

Anti-freezing and peeling*

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1. A ban on extractions

There is a fairly long tradition of assuming that movement out of a moved constituent is blocked. Having its origin in Ross's (1967) observation about island creating properties of displacement, following Wexler & Culicover's (1980) work, this blocking has been described as the Freezing Condition, as in:

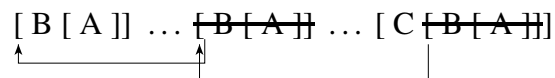
(1) *Freezing Condition*

A moved constituent becomes an island for extraction.

On the condition that other factors do not lead to blocking, such a procedural definition of freezing predicts that derivations conforming to the description in (2) are going to result in well-formedness while derivations in (3) and (4) are going to result in ill-formedness.

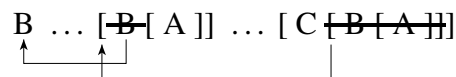
(2) *Successive-cyclic movement (does not violate (1))*

[B [A]] ... [~~B~~ [~~A~~]] ... [C [~~B~~ [~~A~~]]]



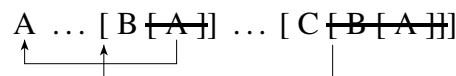
(3) *Order-preserving derivation (violates (1))*

B ... [~~B~~ [A]] ... [C [~~B~~ [~~A~~]]]



(4) *Order-reversing derivation – “peeling” (violates (1))*

A ... [B [~~A~~]] ... [C [~~B~~ [~~A~~]]]



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In the order-preserving derivation in (3), the constituent [B [A]] is moved to a higher position in the tree from where a subsequent extraction of B takes place. In the order-reversing derivation in (4), the constituent [C [B [A]]] undergoes C stranding, which is followed by B stranding.

While the evidence for freezing effects of movement is fairly strong (see Corver (2017) for an overview) there also exist classes of constructions which are derived according to the scenarios in (3) or (4) whose acceptability does not dramatically deviate from their variants derived by the scenario in (2). They comprise particular instances of the two kinds of extractions in Polish: extractions from subjects of certain tensed embedded clauses and left branch extractions of wh-words ('wh-LBE') from fronted wh-phrases. This result was obtained on the basis of a grammaticality judgement experiment among Polish native speakers and it is particularly telling for certain examples of wh-LBE from fronted complex wh-phrases (see Wiland (2010)), whose acceptability levels described in terms of arithmetic mean were higher than the acceptability levels of the variants derived by pied-piping of wh-phrases.

Acceptable extractions from fronted constituents suggest that the attested freezing effects do not result from the categorical ban in (1), which comes out as too coarse. This opens up the avenue for order-reversing ("peeling") derivations in (4) to be in principle well-formed, too. Two such derivations can be quite transparently identified in Polish outside wh-extractions: case alternations in sentences with the verb 'load' and the formation of OVS sentences.

The case alternation in the Polish sentences with the verb 'load' is faithful with respect to the description of possible and impossible patterns of case conversion proposed for Czech in Caha's (2009) work on case. While the ingredients of the constituents in the case alternation and in the formation of Polish OVS sentences are different, both derivations can be described by the derivational scenario in (4).

There are two major approaches that aim to describe (what appear to be) freezing effects of movement: categorical in (1) (e.g. Takahashi (1994), Stepanov (2007)) and non-categorical, which rejects the description in (1). There are a few different proposals that belong to the second and include the Criterial Freezing (Rizzi (2007), Rizzi & Shlonsky (2007)), feature-driven freezing (e.g. Boeckx (2008)), or a phase-based account in Bošković (2017). What is common to these proposals is that they in principle do not ban derivations in (3)-(4) from grammar. In the broad sense, the data discussed in this work makes a case for the second class of approaches; in the narrow sense, it makes a case for peeling derivations like in (4) to be generally admissible in grammar.

