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Interpreting Heads without Rules: Learner Observations on Headedness and Approximate Understanding*

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Abstract In formal grammatical theory, headedness is often treated as a structural property that guides compositional interpretation. English compounds, for example, are typically analysed as right-headed, with the final element determining semantic category and reference. However, how language users perceive and interpret headedness in the absence of explicit grammatical knowledge remains underexplored. This paper examines headedness as a problem of language comprehension focusing on how interpreters construct meaning when formal rules are not available to them.

The analysis draws on a set of qualitative observations involving language learners with differing levels of English proficiency. None of the participants had received instruction on headedness or compound structure. The observations indicate that headedness is not perceived as a purely formal property during comprehension. Rather, the participants treat structural cues as one resource among many in an interpretive process that integrates linguistic form with extra-linguistic knowledge. Even when syntactic structure is correctly perceived, understanding may remain approximate rather than categorical. Importantly, such interpretations are not random but systematic, reflecting coherent inferential strategies via perception and conceptual representation.

Structural rules, while central to linguistic theory, do not guarantee shared understanding in real-time processing. Instead, meaning construction involves negotiation between form, perception and context. The paper contributes to discussions of language comprehension by highlighting the epistemic limits of compositional rules and by showing how interpreters construct meaning even in the absence of explicit grammatical instruction.

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1 Introduction

In formal grammatical theory, headedness is commonly treated as a structural property that governs compositional interpretation. In English compounding, this assumption is most clearly instantiated in the right-head rule according to which the rightmost element of a compound determines its syntactic category and core semantic reference (Bloomfield 1933, Williams 1981). Thus, a *racehorse* is a type of horse, a *nervous system* is a type of system, and an *ice-cream truck driver* is ultimately a driver. This view has supported linguistic descriptions of compound formation across morphology, syntax and semantics, and has often been extended to phrasal structures more broadly (Chomsky 1970, Jackendoff 1977, Spencer 2004).

However, while the formal properties of headedness are well established in linguistic theory, considerably less attention has been paid to how headedness is perceived and interpreted by language users, particularly in contexts where explicit grammatical knowledge is absent. Theoretical accounts typically presuppose that interpreters have access to the relevant structural representations and constituent meanings required for compositional interpretation (Fodor & Lepore 1993, Partee 1995, Pelletier 1994). Yet, for many language users, especially learners, such access cannot be taken for granted (Clark, Gelman & Lane 1985, Lang, Plas, Nissim & Gatt 2022).

This paper views headedness not as a property of grammatical structure alone but as a problem of language comprehension. It asks a simple but underexplored question: How do interpreters construct meaning from compound structures when formal compositional rules are not available to them? Drawing on qualitative observations of language learners with differing levels of English proficiency, the paper argues that headedness is not necessarily accessed as a categorical structural relation during interpretation. Instead, interpreters construct meaning through an inferential process in which structural cues interact with perceptual salience, conceptual plausibility and world knowledge (Frankland & Greene 2020, Wertheimer 1938, Wittgenstein 1953). The resulting interpretations are often approximate rather than categorical, yet systematic. Hence, this study aims to highlight the epistemic limits of compositional rules in real-time processing and contribute to broader discussions of how meaning is negotiated between form, perception and context.

2 Canonical Accounts of Headedness and Their Interpretive Assumptions

2.1 The right-head rule in English compounding

In traditional morphological theory, English compounds are typically analysed as right-headed structures in which the rightmost constituent functions as the head determining the syntactic category and semantic type of the compound as a whole (Bloomfield 1933, Williams 1981). This assumption applies across orthographic forms including closed compounds *(postbox)*, open compounds *(post box)* and hyphenated compounds *(post-box)*, which are generally treated as instantiations of the same underlying compositional principle (Carter & McCarthy 2006).

Within this framework, compounds are often described as endocentric, which means that the compound denotes a subtype of the entity named by its head. For example, a *racehorse* is a kind of horse, a *nervous system* is a kind of system, and a *snowball* is a kind of ball. The left-hand constituent is understood to modify or complement the head rather than introducing an independent meaning.

