The syntax-phonology mapping of adverbial clauses: a flexible approach

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Overview of the talk

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Clausal embedding and phonological structure

Introduction

The present talk concentrates on the intonational phrasing of adverbial clauses.

- This is joint work with Kriszta Szendrői (University of Vienna), which will appear in a volume edited by ZAS. The topic of adverbial clauses here fits in a larger puzzle regarding the phrasing of complex sentences and what it tell us about the relationship between the syntactic and the phonological components of grammar.

- Before delving into the phrasing of adverbial clauses, I will introduce or re-introduce a few empirical facts regarding the prosody of embedded clauses and a few theoretical assumptions regarding the relationship between syntactic and prosodic structure.

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Clausal embedding and phonological structure

The general puzzle: the root vs. non-root clause asymmetry in English

Downing (1970) observes that English displays an asymmetry in the phrasing of two types of clauses:

- '*root* clauses'
- '*non-root* clauses'

Clausal embedding and phonological structure

The general puzzle: the root vs. non-root clause asymmetry in English

(1) Root sentence (Downing, 1970, 30)
A root sentence is any sentence which is not dominated by a predicative sentence. (where "A predicative sentence is any sentence in which the S node immediately dominates a VP".)

Downing's work is based on Emonds's (1969) insight that root clauses are obligatorily set off by *commas* [pauses]. His goal is to predict them.

Clausal embedding and phonological structure

The general puzzle: the root vs. non-root clause asymmetry in English

An intonational contour is spread over the following syntactic domains (Nespor and Vogel, 1986, 188):

- parenthetical expressions

  (2) Lions [as you know] are dangerous.

- non-restrictive relative clauses

  (3) My brother [who absolutely loves animals] just bought himself an exotic tropical bird.

- tag questions

  (4) That's Theodore's cat [isn't it?]

Clausal embedding and phonological structure

The general puzzle: the root vs. non-root clause asymmetry in English

- vocatives

  (5) [Clarence] I'd like you to meet Mr. Smith.

- 'left-dislocation'

  (6) [Good heavens] there's a bear in the back yard.

- right dislocation

  (7) They are so cute [those Australian koalas].

Clausal embedding and phonological structure

The general puzzle: the root vs. non-root clause asymmetry in English

In contrast, the following syntactic domains do not realize an intonational contour of their own. They are fully integrated into a larger domain that realizes one.

- restrictive relative clauses

  (8) That kind old lady always buys fresh meat for the stray cats [that live in the park].

- complement clauses

  (9) I thought [that you already knew [that Gertrude was moving to southern Italy]].

- **adverbial clauses**

  (10) Paul called Paula [before Carla called Carl].

Clausal embedding and phonological structure

Syntax-phonology mapping of syntactic clauses – theoretical perspective

This asymmetry between two types of clauses raises a number of questions. From a theoretical perspective:

- How can we capture the relationship between clauses and major prosodic units?
- What is the notion of clause (or "root clause") in modern syntactic theory that is visible/recognized by the phonological component of grammar?
- How much emphasis should we place on the role of syntax here, compared to semantics/pragmatics?

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Clausal embedding and phonological structure

Syntax-phonology mapping of syntactic clauses – empirical perspective

This asymmetry between two types of clauses raises a number of questions. From an empirical perspective:

- What are typologically valid generalizations regarding the prosodic phrasing of different types of clauses, including adverbial clauses?

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Outline

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Syntax-phonology interface

A few basic assumptions: a hierarchical prosodic structure

The speech flow consists of hierarchically organized phonological domains that more or less reflect syntactic constituency.

(11) Fish fish eat eat.

(12) Buffalo buffalo Buffalo buffalo buffalo buffalo Buffalo buffalo.
(Borgmann, 1967)

→ the prosodic phrasing of these sentences reflects their syntactic structure.

Syntax-phonology interface

A few basic assumptions: a hierarchical prosodic structure

The speech flow consists of hierarchically organized phonological domains that more or less reflect syntactic constituency.

(13) Fish that fish eat eat.

(14) buffalo from Buffalo that buffalo from Buffalo buffalo (=bully) buffalo(=bully) buffalo from Buffalo.

Phonological rules are sensitive to these domains and phonological constraints (prosodic weight, binarity etc) play a role in determining them.

→ They constitute a hierarchical prosodic structure distinct from syntactic structure but (partially) built from it (Selkirk, 1984, and subseq.).

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Syntax and phonological structure

A few basic assumptions: a hierarchical prosodic structure

Consistent with a modular approach of grammar, 'fully specified syntactic structures' are not legible to the phonological component. Prosody does not typically distinguish, for instance, between lexical categories (nouns, verbs, adjectives etc), but distinguishes lexical and functional words.

