities rather specifically to the literal properties of a star, such as 'captivating', 'mesmerising', 'extraordinary', and 'unique'. This difference could potentially confirm the categorical nature of metaphors and the comparative nature of similes. Secondly, Glucksberg and Haught (2006) suggest an alternative to Bowdle and Gentner's (2005) 'career of metaphor hypothesis', proposing their 'quality-of-metaphor hypothesis'. This hypothesis posits that exceptional metaphors, where the vehicle concept is an exemplary and prominent representative of its category, are most effective as categorisations, whereas weaker or limited metaphors might work best as comparisons, regardless of how conventional they may be. In this light, a statement like *I felt like a leaf in the wind* in the context of feeling aimless or directionless conveys a specific message: feeling like you are not in control with no purpose to pursue. This expression, however, does not function well as a categorisation assertion, as the phrase *I felt I was a leaf in the wind* doesn't quite encapsulate the same feeling of being subject to external forces as *I felt like a leaf in the wind* does. According to Glucksberg and Haught (2006), comparison and categorisation can be seen as complementary approaches to understanding metaphors, with the selection of strategy dependent on the quality and aptness of the metaphor. Similes or comparisons are utilised when a categorisation doesn't make much sense, and categorisations are used when the metaphor is apt, be it novel or conventional. However, the work of Glucksberg and Haught (2006) remains somewhat contentious.

Utsumi (2007) introduces the concept of 'interpretive diversity' as the most compelling explanation for the difference between the two figures of speech. This idea essentially refers to

the semantic richness of the figurative interpretation of a topic-vehicle pair, which is determined by both the number of features involved in the interpretation and the uniformity of salience distribution of those features. Simply put, it means that the greater the number of distinct features or attributes brought into play when interpreting a simile or metaphor, and the more evenly these features are perceived or highlighted (their salience), the richer and more diverse the interpretation becomes. Utsumi (2007) suggests a positive correlation between this interpretive diversity and the difference in comprehensibility of metaphors and similes. This means that topic-vehicle pairs that elicit a more diverse range of interpretive features should be easier to understand through a categorisation process. In other words, when the meaning of a figure of speech can be comprehended by grouping the associated features into a broader category (for example, perceiving 'lion' as a symbol of courage and strength in *He fights as a lion*), this tends to enhance our preference for, and understanding of, the metaphorical form. So, the richness of a metaphor, or its ability to encompass a wide range of related features or meanings, can make it more effective and comprehensible to the listener or reader. This, in turn, can influence our preference for metaphors over similes, given that metaphors tend to provide a more compact, efficient means of conveying complex ideas or feelings. Notably, however, the ease of comprehension will also depend on the cultural, linguistic, and personal knowledge of the listener or reader.

Israel et al. (2004) propose a functionalist explanation for the difference between similes and metaphors. They argue that metaphor and simile might function differently, depending on the communication needs of the speaker. According to them, since metaphors are categorical, they are commonly used to categorise one thing as another in an attempt to convey something new about the subject. This makes them highly suitable for the introduction of novel or unfamiliar ideas. On the other hand, being primarily comparative, similes are used to highlight specific resemblances between two things and are useful when the intention is to clarify or explain something by comparing it to a familiar object or idea. The authors also point out that this functionalist perspective does not suggest that all similes are always used for explaining and all metaphors for introducing new ideas, but rather that these are tendencies derived from the cognitive and communicative functions they typically serve. They stress that it's the context in which the figures of speech are used that ultimately determines their precise function.

The functionalist perspective on simile vs metaphor debate has been explored in various other studies, each offering unique findings that help understand the interconnection and difference between these figures of speech. Fogelin (1994) maintains that similes, because of their comparative structure, are better suited to express intricate or multi-faceted comparisons than metaphors. This utility aligns with the functionalist viewpoint, highlighting the unique role of similes in communication. Gibbs's (1994) research on figurative language suggests that similes and metaphors can serve different functions based on the cognitive

demands of the task. For simpler tasks, similes can be more effective due to their straightforward comparative structure, while for complex tasks requiring novel insights, metaphors can be more beneficial. Glucksberg et al. (1997) suggest that similes can serve a 'correction function'. When a metaphor is found to be potentially misleading or overly broad, a simile can be employed to refine the comparison, highlighting only specific similarities while avoiding others. These studies, among others, underscore the multi-faceted functional nature of similes and metaphors and their unique role in human communication (Grishechko et al., 2015). The functionalist explanation continues to evolve with ongoing research, offering a deeper understanding of this vital aspect of language.

