

(Some) Parentheses are focus-sensitive operators¹

Carina BOLAÑOS LEWEN — *Wesleyan University*

Carolyn Jane ANDERSON — *Wellesley College*

Abstract. The term *parenthetical* encompasses a range of constructions, including appositives, speaker-oriented adverbials, and speech report tags. Despite lending their name to the category, parenthesized parentheticals have been little discussed. We explore a parenthesized construction with two interesting properties: (1) it is less independent than previously studied parentheticals and (2) it gives rise to an implication absent from its non-parenthesized paraphrase: *Sally drinks (herbal) tea* implies *Sally does not drink black tea*. We show that this construction, which we call the Restrictive Parenthesized Parenthetical construction, differs from appositives and orthographic representations of focus. Instead, we propose an analysis that treats it as a focus-sensitive operator: its extra implication results from invoking and negating a set of alternatives to the content within the parentheses.

Keywords: parentheticals, focus-sensitivity, alternative semantics

1. Introduction

The term *parenthetical* refers to a wide range of constructions, including appositives, speaker-oriented adverbials, and expressives. Despite lending their name to the category, parenthesized constructions have been relatively little discussed in work on parentheticals. Kaltenböck (2007) lists 17 kinds of parentheticals in English, none of which contain parentheses. This paper discusses one kind of actually parenthesized parenthetical, exemplified in (1).

- (1) Sarah studies linguistics for (intellectual) profit.

A key property of this construction is that it gives rise to an implication that its plain counterpart (2b) does not. Unlike its paraphrase, the parenthetical construction is incompatible with a continuation that entails that there is also financial profit.

- (2) a. Sarah studies linguistics for (intellectual) profit, # in addition to a fat paycheck.
b. Sarah studies linguistics for intellectual profit, in addition to a fat paycheck.

This paper explores the meaning of this construction, which we refer to as a *restrictive parenthesized parenthetical* (RPP). We propose an analysis of its parentheses as a focus-sensitive operator, positing that the implication shown in (2a) comes from invoking and negating a set of alternatives to the parenthesized content. In Section 2, we contrast RPPs with better-studied parentheticals. In Sections 3-4, we motivate and propose a semantic analysis of the RPP construction. In Section 5, we discuss challenges for our account, while arguing against an alternative treatment of parentheses as an orthographic representation of focus.

¹We would like to thank Chris Geissler, Daniel Gutzmann, and the Sinn und Bedeutung 26 audience and reviewers for their thoughtful comments. Special thanks are due to Todd Snider for sparking the discussion in Section 5.

2. Parenthesized, but unlike (other) parentheticals

Parenthetical constructions consist of a parenthetical component attached to a host sentence. Although we classify the RPP construction as a parenthetical by virtue of its parentheses, it differs in key respects from better-known parentheticals.

2.1. Functions of parentheticals

Three functions have been ascribed to parentheticals in previous work. Some parentheticals are described as resulting from speech disfluencies. For instance, Dehé and Kavalova (2007) list the backtracking comment in (3) as an example of a parenthetical that consists of a detached utterance interwoven with its host sentence.

- (3) I suppose you write the trend words as you check out the mistakes you might—God I hope not but—you might embody a whole new theory of syntax. (Aarts and Wallis, 2006)

In this view, parentheticals are a performance phenomenon. Since we find many examples of the RPP construction in published, polished text, they do not belong to this category.

Parentheticals have also been viewed as contributing speaker commentary on the host utterance (Ziv, 1985; Kaltenböck, 2007). For instance, the speaker-oriented adverbial *unfortunately* in (4) conveys the speaker's negative view of the event described.

- (4) Unfortunately, Sally won't be able to join us.

This also does not seem to fit the RPP construction, since in (1), the parenthetical does not contain any subjective content.²

The third view of parentheticals is that they contribute extra detail to the meaning of the host utterance (Biber et al., 1999). This fits best with the RPP construction exemplified in (1), since the parenthetical clarifies the kind of profit. On its face, however, this observation has limited explanatory power: if the parenthetical merely adds extra detail, then it should be semantically equivalent to the version without the parentheses. But for the RPP construction, this is not the case, since (2a) gives rise to an implication that (2b) does not.

2.2. Host/parenthetical independence

A key property of previously studied parentheticals is that the parenthetical and host sentence are independent: the parenthetical can be removed without affecting the host sentence. Biber et al. (1999) describes parentheticals as:

An interpolated structure... a digressive structure... which is inserted in the middle of another structure, and which is unintegrated in the sense that it could be omitted without affecting the rest of that structure or its meaning.

²We present more evidence that RPPs do not behave like speaker-oriented adverbials in Section 3.

(Some) Parentheses are focus-sensitive operators

The strength of host/parenthetical independence has been much debated (McCawley, 1982; Potts, 2002, 2005; Blakemore, 2006; Dehé and Kavalova, 2007; De Vries, 2007; Dehé, 2009; Blakemore, 2009; McInnerney, 2020). Parentheticals and hosts are not always syntactically independent, as shown by McCawley (1982) in (5), where the verb within the parenthetical, *sells*, is separated from its object, *pictures of Elvis Presley*, by the parenthetical/host boundary.

- (5) Mary buys, and Bill knows a man who sells, pictures of Elvis Presley.

However, the attested syntactic dependencies go only in one direction. Parentheticals sometimes depend on their hosts, but hosts are independent of their parentheticals. McCawley (1982) uses VP-ellipsis to demonstrate this, as shown in (6).³

- (6) John talked, it seems, about literature and Mary did too.
→ Mary talked about literature.
↗ Mary talked, it seems, about literature.

The RPP construction behaves differently. Corpus data show that the parenthesized component of an RPP construction cannot always be omitted. In (7a), removing the parenthetical would leave an NP rather than a full DP. In (7b), removing it would leave an orphaned prepositional phrase with no head. Also, VP-ellipsis can include the parenthesized component, as in (8).

- (7) a. I have to work twice as hard to get half the results as (other) people. (Davies, 2008)
b. Such a set would preserve the print and (some) of the tools used to create it. (Davies, 2008)

- (8) John ate (some of) his dinner and Bill did too. ↗ Bill ate all of his dinner.

The RPP construction also seems less semantically independent than other parentheticals. Potts (2005) shows that the truth of the parenthetical and the host sentence are independent.⁴ Although the appositive in (9a) is false, the true contribution of the host can still be accepted, and although the host is false in (9b), the true contribution of the appositive can still be recovered.

- (9) a. Lance Armstrong, an Arkansan, has won the 2003 Tour de France!
b. Lance Armstrong, the 2003 Tour de France winner, is from Arkansas.

The RPP construction lacks this semantic independence: deleting the parenthetical can change the truth of the host sentence. In (10), the parenthetical could be deleted without affecting the grammaticality of the host sentence, but the resulting sentence would become false.

- (10) Context: *Calvin has eaten some, but not all, of the cake.*
a. Calvin didn't eat (all of) the cake.
b. # Calvin didn't eat the cake.

In summary, the parenthesized component of the RPP construction appears less syntactically and semantically independent from its host than better-studied parentheticals.

³See Dehé and Kavalova (2007) for an overview of diagnostics for syntactic independence of parenthetical hosts.

