

# THE INTONATION OF CLAUSE COMBINING: THE CASE OF SO (*THAT*) PURPOSE AND RESULT ADVERBIALS

MATTHIAS MITTENDORFER & ELNORA TEN WOLDE

UNIVERSITY OF VIENNA & UNIVERSITY OF GRAZ

12 MARCH 2026

WORKSHOP ON ADVERBIAL CLAUSES AND PROSODY  
UNIVERSITY OF POTSDAM



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## Purpose and result clauses:

- (1)
  - a. **purpose:** *He promptly ordered loudspeakers mounted in certain sections of the ball park **so that** fans could go there ... (COHA)<sup>1</sup>*
  - b. **result:** *He touched his cheek in confusion, **so that** dabs of wet clay rubbed off ..-(COHA)*
  
- (2)
  - a. **purpose:** *Assistant Scoutmaster and caving expert Dan Slick set up a rope **so** the guys could rappel down into the cave. . . (COHA)*
  - b. **result:** *Our industry is hazardous, **so** we safety train people. . . (COHA)*

## Basic assumption:

- Result clauses = root clauses
- Purpose clauses  $\neq$  root clauses

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<sup>1</sup>*The Corpus of Historical American English*

## Prosody of adverbial clauses: (Downing 1970; Hamlaoui and Szendrői 2025)

- Root-clause<sup>2</sup> status of adverbial clause considered relevant
  - root clauses = prosodic separation from matrix clause
  - non-root clauses = prosodic integration into the matrix clause
- root clauses correspond to IPs, i.e. are the domain of an intonational contour
- predicts distinct prosodic realisations for purpose and result clauses
  - result → root clause; prosodically detached (i.e. independent IP)
  - purpose → not a root clause; prosodically integrated into the IP of the host

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<sup>2</sup>defined as “any sentence that is not commanded by a VP node” (Downing 1970: 31); includes simple sentences, parentheticals, NRRCLs, etc.

## Research questions:

- RQ<sub>1</sub>: The literature claims that in sentences with purpose clauses, the information focus of the message is encoded in the purpose clause; for result clauses, either clause can function as the information focus. Do we find evidence to support this claim in the location of the nuclear pitch accent?
- RQ<sub>2</sub>: What is the prosodic structure of purpose and result clauses? Do they conform to the predictions in the literature? If not,
- are they, as predicted by their distinct syntactic features, characterized by intonational subordination and coordination, respectively?
  - do result clauses show any evidence of recursive prosodic structure?
- RQ<sub>3</sub>: Does FDG's hierarchical, top-down architecture predict the prosodic realization of purpose and result *so (that)* clauses?

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- RQ<sub>3</sub>: Does FDG's hierarchical, top-down architecture predict the prosodic realization of purpose and result *so (that)* clauses?

- 1 Overview: Purpose and Result
  - Pragmatics, Semantics, Syntax
  - Prosody
- 2 Methodology
- 3 Results
- 4 Functional Discourse Grammar
- 5 Conclusion

Purpose	Result
<p>An <b>intended</b> consequence of the event in the main clause.</p>	<p>An <b>unintended</b> consequence of the event in the main clause.</p>
<p><b>Main clause agent</b> undertakes action to bring about event in subordinate clause.</p>	<p>Main clause event or state with <b>no direct agency</b>.</p>
<p>Subordinate clause is <b>non-factual (potential)</b>, future oriented.</p>	<p>Subordinate clause is <b>actual or achieved event</b> (factual, factive).</p>
<p>Subordinate clause can take <b>modality linked to main clause agent-subject</b>.</p>	<p>Subordinate clause has <b>interpersonal modality</b> (speaker-hearer interaction).</p>
<p>Subordinator substituted by <b><i>in order that</i></b>.</p>	<p>Subordinator substituted by with <b><i>the result that</i></b>.</p>