More recently, Steen (2011) added another layer to the discussion by suggesting that metaphors are often used more implicitly than similes, and this affects how they are processed and interpreted. Metaphors can be presented in more subtle and covert ways, making them potentially more challenging to interpret, whereas similes are typically more explicit and easier to understand. Steen's (2011) suggestion builds on various studies exploring the nuanced differences between these two figures of speech, such as Giora's (2004) study on Graded Salience Hypothesis suggesting that figures of speech, such as metaphors and similes, are understood differently based on their salience or prominence in the mind of the reader or listener. Similes, due to their explicit comparative structure, are often more salient and thus easier to understand, while the complexity and abstractness of metaphors can impact their persuasive power. At the same time, although more difficult to process, when understood, metaphors can have a profound effect, potentially more than similes, which are easier to comprehend but may not deliver the same depth of meaning. These studies add to the argument that the implicit nature of metaphors can influence their processing and interpretation. However, it is essential to once again note that the ease or difficulty of interpretation can also depend on individual cognitive abilities, cultural factors, and context.

Thus, studies suggest that while both metaphors and similes are used to create analogies and highlight resemblances between different things, they tend to serve different cognitive and communicative functions. Metaphors, due to their categorical nature, are often used to introduce new or complex ideas and can be more subtle and harder to interpret. Similes, on the other hand, due to their comparative nature, are typically used for clarification or explanation, and they are generally more explicit and easier to understand. Yet importantly, the exact function and interpretation of both similes and metaphors depend significantly on the context in which they are used.

4. STUDY RESULTS

In our Python-powered corpus analysis of 500,000 Amazon Fine Foods Reviews, we detected 29,355 instances of the 'like + gerund' pattern within the dataset. To ensure the validity and reliability of the analysis, we manually refined the list of similes by removing false positives, which included instances

where the pattern appeared in contexts unrelated to simile construction, such as sentences describing actions or preferences without a comparative intent. After refinement, we obtained a total of 10,689 valid instances of the 'like + gerund' pattern eligible for further analysis. The refined list of similes underwent frame detection to identify the underlying FrFs that influenced the choice of similes by the reviewers. The analysis revealed the distribution of similes across different FrFs. Table 1 presents the classification of similes into FrFs along with the number of similes and their corresponding percentages of the total valid similes.

Table 1

Classification of similes in Food-Related Frames (FrFs)

FRAME	NUMBER OF SIMILES	PERCENTAGE OF TOTAL
Intrinsic FrF	3,259	30.49%
Extrinsic FrF	3,027	28.32%
Conceptual FrF	2,404	22.49%
Experiential FrF	1,213	11.34%
Referential FrF	786	7.36%

To comprehensively look into the Extrinsic FrF, we analysed the action descriptors expressed by the gerund and the object references expressed by the objects within this frame. Similes within the Extrinsic FrF were analysed to identify the specific actions or states reviewers associated with the inedible objects. Table 2 presents a breakdown of the action descriptors used in the Extrinsic FrF similes, along with their frequencies and percentages of occurrence in the sample.

Table 2

Action descriptors in Extrinsic FrF similes

ACTION DESCRIPTOR	NUMBER OF INSTANCES	PERCENTAGE
Eating	4,406	41.22%
Drinking	2,476	23.16%
Chewing	1,290	12.07%
Biting into	977	9.14%
Swallowing	629	5.88%
Licking	325	3.04%
Trying	211	1.97%
Cooking	193	1.81%
Sucking on	143	1.34%
Getting	39	0.37%
TOTAL	10,689	100%

The object references (i.e., objects immediately following the 'like + gerund' pattern used in the Extrinsic FrF similes were further categorised to identify the types of inedible objects commonly employed for comparison. Table 3 below presents the breakdown of the object references, their respective categories configured by us on the basis of group classification, as well as frequencies, and percentages within the Extrinsic FrF similes following the sample analysis.