⁴Semantic/pragmatic independence does not always hold. Amaral et al. (2007) show that discourse-anaphoric relations cross host/appositive boundaries in both directions:

- (i) Stan Bronowski, who took an exam, passed it with flying colors.
(ii) Several students, most of them linguists, missed the bus.

Moreover, Blakemore (2009) argues that parentheticals pragmatically affect hosts via discourse context update.

3. (Semantic) properties of the RPP construction

In this section, we illustrate the semantic properties of the construction. The RPP construction gives rise to an implication that its plain paraphrase does not: as we show again in (11), the parenthesized version rules out a continuation that can follow the non-parenthesized version.

- (11) a. Often Sally drinks (herbal) tea before bed. # Or black tea.
b. Often Sally drinks herbal tea before bed. Or black tea.

We will take this implication pattern as a defining characteristic of the RPP construction.

3.1. Two components of meaning

Taking the contrast shown in (11) as our starting point, we propose that the RPP construction contributes two components of meaning.

First, it contributes the same proposition as its non-parenthesized equivalent: *Sally drinks (herbal) tea* implies that Sally drinks herbal tea. Given the canonical optionality of parentheticals, we might be tempted to posit that only the host sentence is contributed (i.e., *Sally drinks tea*). As shown in Section 2.2, however, deleting the RPP construction does not always leave a syntactically well-formed host. Moreover, if the RPP in (12) contributed *Sally does not drink tea*, the entailment would be valid.

- (12) Sally does not drink (black) tea. $\rightarrow$ Sally does not drink tea.

Since the RPP construction does not entail its host in downward-entailing environments like (12), the content of the parenthetical must be part of its contribution.

The second component of meaning is the implication that the RPP construction carries beyond its non-parenthesized equivalent. As we have seen, certain continuations of the RPP construction are infelicitous, even though they can follow its non-parenthesized equivalent. This contrast is illustrated again in (13) below.

- (13) a. Calvin tried to eat a loaf of bread. And he succeeded!
b. Calvin (tried to) eat a loaf of bread. # And he succeeded!

What is the nature of this implication? We suggest that the parenthetical rules out some alternative(s) to its contents. In (2), the alternatives are other kinds of profit. In (11), the alternatives are other kinds of tea. In (13), the alternative to trying is succeeding.

We propose the truth-conditions in (14) as a preliminary meaning for the RPP construction.

- (14) **Preliminary truth-conditions for the RPP construction:**
[[$\alpha(\beta)$]] = $\alpha\beta \wedge \neg\alpha$ ALT(β) where ALT is a function for generating alternatives.

The RPP contributes two components: the proposition expressed by its non-parenthetical equivalent, and a negated alternative. In the following sections, we will refine this semantics for the RPP construction as we probe its semantic properties.

(Some) Parentheses are focus-sensitive operators

3.2. What is at-issue?

Although we have identified two components of meaning contributed by the RPP construction, we have not yet identified the nature of their content. In this section, we argue on the basis of projection behavior that the RPP's first component of meaning is at-issue, but its second is not.

Projection behavior varies across classes of content: assertions do not project (Simons et al., 2010); presuppositions project past presupposition holes (Karttunen, 1974); and implicatures project past presupposition plugs (Potts, 2005). We explore the RPP construction's projection behavior in three environments that allow presuppositions to project: negation, attitude reports, and possibility modals. We observe that in each of these environments, the first component of the RPP construction's meaning does not project, but the second does.

The first component of the RPP construction's meaning is interpreted under the scope of negation (15a), while the second component can project out of its scope (15b). In (15), the negation cannot be interpreted as targeting the manner of the rejection, but it does target the proposition that Sally was rejecting Sarah.

- (15) Sally wasn't (politely) rejecting Sarah.
- a. In fact, Sally had lost her phone. ((15) $\rightarrow$ Sally wasn't rejecting Sarah.)
 - b. # In fact, Sally was deliberately rude. ((15) $\nrightarrow$ Sally's rejection wasn't polite.)

When the RPP construction is embedded under attitude reports, its first component of meaning is again interpreted under the scope of, e.g., *believe* (16a), while the implicative component projects out of its scope (16b). In (16), it must be the case that Sally was polite, but it is not necessarily the case that Sally was rejecting Sarah at all (Sarah's belief may be false).

- (16) Sarah believed Sally was (politely) rejecting her.
- a. But in fact, Sally wasn't rejecting her at all. ((16) $\nrightarrow$ Sally was rejecting Sarah.)
 - b. # But in fact, Sally was deliberately rude. ((16) $\rightarrow$ Sally's rejection was polite.)

The projection pattern is the same for possibility modals: the first component is interpreted locally, while the second projects. In (17), *may* scopes over the proposition that Sally was politely rejecting Sarah, leaving open the possibility that there was no rejection. By contrast, the implication that Sally's manner was polite projects and cannot be contradicted.

- (17) Sally may have been (politely) rejecting Sarah.
- a. Or Sally may not have been rejecting her at all. ((17) $\rightarrow$ Sally may have been rejecting Sarah.)
 - b. # Or Sally's rejection may have been rude. ((17) $\nrightarrow$ Sally's rejection may have been polite.)

In summary, the first component of meaning must be interpreted locally in environments where both presuppositions and implicatures project, suggesting that it is an assertion. We adopt this analysis and will refer to this component as the **RPP assertion**:

- (18) **RPP assertion:** $\alpha(\beta)$ asserts $\alpha\beta$.

3.3. What is not at-issue?

Since the RPP construction's second component projects, it is not at-issue. But what sort of not at-issue content does it contribute? We consider three possibilities: presuppositions, conversational implicatures, and conventional implicatures.

Presuppositions are not at-issue content that is assumed to be in the Common Ground (and that must be accommodated, if it is not). Implicatures convey new information that is deduced by reasoning about the speaker's intentions. These implicatures may be conventional (obligatorily triggered) or conversational (calculated from the context).

3.3.1. Cancellation

Conversational implicatures arise from reasoning about the speaker's cooperative behavior. In (19), the word choice begets an implicature that something was atypical about the singing event.

- (19) Miss X produced a series of sounds that corresponded closely with the score of "Home Sweet Home." (Grice, 1975)

Implication: Miss X did not sing well.

Conversational implicatures can generally be cancelled by restricting the context such that it no longer supports the reasoning. To cancel (19), imagine a context where the evaluation of the singing is atypical rather than the singing itself: perhaps we are reading scores out of a computer program that rates singing based on pitch accuracy.

Meanwhile, presuppositions are difficult to cancel, but can be plugged (fail to project) under some operators, such as negation. In (20a), negation blocks the projection of the presupposition that Ali has a brother, but as (20b) shows, the presupposition cannot be cancelled. The scalar implicature in (20c), on the other hand, can be cancelled without loss of felicity.

- (20) a. Ali's brother isn't bold: Ali doesn't have a brother!
b. # Ali's brother is bold. Actually, Ali doesn't have a brother.
c. Some of the students fell asleep. Actually all of them did.

Conventional implicatures, like presuppositions, are also difficult or impossible to cancel, as shown in (21) (Potts, 2005). In (21), the conventional implicature associated with the predicate of personal taste *lovely* cannot be canceled, unlike the conversational implicature in (20c).

- (21) *Context: Edna has been offered one of Abe's vases, which she likes but he finds ugly.*
Abe said I could have one of his lovely vases. # But actually, they are all ugly!