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Syntax and phonological structure

A few basic assumptions: a hierarchical prosodic structure

Mapping algorithms at the post-lexical level (Selkirk, 1996, 2005, 2011; Truckenbrodt, 1995, 1999):

Lexical XPs $\leftrightarrow$ Phonological phrases (PP or ϕ)

Syntactic clauses $\leftrightarrow$ Intonational phrases (IP or ι)

Syntax and phonological structure

A few basic assumptions: a hierarchical prosodic structure

In the early days of prosodic phonology, phonological structure was considered flat compared to syntactic structure.

Strict Layer Hypothesis (SLH) (Selkirk, 1984):

- A constituent of C^i could only dominate a constituent C^{i-1} .

After a weaker version of the SLH was proposed, through a set of rankable OT constraints (Selkirk, 1996), phonological structure is nowadays considered to show a greater correspondence to syntactic structure and potentially as much recursivity (Elfner, 2012; Ito and Mester, 2007, 2009; Myrberg, 2013; Selkirk, 2009, 2011; Truckenbrodt, 2005; Wagner, 2005, 2010)

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Our work

Our research questions

In the present work, our aim is to address the following questions:

- Is there a correlation between the nature of the clause (subject/complement/adverbial) and its prosodic status?
- Is there a correlation between the syntactic position (extraposed, high or low-attachment, verb adjacent) and its prosodic status?

- How to best account for the relationship between clausal embedding and phonological structure within and across languages?

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Outline

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English intonational phrases

Perceptual and acoustic cues

Acoustic and perceptual correlates of intonational phrases in English (Lieberman, 1967; Gleason, 1961; Trager and Smith, 1957; Pierrehumbert, 1980; Ladd, 1988; Selkirk, 2005):

- their own intonational contour (ending with a boundary tone)
- their own terminal juncture (often associated with a perceived pause)
- one primary stress
- declination

A typical non-root clause

The syntax-phonology mapping of in situ complement clauses

Complement clauses do not typically introduce their own intonational phrase (Selkirk, 2005):

(15) Billy thought that his father was a merchant and his mother was a secret agent.

(16) Billy thought that his father was a merchant and his father was a secret agent.

(17) Billy thought: "my father is a secret agent". ← direct quote

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A brief overview of a typical non-root clause

The syntax-phonology mapping of in situ complement clauses

Complement clauses do not typically introduce their own intonational phrase (Selkirk, 2005) :

(18) Billy thought that his father was a merchant and his mother was a secret agent.

(19) Billy thought that his father was a merchant)$_{IP}$
|| ∧∧! and his father was a secret agent)$_{IP}$.

(20) Billy thought: "my father is a secret agent". ← direct quote

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Adverbial clauses: root-like or non-root-like clauses?

The phrasing of adverbial clauses

- Adverbial clauses represent a much larger and diverse set than argument clauses.

→ So far, the relation they express (adversative, causative, consecutive, causal, manner etc) does not seem to play a central role.

→ Their attachment site seems crucial.

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Adverbial clauses: root-like or non-root-like clauses?

The phrasing of adverbial clauses: restrictive vs. non-restrictive interpretation

(21) Cindy isn't planting a garden because she loves tomatoes)$_{IP}$.

- the adverbial clause is in the scope of the negation
  → VP modifier (Rutherford, 1970; Sæbø, 1991; Charnavel, 2017).

(22) Cindy isn't planting a garden)$_{IP}$, || ∧∧ because she loves tomatoes)$_{IP}$.

- the adverbial clause is not in the scope of the negation
  → attachment to the root node (Rutherford, 1970).

→ the phrasing of these adverbial clauses is consistent with Emond's and Downing's predictions.

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Adverbial clauses: root-like or non-root-like clauses?

The phrasing of adverbial clauses: restrictive vs. non-restrictive interpretation

Rutherford (1970) provides numerous examples in which a comma intonation allows to distinguish between a *restrictive* interpretation of adverbial clauses, in 23a to 26a, and a *non-restrictive* one, in 23b to 26b:

(23) a. He's not coming to class because he's sick.
b. He's not coming to class, because he just called from San Diego.

(24) a. She loves her husband (even) though he beats her.
b. She loves her husband, (al)though (I know) he beats her.

(25) a. Mary won't marry John if I have anything to *say* about it.
b. Mary won't marry John, if *I* have anything to say about it.