Table 1: Semantic and pragmatic features of purpose and result clauses

Purpose	Result
<p><b>Overt marker of mood (modality):</b> <i>The shop closes early so that staff <b>can</b> get home in time.</i></p>	<p><b>Overt marker of mood (modality) less likely:</b> <i>We paid him immediately, so that he left contented.</i></p>
<p><b>Fronting:</b> <i><b>So that staff can get home in time</b>, the shop closes early.</i></p>	<p><b>No fronting:</b> <i><b>#So that he left contented</b>, we paid him immediately.</i></p>
<p><b>Clefting:</b> <i>It is <b>so that staff can get home in time</b> that the shop closes early.</i></p>	<p><b>No clefting:</b> <i><b>#It is so that he left contented</b> that we paid him immediately.</i></p>
<p><b>Negation of SC</b> not presupposed: <i>The shop closes early so that staff can get home on time, <b>but they still didn't</b>.</i></p>	<p><b>No negation of SC</b> <i><b>#We paid him immediately</b>, so that he left contented, <b>but he still didn't</b>.</i></p>

Table 2: Syntactic features of purpose and result clauses

- **Purpose:** more integrated
  - MC negation scopes over SC: *You cannot sacrifice your people so that you might be at ease.* (COHA:FIC:2017)
  - share main clause illocution (Verstraete 2007: 31) : *Jerry, did you frame it so that I could win that race?* (COHA:TV/MOV:1947)
- **Result:** more separate
  - 'and' test: ... *she had rheumatoid arthritis and so she couldn't work ...* (COHA:FIC:2006)
  - MC negation does not scope over SC: *The doors would not close tightly so it was easy to hear my parents* (COHA:1999:MAG)
  - some clearly have a separate illocution: *I'm white, so how can I possibly relate?* (COCA:WEB:2012)
  - result clauses are a heterogeneous group

## Adverbial clause prosody: (cf. Hamlaoui and Szendrői 2025: vii; Downing 1970)

- type of relation between matrix clause and adverbial irrelevant
- attachment height crucial
  - low attachment in (3a) → prosodically integrated ( $\neq$  root clause)
  - high attachment in (3b) → prosodically separated (= root clause)

- (3) a. Cindy isn't planting a garden because she loves tomatoes.  
[It's not because she loves tomatoes that she's planting a garden.]
- b. Cindy isn't planting a garden, because she loves tomatoes.  
[The reason why she isn't planting a garden is that she loves tomatoes.]

(Selkirk 2005: 23)

## Phrasing of in-situ adverbial clauses: (Hamlaoui and Szendrői 2025: xi-x; Downing 1970)

(4)  $_{IP}(\text{main clause} + \text{in situ adverbial clause})_{IP}$

- adverbial clauses will be prosodically integrated if they are
  - in situ
  - in scope of main verb

## Predictions:

- Purpose clauses  $\neq$  root clauses  $\rightarrow$  prosodic integration
- Result clauses = root clauses  $\rightarrow$  prosodic separation

## Empirical situation may be more complex:

- Couper-Kuhlen (1996): relevance of semantics
  - direct cause *because* (5a): no declination reset
  - indirect cause *because* (5b):<sup>3</sup> (partial) declination reset

- (5) a. I feel the difference, because we haven't got the heat on.  
b. To say it was tepid is ridiculous, [and I believe this] because it was really like bathwater.

(Couper-Kuhlen 1996: 403)

Both (5a-b) are root clauses, i.e. show prosodic separation, but semantics of *because* seems to affect the prosodic realisation.

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<sup>3</sup>causal link is epistemic; adverbial gives "[account] for why a speaker knows or believes what is expressed in prior clause" (Couper-Kuhlen 1996: 403)

## Prosodic structure:

- traditionally assumed to be non-recursive (unlike syntactic structure)
- known as the strict layer hypothesis (SLH; Selkirk 1984: 26; Nespor and Vogel 2007 [1986]: 7)
  - each IP boundary should come with (full) pitch reset
  - but not always the case (Couper-Kuhlen 1996; Ladd 1984, 1986)

## Compound Prosodic Domains: (CPD; Ladd 2008)

- “a prosodic domain of a given type X whose immediate constituents *are themselves of type X*” (original emphasis; Ladd 2008: 297)
  - involves recursive structure
  - implies a weakening of the SLH

## Phonological recursion in Couper-Kuhlen (1996):

- intonational subordination → no declination reset (direct cause)
  - second IP “is subordinate to the first” (Couper-Kuhlen 1996: 402)
  - declination line of second IP simply prolongs that of first IP
- intonational coordination → declination reset (indirect cause)
  - declination lines (partially) independent of each other<sup>4</sup>

Intonational subordination (and partial reset) suggests some sort of recursive prosodic structure along the lines of Ladd (1986, 2008).