Cancellation thus distinguishes conversational implicatures from other kinds of not-at-issue content. Although the RPP construction can be used to convey a scalar implicature-like meaning, when *some* is parenthesized, the implication cannot be cancelled, as shown in (22b)-(22c).

- (22) a. Calvin ate some of the tuna. Actually, he ate all of it.
b. Calvin ate (some of) the tuna. # Actually, he ate all of it.
c. Calvin ate (some of) the tuna. # Actually, he didn't eat any of the tuna.

(Some) Parentheses are focus-sensitive operators

The fact that the second component of the RPP construction's meaning is not cancellable suggests that it is not a conversational implicature.

3.3.2. Reinforcement

Conversational implicatures, unlike presuppositions, can be reinforced without redundancy.

- (23) **Reinforceability** (Horn, 1972): if p implicates q , then $p \wedge q$ is felicitous. But if p presupposes q , $p \wedge q$ is infelicitous (due to redundancy).

In (24a), the first conjunct presupposes the second, and the result is infelicitous; in (24b), the first conjunct conversationally implicates the second, and the conjunction is felicitous.

- (24) a. # John is a bachelor and/but he is a man.
b. Some people left early ?and/but not everyone did. (Rett, 2020)

This property has also been framed in terms of disjunction: disjoining a property with something it presupposes is infelicitous (25a), while disjoining a sentence with something it conversationally implicates is felicitous (25b).

- (25) a. # Jane is a woman or she is a queen.
b. Jane bought A or B or both. (Rett, 2020)

The evidence is less clear-cut for conventional implicatures. The conventional implicatures that Potts (2005) refers to as *supplements*, like appositives, do not seem to be reinforceable (26).

- (26) # Armstrong, a cancer survivor, is a cyclist and/but he is a cancer survivor.

However, Potts (2005)'s second category of conventional implicatures, expressives, are reinforceable. The conventional implicature of *damn* can be reinforced by an assertion that the speaker carries a negative attitude, as in (27).

- (27) I have to mow the damn lawn and I do not like it.

What about the RPP construction? As (28) shows, it cannot be reinforced. In (28b), reinforcing the implication that Jane didn't buy all of the tuna is infelicitous, indicating that the second component of the RPP construction's meaning is not a scalar implicature.⁵

- (28) a. Jane bought some of the tuna or she bought all of it.
b. # Jane bought (some) of the tuna or she bought all of it.

Thus, the infelicity of reinforcing the RPP construction is another way in which it behaves more like a presupposition than an implicature.

⁵The first component, as expected for at-issue content, also cannot be reinforced (# *Jane bought (some) of the tuna and she bought some of it.*).

3.3.3. Projection revisited

We have seen two kinds of evidence that the second component of the RPP construction's meaning is not a conversational implicature: it cannot be cancelled or reinforced. However, this evidence does not adjudicate between a presuppositional and conventional implicature analysis, because neither presuppositions nor supplemental conventional implications can be cancelled or reinforced. To distinguish these two classes, we return to projection behavior.

In Section 3.2, we saw that the second component of an RPP projects out of negation, possibility modals, and attitude reports. These are environments in which both presuppositions and conventional implicatures project. But presuppositions behave differently from conventional implicatures in other environments. Speech reports, for instance, are presupposition plugs: presuppositions do not project out of speech reports, while conventional implicatures generally project to the top level.⁶ In (29a), for instance, the conventional implicature contributed by the appositive must be consistent with the speaker's beliefs (potentially in addition to Sue's). By contrast, the presupposition triggered by the factivity of *know* in (29b) is interpreted locally.

- (29)
- a. Sue said that Cal, who is a picky eater, had eaten his dinner. # I later found he isn't a picky eater.
 - b. Sue said that Sally knew Cal had eaten his dinner. I later saw that he hadn't.
 - c. Sue said that Cal had eaten (some of) his dinner. I later saw that he'd finished it.

The second component of the RPP construction's meaning seems to allow a local interpretation more easily than conventional implicature. In (29c), the implication is that Sue said that Cal didn't eat all of his dinner, making it consistent with a continuation that Cal did eat all of it.

However, the judgments are subtle; it is also possible to construct examples where the second component projects past a presupposition plug. In the context shown in (30), the second component of the RPP in (30c) appears to project like the conventional implicature in (30a), although the presupposition in (30b) does not.

- (30)
- Context: Jane and Susan are planning a barbecue. Jane knows that Susan lives in Hathaway Farms, a townhouse complex where first-floor units have patios. But she does not know which apartment is Susan's.*
- a. Jane said that my yard, which is small, can't hold all the guests that we want to invite. # But in fact, my yard isn't small.
 - b. Jane said that my small yard couldn't hold all the guests that we wanted to invite. But actually, I don't even have a yard.
 - c. Jane said that my (small) yard couldn't hold all the guests that we wanted to invite. ? But in fact, my yard isn't small.

However, there is still a contrast between the behavior of the conventional implicature and the RPP construction's second component. When the conventional implicature projects (i.e., is speaker-oriented), it does not need to be true at the local level. The appositive in (31a) must be a belief that only the speaker holds, since if Jane knew the guests were vegetarian, she would not expect them to want meat.

⁶Conventional implicatures are most frequently, though not obligatorily, anchored to the speaker's perspective (Amaral et al., 2007; Harris and Potts, 2009; Harris, 2012; Kaiser, 2015).

(Some) Parentheses are focus-sensitive operators

- (31) *Context: Jane and Susan are planning a barbecue together.*
a. Jane said that our guests, who are all vegetarian, will want both veggie burgers and beef burgers. She doesn't know that most people in Northampton are vegan.

In cases where the second component of the RPP construction appears to project, however, it also holds locally. In (32), both Jane and Susan must believe that some but not all of the guests will want both veggie and meat burgers, as the contrast between (32a) and (32b) shows.

- (32) *Context: Jane and Susan are planning a barbecue together.*
Jane said that (some of) our guests will want both veggie burgers and beef burgers.
a. Since we're inviting 20 people, she thinks we need 15 of each.
b. # Since we're inviting 20 people, she thinks we need 20 of each. But I think we would be safe with just 15.

Thus, although the second component of the RPP construction's meaning can project past presupposition plugs, its projection behavior is not the same as a conventional implicature either.

It is therefore difficult to distinguish between a presuppositional and conventional implicature analysis of the second component. For the remainder of the paper, we will refer to the second component of the RPP construction's meaning as a presupposition, while acknowledging that depending on the theory of presupposition and conventional implicature adopted, it could alternatively be viewed as a conventional implicature.

3.4. What alternatives are invoked?

We have proposed that the second component of the RPP construction's meaning invokes and negates alternatives to its parenthesized content. However, we have not addressed two questions about these alternatives. First, does the RPP construction negate a set of alternatives or a single alternative? Second, how is the relevant set of alternatives determined? This section explores these issues.

3.4.1. How many alternatives?

So far, we have discussed a single negated alternative for each RPP construction. But because the alternative set is implicit, it can be difficult to determine whether a single alternative or a set of alternatives is being invoked. For instance, in (33), it is clear that one negated alternative is *large dog*. But what about medium dogs?

- (33) Tenants may have a (small) dog or cat as long as proof of vaccination is provided.