The paper is organized as follows. In section 2 we describe the grammaticality judgement experiment among native speakers of Polish. Its results cover extractions from subjects (in section 3) and from fronted wh-phrases (in section 4). Section 5 discusses peeling derivations resulting in case alternations and non-canonical OVS sentences in Polish. Section 6 is a conclusion.

2. Experiment

The empirical study was carried out in order to test the language intuitions of native speakers of Polish as to the grammaticality of selected sentences involving: extractions from subjects of (tensed) *żeby*-clauses, extractions from subjects of indicative *że*-clauses embedded under assertive verb *mówić* ‘say’, and wh-LBE from fronted complex wh-phrases. The results were collected with the use of a specially designed questionnaire in a Google Form.

The experiment included 24 interrogative sentences including 8 fillers. The 16 tested sentences were logically grouped in grammatically related pairs or triplets which were identical with respect to lexical content but differed with respect to the fronted constituent (a pied-piped wh-phrase, or an extracted wh-word from a fronted or an in situ wh-phrase). The order of the sentences in the questionnaire was randomized.

The participants of the experiment were 50 native speakers of Polish (with a disproportion in terms of sex – 12 males and 38 females), aged between 20 and 65 (with a disproportion – 45 participants were aged between 20 and 23).

The participants received a link to a Google Form with the questionnaire and upon providing their email addresses for verification they were asked to provide information about age and sex and to judge the acceptability of the 24 sentences using a 5-point Likert-type scale (1 – definitely incorrect; 2 – rather incorrect; 3 – on the border of correctness; 4 – rather correct; 5 – definitely correct). There was no time limit to complete the questionnaire. The experiment was carried out from March till April 2018.

The scores were automatically collected from the questionnaire and subsequently processed using Microsoft Excel. For each sentence, the scores were analyzed with respect to central tendency, dispersion, and distribution. The central tendency was measured using the arithmetic mean (Mean), dispersion was measured using standard deviation (StDev), and the distribution of scores was measured using skewed distribution (SkDis).

3. Extractions from subjects

Assuming subject-raising from the θ -position to the surface (“EPP”) position, a class of examples often put forward in favor of (1) is based on the contrast between extractions from internal and external arguments, as illustrated by the examples from Stepanov (2007):

- (5) a. ?*Who does [a picture of t] hang on the wall?
b. Who is there [a picture of t] on the wall?

The same assumption allows (1) to cover blocked extractions from the subjects of passives, as in (6a)-(6b), and extractions from subjects of embedded interrogative clauses, as in (6c). Though, extractions like in (6d) seem to be less degraded.

- (6) a. *Who₂ did you think [that [pictures of t₂]]₁ were taken t₁ illegally]?
b. *Which cars₂ were [the tires of t₂] punctured t₁ by the road’s rough surface?
c. ?*I wonder [who₂ [friends of t₂]]₁ [_{vP} t₁ hired Mary]]
d. ?I wonder [who₂ [the pictures of t₂]]₁ will [_{vP} t₁ make it to the front cover]]

However, the account of the Subject Island Condition in English along the lines of (1) is challenged by extractions from raised subjects in Polish – to an extent a small sample of items can be informative. In the experiment, certain instances of extractions from raised subjects in Polish received only moderately decreased levels of grammatical acceptability when compared to equivalent sentences with pied-piped subject wh-phrases.

Let us start with sentences where the acceptability contrast turned out to be pronounced. Namely, in sentences with possessive wh-subjects, the variant involving pied-piping was considerably better accepted than the variant with the extracted possessive wh-pronoun. This result was obtained both from the sentences with indicative *że*-clauses embedded under assertive verb *mówić* ‘say’, as in (7a)-(7b), and from the sentences with subjunctive *żeby*-clauses, as in (8a)-(8b).¹