Table 3
Object references in Extrinsic FrF similes

OBJECT REFERENCE CATEGORY	OBJECT REFERENCE EXAMPLES	NUMBER OF INSTANCES	PERCENTAGE
Hardware	hardware screws, nails, foam insulation, piece of caulk, sandpaper, packing peanuts, styrofoam, sawdust, gravel, rubber band, wad of rubber, belt, bubble wrap	3,577	33.46%
Material	cardboard, metal, rubber, paper, plastic, pieces of plastic, plastic bag, wood, shoe leather, teak, felt, cotton, silicone	3,300	30.87%
Nature	rocks, a bowl of rocks, air, air bubble, hay, water, sea water, flower water, sand, mud, dirt, jellyfish, tree bark, grass	2,661	24.89%
Drugs	cough medicine, cough syrup, pill, meds, nasal spray	764	7.15%
Chemical produce	cleaning solution, sunscreen, battery acid, detergent, perfume, cologne	356	3.34%
Misc	tea bag, front yard, slivers of candle wax, change, chalkboard, sponge, poker chip	31	0.29%
TOTAL		10,689	100%

Following this, we also singled out descriptors that accompanied the detected object references. These descriptors included the following: *dry, chewy, sour-ish, soggy, crumbly, soft, big, sweet, vaguely sweet, smooth, salty, salted, small, flavoured, tortilla chip flavoured, brewed, liquid, tasteless, dirty, tangy, metallic, leathery, pungent, bitter, burnt, dense, gooey, sticky, greasy, oily, spongy, bubbly.*

5. DISCUSSION
5.1. General observations

The results of the current study have provided a compelling exploration of the sensory experiences of food and beverage consumers, notably identifying key mechanisms that reveal a complex interplay of cognitive and linguistic factors that shape these experiences. Given the significant intertwinement of cognition, language, and sensory perception in the formulation of food and beverage experiences, this discussion draws upon several theoretical perspectives to offer a comprehensive interpretation of the findings.

Our primary finding from the analysis of the Amazon Fine Foods Reviews was the detection of 10,689 valid instances of the 'like + gerund' simile pattern. This finding is particularly significant, indicating that simile constructions are common in the reviews, serving as useful communicative tools that aid in conveying nuanced descriptions and comparisons. Moreover, the abundant presence of similes in the reviews found in the sample adds to the overall appeal of the text, injecting elements of humour, irony, and creativity.

When dissecting the simile structure, we observed the preponderance of the Intrinsic and Extrinsic FrFs over others. This suggests that reviewers uniformly leverage experiences both within and outside the direct realm of food to explain their food-related experiences. This could be interpreted through the lens of Kittay and Lehrer's (1981) analogy engine concept, where the reviewers draw on their existing knowledge to describe novel experiences. Similes in this context act as cognitive bridges that connect new (food) experiences to already known (intrinsic or extrinsic) concepts, boosting comprehension and enhancing the narrative's appeal.

The prominent use of the Extrinsic FrF, which is the focus of this study, is also interesting from a cognitive perspective, as it seems to corroborate Gentner's (1983) structure-mapping theory. By associating the eating experience with non-food items or actions, reviewers are drawing on relational similarities, bringing about a richer and more creative understanding of the food products. This observation also resonates with the argument by Kao (2022) on the role of similes in facilitating analogical reasoning and creativity.

Another aspect worth discussing is the distribution of action descriptors and object references within the Extrinsic FrF. The most common actions associated with non-food objects included *eating, drinking,* and *chewing,* which could be seen as an extension of the analogy engine concept, where familiar actions are used as a bridge to connect novel experiences. At the same time, the recurrence of these action descriptors aligns with Posner's (1980) spotlight model of attention, as these similes help draw

the readers' attention to specific aspects of the product by associating it with familiar actions, thereby enhancing their understanding.

The object references within the Extrinsic FrF were predominantly associated with hardware, material, and nature. It is intriguing to observe how reviewers connect food experiences with elements like screws, nails, cardboard, rocks, air, and water. This connects with Veale's (2019) perspective on similes as a form of conceptual blending. By comparing food experiences to disparate domains, reviewers create a unique blend that generates novel insights and amplifies the communicative richness of their reviews.