(26) a. Mary will marry John unless the fortune teller is too pessimistic.
b. Mary will marry John, unless the fortune teller is too pessimistic.

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Adverbial clauses: root-like or non-root-like clauses?

The phrasing of adverbial clauses: *while*-clauses

In the case of *while*-clauses, Downing (1970) observes that they only phrase separately from the main clause when they express a coordinate adversative clause, as in 27, and not an adverbial clause of duration, as in 28.

(27) The men worked, / {while/whereas/but} the women talked.

(28) The men worked while the sun was shining.

In Rutherford's analysis, the non-restrictive adverbial clauses are treated as coming from a high sentence, headed by a performative that has been deleted. Their relation to the main clause is thus looser than the restrictive adverbials'.

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Adverbial clauses: root-like or non-root-like clauses?

The phrasing of adverbial clauses: *if*-clauses

Left-peripheral *if*-clauses are described by Selkirk (2005) as phrasing separately from the main clause:

(29) If you had a llama $)_{IP}$, you could ride it$)_{IP}$.

Selkirk notes that this is consistent with Emonds' treatment of this type of clauses as root clauses.

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Adverbial clauses: root-like or non-root-like clauses?

The phrasing of adverbial clauses: temporals

Downing reports differences in intonational phrasing between what he assumes are (low) in situ and left-extraposed temporal adverbial clauses:

(30) We can talk after we eat)$_{IP}$.

(31) After we eat)$_{IP}$ we can talk)$_{IP}$.

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Adverbial clauses: root-like or non-root-like clauses?

The phrasing of adverbial clauses: temporals

He notes, however, that being phrased separately is not specific to leftward adverbial *clauses*:

(32) While sleeping / I heard the phone ringing.

(33) When empty / the container weighs 14 ounces.

(34) Empty / the container weighs 14 ounces.

(35) In the afternoon / everyone went swimming.

(36) Tonight / I want to relax home.

Adverbial clauses: root-like or non-root-like clauses?

The phrasing of adverbial clauses: temporals

According to Downing (1970) sentences such as 37 and 38 provide evidence for the fact that a root clause inserts its own intonational phrase breaks and that a break is only found if the adverbial is moved out of it.

(37) Tomorrow / I promised that he would be there.

(38) I promised that tomorrow he would be there.

→ the perceived break is the left edge of the main clause rather than (necessarily) associated with the right edge of the adverbial clause.

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Adverbial clauses: root-like or non-root-like clauses?

Summarizing the phrasing of complex sentences with argument and adverbial clauses

(39) $_{IP}$(subject clause + main clause)$_{IP}$

(40) $_{IP}$($_{IP}$(topicalized subject clause)$_{IP}$ $_{IP}$(main clause)$_{IP}$)$_{IP}$

(41) $_{IP}$(main clause + complement clause)$_{IP}$

(42) $_{IP}$($_{IP}$(main clause)$_{IP}$ $_{IP}$(extraposed complement clause)$_{IP}$)$_{IP}$

(43) $_{IP}$**(main clause + in situ adverbial clause)**$_{IP}$

(44) $_{IP}$($_{IP}$(main clause)$_{IP}$ $_{IP}$(coordinate adversative clause)$_{IP}$)$_{IP}$

(45) $_{IP}$**(adverbial/adverbial clause** $_{IP}$**(main clause)**$_{IP}$**)**$_{IP}$

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Adverbial clauses: root-like or non-root-like clauses?

Summarizing the phrasing of complex sentences with argument and adverbial clauses

(46) $_{IP}$(main clause + in situ adverbial clause)$_{IP}$

(47) $_{IP}$(adverbial/adverbial clause $_{IP}$(main clause)$_{IP}$)$_{IP}$

(48) $_{IP}$($_{IP}$ (adverbial/adverbial clause)$_{IP}$ $_{IP}$(main clause)$_{IP}$)$_{IP}$

- In sum, the prosodic phrasing of adverbial clauses in English reflects the fact that they can either attach to the root node or be located lower down in the syntactic structure. In the former case they sit outside the IP constituted by the main clause and sometimes insert their own IP boundaries. In the latter case, they typically sit within the core intonational phrase and do not insert IP boundaries.

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Outline

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Possible theoretical treatments

What is a 'syntactic clause' in current syntactic theory?

Recall the mapping algorithm relating to intonational phrases:

Syntactic clauses $\leftrightarrow$ Intonational phrases (IP or ι)

How can we account for these different phrasings within a theory in which prosodic phrasing is handled by the phonological component of grammar? Alternative approaches have been put forward.