- (7) a. [Czyi rodzice]₁ mówiłeś [że t₁ powinni przyjść osobiście]?
 whose parents said.2SG.M COMP should.3PL come.INF in-person
- b. Czyi₁ mówiłeś [że [t₁ rodzice] powinni przyjść osobiście]?
 whose said.2SG.M COMP parents should.3PL come.INF in-person
 ‘Whose parents do you think should come in person?’
- (8) a. [Czyi rodzice]₁ mówiłeś [że-by t₁ koniecznie przyszli na
 whose parents said-2SG.M COMP-SJV definitely came.3PL on
 wywiadówkę]?
 parents.evening
- b. Czyi₁ mówiłeś [że-by [t₁ rodzice] koniecznie przyszli na
 whose said-2SG.M COMP-SJV parents definitely came.3PL on
 wywiadówkę]?
 parents.evening
 ‘Whose parents did you say should definitely come to the parents’ evening?’

The acceptability in terms of arithmetic mean for the variant involving pied piping in (7a) was 3.12 (with skewness close to 0, indicating symmetrical distribution of scores), while the mean for the variant involving extraction from the subject in (7b) was only 2.00. For the sentence involving pied-piping in (8a) the mean was 2.90, while for the variant with extraction in (8b) only 1.70 (with positive skewness 1.75). Thus, in both cases the acceptability contrast between the variants was >1 in a 5-point scale. The standard deviation for these items – as well as for all other items in the experiment – did not exceed 1.48, which indicates that the judgements were fairly concentrated around the mean scores. The collective results for the extractions from subjects are given toward the end of this section in the table in (12).

These examples contrast with respect to the acceptability of extractions of non-possessive wh-phrases from subjects of *żeby*-clauses embedded under the inflected verb *chcieć* ‘want’

¹The brackets and the traces in all the relevant sentences have been added in this paper for ease of exposition and were not included in the sentences in the questionnaire.

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(the (b) sentences in (9) and (10)) as compared to their variants with pied-piping (the (a) sentences in (9) and (10)):

- (9) a. [Rodzice którego dziecka]₁ *pro* chcesz [że-by t₁ przyszli
parents which child want.2SG COMP-SJV came.3PL
osobiście na wywiadówkę]?
in-person on parents.evening
- b. [Którego dziecka]₁ *pro* chcesz [że-by [rodzice t₁] przyszli
which child want.2SG COMP-SJV parents came.3PL
osobiście na wywiadówkę]?
in-person on parents.evening
'Parents of which child do you want to come in person to the parents' evening?'
- (10) a. [Zawodnicy [której drużyny]]₁ *pro* chciałeś [że-by t₁
players which team-GEN wanted-2SG.M COMP-SJV
wygrali mecz]?
won.3PL game
- b. [Której drużyny]₁ *pro* chciałeś [że-by [zawodnicy t₁]
which team-GEN wanted-2SG.M COMP-SJV players
wygrali mecz]?
won.3PL game
'Players of which team did you want to win the game?'

For the sentence with pied-piping in (9a) the mean was 3.38, while for the variant with extraction in (9b), 2.82 (with a close to symmetric distribution of scores in both sentences). While both variants of (10) were rated lower than the sentences in (9), the difference was rather small, with the arithmetic mean 2.62 for (10a) and 2.40 for (10b).

A relatively minor contrast in grammaticality judgments in terms of the arithmetic mean and symmetric distribution of scores for pied-piping and wh-extraction is observed in *że*-clauses with the modal verb *powinien* 'should', as in:

- (11) a. [Zawodnicy której drużyny]₁ *pro* mówiłeś [że t₁ powinni
players which team said.2PL.M COMP should.3PL.M
byli wygrać mecz]?
were.3PL.M win.INF game
- b. [Której drużyny]₁ *pro* mówiłeś [że [zawodnicy t₁] powinni
which team said.2PL.M COMP players should.3PL.M
byli wygrać mecz]?
were.3PL.M win.INF game
'The players of which team did you say should have won the game?'

For the sentence in (11a) the mean was 3.36, for the sentence in (11b), 2.78.