As seen in our study, the use of similes in Amazon Fine Foods Reviews not only fosters cognitive engagement within the discourse but also enriches the dialogue by adding texture, humour, and creativity. This aligns with the construction-integration model of discourse understanding proposed by Kintsch (1988) and further reinforces the view by Cuenca and Romano (2022) on the role of similes in discourse processing. Interestingly, our findings also underscore the emotive function of similes. As seen from the descriptors accompanying the object references, similes serve as a subtle yet effective way to express the reviewers' emotions. This aspect is aligned with Dancygier's (2021) research on the emotive function of similes and further emphasises Recanati's (2005) contextualism. The nuanced interpretations, the richness of the language, and the expressive power of similes depend on the broader linguistic and situational context.

Thus, the use of similes in Amazon Fine Foods Reviews extends beyond linguistic ornamentation, revealing a rich tapestry of cognitive underpinnings that facilitate comprehension, draw attention, enhance creativity, and convey emotions. The findings reaffirm that the comprehension of similes is a complex process, rooted in individual cognition, discourse dynamics, and contextual factors, bringing into focus the complex interplay of cognition, language, and sensory perception in shaping food and beverage experiences.

5.2. Cognitive mechanisms

The discussion below further validates and elucidates the cognitive mechanisms implied in our original discussion, including the analogy engine, spotlight model of attention, structure-mapping theory, and the role of similes in contextualism. Cognitive mechanisms in simile construction can be grouped into the following categories.

1. *Associative Memory.* Simile creation relies on the mechanism of associative memory. This involves recalling and linking different memory units based on their similarities. For instance, in *It's like eating sweet smooth silk*, the reviewer links the taste of the product to the texture of silk based on the shared attribute of smoothness. Here, the mechanism of associative memory aids in the construction of a vivid and evocative comparison. This underscores that we

understand and express abstract or unfamiliar concepts in terms of more concrete or familiar ones. Hence, comparing a food item to an inedible object is a cognitive strategy that communicates subjective experience of the new or complex flavours and textures people encounter.

2. *Analogical Reasoning.* Analogical reasoning is a cognitive process where one maps similarities from a known domain (source) onto an unknown or less familiar domain (target) to aid understanding. On a deeper level, these cognitive processes are related to schema theory, which suggests that people interpret new experiences based on existing cognitive structures, or 'schemas', shaped by past experiences. As such, when participants liken their consumption experiences to inedible objects, they are likely drawing upon established schemas related to the target, which could include not just their sensory characteristics, but also emotional associations, memories, or cultural connotations tied to these foods. This is evident in examples like *It was like eating sawdust* and *It's like chewing rubber bands*, where reviewers apply their prior knowledge of non-food items to create a vivid analogy, thereby enriching the descriptions.

3. *Creative Imagination.* The construction of similes also involves a significant degree of creative imagination, which is a cognitive ability that allows individuals to generate novel and unique ideas by combining or restructuring existing knowledge in unusual ways. This is evident in instances such as *Kind of like those first-generation Power Bars, you know, the ones that tasted like eating your front yard* and *Literally like eating a piece of rubber*. These examples showcase how reviewers imaginatively compare food experiences with unrelated objects or scenarios and highlight the fact that the use of similes reflects the role of creativity in language use. According to the cognitive linguistics perspective, creativity is not limited to 'poetic' language but is a fundamental part of everyday language use. The variety of similes found in our study underscores this point, illustrating how participants draw on their creative resources to express their sensory experiences.

4. *Emotional Expression.* As noted in the original discussion, similes also serve as emotional expressions. This involves cognitive processes related to the recognition, understanding, and communication of emotional states. For instance, the simile *Some people might not like how it smells at first, and how the texture is like eating jelly-fish, chewy and almost tasteless* not only communicates a bitter taste but also expresses a strong negative emotion towards the product. This is an example of a negative sensory experience, which in the study often centred around disagreeable textures, underscoring the integral role of texture in consumption experiences. These descriptions also reveal the power of language in constructing these experiences, as participants use linguistic tools or expressive vocabulary to convey the tactile sensations and emotional reactions associated with unpleasant textures. This finding explicitly aligns with the theory of embodied cognition, which suggests that our cognitive processes, including language, are profoundly shaped by our bodily experiences. Here, the language is clearly grounded in the reviewer's

'In the 'like + gerund' pattern, the gerund serves as an action descriptor, portraying a significant element of the reviewers' experience. It signifies the specific action that the reviewer equates to their experience with the food product, such as eating, drinking, chewing, biting, and even non-gastronomic actions like cooking. On the other hand, object references stand as a proxy for specific sensory experiences or real-world objects, which act as vivid symbols for the consumers' experiences. These references can range from daily items like paper or water to more unexpected and creative analogies like salty rock or sour-ish cardboard'

bodily experience of texture, illustrating vividly and overtly how sensory perception, cognition, and language intersect in shaping consumption experiences.