In some contexts, the RPP construction negates fewer alternatives than *only*, which negates all alternatives to its associate (Horn, 1969; Rooth, 1985). In (34), for instance, *only* is infelicitous, since it entails that Arjun eats all meats that are not red meat. The RPP version, on the other hand, is compatible with the context, which suggests that it negates only one alternative.

- (34) Context: For health reasons, Arjun tries not to eat red meat, and he also dislikes turkey.
a. # Arjun avoids only RED meat.
b. Arjun avoids (red) meat.

In other cases, however, the RPP construction presupposes the negation of more than one alternative. For instance, in (11), repeated as (35) below, the negated alternatives seem to include all caffeinated teas, not just the most caffeinated kind. In the corpus example in (36), the first RPP seems to negate both *most* and *all* in an alternative set of $\{some, most, all\}$.

- (35) Often Sally drinks (herbal) tea before bed. # Or black tea. # Or green tea.
(36) [Barack Obama] secured 93% of the Black vote, 73% of the Asian vote, 71% of the Hispanic vote, and 58% of the non-white Other vote. This data suggests there are real and palpable differences between how (some) Whites and (most) non-Whites see the world, a difference that will become increasingly influential. (Davies, 2008)

We conclude that the RPP construction can negate more than one alternative, but need not negate all alternatives that are accessible to *only*.

3.4.2. Alternative selection

One way of reconciling the examples above is to posit that the RPP construction negates all stronger alternatives to its parenthesized content. The caffeinated teas in (35) are stronger than herbal tea; perhaps turkey is not a stronger alternative than red meat. This requires a way of defining alternative strength.

Logical Strength One way of measuring alternative strength is logical strength: stronger alternatives entail weaker ones. Some of the examples presented so far make use of well-known scalar alternatives, such as *some/all*, as in (22), repeated as (37a) below. In these cases, the negated component is a logically stronger alternative to the parenthesized content. In the upward-entailing environment in (37a), *all* entails *some*, and is the logically stronger alternative. As expected, we find scale reversal in the downward-entailing environment in (37b).

- (37) a. Calvin ate (some of) the tuna. # In fact, he ate all of it.
b. Calvin didn't eat (all of) the tuna. # In fact, he didn't eat any.

However, we also find cases where the logically strongest alternative of a conventional scale is parenthesized in an upward-entailing environment. For instance, (38), from the Wikipedia page for a software project, contains an RPP where the parenthesized component is *all*, which is the logically strongest alternative on its scale.

- (38) Zekr comes with an NSIS installer for Windows and an Application bundle for Mac. There is always a base .tar.gz package for (all) Linux machines as well as Debian packages for Debian-compliant Linux distributions. (Davies, 2015)

The negated alternative in this case seems to be *some but not all*. Admittedly, if this is the case, the presupposition is not contributing much, since asserting *all* in a positive environment will logically entail that *some but not all* is false. Nonetheless, this example suggests that we cannot

(Some) Parentheses are focus-sensitive operators

adopt logical strength as a general criterion for the alternative negated by the RPP construction.

Comparative Likelihood Previous analyses of the focus-sensitive operator *even* have proposed using comparative likelihood as a strength criterion for the alternative it invokes (Karttunen and Peters, 1979; Rooth, 1992; Lahiri, 1998). In a comparative likelihood approach, an RPP invokes and negates a more likely alternative to its parenthesized content.

This approach works well for (38) above: the RPP construction is licensed because small open source projects like Zekr are expected to support only some Linux machines. Thus, although *all* is logically stronger, it is less contextually likely than *some but not all*.

In other cases, comparative likelihood fails. In (35), repeated as (39), the negated alternative is black tea, but it is less likely that someone will drink black tea before bed than herbal.

(39) Often Sally drinks (herbal) tea before bed. # Or black tea.

Contextually Relevant Gradability Greenberg (2018) defines alternative strength by appealing to contextually relevant gradability, proposing that *even* is licensed when the prejacent exceeds the standard on the scale of a contextually relevant gradable property to a greater degree than its alternative exceeds the standard.

If we adopt this view, we can identify the gradable property in (39) as caffeine level, which allows us to derive the *herbal/black* scale. However, contextually relevant gradability makes for a very lenient strength criterion for the RPP construction.⁷ Consider the RPP in (40) (another case where comparative likelihood fails, since red is the most expected color for apples).

(40) James will eat every variety of (red) apple. # And green apples.

Our gradable property must be one where *green* is more extreme than *red*; perhaps it is the property of being less canonical as an apple color. But in other cases, it is more difficult to imagine the relevant gradable property. In the corpus example (41), the negated alternative is European football (soccer). The author's parenthetical, by invoking both sports, serves to ridicule middle-grade sexists who sort the two sports into different gendered categories.

(41) So whose rules and expectations should they prepare their kids for? The people who will be horrified if you get your son this toy instead of this one, even though he likes pink and purple better? Or maybe the people who think it's totally cool how into science your daughter is, but inappropriate that you let her play (American) football or join the wrestling team? (Davies, 2008)

To analyze this example via contextually relevant gradability, we would have to posit varieties of football as a gradable predicate. But this seems wrong. There are two types of football, American and European, and they are distinct games. If this is a scale, what is the standard?

For cases like this, it is unclear what we gain from appealing to gradable properties. We therefore propose that both the alternative set and its ordering criterion are contextually determined.

⁷Greenberg's (2018) proposal for *even* does not over-generate in the same way because *even* carries additional restrictions: its prejacent and alternative must be on the same side of the scale, and must both exceed the standard.

4. A semantics for the RPP construction

In Section 3, we illustrated three key properties of the RPP construction's meaning. It makes two contributions: an assertion equivalent to its non-parenthesized paraphrase and a presupposition that negates stronger alternatives to the contents of the parentheses. We also found that the selection of the alternatives is flexible: the set of alternatives and its ordering criterion are contextually determined.

(42) Properties of the RPP construction

- a. **Assertion:** the RPP construction asserts its non-parenthesized equivalent.
- b. **Presupposition:** the RPP construction presupposes the negation of a set of alternatives to the parenthesized content.
- c. **Alternative set:** the negated set of alternatives is contextually determined.

With these desiderata in mind, we propose the semantics in (43) for the RPP construction.

(43) Semantics of the RPP construction:

$$[[\alpha(\beta)]]^C =$$

- a. Asserts: $\alpha\beta$
- b. Presupposes: $\exists \text{ALT}' \subseteq \text{ALT}_C(\beta). \forall \delta \in \text{ALT}'. (\neg \alpha\delta) \wedge (\delta >_C \beta)$ where ALT_C takes a constituent γ and returns a set of relevant alternatives to γ and $>_C$ is an alternative strength criterion in C .

The RPP construction asserts its parenthesized component and presupposes the negation of all stronger alternatives in a contextually supplied set of alternatives to its parenthesized component. By this analysis, the semantics of (39) are as shown in (44). The semantics of (22), our scalar implicature-like example, are as shown in (45).

(44) Often Sally drinks (herbal) tea before bed.

- a. Asserts: Often Sally drinks herbal tea before bed.
- b. Presupposes:
 $\{\neg \text{Often Sally drinks white tea before bed}, \neg \text{Often Sally drinks oolong tea before bed}, \neg \text{Often Sally drinks green tea before bed}, \neg \text{Often Sally drinks black tea before bed}\}$

(45) Calvin ate (some of) the tuna.