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<sup>4</sup>Partial reset is likely a case of subordination, given that in this case, “the beginning and ending points of successive [IPs] may themselves form an overall ‘grand’ declination line” (Couper-Kuhlen 1996: 397).

**Purpose, result, and prosodic structure:** (cf. Kortmann 1996; Nykiel 2020; Quirk et al. 1985)

- Purpose syntactically integrated into matrix clause
- Result more detached from host, exhibiting degrees of syntactic separation

## Two hypotheses:

**Hyp<sub>1</sub>:** Result clauses show different degrees of pitch reset depending on the degree of integration (i.e. suggests prosodic recursion)

**Hyp<sub>2</sub>:** Purpose clauses are prosodically fully integrated into the prosodic unit of the matrix clause.

## Data collection:

- data extracted from ICE-GB (Nelson, Wallis and Aarts 2002)
- 91 *so that* purpose and result clauses<sup>5</sup>
  - 40 purpose clauses
  - 34 result clauses
  - 17 ambiguous cases (either purpose or result reading)

## Syntactic coding

- **subordinator:** *so* and *so that*
- **SC semantics:** purpose, result and ambiguous
- **agency:** first, second, third person, and events
- **main clause function:** order, suggestion, request

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<sup>5</sup>initial total of 111; 20 examples removed (e.g. lack of pitch track, tracking errors, etc.)

**Result clause types:** modification tests taken from Functional Discourse Grammar used as basis (Hengeveld and Mackenzie 2008; Keizer 2015)

- if SC represents only a separate Communicated Content, allows only modification of reportatives, e.g. *reportedly*, which scope over a Communicated Contents and not a Discourse Act (Type 1)

(6) [...] *they only laughed at him, so he **allegedly** lashed out physically at one of them [...]*

- if SC represents a separate Discourse Act, allows modifiers such as *frankly* (Type 2)

(7) *Being ill has led me to leaving my humanitarian position, so **sadly/frankly** I am on a shoestring budget.*

## Prosodic coding: (cf. Couper-Kuhlen 1996: 398)

- carried out in *Tones and Breaks Indices (ToBI)* (Beckman, Hirschberg and Shattuck-Hufnagel 2006)
- Boundary between matrix clause and adverbial clause (IP vs. PP)
- if separate IPs, two comparative judgments made on basis of pitch track<sup>6</sup>
  - Judgment 1: height of first pitch accent in adverbial clause vs. height of last pitch accent in matrix clause
  - Judgment 2: height of first pitch accent in adverbial clause vs. height of first accent in matrix clause
- if matrix clause consisted of several IPs, immediately preceding IP taken for judgement

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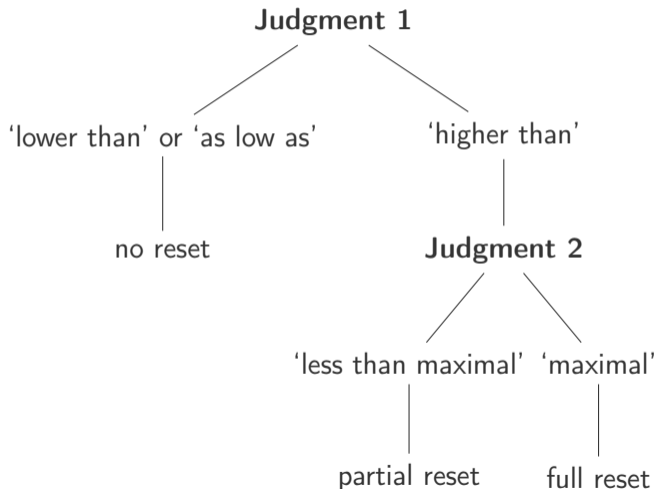
<sup>6</sup>degree of reset dependent on height of first pitch accent in prosodic unit (cf., e.g., Gussenhoven 2004: 113–116)

## Judgment 1:

height of first pitch accent in adverbial clause vs. height of last pitch accent in matrix clause

## Judgment 2:

height of first pitch accent in adverbial clause vs. height of first accent in matrix clause



(8) Foster carers involve the children's families so that they don't lose touch.