- Recent approaches give a central role to the notion of 'syntactic clauses', typically understood as 'CP' (Truckenbrodt, 2005), but with the addition of a distinction between various clauses based on their syntactic/semantic/pragmatic properties (e.g., CommaP, Potts (2005)).

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Possible theoretical treatments

Syntax-phonology mapping of complex sentences

In Selkirk's (2005) edge-based approach and Truckenbrodt's (2005) application of it to German complex sentences, three constraints are central in accounting for the phrasings we have observed:

(49) ALIGN-CP, RIGHT

The right edge of a CP must coincide with the right edge of an intonational phrase.

(50) WRAP-CP

Each CP is contained in a single intonational phrase.

(51) NONRECURSIVITY:

No C^i dominates C^j, j =i,
e.g., "No Ft dominates a Ft".

Possible theoretical treatments

Syntax-phonology mapping of complex sentences

- The ranking of NonRecursivity is crucial:
  NonRec >> Align-CP, Wrap-CP

(52) $_{IP}($ $_{CP}$ main clause ($_{CP}$ complement clause) $)_{IP}$

→ how to account for Downing's observed recursive intonational phrasing in extraposed/leftward adverbial clauses?

(53) $_{IP}(_{IP}$(adverbial/adverbial clause)$_{IP}$ $_{IP}$(main clause)$_{IP})_{IP}$

Possible theoretical treatments

Syntax-phonology mapping of complex sentences

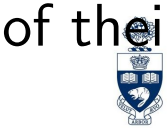
Independent constraints, based on syntactic/discursive properties of the clauses that insert their own IP boundaries, dominate NonRec.

(54) Align-Topic, R (Feldhausen, 2010)

Align the right edge of a [dislocated] topic constituent with the right edge of a prosodic phrase [ι/Intermediate phrase]

$\rightarrow$ one has to argue that the extraposed/leftward adverbial clauses are topical in nature (which is not always trivial).

Clauses with this property would form their own IP independently of their size or position.



Possible theoretical treatments

Syntax-phonology mapping of complex sentences

Independent constraints, based on syntactic/discursive properties of the clauses that insert their own IP boundaries, dominate NonRec.

(55) SpA-IP (Hamlaoui and Szendrői, 2017)

Each speech act is contained in a single intonational phrase.

→ one has to argue that the extraposed/leftward adverbial clauses are speech acts of their own.

Clauses with this property would form their own IP independently of their size or position.

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Possible theoretical treatments

Syntax-phonology mapping of complex sentences

Match theory advocates for a more direct correspondence between syntactic and prosodic structure than the edge-based approach: both syntactic edges are mapped onto intonational phrase boundaries.

(56) MATCH CLAUSE (Selkirk, 2011)

A clause in syntactic constituent structure must be matched by a corresponding prosodic constituent, call it ι[IP], in phonological representation.

Possible theoretical treatments

Syntax-phonology mapping of complex sentences

(57)

Match Clause: Spelling Out the complements of complementizer heads as ι

a. Match Force^0 Clause

$_{\text{ForceP}}$[Spec $_{\text{Force'}}$[Force^0 $_{\text{CP}}$[.....]]]

⇓ SPELL-OUT on the ForceP phase

ι(.....)ι

b. Match Comp^0 Clause

$_{\text{CP}}$[Spec $_{\text{C'}}$[Comp^0 $_{\text{FncP}}$[.....]]]

⇓ SPELL-OUT on any complementizer–level phase

ι(.....)ι

(where Comp^0 designates any functional head of the 'complementizer layer')

→ In English, 57a ranks above 57b. Typological differences in the phrasing of embedded clauses can be the direct result of syntactic differences (i.e., whether a clause is or is not a ForceP).

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Possible theoretical treatments

Syntax-phonology mapping of complex sentences: a flexible approach

Hamlaoui and Szendrői (2015, 2017) propose that 'syntactic clause' needs more flexibility. It should be determined in each language and each construction by reference to the highest projection in the root clause to which the verb is overtly moved or inserted, together with the material in its specifier. There is no particular syntactic head that is recognized by the phonological component as corresponding to an intonational phrase.

Possible theoretical treatments

Syntax-phonology mapping of complex sentences: a flexible approach

(58) a. Syntax-to-prosody mapping

i. ALIGN-L (HVP, ι)
Align the left edge of the highest projection whose head is overtly filled by the **root** verb, or verbal material with the left edge of an ι.

ii. ALIGN-R (HVP, ι)
Align the right edge of the highest projection whose head is overtly filled by the **root** verb, or verbal material with the right edge of an ι.

b. Prosody-to-syntax mapping

i. ALIGN-L (ι, HVP)
Align the left edge of an ι with the left edge of the highest projection whose head is overtly filled by the verb or verbal material.

ii. ALIGN-R (ι, HVP)
Align the right edge of an ι with the right edge of the highest projection whose head is overtly filled by the verb or verbal material.