5. *Attention Directing.* Similes can serve to direct attention to specific aspects of an experience, which aligns with the spotlight model of attention. For example, the simile *It's like eating a mouthful of tortilla chip flavoured sand* draws attention to both the unusual texture and flavour of the product.

6. *Sensory Perception.* Similes often involve sensory perceptions such as taste, touch, smell, and sight. They leverage the cognitive process of sensory integration, where different sensory information is processed to create a comprehensive understanding. In the simile *It's like drinking mud*, the sensory perception of drinking a liquid with the texture of mud paints a vivid picture of the experience.

7. *Sensory Detail Encoding.* This mechanism pertains to how our sensory receptors (in this case, mainly those involved in gustation and olfaction) process and interpret various qualities or attributes of food. In the context of this study's dataset, this cognitive mechanism is crucial in producing similes that compare food's sensory attributes such as taste, texture, and smell to a vast range of object references. This mechanism works by creating mental representations of sensory experiences that can be recalled and used for comparison. For instance, the descriptors *dry, chewy,* or s*oggy* involve encoding the tactile and kinaesthetic sensations experienced during eating. Descriptors like *sour-ish, sweet,* or *salty* involve encoding the gustatory sensations, and *pungent, burnt,* or *metallic* involve encoding olfactory sensations. Descriptors like *small, big,* or *bubbly* can involve visual encoding as well as tactile experiences. It's noteworthy that sensory detail encoding isn't a passive process – rather, it often necessitates active attention to the sensory details of the food, highlighting the intricate nature of the cognitive mechanisms at play in forming these similes.

These cognitive mechanisms interplay dynamically in the construction of similes, providing a rich, nuanced, and engaging account of the reviewers' food experiences. Importantly, simile construction commonly relies on a combination of cognitive mechanisms at play, rather than a single cognitive 'incentive'.

5.3. Action descriptors and object references interplay

Dataset analysis shows that consumers frequently employ similes to paint vivid, evocative descriptions of their product experiences. They rely heavily on their past experiences, sensory perception, and creative imagination, harnessing them to bring the abstract concepts of taste, texture, and aroma to life. In the 'like + gerund' pattern, the gerund serves as an action descriptor, portraying a significant element of the reviewers' experience. It signifies the specific action that the reviewer equates to their experience with the food product, such as eating, drinking, chewing, biting, and even non-gastronomic actions like cooking.

For example, *in It was like eating air*, the gerund *eating* represents the physical act of consuming the product. The comparison to 'air' conjures up an image of the product being light, perhaps insubstantial or lacking in flavour. The simile highlights the product's perceived deficiency, with the user's expectations not aligning with their experience.

On the other hand, object references stand as a proxy for specific sensory experiences or real-world objects, which act as vivid symbols for the consumers' experiences. These references can range from daily items like *paper* or *water* to more unexpected and creative analogies like *salty rock* or *sour-ish cardboard*. The object chosen for comparison further accentuates the sensory dimensions of the product's features, such as its taste, texture, smell, or even sound. For instance, in *It was like drinking brewed hay*, the action of 'drinking' implies the liquid form of the product, and the object reference 'brewed hay' illustrates an undesirable flavour. The reviewer thereby conveys dissatisfaction with the beverage's taste, likening it to a typically non-palatable, earthy substance.

The use of these similes indicates that consumers engage in associative memory, analogical reasoning, and creative imagination when formulating their reviews. They draw upon their vast banks of lived experiences to construct comparisons that communicate their experiences with the product in a way that is relatable and tangible for other potential consumers.

A thorough examination of the dataset allowed us to detect several patterns in the interplay between specific action descriptors and object references. These patterns illuminate how users' sensory experiences of food products trigger specific cognitive mechanisms, leading to the formation of these similes.