[S2B-038 #105]

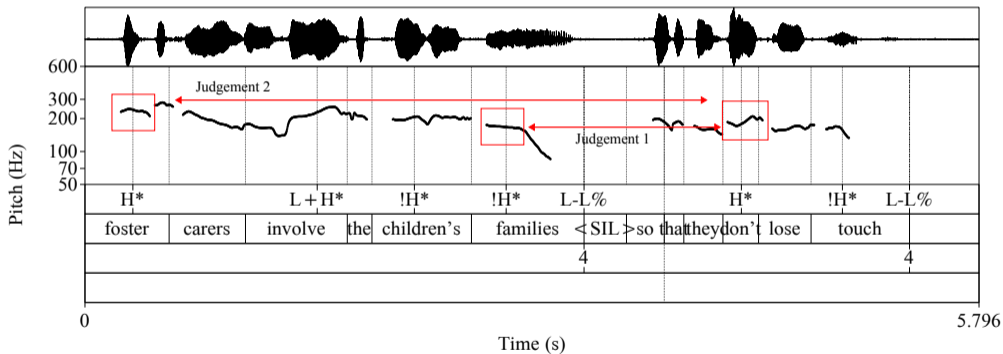


Figure 1: Pitch judgments illustrated

IP<sub>1</sub> with single accent only:

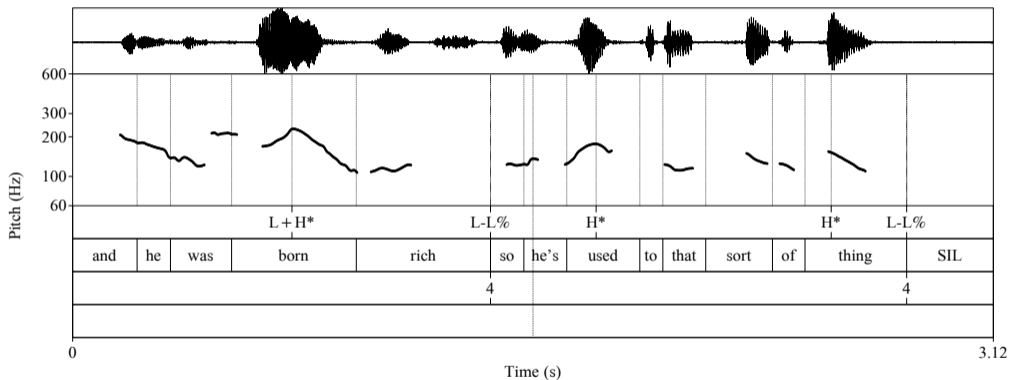


Figure 2: Case w/ only a single accent for comparison

## Result Clauses

## Overview of prosodic coding:

Phrasing	Reset	# of instances	Total
IPs	no reset	15	30
	partial reset	8	
	full reset	7	
PPs	N/A	4	4
<b>Total</b>			<b>34</b>

Table 3: Phrasing of result clauses

- clear tendency for IP phrasing (Downing 1970; Hamlaoui and Szendrői 2025)
- majority of result clauses do not show full reset (i.e. no intonational coordination)

- (9) W w it would be butt-jointed so you'd have nothing uhm by way of a hump in in the middle and we'd secure it underneath. [S1B-073 #230]