- a. Asserts: Calvin ate some of the tuna.
- b. Presupposes: $\neg \text{Calvin ate all of the tuna.}$

Although the two components of meaning that we propose are similar to a scalar implicature, since *some* is strengthened to *some but not all* by the negation of the stronger alternative, in the case of the RPP construction, this is a presupposition rather than an implicature.

Our proposed analysis treats the RPP construction's parentheses like a focus-sensitive operator. Like *only* (Horn, 1969; Rooth, 1985, 1992), the RPP construction contributes two components of meaning: it contributes the content of the non-parenthesized equivalent, and it also invokes and negates a set of alternatives.

4.1. The RPP construction as a focus-sensitive operator

Although our analysis treats the RPP construction like a focus-sensitive operator, our proposed semantics differ from the standard analysis of *only* in one key respect. Compared to *only*, the RPP construction's at-issue and not-at-issue components are flipped. While *only* presupposes its argument and asserts the negation of its alternatives (Horn, 1969; Rooth, 1985), the RPP construction asserts its argument and presupposes the negation of the alternatives.

This reversal explains why *only* and the RPP construction pattern differently in one environment: negative polarity licensing. Previous work has shown that *only* licenses negative polarity items in non-focused positions, but is incompatible with positive polarity items (Klima, 1964; Beaver and Clark, 2008; Roberts, 2011), as illustrated in (46). The RPP construction, by contrast, is compatible with positive polarity items, but cannot license negative polarity items (47).

- (46) a. Only some students have any money left.
b. # Only junior faculty are quite tired these days.
- (47) a. # (Some) students have any money left.
b. (Junior) faculty are quite tired these days.

This contrast is predicted by the difference in the at-issue status of the two constructions' components: unlike *only*, the RPP construction is not a Strawson downward monotone environment.

(48) **Strawson downward monotonicity: (von Fintel, 1999)**

Let presupposition (ϕ) be the strongest sentence presupposed by ϕ . The expression α occurs in a Strawson downward monotone position in a sentence ϕ iff for any β which is stronger than α , the combination of ϕ and presupposition ($\phi[\alpha/\beta]$) entails $\phi[\alpha/\beta]$.

If (49) is a Strawson downward monotone environment, it should entail (50), the proposition made by substituting a stronger expression for *publish papers*, assuming the presuppositions of (50) are satisfied.⁸ This is the case: if senior faculty do not publish papers, they cannot publish interesting papers. So *only* satisfies the definition of Strawson downward monotonicity.

- (49) Only the junior faculty publish papers.
a. Presupposition: The junior faculty publish papers.
b. Assertion: It is not the case that the senior faculty publish papers.
- (50) Only the junior faculty publish interesting papers.
a. Presupposition: The junior faculty publish interesting papers.
b. Assertion: It is not the case that the senior faculty publish interesting papers.

In the equivalent RPP constructions (51) and (52), however, the entailment does not hold. We cannot deduce from *The junior faculty publish papers* and *The senior faculty do not publish interesting papers* that the papers produced by the junior faculty are interesting.

- (51) The (junior) faculty publish papers.
a. Assertion: The junior faculty publish papers.
b. Presupposition: It is not the case that the senior faculty publish papers.

⁸We follow Beaver and Clark (2008)'s account, which treats the not-at-issue component as a presupposition. But see Roberts (2011) for a parallel analysis that generalizes the definition in (48) to all not-at-issue content.

- (52) The (junior) faculty publish interesting papers.
- a. Assertion: The junior faculty publish interesting papers.
 - b. Presupposition: It is not the case that the senior faculty publish interesting papers.

Thus, the difference in polarity licensing behavior that we observe follows from the difference in the at-issue status of the components of each construction's meaning.

4.2. Relation to the Question Under Discussion

We have argued that the RPP construction asserts its non-parenthesized equivalent, based on the projection evidence in Section 3. The construction's first component of meaning, however, does not behave like an assertion in one key respect: the parenthesized component cannot be targeted by a direct denial. In (53), if either component of the RPP construction's meaning could be targeted by direct denial, we would expect (53a-ii) to be felicitous. But it is not.

- (53)
- a. Jim has a (small) yard.
 - (i) No, he doesn't have a yard at all!
 - (ii) # No, it's quite large!
 - b. Jim has a small yard.
 - (i) No, he doesn't have a yard at all!
 - (ii) No, it's quite large!

We explain this behavior by illustrating a more general property of the RPP construction: it cannot be used to contribute a complete answer to the Question Under Discussion (QUD).

Although the first component of the RPP construction's meaning does not project, it also cannot be used to directly answer the Question Under Discussion. In (54), for instance, the Question Under Discussion relates to whether Calvin has eaten dinner. Although B can felicitously respond with either a *some* or *all* answer, B cannot use the RPP construction.

- (54) *Context: Calvin is a cat who often nibbles at his dinner and returns later to finish it.*
A: Did Calvin eat the whole bowl of food?
- a. B: Yes, he ate all of it.
 - b. B: No, but he ate some of it.
 - c. B: # Yes, he ate (all of) it.
 - d. B: # No, but he ate (some of) it.

This is puzzling under our proposal that the RPP construction contributes an assertion, since we follow Simons et al. (2010) in defining at-issue content by its relation to the QUD (55).

- (55) **At-issueness** (Simons et al., 2010): a proposition *p* is at-issue relative to a question *Q* iff ?*p* is relevant to *Q*, where ?*p* denotes the question whether *p* and relevance is defined as follows:
- a. An assertion is relevant to a QUD iff it contextually entails a partial or complete answer to the QUD.

The RPP's inability to answer the QUD in (54) calls into question the at-issue status that its projection behavior suggests. But in a similar context where A poses a less specific question,

(Some) Parentheses are focus-sensitive operators

the RPP construction can be used to provide information relevant to the QUD. In (56), the RPP is felicitous, and even seems to resolve the QUD.

- (56) *Context: Calvin is a cat who often nibbles at his dinner and returns later to finish it.*
 A: Did Calvin eat dinner?
 a. B: Yes, he ate (some of) his food.
 b. B: Yes, he ate (all of) his food.

Similarly, in (57), the RPP construction is felicitous and provides an answer to the QUD (whether Melvin’s classmates were invited). How can we reconcile these examples with (54)?

- (57) *Context: A and B are throwing a birthday party for their son, Melvin. It will be a mixed party with family members, neighbors, and kids from Melvin’s school.*
 A: Did we invite Melvin’s classmates?
 a. B: Yes, he invited (some of) them.
 b. B: Yes, he invited (all of) them.

We posit that the RPP construction does contribute an assertion, but of an unusual kind: it is an assertion that (1) entails an answer to the QUD and (2) is not entailed by a complete answer to the QUD. By restricting the RPP’s assertion so that it is not equivalent to a complete answer, we capture its infelicity in (54), while meeting the definition of at-issue content in (55).

Intuitively, our restriction imposes a superfluity condition on the RPP construction: its assertion conveys something beyond what is required by the QUD. Although this is unusual, it is one way of formalizing the intuition that parentheticals contribute extra detail discussed in Section 2.1.

Alternatively, we might separate out this extra content, and analyze *Sally drinks (herbal) tea* as asserting that Sally drinks tea, presupposing that Sally does not drink black tea, and presupposing that Sally drinks herbal tea. But this runs into the same issue with downward-entailing environments demonstrated in (12), repeated as (58) below:

- (58) Sally does not drink (black) tea. $\nrightarrow$ Sally does not drink tea.