(12) *Results for sentences in (7a)-(10b)*

	(7a)	(7b)	(8a)	(8b)	(9a)	(9b)	(10a)	(10b)	(11a)	(11b)
Mean	3.12	2.00	2.90	1.70	3.38	2.82	2.62	2.40	3.36	2.78
StDev	1.42	1.48	1.22	1.16	1.21	1.21	1.05	1.20	1.17	1.20
SkDis	-0.13	1.21	0.34	1.75	-0.07	0.34	0.06	0.58	-0.28	0.00

These results indicate that while there was a significant contrast in acceptability judgment in the pair of sentences with *wh*-possessive pronouns (sentences (7a)-(7b) and (8a)-(8b)) in terms of the mean (>1 in both pairs), the contrast was less pronounced in the three other pairs. In the context of the design of the experiment where all the sentences were listed in a random order, it is important to observe that sentences involving extractions from subjects in (9b) and (11b) both received higher scores than the sentence with the pied-piping in (10a) and only slightly lower scores than the sentence with pied-piping in (8a).

Let us note that the derivation of (9b) and (11b) conforms to the peeling derivation outlined in (4).

4. Left branch extractions from fronted *wh*-phrases

While the couple of examples listed above indicate that certain extractions from subjects are only moderately degraded as compared to pied-piping, conclusions about the validity of the generalized Freezing Condition (either way) on the basis of these differences should be cautious at best. In contrast, the degree of well-formedness of *wh*-LBE from fronted *wh*-phrases give us a much clearer picture of extractions from moved constituents as in principle permissible in Polish. Obviously, this result rests on the assumption that the fronting of the *wh*-word in Polish is derived by its direct extraction out of the complex *wh*-phrase (see Wiland (2010, 344-5)).

There are two basic facts about Polish that must be pointed out before we proceed. One is that *wh*-LBE is in principle well-formed in Polish.² The other is that its base (unmarked) order is S - V - (dative) IO - (accusative) DO and that this order can be altered by scrambling.³ For example, the accusative direct object *nowy samochód* ‘new car’ in (13) can be fronted to a position before the dative object or before the verb.

- (13) Paweł (nowy samochód) kupił (nowy samochód) swojej żonie nowy samochód
 P.NOM new car.ACC bought new car.ACC his wife.DAT new car.ACC
 ‘Paweł bought his wife a new car.’
-

We have tested grammatical acceptability of *wh*-LBE from the accusative direct object from these three positions, that is from the base position as in (14a) and from the fronted positions as in (14b) and in (14c):

²See Cegłowski (2017, ch.2) for a recent study of acceptability judgments of *wh*-LBE in comparison with LBE of adjectives and LBE of demonstratives in Polish.

³See Witkoś (2007), Wiland (2009, ch.4), and Citko (2011, ch.4).

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- (14) a. Jaki₁ Paweł kupił swoją żonę [t₁ samochód] ?
 what P.NOM bought his wife.DAT car.ACC
- b. Jaki₂ Paweł kupił [t₂ samochód]₁ swojej żonie t₁ ?
 what P.NOM bought car.ACC his wife.DAT
- c. Jaki₂ Paweł [t₂ samochód]₁ kupił swoją żonę t₁ ?
 what P.NOM car.ACC bought his wife.DAT
 ‘What car did Paweł buy his wife?’

For the sentence in (14b) with the wh-LBE from a fronted position, the arithmetic mean was 3.78 (with skewed distribution at -1.02, indicating that most judgements were above the mean score). This was the highest mean score among all the items in the experiment. For the sentence in (14a) with the extraction from the base position, the mean score was 3.32, while for the sentence in (14c) with the extraction from the wh-phrase fronted to the pre-verbal position, the mean score was 2.82 (both these sentences had an SkDis close to 0 and StDev below 1.5, which indicates that the judgments were fairly concentrated around the mean scores). The collective results for the sentences with wh-LBE are given below in the table in (16).