1. *Eating and Intangible or Insipid Substances.* One of the recurring patterns we found is that the action descriptor *eating* is frequently associated with objects that denote insipidness, intangibility, or a lack of substance, such as *air, cardboard,* or *sawdust.* This correlation may be a consequence of sensory imagination and perception, where a food product with a lack of flavour or distinctive texture is likened to substances that are typically not associated with gastronomic pleasure. This implicates a heavy focus on Sensory Perception as a key cognitive mechanism at play. The product's lack of flavour or distinct texture stimulates the cognitive process of sensory perception that draws from the database of prior sensory experiences to compare the insubstantial nature of the product to intangible or flavourless substances.

2. *Drinking and Harsh or Unpleasant Substances.* The action descriptor *drinking* often pairs with object references that connote harshness or undesirability, such as *battery acid, sunscreen,* or *mud.* This pattern signifies the engagement of Associative Memory and Analogical Reasoning. Associative memory links the unpleasant taste of the beverage to previously experienced non-palatable substances. Subsequently, through analogical reasoning, the understanding of the unpleasant experience is enhanced by mapping these unpleasant characteristics onto the less familiar domain of the reviewed product.

3. *Chewing and Hard or Rubber-like Materials.* Our data shows that the action descriptor *chewing* is commonly matched with hard or rubbery materials, such as *rocks, rubber bands,* or *gravel.* This pairing suggests a dynamic interplay between Sensory Perception and Associative Memory. The hard or resistant texture of a product as perceived by the senses triggers associative memory, which then recalls the sensation of chewing non-edible, resistant materials.

4. *Biting and Tough or Resistant Substances.* Similarly, the action descriptor *biting* often correlates with object references denoting toughness or resistance, like *soggy cardboard.* This pattern reveals the working of Sensory Detail Encoding and Emotional Expression. Sensory Detail Encoding is triggered when physical resistance is encountered while biting into a product, recalling memories of biting into similarly resistant materials. Simultaneously, Emotional Expression aids in communicating the frustration or disappointment associated with the challenging experience.

5. *Cooking and Hard or Unyielding Materials.* In the dataset, *cooking* is often paired with hard or unyielding materials such as rocks. This alignment indicates the involvement of Associative Memory, Analogical Reasoning, and Attention Directing. The extended cooking time or the effort required to cook a product stimulates associative memory, which equates this experience with cooking hard substances. Through analogical reasoning, this analogy helps in understanding the challenging cooking process. Also, this analogy serves to direct attention to the extraordinary effort required in cooking the product.

6. *Sensory Transfer.* During our analysis, we also identified instances of sensory transfer in the Extrinsic FrF similes. Sensory transfer occurs when the action descriptor and the object reference do not match semantically, creating a figurative comparison that emphasises the sensory experience. Examples of sensory transfer similes include phrases such as *like drinking grass* and *like chewing air.* These similes evoke an unconventional sensory experience related to the object being described, implicating a strong correlation with Creative Imagination, employed to form unconventional comparisons and add depth and nuance to their descriptions.

The 'like + gerund' pattern in Extrinsic FrFs provides rich, nuanced observations highlighting consumers' product experiences. The interplay between action descriptors and object references, as evidenced in the data analysis, creates compelling, vivid imagery, helping to communicate the multidimensional sensory experiences of food consumption. The use of similes in reviewers' experiences thus carries significant importance. Similes allow individuals to draw parallels between two disparate objects or experiences, and this comparative structure has been vividly observed in our study. Language scholars argue that similes act as 'semantic prisms', breaking up abstract experiences into comprehensible segments, allowing them to be understood in terms of the familiar. By connecting their food and beverage experiences to familiar comparisons outside of the realm of food, participants utilise the cognitive framework established by the simile to interpret, understand, and communicate their experiences effectively.

5.4. Observations on potential aggressive narratives

Our exploration reveals the intricacies of simile usage in online reviews, showcasing the utility of such figurative language as a mechanism for expressing emotive intensity, often verging on speech aggression. This linguistic behaviour is attributable to a blend of cognitive mechanisms, such as Emotional Expression, Creative Imagination, and Associative Memory, among others.

The rhetoric of online reviews is intrinsically persuasive and evaluative, providing a platform for consumers to articulate their experiences and influence the perception of potential consumers. The creative usage of similes, with the strategic pairing of action descriptors and object references, as we have observed in our findings, amplifies the emotional valence and persuasive potential of these reviews. For instance, *drinking battery acid* juxtaposes an everyday activity – drinking – with a substance synonymous with harm and unpleasantness – battery acid. The resultant imagery serves as a potent embodiment of the reviewer's negative experience, thereby creating a memorable and persuasive narrative.