If we remove the modifier from the assertion, (58) contributes the three components in (59):

- (59) Sally does not drink tea $\wedge$ Sally does not drink black tea $\wedge \neg$ (Sally does not drink *ALT*(black) tea)

But these three conjuncts are incompatible: if Sally does not drink tea, then the negated alternative cannot be true, since it requires her to drink some alternative type of tea. Thus, it is not viable to split the parenthesized content away from the host assertion.

This data supports our original analysis of the RPP’s two components of meaning, with the additional restriction that the assertion cannot be entailed by a complete answer to the QUD.

- (60) **Semantics of the RPP construction:**
 $[[\alpha(\beta)]]^C =$
 a. Asserts: $\alpha\beta$
 b. Presupposes: $\exists \text{ALT}' \subseteq \text{ALT}_C(\beta). \forall \delta \in \text{ALT}'. (\neg \alpha\delta) \wedge (\delta >_C \beta)$ where ALT_C takes a constituent γ and returns a set of relevant alternatives to γ and $>_C$ is a alternative strength criterion in C .

(61) **Pragmatics of the RPP construction:**

$\alpha(\beta)$ is felicitous in a context C with a QUD Q if $\alpha\beta$ entails a complete or partial answer to Q and is not entailed by a complete answer to Q .

5. (Some) alternatives and challenges

We have argued that the RPP construction differs from previously analyzed parentheticals in interesting ways and proposed a preliminary analysis of its semantics. However, questions remain. In this section, we discuss one alternative and one challenge to our proposal.

5.1. Is the RPP construction focus-marking?

A possible alternative to our analysis of the RPP construction is to view it as an orthographic representation of focus. We noted in Section 2 that unlike other parentheticals, the RPP construction is not syntactically independent. In most (but not all) RPPs, only a single word is parenthesized, as is common for focus markers. Moreover, the semantic contribution discussed in Section 3 could result from the set of alternatives invoked by focus.

We argue against treating the RPP construction as orthographic focus-marking for two reasons. First, we find that the RPP construction has a different intonation than other orthographic focus markers like all-caps, italics, and bolding. Although all four markers invoke alternatives to *fixed-gear* in (62a) and (62b), we informally observe differences in their intonation.

- (62) a. Walter rides a {FIXED-GEAR, *fixed-gear*, **fixed-gear**} bicycle.
 b. Walter rides a (fixed-gear) bicycle.

The orthographic markers in (62a) are pronounced with the increased pitch and intensity typically associated with focus intonation (Breen et al., 2010; Heath, 2021). Example (62b), on the other hand, is pronounced with decreased pitch and intensity, along with comma intonation: an intonation break before and after the parentheses, common for parenthetical constructions (Bolinger, 1989; Potts, 2002; Astruc-Aguilera, 2005).

Second, the RPP construction differs from all-caps focus in how it interacts with focus-sensitive operators. In (63a), *only* can target the all-caps-focused word, *SMALL*, but in (63b), *only* seems unable to target (*small*), instead excluding alternatives to *front yard*.

- (63) *Context: Two friends are discussing how much green space there is around a house.*
 a. It only has a SMALL front yard. But it has a large backyard.
 b. It only has a (small) front yard. # But it has a large backyard.

Thus, the RPP construction does not seem to be interchangeable with other focus markers.

5.2. Is negating the alternative too strong?

In some RPP constructions, the speaker does not seem absolutely committed to the negation of the alternative it invokes. For instance, in (64), Ben seems to be expressing ignorance about whether Sally will drink tea, rather than expressing certainty that she will not.⁹

- (64) *Context: Ada is offering tea to her guests. Sally is out of the room.*
 Ada: Should I make a full pot of black tea?
 Ben: Sally drinks (herbal) tea.

This suggests that our proposed presupposition for the RPP construction is too strong. Instead of ruling out an alternative to the parenthesized content, the speaker seems to express hesitancy about committing to the proposition without the parenthetical. So rather than presupposing a negated alternative, the speaker may be contributing both a commitment to the parenthesized content and an unwillingness to commit to the unrestricted proposition.

One reason the speaker might avoid committing to the non-parenthesized proposition is if they know that a stronger alternative is false. For instance, Ben may not want to assert *Sally drinks tea* because he knows she does not drink black tea. But he might also be unwilling to commit if he is merely uncertain. In the context in (64), the information that Sally drinks herbal tea is relevant, but not decisive. Sally might be more likely to drink black tea if she drinks other teas. Or less likely, if she drinks herbal to avoid caffeine. By using the RPP construction, Ben avoids settling the Question Under Discussion himself while providing Ada with (potentially) relevant evidence.

This is an interesting direction for future work on the RPP construction, though it poses a few challenges. First, it would require a pragmatics that allows conversational moves to comment on other possible conversational moves (Cohen and Krifka, 2011; Wiegand, 2016). Second, it rests on the assumption that asserting *Sally drinks tea* would be interpreted as a commitment to Sally drinking every kind of tea, rather than at least one kind of tea. Empirical evidence is necessary in order to determine whether the misunderstanding that the speaker in (64) seems to be avoiding is in fact a likely one.

6. Conclusion

This paper focuses on one kind of parenthesized parenthetical that has been little discussed, which we have named the Restrictive Parenthesized Parenthetical construction. Unlike traditional parentheticals, RPPs are neither syntactically nor semantically independent from their hosts, and they carry an implication that their non-parenthesized counterparts do not. After exploring the semantic properties of the RPP construction, including its projection behavior, compatibility with negative polarity items, and relation to the Question Under Discussion, we have analyzed it as making two contributions: it asserts its parenthesized content and presupposes the negation of an alternative to this content.

Our analysis of the RPP construction essentially treats the parentheses as a focus-sensitive operator, since we posit that it invokes and negates stronger alternatives to the parenthesized

⁹Thank you to Todd Snider for discussion about this point.

content. However, we do not assume that this treatment applies to all parenthesized parentheticals. We hope that our analysis of the RPP construction, and its unusual relation to the Question Under Discussion, will motivate future work on parenthesized parentheticals, which constitute a rich and understudied class of phenomena at the semantics-pragmatics interface.