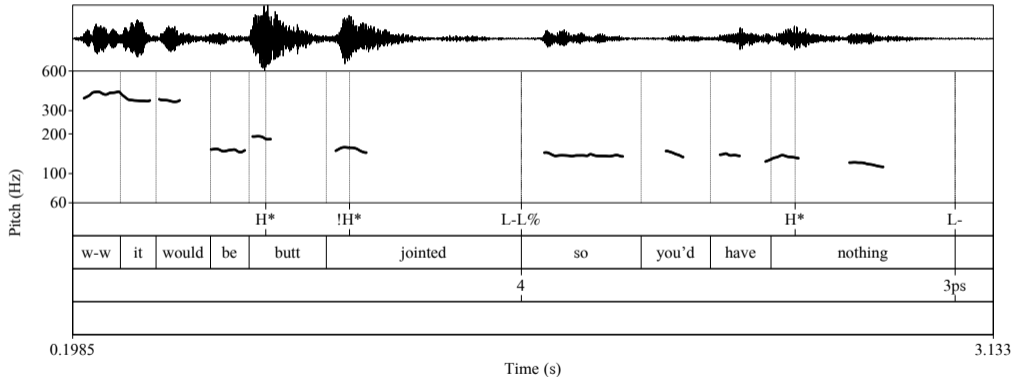


Figure 3: Result clause w/o pitch reset

(10) The row the rows relate to the artefact types so that one two one O four two relates to beads.

[S1B-017 #079]

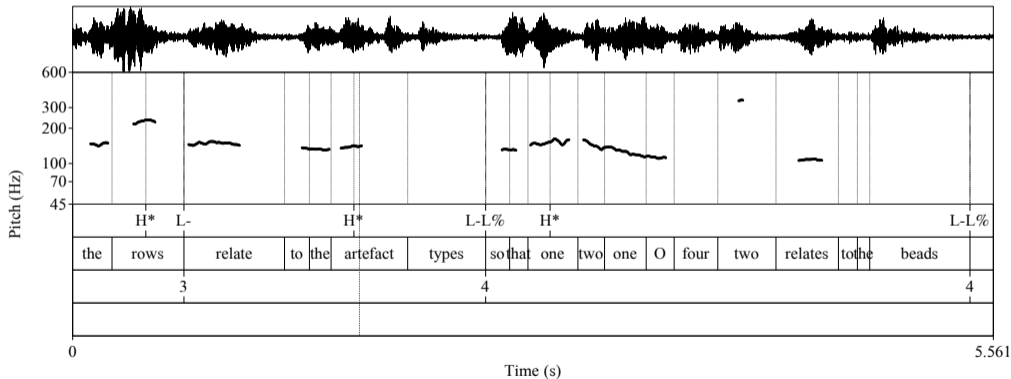


Figure 4: Result clause w/ partial reset

- (11) That same history planted English geographically so that it became the founding and bonding language of the United States [...]

[S2B-048 #045]

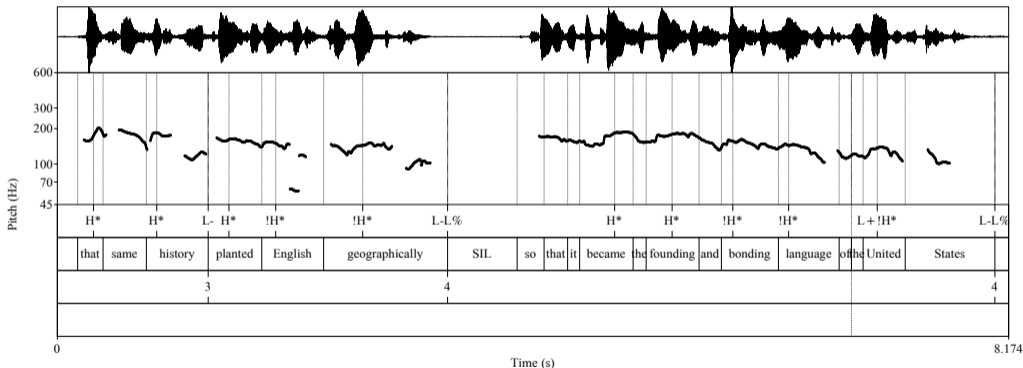


Figure 5: Result clause w/ full reset

Does the level of reset correlate with the degree of integration?

Types	Reset			Total
	no reset	partial reset	full reset	
Type 1	6	2	0	8
Type 2	9	6	7	22
<b>Total</b>	15	8	7	<b>30</b>

Table 4: Types across degrees of pitch reset

- no clear pattern emerges w.r.t pitch reset and syntactic integration
- there might be a slight constraint on full reset for result clauses of 'type 1'

## Overall results:

- predicted prosodic separation of result clauses borne out in data (root-clause status)
- pitch reset in relation to degree of syntactic integration less clear
  - some evidence for prosodic recursion, i.e. a weakening of the SLH, though

## Some open questions:

- What triggers the different types of reset?
  - syntax seems unlikely at this point
  - pragmatic/semantic factors?
  - more data needed to answer this question
- What is the theoretical status of partial reset? Do we need more than a two-way distinction between subordination and coordination?