Acceptability was also tested for wh-LBE in complex sentences with the verb *chcieć* ‘want’, as in:

- (15) a. Jaki₁ Paweł chciał [kupić swoją żonę [t₁ samochód]] ?
 what P.NOM wanted.2SG.M buy.INF his wife.DAT car.ACC
- b. Jaki₂ Paweł chciał [kupić [t₂ samochód]₁ swojej żonie t₁] ?
 what P.NOM wanted.2SG.M buy.INF car.ACC his wife.DAT
- c. Jaki₂ Paweł [t₂ samochód]₁ chciał [kupić swoją żonę t₁] ?
 what P.NOM car.ACC wanted.2SG.M buy.INF his wife.DAT
 ‘What car did Paweł want to buy his wife?’

Similar to (14b) with the wh-LBE from the fronted position, also the judgements for the sentence in (15b) were the highest in this set and second highest in the experiment, with the mean score 3.72. Likewise, the judgements for (15a) were the second highest in this set with the mean 3.60 and the mean for (15c) was 2.98 (with an almost symmetric distribution).

(16) *Results for sentences in (14a)-(15c)*

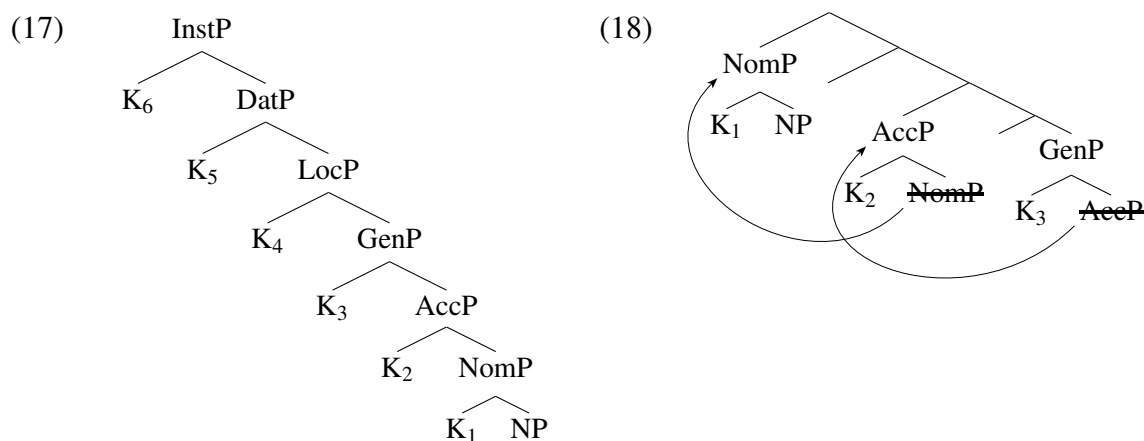
	(14a)	(14b)	(14c)	(15a)	(15b)	(15c)
Mean	3.32	3.78	2.82	3.60	3.72	2.98
StDev	1.19	1.18	1.45	1.16	1.13	1.41
SkDis	-0.05	-1.02	0.12	-0.38	-0.76	0.04

We can, thus, conclude that if wh-LBE in Polish takes place from fronted wh-phrases according to the scenario in (3), these results provide evidence against the generalized Freezing Condition.

5. What case alternations and OVS sentences in Polish have in common

A situation where at least certain anti-freezing order-preserving derivations receive relatively high degrees of grammatical acceptability opens up the possibility for order-reversing or peeling derivations to be in principle legal, too. While the acceptability levels of the extractions from subjects discussed in section 3 offer only a cautious insight into the nature of such derivations, there exists a different class of evidence in favor of peeling in Polish, namely, conversion of bigger to smaller cases under upward movement.

Assuming the decomposition of cases as in (17), Caha (2009, ch.4) argues on the basis of the Czech ‘spray-load’ alternation that case derivation involves peeling as in (18).