References

- Aarts, B. and S. Wallis (2006). *The Diachronic Corpus of Present-Day Spoken English*. Available online at <https://www.ucl.ac.uk/english-usage/projects/dcpse>.
- Amaral, P., C. Roberts, and E. A. Smith (2007). Review of *The Logic of Conventional Implications* by Chris Potts. *Linguistics and Philosophy* 30(6), 707–749.
- Astruc-Aguilera, M. L. (2005). *The Intonation of Extra-Sentential Elements in Catalan and English*. Dissertation, University of Cambridge.
- Beaver, D. I. and B. Clark (2008). *Sense and sensitivity: How focus determines meaning*. Wiley.
- Biber, D., S. Johnsson, G. Leech, S. Conrad, and E. Finegan (1999). *Longman Grammar of Spoken and Written English*. Harlow: Pearson.
- Blakemore, D. (2006). Divisions of labour: The analysis of parentheticals. *Lingua* 116(10), 1670–1687.
- Blakemore, D. (2009). On the relevance of parentheticals. In *Actes d'IDP*, pp. 9–17.
- Bolinger, D. (1989). *Intonation and its Uses: Melody in Grammar and Discourse*. Edward Arnold.
- Breen, M., E. Fedorenko, M. Wagner, and E. Gibson (2010). Acoustic correlates of information structure. *Language and Cognitive Processes* 25(7-9), 1044–1098.
- Cohen, A. and M. Krifka (2011). Superlative quantifiers as modifiers of meta-speech acts. In B. Partee, M. Glanzberg, and J. Skilters (Eds.), *Baltic International Yearbook of Cognition, Logic and Communication* 6, pp. 1–56.
- Davies, M. (2008). *The Corpus of Contemporary American English (COCA): 600 million words, 1990-present*. Available online at www.english-corpora.org/coca.
- Davies, M. (2015). *The Wikipedia Corpus*. Available online at <https://www.english-corpora.org/wiki/>.
- De Vries, M. (2007). Invisible constituents? Parentheses as B-merged adverbial phrases. In N. Dehé and Y. Kavalova (Eds.), *Parentheticals*, pp. 203–234. Amsterdam: Benjamins.
- Dehé, N. (2009). Clausal parentheticals, intonational phrasing, and prosodic theory. *Journal of Linguistics* 45, 569–615.
- Dehé, N. and Y. Kavalova (2007). Parentheticals: An introduction. In N. Dehé and Y. Kavalova (Eds.), *Parentheticals*, pp. 1–24. Amsterdam: Benjamins.
- Greenberg, Y. (2018). A revised, gradability-based semantics for *even*. *Natural Language Semantics* 26, 51–83.
- Grice, P. (1975). Logic and conversation. In P. Cole and J. Morgan (Eds.), *Syntax and semantics*, Volume 3, pp. 41–58. New York: Academic Press.
- Harris, J. A. (2012). *Processing Perspectives*. Ph. D. thesis, University of Massachusetts, Amherst, Amherst, MA.
- Harris, J. A. and C. Potts (2009). Perspective-shifting with appositives and expressives. *Linguistics and Philosophy* 36(2), 523–552.
- Heath, M. (2021). *Tweeting Out Loud: Prosodic Orthography on Social Media*. Dissertation, University of Minnesota.

- Horn, L. (1969). A presuppositional analysis of *only* and *even*. In R. I. Binnick, A. Davison, G. M. Green, and J. L. Morgan (Eds.), *Chicago Linguistic Society* 5, pp. 98–107.
- Horn, L. R. (1972). *On the Semantic Properties of Logical Operators in English*. Dissertation, UCLA.
- Kaiser, E. (2015). Perspective-shifting and free indirect discourse: Experimental investigations. In S. D’Antonio, M. Moroney, and C. R. Little (Eds.), *Semantics and Linguistic Theory*, Volume 25, pp. 346–372.
- Kaltenböck, G. (2007). Spoken parenthetical clauses in English. In N. Dehé and Y. Kavalova (Eds.), *Parentheticals*, pp. 25–52. Amsterdam: Benjamins.
- Karttunen, L. (1974). Presuppositions and linguistic context. *Theoretical Linguistics* 1, 181–194.
- Karttunen, L. and S. Peters (1979). Conventional implicature. In C.-K. Oh and D. Dinneen (Eds.), *Syntax and Semantics*, Volume 11, pp. 1–56. New York: Academic Press.
- Klima, E. (1964). Negation in English. In J. A. Fodor and J. Katz (Eds.), *The Structure of Language*. Prentice Hall.
- Lahiri, U. (1998, March). Focus and negative polarity in Hindi. *Natural Language Semantics* 6, 57–123.
- McCawley, J. D. (1982). Parentheticals and discontinuous constituent structure. *Linguistic Inquiry* 13(1), 91–106.
- McInnerney, A. (2020). Parentheticals associate with their hosts pragmatically, not syntactically: Evidence from *as*-parentheticals. In M. Asatryan, Y. Song, and A. Whitmal (Eds.), *NELS*, Volume 50, pp. 177–187. Amherst, MA: GLSA.
- Potts, C. (2002). The syntax and semantics of *as*-parentheticals. *Natural Language and Linguistic Theory* 20, 623–689.
- Potts, C. (2005). *The logic of conventional implicatures*. Oxford Studies in Theoretical Linguistics. Oxford University Press.
- Rett, J. (2020). Manner implicatures and how to spot them. *International Review of Pragmatics* 12, 44–79.
- Roberts, C. (2011). *Only*: A case study in projective meaning. In B. H. Partee, M. Glanzberg, and J. Skilters (Eds.), *Formal Semantics and Pragmatics: Discourse, Context, and Models*, Volume 6 of *The Baltic International Yearbook of Cognition, Logic and Communication*. United States: New Prairie Press.
- Rooth, M. (1985). *Association with focus*. Dissertation, University of Massachusetts, Amherst.
- Rooth, M. (1992). A theory of focus interpretation. *Natural Language Semantics* 1(1), 75–116.
- Simons, M., J. Tonhauser, D. I. Beaver, and C. Roberts (2010). What projects and why. In N. Li and D. Lutz (Eds.), *Proceedings of Semantics and Linguistic Theory*, Volume 20, pp. 309–327.
- von Stechow, K. (1999). NPI licensing, Strawson entailment, and context dependency. *Journal of Semantics* 16(2), 97–148.
- Wiegand, M. (2016). *Just* and its meanings: Exclusivity and scales in alternative semantics and speech act theory. Ms. Cornell University.
- Ziv, Y. (1985). Parentheticals and Functional Grammar. In M. Bolkestein, C. de Groot, and J. L. Mackenzie (Eds.), *Syntax and Pragmatics in Functional Grammar*, pp. 181–199. Dordrecht: De Gruyter Mouton.