# Purpose Clauses

## Overview of prosodic coding:

Prosodic phrasing	Reset	# of instances	Total
IP	no reset	8	17
	partial reset	7	
	full reset	2	
+PP	N/A	22	23
-PP	N/A	1	
<b>Total</b>			<b>40</b>

Table 5: Phrasing of purpose clauses

- prosodic phrasing unexpected
- purpose clauses not systematically integrated<sup>7</sup>

<sup>7</sup>as is suggested in, for instance, Hamlaoui and Szendrői (2025) and Downing (1970)

## Categories coded for:

- main clause agent in matrix clause (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> person, event)
- interpersonal function of matrix clause (order, suggestion, request)
- type of coordinator (*so*, *so that*)

Only the latter shows some kind of effect!

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- interpersonal function of matrix clause (order, suggestion, request)
- type of coordinator (*so*, *so that*)

Only the latter shows some kind of effect!

## Type of coordinator and phrasing:

Coordinator	Prosodic phrasing		Total
	IP	PP	
<i>so</i>	5	16	<b>21</b>
<i>so that</i>	12	7	<b>19</b>
<b>Total</b>	17	23	<b>40</b>

Table 6: Type of coordinator across prosodic phrasing

- *so* → tendency for PP phrasing
- *so that* → (weak) tendency for IP phrasing

(12) Now cover the front brakes so the bike can not roll away from you.

[S2A-054 #045]

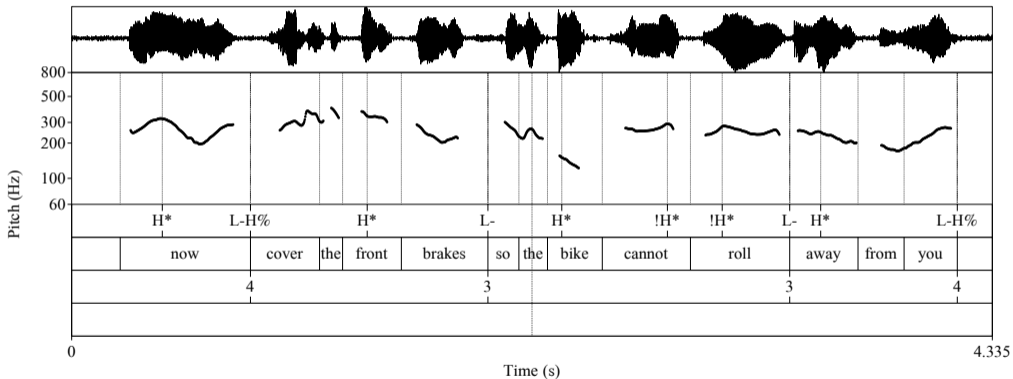


Figure 6: Example of a purpose clause w/ so phrased as a PP

- (13) [...] a member who has to declare his interests should do it at the beginning of his speech so that members should be able to judge what he's saying. [S1B-051 #134]

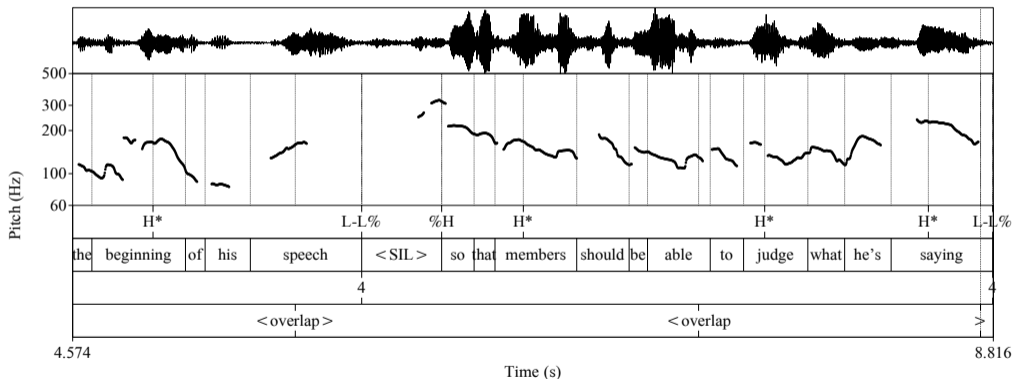


Figure 7: Example of a purpose clause w/ *so that* phrased as an IP

IP phrasing may also be related to more paralinguistic features like hesitations:

- (14) a. We were I lowering a dipping platform [pause of 1.38 sec] so the younger kids can sort of watch fish fishnets and sort of have a look and see what's in the ponds

[S1A-081 #070]

- b. Well I mean part part of the reason I am eating [pause of 0.64 sec] is **so that** [pause of 1.08 secs] I we don't have to have a picnic

[S1A-006 #031]

- prosodic coding of disfluencies difficult (cf. Brugos and Shattuck-Hufnagel 2012)
- disfluent IP breaks may in fact be PPs (labelled '3ps', '3pr', etc. on break index)<sup>8</sup>

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<sup>8</sup>See also Dehé (2009)

## Overall results:

- prosodic realisation variable
  - purpose clauses not invariably realised as predicted by Downing (1970) (cf. Hamlaoui and Szendrői 2025)
    - (4)  $IP(\text{main clause} + \text{in situ adverbial clause})_{IP}$
  - data does not show clearly motivated pattern
- more data will help in explicating relationship between phrasing and pragmatic/syntactic trigger

## In-between Cases

## Both purpose and result interpretations possible:

- (15) a. The first power stations were built along the Thames **so that** river water could be used as a coolant. [S2B-022 #041]
- b. The census form has been designed **so that** household questions appear on the front and back. [S2B-044 #056]
- no clear intender, but SC modality
  - no explicit agent
  - but *were built* and *designed* imply an agent

## Prosodic phrasing:

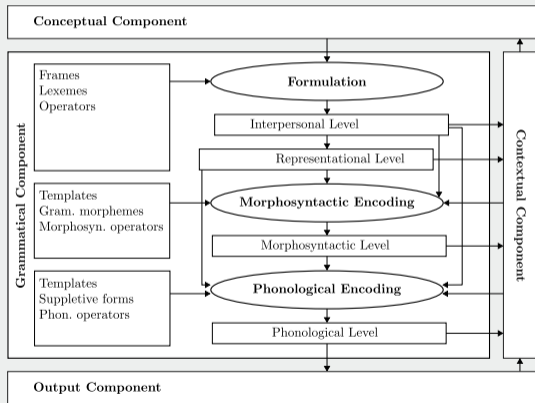
	IP			+PP/-PP	Total
	no reset	partial reset	full reset		
	6	7	2	2	17
<b>Total</b>	15				

Table 7: Prosodic phrasing of in-between cases

- large majority of in-between examples phrased as separate IPs (i.e. what would be expected of result clauses)
- does prosodic phrasing disambiguate ambiguous cases?

# Functional Discourse Grammar

## FUNCTIONAL DISCOURSE GRAMMAR



## GENERAL CHARACTERISTICS

- form-oriented: only systematically coded functional elements represented
- function-to-form: functions used to explain the form
- hierarchical top-down organisation (i.e. directional)

(cf. Hengeveld and Mackenzie 2008; Keizer 2015)

## The Interpersonal Level: Discourse Act ( $A_1$ ) as basic unit of analysis

- “the smallest identifiable unit of communicative behaviour” (Kroon 1995: 65); they can be
  - in a relationship of equipollence:  $(A_1) (A_2)_\Phi$  ('and' test; frame-oriented function)
  - in a relationship of dependence:  $(A_1) (A_2)_\Phi$  (host-oriented function)
- contains three configurational layers
  - Illocution ( $F_1$ )
  - Speech Participants  $(P_1)_S (P_2)_A$
  - Communicated Content ( $C_1$ )

(16)  $(A_1: [(F_1) (P_1)_S (P_2)_A (C_1: [(R_1)_{\{\Phi\}} \dots (R_{1+N})_{\{\Phi\}} (CM_1)_{\{\Phi\}}] (C_1)_{\{\Phi\}}]) (A_1)$