In the peeling derivation in (18), case-forming features K_n become stranded by the movement of their complement. We can find case conversions of the type advanced in Caha (2009, ch.4) for Czech in Polish constructions with the (prefixed) verb *załadować* ‘load’, which turn out to only include a change in the case-marking of the NP argument from a bigger (containing) to smaller (contained) case according to the hierarchy in (17). The sentences in (19) illustrate the INST > GEN > ACC > NOM conversion, where the Figure NP *trawa* ‘grass’ changes its case under movement (with the *-nie* ‘-ing’ suffix delimiting the height of genitive marking in (19b)).⁴

- (19)
- a. Jan załadował traw-**ą** ciężarówk-**ę**
 Jan-NOM loaded grass-INST truck-ACC
 ‘Jan loaded the truck with grass.’
 - b. załadowa-nie traw-**y** na ciężarówk-**ę**
 load-ING grass-GEN on truck-ACC
 ‘the loading of the grass on the truck’
 - c. Jan załadował traw-**ę** na ciężarówk-**ę**
 Jan-NOM loaded grass-ACC on truck-ACC

⁴Taraldsen Medová & Wiland (2018) argue that case layers which are stranded by extractions of embedded case projections spell out as (parts of) participle suffixes in Polish and Czech, which explains why only unaccusative verbs can form the so-called adjectival participles based on the *l*-morpheme (the so-called *l*-participles in Slavic), as in the Polish *zmar-ł-y* ‘dead’ but not **kop-ł-y* ‘kicked’.

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lit. ‘Jan loaded the grass onto the truck.’

- d. Traw-a został-a załadowa-n-a na ciężarówk-ę
 grass-NOM became-AGR loaded-PRT-AGR on truck-ACC
 ‘The grass was loaded on the truck.’

It is argued in Wiland (2016) that non-canonical OVS sentences in Polish are derived according to the same derivational scenario as case peeling with the difference reduced to the sequence of clausal projections (VP, TP, etc.) rather than to case projections (AccP, NomP, etc.).

In particular, the Polish OVS sentences are analyzed as derived by fronting of a constituent minimally comprising the verb and the object to a position above the surface (“EPP”) position of the nominative subject, which is followed by object-fronting to the left periphery (TopP or FocP, depending on the variant of the OVS construction), as in:

$$(20) \quad [{}_{TopP/FocP} O \dots (to_{Top}) \dots [V \{O\}] \dots [S \{V \{O\}\}]]$$

In other words, the OVS word orders are derived in the way outlined in (4).

Perhaps the most transparent argument for such an analysis of OVS sentences is the presence of VP-external elements below the object but above the nominative subject, as in (22). In such sentences, the fronted object is on the one hand followed by a Topic particle *to*, which indicates its placement in spec-TopP, and on the other hand it is followed by elements like the mood particle *by* and *nie* ‘not’, which appear pre-verbally in canonical S-(Mood-Neg-)V-O sentences, as in (21).⁵

- (21) [Nauczyciel od fizyki] by nie oblał Marii. *S-Mood-Neg-V-O*
 teacher.NOM from physics MOOD NEG failed M.GEN
 ‘The physics teacher would not fail Mary.’

- (22) Marii to by nie oblał [nauczyciel od fizyki] *O-Top-Mood-Neg-V-S*
 M.GEN TOP MOOD NEG failed teacher.NOM from physics
 ‘The physics teacher would not fail Mary.’

Such word orders are underivable by a combination of individual object and verb fronting but, instead, are a natural consequence of (20).

6. Conclusion

We have shown that on the proviso that in the relevant cases the wh-LBE in Polish is derived by a direct extraction from a fronted wh-phrase, such constructions constitute evidence against the generalized Freezing Condition. While LBE is an order-preserving derivation,

⁵Other arguments in favor of (20) discussed in Wiland (2016) include binding from sentence-final subjects, inverse scope between the subject and negation, and the position of adverbs and the clitic *się*.

unlocking anti-freezing derivations in grammar renders peeling to be in principle legitimate, too.

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