- Zamfirescu (Eds.), *Deconstructing Language Structure and Meaning: Studies on Syntax, Semantics and Phonology*, pp. 303–322. Newcastle upon Tyne: Cambridge Scholars Publishing.
- Bleotu, A. C. (to appear). The linguistic genius of children: Insights from coloring experiments in language acquisition.
- Bleotu, A. C., A. Benz, and N. Gotzner (2021a). Where truth and optimality part. Experiments on implicatures with epistemic adverbs. In *Experiments in Linguistic Meaning 1*, pp. 47–58.
- Bleotu, A. C., A. Benz, and N. Gotzner (2021b). Shadow-playing with Romanian 5-year-olds. Epistemic adverbs are a kind of magic! In A. Beltrama, F. Schwarz, and A. Papafragou (Eds.), *Experiments in Linguistic Meaning 1*, pp. 59–70. LSA.
- Chemla, E. and B. Spector. (2011). Experimental evidence for embedded scalar implicatures. *Journal of Semantics* 28(3), 359–400.
- Chierchia, G. (2004). Scalar implicatures, polarity phenomena, and the syntax/pragmatics interface. In A. Belletti (Ed.), *Structures and Beyond*, pp. 39–103. Oxford: Oxford University Press.
- Chierchia, G., D. Fox, and B. Spector (2012). Scalar implicature as a grammatical phenomenon. In C. Maienborn, K. von Steubner, and P. Portner (Eds.), *Semantics: An International Handbook of Natural Language Meaning*, Volume 3, pp. 2297–2331. Berlin: De Gruyter Mouton.
- Clifton, C. Jr. and C. Dube. 2010. Embedded implicatures observed: A comment on Geurts and Pouscoulous (2009). *Semantics and Pragmatics* 3(7), 1–13.
- Cournane, A. (2015). Revisiting the Epistemic Gap: evidence for a grammatical source. In K. Jepson and E. Grillo (Eds.), *Proceedings of the 39th annual to the Boston University Conference on Language Development (BUCLD39)*, pp.127-140. Somerville, MA: Cascadilla Press.
- Cournane, A. (2021). Revisiting the epistemic gap: It's not the thought that counts. *Language Acquisition* 28(3), 215-240.
- Crain, S., W. Ni, and L. Conway. (1994). Learning, parsing and modularity. In C. Jr. Clifton, L. Frazier, and K. Rayner (Eds.), *Perspectives on Sentence Processing*, pp. 443– 467. New Jersey: Lawrence Erlbaum Associates Hillsdale.
- Crain, S. and R. Thornton. (1998). *Investigations in Universal Grammar: A Guide to Experiments on the Acquisition of Syntax and Semantics*. Cambridge, MA: MIT Press.
- Gaidargi, A. (2019). On the comprehension of modal flavours by Romanian monolinguals. Poster presented at *The 6th Bucharest Colloquium of Language Acquisition (BUCLA 6)*.
- Gajewski, J. and Y. Sharvit (2012). In defense of the grammatical approach to local implicatures. *Natural Language Semantics* 20, 31–57.
- Geurts, B. and N. Pouscoulous (2009). Embedded implicatures?!? *Semantics and Pragmatics* 2(4), 1–34.
- Geurts, B. and B. van Tiel (2013). Embedded scalars. *Semantics and Pragmatics* 6(9), 1– 37
- Gotzner, N. and A. Benz (2018). The best response paradigm: A new approach to test implicatures of complex sentences. *Frontiers in Communication* 2(21), 1–13.
- Gotzner, N., D. Barner, and S. Crain (2020). Disjunction triggers exhaustivity implicatures in 4-to 5-year-olds: Investigating the role of access to alternatives. *Journal of Semantics* 37(2), 219–245.
- Grice, H. P. (1975). Logic and conversation. In Cole, P. and J. L. Morgan (Eds.), *Syntax and Semantics*, pp. 41–58. New York: Academic Press.

- Grice, H.P. (1989). *Studies in the Way of Words*. Cambridge, MA: Harvard University Press.
- Guasti, M. T., G. Chierchia, S. Crain, F. Foppolo, A. Gualmini, and L. Meroni (2005). Why children and adults sometimes (but not always) compute implicatures. *Language and Cognitive Processes* 20(5), 667–696.
- Hacquard, V. (2006). *Aspects of modality*. Cambridge, MA: MIT dissertation.
- Hacquard, V. (2009). On the interaction of aspect and modal auxiliaries. *Linguistics and Philosophy* 32, 279–312.
- Heizmann, T. (2006). Acquisition of deontic and epistemic readings of *must* and *müssen*. In T. Heizmann (Ed.), *University of Massachusetts Occasional Papers in Linguistics (UMOP) 34: Current Issues in Language Acquisition*. Amherst, MA: GLSA, UMass Amherst.
- Hirst, W. and J. Weil (1982). Acquisition of epistemic and deontic meaning of modals. *Journal of Child Language* 9(3), 659–666.
- Horn, L. R. (1972). *On the semantic properties of logical operators in English*. Ph. D. thesis, University of California, Los Angeles.
- Husband, E. M. and N. Patson (2021). Do scalar implicatures prime? The case of exclusive ‘or’. *Proceedings of the Annual Meeting of the Cognitive Science Society* 43, pp. 2149–2155. Retrieved from <https://escholarship.org/uc/item/0cm0j081>
- Katsos, N. and D. Bishop (2011). Pragmatic tolerance: Implications for the acquisition of informativeness and implicature. *Cognition* 120 (1), 67–81.
- Kratzer, A. (1981). The notional category of modality. In H. J. Eikmeyer, and H. Rieser (Eds.), *Worlds, Words, and Contexts*, pp. 38–74. Berlin: de Gruyter.
- Leahy, B. P. and S. E. Carey (2020). The acquisition of modal concepts. *Trends in Cognitive Sciences* 24(1), 65–78.
- Moscatti, V., L. Zhan, and P. Zhou (2017). Children’s on-line processing of epistemic modals. *Journal of Child Language* 44(5), 1025–1040.
- Noveck, I. (2001). When children are more logical than adults. *Cognition* 78(2), 165–188.
- Noveck, I. A., S. Ho, and M. Sera (1996). Children’s understanding of epistemic modals. *Journal of Child Language* 23(3), 621–643.
- Ozturk, O. and A. Papafragou (2015). The acquisition of epistemic modality: From semantic meaning to pragmatic interpretation. *Language Learning and Development* 11(3), 191–214.
- Palmer, F. R. (1986). *Mood and modality*. Cambridge: Cambridge University Press.
- Papafragou, A. and J. Musolino. (2003). Scalar implicatures: Experiments at the semantics-pragmatics interface, *Cognition* 86(3), 253–282.
- R Core Team. (2021). R: A language and environment for statistical computing. R Foundation for Statistical Computing. Vienna, Austria. Available online at <https://www.R-project.org/>.
- Russell, B. (2006). Against grammatical computation of scalar implicatures. *Journal of Semantics* 23, 361–382.
- Robinson, E. J., M. Rowley, S. Beck, D. Carroll, D., and I.A. Apperly (2006). Children’s sensitivity to their own relative ignorance: Handling of possibilities under epistemic and physical uncertainty. *Child Development* 77(6), 1642–1655.
- Sharvit, Yael, and J. Gajewski. (2008). On the calculation of local implicatures. In C. Chang and H. Haynie (Eds.), *Proceedings of the 26th West Coast Conference on Formal Linguistics*, pp. 411–419. Somerville: Cascadilla Press.
- Stoicescu, I., A. Sevcenco, and L. Avram (2013). The acquisition of scalar implicatures: A clinical marker of developmental dyslexia in Romanian? In L. Avram and A. Sevcenco (Eds.), *Topics in Language Acquisition and Language Learning in a Romanian Context*.

Romanian 5-year-olds derive global but not local implicatures

- Selected Papers from Bucharest Colloquium of Language Acquisition (BUCLA), 15-16 December 2011*, pp. 161-181. Bucharest: Editura Universității din București.
- Stoicescu, I., A. Sevcenco, and L. Avram (2015). The acquisition of scalar implicatures in child Romanian. In M. Burada and O. Tatu (Eds.), *Proceedings of Conference on British and American Studies*, pp. 141-155. Newcastle upon Tyne: Cambridge Scholars Publishing.
- Tieu, L., J. Romoli, P. Zhou, and S. Crain (2016). Children's knowledge of free choice inferences and scalar implicatures. *Journal of Semantics* 33(2), 269–298.
- Zondervan, A. (2010). The role of QUD and focus on the scalar implicature of *most*. In J. Meibauer and M. Steinbach (Eds.), *Experimental Semantics/Pragmatics*, Vol. 175, pp. 221–238. Amsterdam: John Benjamins.
- Zehr, J., and F. Schwarz (2018). PennController for Internet Based Experiments (IBEX).