## Phonological Level:

- least developed level in FDG
- architecture follows prosodic hierarchy (cf. Nespor and Vogel 2007 [1986])
  - layers defined in terms of phonological phenomena relevant to their domain
  - prosodic recursion explicitly permitted (Hengeveld and Mackenzie 2008: 428)

(17) (U<sub>1</sub>: [(IP<sub>1</sub>: [(PP<sub>1</sub>: [(PW<sub>1</sub>)] (PP<sub>1</sub>))] (IP<sub>1</sub>))] (U<sub>1</sub>))

## Degrees of integration in FDG: Purpose clauses

- purpose fully integrated (pragmatically and syntactically)
- reflected in FDG by embedding on the IL (which affects prosodic phrasing)
  - purpose clause corresponds to Communicated Content ( $C_1$ )
  - ( $C_1$ ) embedded within the (hierarchically-lower) Comment ( $C_{M_1}$ )

- (18) a. She whispered **so nobody would hear her**.
- b. ( $C_1$ : [( $R_1$ ) ( $C_{M_1}$ : [( $T_1$ ) ( $C_2$ )] ( $C_{M_1}$ ))] ( $C_1$ ))<sub>Mess</sub>

**Prediction:** purpose clause realised as PP

- (19) ( $IP_1$ : [( $PP_1$ : – she whispered – ( $PP_1$ )) ( $PP_2$ : – so nobody could hear her her – ( $PP_2$ ))] ( $IP_1$ ))

## Degrees of integration in FDG: Result clauses

- result clauses show varying degrees of (pragmatic and syntactic) integration
- as with purpose, reflected by embedding on the IL
  - Type 1: Two Communicated Contents embedded in overarching Communicated Content
  - Type 2: Two Discourse Acts, both nuclear (but frame-oriented function)

**Type 1:**

- less strongly separated
- in FDG, two Communicated Contents embedded in overarching Communicated Content

- (20) a. He touched his cheek in confusion, so that dabs of wet clay rubbed off.  
 b.  $(C_1: [(C_2) (C_3)] (C_1))_{\text{Mess}}$

**Prediction:** IP phrasing

- (21)  $(IP_1: [(IP_2: - \text{He touched his cheek in confusion} - (IP_1)) (IP_2: - \text{so that dabs of wet clay rubbed off} - (IP_2))] (IP_1))$

Type 2:<sup>9</sup>

- more strongly separated
- in FDG, two Discourse Acts, both nuclear (related by frame-oriented function)

- (22) a. Real wolves didn't get this far south, so I only have to worry about intruding on any local werewolves.
- b. (M<sub>1</sub>: [(A<sub>1</sub>) (A<sub>2</sub>)Concl] (M<sub>1</sub>))

## Prediction: IP phrasing

- (23) (IP<sub>1</sub>: – Real wolves didn't get this far south – (IP<sub>1</sub>)) (IP<sub>2</sub>: – so I only have to worry about intruding on any local werewolves – (IP<sub>2</sub>))

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<sup>9</sup>NB: There might be a three-way distinction.

## Functional Discourse Grammar:

- analysis so far does not fully support the predictions made by FDG
- phrasing of result clauses correctly predicted
  - high(er) layers on the IL trigger IP phrasing
  - reset pattern not predicted; two potential explanations
    - pattern is there, but simply not enough data considered
    - degrees of integration not reflected in the reset (i.e. not prosodically marked)
  - however, neither explanation problematic for model
- phrasing of purpose not predicted by FDG
  - (slight) majority phrased as PPs though
  - more data needed to see if this is a systematic pattern

## General conclusions:

- Result clauses
  - systematically phrased as IPs (root clauses)
  - reset pattern unclear
  - some evidence for prosodic recursion, but patterns cannot yet be linked to any communicative motivation
- Purpose clauses
  - variable prosodic phrasing
  - type of coordinator relevant (*so* vs. *so that*)
- In-between cases
  - large majority phrased as IPs
  - full reset plays little to no role

## In FDG:

- different degrees of integration represented on the Interpersonal Level
- predicted prosodic realisation largely not found, however

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