This account has strong explanatory power at the level of formal description (Kiparsky 2004, Scalise & Bisetto 2011). It offers a principled basis for predicting category membership, inflectional behaviour and semantic relations with compounds while closely aligning with hierarchical analyses in syntax, such as X-bar theory, in which phrases are organised around a head that projects structure upward (Chomsky 1970, Jackendoff 1977).

2.2 Interpretive presuppositions of canonical models

Despite their descriptive elegance, canonical accounts of headedness rely on several interpretive presuppositions. First, they assume that interpreters reliably identify which element functions as the head within a compound. Second, they assume sufficiently precise lexical knowledge of each constituent to support compositional inference. Third, they assume that structural principles are applied consistently across contexts.

These presuppositions are rarely questioned within formal analyses, where the focus lies on grammatical well-formedness over real-time interpretation. Yet they become problematic when considering language users who lack explicit knowledge of grammatical rules or who possess only partial lexical representations. In such cases, it is not obvious that headedness will be accessed as a structural property at all.

Orthographic variation provides a clear illustration of this issue. The contrast between *redhead* and *red head* demonstrates how spacing can radically alter interpretation. While *redhead* conventionally denotes a person with red hair, *red head* refers compositionally to any entity whose head is red. The distinction depends not only on structure, but also on convention, lexicalisation and familiarity. For interpreters without prior exposure to these conventions, the intended meaning may not be recoverable through structural analysis alone.

These observations suggest that headedness, as treated in formal theory, may not correspond straightforwardly to how compounds are interpreted in practice, particularly under conditions of limited grammatical knowledge.

3 Compositionality, Predictability and Their Limits

One of the major advantages attributed to the right-head rule is predictability. Endocentric compounds are often described as semantically transparent, allowing interpreters to infer meaning by combining the contributions of their constituents in a systematic way. From this perspective, compositionality supports efficient processing and facilitates the interpretation of novel compounds (Montague 1973, Partee 1995).

Cognitive and semantic accounts of compounding have emphasised the role of systematic relations between constituents suggesting that meaning construction can proceed relatively straightforward when structural principles are respected (Heyvaert 2011, Phillips & Wilson 2011). On this view, adherence to the right-head rule enables interpreters to construct meaning even in the absence of prior exposure, provided that the meanings of the individual constituents are known.

However, this advantage can be conditional. Predictability depends on the interpreter's access to reliable lexical and conceptual representations of the constituents involved (Allan 1986, Cummins 1996, Johnson 2004). When such representations are incomplete or distorted, compositional inference may lead to interpretations that are internally coherent yet misaligned with conventional usage.

Thus, while compositionality provides a powerful explanatory tool at the level of linguistic theory, it does not guarantee shared understanding in real-time interpretation. The following observations illustrate how interpreters may construct meaning in systematic but non-canonical ways when formal rules and lexical knowledge are only partially available.

4 Learner Observations: Headedness as Interpretive Hypothesis

To explore how headedness is perceived in the absence of explicit grammatical instruction, a set of qualitative observations was conducted with three interpreters differing in age and English proficiency. None of the participants had received formal instruction on headedness or compound structures. The aim was not to test rule knowledge but to examine how meaning is constructed intuitively when interpreters are asked to identify 'what the word is' in a compound.

4.1 Observation 1 (Ob1)

With my 12-year-old student, who attends an American international school, I used a series of examples to prompt his intuitive understanding of which part of the compound serves as a head. To the question 'Is a snowball snow or a ball?', he immediately responded 'snow'. I then presented him another compound noun: apple tree. He identified 'tree' as the head. Next, I inquired about 'butterfly', to which he responded 'fly'. (Ob1 ends)

The first observation involved a 12-year-old learner attending an American international school. He was presented with a series of English compound nouns and asked to indicate which element best represented the core meaning of each word. His responses suggest that the learner did not apply a consistent structural rule across compounds. Instead, his interpretations appeared to depend on how he conceptualised the referent as a whole, treating different constituents as salient depending on perceived meaning.