Furthermore, our findings underscore the subtle nuances of expressing dissatisfaction or disappointment. Similes using insipid or intangible substances like *eating air* or *drinking mud* can signify a lack of quality or taste, possibly indicating a form of passive aggression. Here, an absence of sensory satisfaction is translated into tangible comparisons. The use of familiar and relatable objects in these comparisons enhances the shared understanding of the displeasure being communicated, illustrating the cognitive process of common grounding in language use.

Additionally, we observe the role of creative imagination in formulating original and unexpected similes, such as *sucking on dirty change* or *like trying to eat a poker chip.* Such comparisons might initially seem outlandish, but they serve to magnify the unsatisfactory experiences of the reviewer in a unique and evocative way. The amplified expressiveness contributes to the emotive intensity, often creating a dramatic and exaggerated depiction of the reviewer's experience.

This leads us to consider a potentially broader impact of these similes on online discourse. The Spotlight Model of Attention becomes pivotal here, guiding readers' attention towards specific displeasing aspects of the reviewer's experience. The

negative depiction is amplified by drawing analogies to displeasing real-world objects or experiences, influencing the reader's perception and potentially swaying purchasing decisions.

Linguistically, several aspects can hint at speech aggression in the simile examples used in online reviews. These can be broadly categorised into two sections, which are lexical choices and figurative construction.

1. *Lexical Choices.* The choice of words, both for action descriptors and object references, can indicate the presence of speech aggression. Words that denote unpleasant, harmful, or otherwise negative connotations can serve as clear markers of aggression. For instance, *licking a dirty chalkboard* or *chewing gravel* use words that are inherently associated with discomfort.

2. *Exaggerated Comparisons.* The use of hyperbolic or exaggerated comparisons can signal an aggressive stance. For example, *drinking sunscreen* creates a stark, intense image that goes beyond mere dissatisfaction and veers into the territory of aggressive condemnation.

3. *Incongruent Pairings.* Similes that pair routine actions with undesirable or harmful substances also highlight an aggressive tone. An example like *cooking rocks* combines a familiar, everyday activity with a decidedly non-culinary object, serving to shock the reader and emphasise the reviewer's displeasure.

4. *Creative, Unorthodox Similes.* Linguistic creativity can also hint at speech aggression. Unconventional or unexpected comparisons, such as *eating slivers of candle wax in your cereal*, not only grab attention but also serve to markedly dramatise the negative experience, effectively enhancing the aggressiveness of the speech.

5. *Usage of Insipid or Intangible Substances.* Similes like *eating a salted air bubble* or *chewing shoe leather* that involve insipid or intangible substances often indicate passive aggression, expressing disappointment or dissatisfaction in a subtle yet impactful manner.

One might argue that the above elements, combined with the context of the review, work together to create an aggressive narrative. Importantly, however, we do not view such linguistic aggression as necessarily harmful or negative, as it is often a tool used by reviewers to express their experiences more vividly and persuasively. However, identifying these elements can provide a valuable lens to understand the dynamics of online review discourse and the persuasive power of emotive language therein.

From a discursive point of view, linguistic aggression helps to establish the reviewer's stance and position in the online discourse community. It functions as a persuasive tool, underscoring the reviewer's experience and potentially influencing other users' perceptions of the product being reviewed. It's a strategy to claim authority and assert credibility in the community, often engaging readers more effectively than a bland, neutral tone.

Cognitively, linguistic aggression can engage the reader's associative and experiential memory, leading to a more profound understanding of the review. Encountering a creative simile, the brain automatically draws on sensory experiences and emotions associated with that unconventional comparison, creating a more vivid and memorable representation of the reviewer's experience. This level of cognitive engagement can result in a stronger impact and deeper comprehension of the review.

Our study supports the notion that this form of linguistic amplification is not necessarily harmful. Instead, it may contribute positively to the richness of the discourse and help to facilitate a more nuanced understanding of the reviewers' experiences. Its role is to amplify and add drama to the narrative, rather than incite negativity or hostility. Hence, understanding this aspect of online review discourse can help unravel how users employ language as a strategic tool to express, persuade, and engage in the digital space.