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Possible theoretical treatments

Syntax-phonology mapping of complex sentences: a flexible approach

Predictions:

- Any clause that is in the scope of the root verb is prosodically integrated.
- Any clause that is attached higher than the specifier of the projection hosting the root verb should be outside the core intonational phrase.
- Typological variation is captured by the asymmetry between syntax-to-phonology and phonology-to-syntax requirements.
- An additional constraint, that relates to Speech Acts, is needed to account for clauses such as direct quotes.
- Purely prosodic constraints can promote non-integrated clauses to intonational phrases for purely phonological reasons (Myrberg, 2013).

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Possible theoretical treatments

Syntax-phonology mapping of complex sentences: a flexible approach

(59) Evaluation of a complex sentence with a complement clause or a low adverbial clause (Hamlaoui and Szendrői, 2017).

	$[_{TP}$ V $[_{CP}$ $[_{TP}$ V $]]]$	SPA-ι	HVP-L/R	ι-L/R	*REC
☞	a. $(_{\iota 1}$ $[_{TP}$ V $[_{CP}$ $[_{TP}$ V $]]]$ $)$				
	b. $(_{\iota 1}$ $[_{TP}$ V $[_{CP}$ $(_{\iota 2}$ $[_{TP}$ V $]]]$ $))$				!*
	c. $(_{\iota 1}$ $(_{\iota 2}$ $[_{TP}$ V $)$ $[_{CP}$ $[_{TP}$ V $]]]$ $)$			$!)_{\iota 2}$	*
	d. $(_{\iota 1}$ $[_{TP}$ V $)$ $[_{CP}$ $(_{\iota 2}$ $[_{TP}$ V $]]]$ $)$	!*		$)_{\iota 1}$	
	e. $(_{\iota 1}$ $(_{\iota 2}$ $[_{TP}$ V $)$ $[_{CP}$ $(_{\iota 3}$ $[_{TP}$ V $]]]$ $))$			$!)_{\iota 2}$	*
	f. $[_{TP}$ V $[_{CP}$ $(_{\iota 1}$ $[_{TP}$ V $]]]$ $)$	!*	HPV-L		

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Possible theoretical treatments

Syntax-phonology mapping of complex sentences: a flexible approach

(60) Evaluation of a complex sentence with a high or left-extraposed adverbial clause (Hamlaoui and Szendrői, 2017).

	$[_{TP}\,[_{CP}\,[_{TP}\,V\,]]\,[_{TP}\,V\,]]$	SPA-ι	HVP-L/R	ι-L/R	*REC
	a. $(_{\iota 1}\,[_{TP}\,[_{CP}\,[_{TP}\,V\,]]\,[_{TP}\,V\,]\,)$		!HVP-L		
☞	b. $(_{\iota 1}\,[_{TP}\,[_{CP}\,[_{TP}\,V\,]]\,(_{\iota 2}\,[_{TP}\,V\,]\,))$				*
	c. $(_{\iota 1}\,(_{\iota 2}\,[_{TP}\,[_{CP}\,[_{TP}\,V\,]]\,)\,[_{TP}\,V\,]\,)$		!HVP-L		*
	d. $(_{\iota 1}\,[_{TP}\,[_{CP}\,[_{TP}\,V\,]]\,)\,(_{\iota 2}\,[_{TP}\,V\,]\,)$	!*			
☞	e. $(_{\iota 1}\,(_{\iota 2}\,[_{TP}\,[_{CP}\,[_{TP}\,V\,]])\,(_{\iota 3}\,[_{TP}\,V\,]\,))$				*
	f. $[_{TP}\,[_{CP}\,[_{TP}\,V\,]]\,(_{\iota 1}\,[_{TP}\,V\,]\,)$	!*	HPV-L		

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Outline

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Possible theoretical treatments

I have focused on English (Downing, 1970; Rutherford, 1970; Selkirk, 2005) to illustrate an intonational phrasing of adverbial clause that is, so far, consistent with observations in languages such as Basaá (Bantu A43) and Hungarian (Hamlaoui and Szendrői, 2017). A lot of work remains to be done to understand how the root/non-root clause distinction in terms of intonational phrase-mapping can best be captured.

> what is the breadth of variation in the phrasing of complex sentences containing adverbial clauses?

Thank you!

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