4.2 Observation 2 (Ob2)

An additional case was made with the other 12-year-old student, who attends a Canadian international school. She identified 'snow', 'apple' and 'fly' (she said, 'It can't be butter.') as the heads. (Ob2 ends)

A second observation involved another 12-year-old learner attending a Canadian international school. She was presented with the same set of compounds and asked the same questions. Her responses closely mirrored those of the first learner. She identified *snow* in *snowball*, *apple* in *apple tree*, and *fly* in *butterfly*, explicitly rejecting *butter* as a plausible contributor ('It can't be butter'). As in the first case, her interpretations were systematic but did not align consistently with the right-head rule.

4.3 Observation 3 (Ob3)

With my mother, who lacks competence in English yet understands some basic words, she identified the heads 'snow', 'tree', and 'fly'. (Ob3 ends)

The third observation involved an adult speaker with minimal English proficiency. Despite limited lexical knowledge, she identified *snow*, *tree* and *fly* as the salient elements in the same compound.

Notably, her interpretations overlapped with those of the young learners suggesting that the observed patterns were not age-specific or dependent on formal education. Instead, they appeared to reflect shared inferential strategies grounded in perception and conceptual plausibility.

4.4 Observation 4 (Ob4)

My mother, who has limited English proficiency, identified the head in the word 'waterslide' as 'water' and drew an image as below.

Figure 1 The drawing of the 'waterslide': water which slides.

Furthermore, she was not able to make sense of any other compounds related to 'slide' such as 'a red slide' and 'a children's slide'. (Ob4 ends)

A fourth observation further illustrates how headedness emerges as an interpretive hypothesis influenced by constituent knowledge rather than as a formally

applied rule. This observation involved the same adult participant described in subsection 4.3, whose English proficiency is limited but who possesses basic lexical knowledge.

When presented with the compound *waterslide*, she identified water as the element most central to the meaning. She subsequently produced a drawing (Figure 1) representing *water that slides*. Her interpretation reflects a compositional analysis grounded in her available lexical representations: *water* was treated as a salient way, while *slide* was interpreted primarily in its verb sense ('to move smoothly') rather than as a noun denoting a piece of playground equipment.

This interpretation was not arbitrary. It was internally coherent and conceptually plausible given the participant's lexical knowledge. The compound was analysed relationally with *water* constructed as the primary element and *slide* as describing an action rather than functioning as the head of a nominal category. In this sense, the participant constructed meaning compositionally, but on the basis of non-canonical constituent representations.

The interpretive consequences extended beyond the single compound. The participant was not able to interpret related expressions such as a *red slide* or a *children's slide* suggesting that the absence of a stable nominal representation for slide disrupted interpretation across a broader lexical network related to compounds or phrases. This indicates that when constituent knowledge is incomplete or misaligned with conventional usage, headedness may be reassigned in a way that remains systematic but diverges from canonical grammatical analyses.

Together with Ob1–3, this case supports the view that headedness in comprehension is not accessed as a fixed structural property. Instead, interpreters select constituents as interpretive anchors based on perceptual salience, conceptual plausibility and available lexical knowledge.

5 Discussion: Approximate but Systematic Understanding

The four observations (Ob1–4) indicate that headedness is not necessarily accessed as a formal grammatical relation during interpretation. Rather than identifying heads based on structural position, interpreters appear to construct meaning by selecting constituents that function as interpretive anchors, elements that best support conceptualisation given available lexical knowledge, perceptual salience and plausibility.

Crucially, the resulting interpretations are not random. As Phillips & Wilson (2011) argued, compositionality supports systematic interpretation through mapping relations between constituents, even in the absence of explicit assumptions. Across participants, similar choices were made for the same compounds, which suggests the operation of coherent inferential strategies. For example, in *snowball*, all interpreters prioritised *snow* over *ball* reflecting an emphasis on material composition or perceptual prominence rather than on category membership. Likewise, in *butterfly*, *fly* was consistently selected as the salient element indicating reliance on recognisable lexical categories even when the compound is semantically opaque. This aligns with (Heyvaert 2011), who argues that predictability in compounding

presupposes stable access to constituent meanings — an assumption that may not hold uniformly across language users or proficiency levels.