6. CONCLUSION

This study explored the 'like + gerund' simile construction within the confines of online food reviews, specifically focusing on the Extrinsic Food-Related Frame (FrF) which was defined as a frame including comparisons with inedible objects. The key research questions centred around how these similes articulate the perceptions and experiences of reviewers, what cognitive underpinnings inform this specific simile construction and its interpretation, and whether such similes can contribute to aggressive narratives.

Our findings elucidated that reviewers deftly employ 'like + gerund' similes within the Extrinsic FrF as a unique medium to convey their experiences and impressions. This study confirmed that such similes generate vivid, action-based depictions of food experiences, extending the reach of the reviews to a diverse experiential spectrum.

Research findings highlighted several key cognitive mechanisms involved in the construction of similes in online food reviews. Firstly, we identified the role of associative memory in forming connections between different memory units based on their similarities, thereby facilitating picturesque and evocative comparisons. Secondly, we observed that analogical reasoning, a cognitive process allowing for mapping similarities from a familiar domain onto an unfamiliar one, significantly influenced the simile construction process. This was strongly associated with schema theory, suggesting that reviewers were likely drawing upon established cognitive structures formed by past experiences to create their comparisons. The third cognitive mechanism was creative imagination, which permitted the reviewers to generate novel comparisons by reorganising existing knowledge in unconventional ways. This underlined the creative potential inherent in everyday language use. Next, we found that similes often served as means of emotional expression, with reviewers using language to effectively communicate their emotional states, thereby revealing a link between sensory perception, cognition, and language. Similes were also found to guide attention towards specific aspects of a food experience, aligning with the spotlight model of attention. Moreover, we recognised the role of sensory perception and sensory integration in the construction of similes, as these processes allowed reviewers to

form comprehensive understandings of their experiences. Lastly, the cognitive mechanism of sensory detail encoding emerged as crucial in creating mental representations of sensory experiences for later recall and comparison. This mechanism emphasised the active attention paid to the sensory details of food, showcasing the complexity of cognitive processes involved in simile formation. These diverse cognitive mechanisms dynamically interact in the construction of similes, offering a rich, nuanced, and engaging depiction of reviewers' food experiences.

The study highlighted how consumers frequently use similes to express their experiences with food products, painting vibrant descriptions using action descriptors and object references. The 'like + gerund' pattern was found to be a common formula, with the gerund representing an action associated with the food experience and the object references serving as symbolic representations of their sensory experiences. Examples ranged from commonplace items to more creative analogies, illustrating consumers' reliance on past experiences, sensory perceptions, and creative imagination to describe the abstract concepts of taste, texture, and aroma. Patterns in the interplay between action descriptors and object references were identified, which revealed how certain food experiences triggered specific cognitive mechanisms. For instance, *eating* was often associated with insubstantial or bland substances, indicating sensory perception. *Drinking* was linked to unpleasant substances, demonstrating the role of associative memory and analogical reasoning. *Chewing* and *biting* were tied to hard or tough substances, emphasising sensory perception and emotional expression. Additionally, sensory transfer in similes highlighted the creative imagination at work. These

linguistic patterns underscore the richness of similes in expressing multi-dimensional sensory experiences of food consumption. By drawing on a vast array of comparisons outside the realm of food, reviewers utilise the cognitive framework provided by the simile to effectively interpret, understand, and convey their experiences. As semantic prisms, similes break down abstract experiences into comprehensible segments, making them accessible and relatable to the reader.

In some instances, these similes verged on forming an aggressive narrative due to the hyperbolic, contrastive nature of the Extrinsic FrF. However, these instances were found to predominantly serve as tools to enhance the expressiveness and persuasiveness of the reviews, rather than in any way promote negativity or upfront aggression.

The implications of this study extend to the broader landscape of cognitive linguistics, contributing to the understanding of how experiential semantics shapes figurative language. It underscores the dynamic interplay between language and cognition, and how this relationship manifests in real-world contexts such as online reviews. The study's relevance is accentuated by the increasing significance of online reviews in moulding consumer perceptions and decision-making processes. Understanding how figurative language, specifically 'like + gerund' similes, are employed in such contexts provides a window into the persuasive power of language.

Acknowledgements

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