Ob4 further refines this pattern by demonstrating how constituent knowledge constrains interpretive outcomes across related constructions. The interpretation of *waterslide* as 'water that slides' illustrates how headedness may be reassigned when a constituent lacks a stable nominal representation. Importantly, this reassignment did not affect a single compound in isolation but extended to an entire lexical network rendering expressions such as a *red slide* or a *children's slide* uninterpretable. This suggests that approximate understanding is not merely local or item-specific, but structurally consequential. This shapes how compounds and related phrases are interpreted more broadly. This finding echoes Szabó's (2022) claim that systematicity in compositionality depends critically on both constituent meaning and the mode of their combination.

These findings also bear on debates surrounding exocentricity and graded compositionality. Traditional accounts treat exocentric compounds as non-compositional and headless failing the hyponymy (IS A) test (Allen 1979, Bloomfield 1933, Nóbrega & Panagiotidis 2020). Yet, subsequent work has shown that many supposedly exocentric compounds exhibit morphological or syntactic headedness, challenging a strict endocentric-exocentric dichotomy (Bauer 2008, Plag 2003). The learner interpretations observed here suggest that exocentricity may also emerge at the level of comprehension, not because compounds lack internal structure, but because interpreters construct meaning using constituent representations that diverge from these presupposed by formal analysis.

From a processing perspective, this perspective can support recent proposals advocating more flexible approaches to headedness. Bauer's (2020) notion of semi-headedness and Nóbrega & Panagiotidis's (2020) distinction between real and false exocentric compounds both point forward the inadequacy of rigid binary classifications. Similarly, work on idiomatic expressions has demonstrated that compositionality exists on a continuum, with some expressions allowing syntactic manipulation while others resist it (Corver, van Craenenbroeck, Harwood, Hladnik, Leufkens & Temmerman 2019).

These observations support accounts of language comprehension that emphasise 'good-enough' processing, in which interpreters construct representations that are sufficient for communicative purposes without necessarily conforming to formal grammatical specifications (Baggio 2021, Frankland & Greene 2020, Tacca 2010). From this perspective, headedness functions less as a rule that is applied and more as an interpretive hypothesis (Szabó 2022, Wittgenstein 1953). This is dynamically negotiated during comprehension and revised in response to perceptual and conceptual constraints.

Overall, the observations reported here highlight an epistemic gap between grammatical theory and language use. While structural rules such as the right-head rule provide powerful descriptive tools for analysing linguistic systems, they do not fully capture how meaning is constructed in real-time interpretation, particularly when constituent knowledge is incomplete or unstable. A comprehensive account of compositionality must therefore accommodate not only formal structure, but

also the interpretive processes through which language users make sense of that structure.

6 Implications for Theories of Compositionality

The observations reported in this study do not undermine the status of headedness as a grammatical construct. Rather, they challenge a widespread assumption in formal theories of compounding. Canonical accounts of headedness successfully describe how compounds are organised within the grammatical systems (Bloomfield 1933, Williams 1981). Yet, they remain largely silent on how such structures are accessed and used by interpreters when explicit grammatical knowledge is absent.

The learner interpretations documented here expose a structural-interpretive asymmetry. Although compounds such as *snowball* or *waterslide* are structurally endocentric and right-headed, interpreters systematically constructed meanings that diverged from canonical head-modifier relations. This divergence does not reflect randomness or failure, but rather the operation of inferential strategies grounded in perceptual salience and conceptual plausibility.

The findings have direct consequences for theories that treat compositionality as a categorical property. Traditional distinctions between compositional and non-compositional expressions have already been problematised by evidence of graded compositionality and partial structural inheritance (Bauer 2008, Bozşahin 2023, Corver et al. 2019, Plag 2003). More recent proposals explicitly reject rigid binary classifications arguing instead of intermediate or mixed types such as semi-headed compounds (Bauer 2020) or the distinction between real and false exocentric compounds (Nóbrega & Panagiotidis 2020). The learner data presented here extend these arguments from structural analysis to interpretation demonstrating that compositionality itself is gradient at the level of comprehension.

Broadly, the findings call for a clearer distinction between grammatical compositionality and interpretive compositionality, which concerns how language users construct meaning in real time. Treating these two levels as interchangeable obscures the epistemic conditions under which shared understanding succeeds or fails. A theory of compositionality that aims to be explanatorily adequate must therefore account not only for structural well-formedness, but also the inferential processes through which interpreters assign meaning under uncertainty (Baggio 2021, Frankland & Greene 2020, Szabó 2022).

7 Conclusion

This paper has examined headedness not as a property of grammatical structure alone, but as a problem of language comprehension. By focusing on how interpreters construct meaning from compound structures in the absence of explicit grammatical instruction, the study has shown that headedness is not necessarily accessed as a categorical structural relation during interpretation. Instead, interpreters rely on inferential processes in which structural cues interact with perceptual salience,

conceptual plausibility and available lexical knowledge (Allan 1986, Wertheimer 1938, Wittgenstein 1953).

Across four qualitative observations involving learners of different ages and proficiency levels, interpreters produced meanings that were initially coherent and systematically derived, yet often diverged from canonical right-headed analyses (Bloomfield 1933, Williams 1981). These interpretations were neither random nor idiosyncratic. Rather, they reflected shared inferential strategies that prioritised certain constituents as interpretive anchors based on how the compound was conceptualised as a whole (Cummins 1996, Phillips & Wilson 2011). The *waterslide* case further demonstrated that such approximate interpretations can propagate across a broader lexical network when constituent representations are unstable affecting the interpretation of related compounds and phrases (Heyvaert 2011, Lang et al. 2022).

These findings together highlight an epistemic gap between grammatical descriptions of compositionality and the processes through which meaning is constructed in real-time comprehension. While formal theories successfully capture how compounds are organised within the linguistic system (Bauer 2020, Bloomfield 1933, Nóbrega & Panagiotidis 2020), they do not fully account for how those structures are accessed and interpreted under conditions of limited grammatical knowledge (Baggio 2021). The study therefore argues for a distinction between grammatical compositionality, which concerns structural alignment with the system, and interpretive compositionality, which concerns inference-meaning construction by language users (Partee 1995, Szabó 2022).

By reframing headedness as an interpretive hypothesis rather than a rule applied, this paper contributes to ongoing debates on graded compositionality and the limits of binary classifications such as endocentric versus exocentric compounding (Bauer 2008, Scalise & Bisetto 2011, Scalise, Fábregas & Forza 2009). More broadly, it demonstrates the need for theories for compositionality to engage more directly with the epistemic conditions of interpretations, particularly in contexts where grammatical knowledge cannot be assumed (Baggio 2021, Frankland & Greene 2020).

8 Limitations and Future Research Directions

The present study contains limitations that should be acknowledged. First, the dataset is small and based on a limited number of observations. While this allows for close analysis of interpretive strategies, it does not permit generalisation across populations, languages or compound types. Second, the observations were conducted in informal settings without controlled experimental manipulation. As a result, factors such as task phrasing, prior exposure and individual differences in lexical knowledge could not be systematically isolated. Third, the present study focuses exclusively on English compounds. Given cross-linguistic variation in headedness patterns and compounding strategies, it remains an open question whether similar interpretive phenomena would arise in languages with different morphological typologies or head-directional preferences. Finally, the study does not attempt to model the cognitive mechanism underlying interpretive hypothesis formation.

Despite these limitations, the present findings point toward a productive research agenda. By treating headedness as an interface phenomenon, future studies can move toward a more comprehensive account of compositionality that reflects not only how language is structured, but how it is understood.

The findings of this study point forward several directions for future research. First, while present analysis is based on qualitative observations, later work could combine interpretive elicitation with controlled experimental methods. Manipulating factors such as constituent transparency, orthographic form and semantic plausibility would allow researchers to examine more systematically how interpreters prioritise different cues when constructing meaning from compounds. Second, cross-linguistic investigation would be valuable in determining the generality of the phenomena observed here (Nóbrega & Panagiotidis 2020, Scalise et al. 2009). Languages differ considerably in their compounding strategies and headedness patterns, so comparative studies could reveal whether interpretive reassignment of headedness reflects language-specific conventions or more general principles of human language comprehension. Finally, future work could explore the implications of interpretive compositionality. Longitudinal studies tracking how learners' interpretations of compounds evolve as constituent knowledge stabilises would shed light on the relationship between grammatical representation, lexical development and meaning construction over time.

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