

Helen de Hoop, Peter de Swart

Unexpected (in)animate argument marking

Abstract: The present chapter discusses the phenomena of object-fronting and passivization in relation to animacy. Both phenomena can be the outcome of a competition between a general subject-first preference and a topic-first preference in language. We explore how different patterns of unexpected (in)animate marking in object-initial and passive sentences might be expressed in a formal bidirectional OT account of grammar. Patterns in Dutch, Kinyarwanda, and Biak can be explained using the same model, which integrates the speaker's taking into account the hearer's perspective in production and the hearer's taking into account the speaker's perspective in interpretation. We show that both the speaker's choice between competing forms and the hearer's choice between competing interpretations constrain the use of object-fronting and passivization in language.

Keywords: Object-fronting, passivization, animacy, bidirectional OT, Dutch, Kinyarwanda, Biak

1 Introduction

Languages use case, word order, and agreement to overtly encode the arguments of a predicate. Animacy is a crucial feature of arguments that provides information about their potential roles in the event described by the predicate. For instance, it has been noticed that there is a tight relation between animacy and the semantic role of Agent (Primus 2012). Some languages even exclude the possibility of inanimate Agents (cf. Fauconnier 2011). Also, Experiencers are by definition animate, since only sentient arguments can undergo “an event of emotion, cognition, volition, perception, or bodily sensation” (Verhoeven 2014: 130). Animacy is

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Helen de Hoop, Centre for Language Studies, Radboud University Nijmegen, P.O. Box 9103, 6500 HD Nijmegen, The Netherlands, e-mail: helen.dehoop@ru.nl

Peter de Swart, Centre for Language Studies, Radboud University Nijmegen, P.O. Box 9103, 6500 HD Nijmegen, The Netherlands, e-mail: peter.deswart@ru.nl

often thought of as an inherent property of arguments, whereas other prominence features such as specificity are not (cf. de Swart & de Hoop 2007, 2018). With animate referents being conceptually more prominent than inanimate ones, subjects being more prominent than objects, and Agents being more prominent than Patients, the question arises how speakers choose to encode messages in which the Patient rather than the Agent is the topic or high-prominent argument of the sentence (cf. Aissen 1999). Note that the topic can loosely be characterized as “the entity that is talked about”, but their properties have been shown to vary. For example, topics are often subjects but not always, they usually occur sentence-initially but not necessarily, and they are generally definite, but they can be indefinite too (van Bergen & de Hoop 2009). Also, while they are often animate, they can also be inanimate.

This chapter discusses two syntactic structures, as well as the relation between them, in which the Patient is high-prominent, i.e. the topic, namely object-fronting and passivization. Object-fronting involves a change in word order, whereas passives are generally characterized by a grammatical demotion of the Agent with a concomitant promotion of the Patient. We examine the role of animacy in the realization of these structures.

The interplay between the possible structures in a language and prominence features of arguments is couched in the general framework of Optimality Theory, in which grammar is viewed as a set of violable and potentially conflicting constraints that interact with each other (Smolensky & Legendre 2006). Because there is no fixed meaning associated with any particular type of structure, we assume that the relation between structure and interpretation cannot be modelled as a one-to-one mapping from form to meaning or vice versa. In other words, it does not suffice to optimize from structure to (obtained) interpretation or from (intended) interpretation to structure only. Therefore, we study the interplay between structure and interpretation from a bidirectional perspective, taking into account both the constraints imposed by the speaker on the optimal structure and those by the hearer on the optimal interpretation, resulting in optimal *pairs* of form and meaning (Blutner et al. 2006).

We will argue that taking into account both the hearer’s and speaker’s perspectives in a bidirectional Optimality-Theoretic analysis can explain patterns of object-fronting and passivization in relation to animacy features of arguments across languages.

2 The hearer's perspective on object-fronting: Competing interpretations

A cross-linguistic generalization is that most transitive sentences have a human subject and an inanimate object (cf. Comrie 1989). Corpus studies in Swedish, Norwegian and Dutch have shown that in transitive sentences objects hardly ever outrank subjects in the animacy hierarchy, where humans outrank animate entities which in turn outrank inanimate ones (cf. Dahl and Fraurud 1996; Øvrelid 2004; Bouma 2008).

Another well-attested phenomenon across the languages of the world is the preference for subject-initial sentences. In more than 75 % of the languages the basic word order is subject-initial (Dryer 2013). Since object-fronting can be a type of topicalization (although not necessarily, because it can also be focus-preposing), we may expect object-fronting to occur when the object is the topic of the sentence. Since animate arguments are better topics than inanimate ones (Givón 1984; Brunetti 2009), we may expect object-fronting to happen more often when the object is animate (see also Bouma 2008; van Bergen 2011; Lamers & de Hoop 2014).

However, from the hearer's point of view, it is important to identify the subject and object of a transitive sentence (de Swart 2007). If the speaker simply fronts an animate object without taking into account the hearer's perspective, the hearer may arrive at the (non-intended) subject-initial interpretation. In fact, even inanimate sentence-initial arguments tend to be interpreted as the subject (Bickel et al. 2015). From the hearer's perspective, the subject and the object in a transitive clause should be distinguishable. Since usually the object of a transitive clause is not higher in animacy than the subject, hearers are likely to interpret a fronted (or first) argument as the subject, especially when it is animate. In other words, from the hearer's perspective, object-fronting should only be allowed when the fronted argument can be identified as the object of a transitive verb, which is more likely the case if it is inanimate.

Notoriously, sometimes the animacy of a subject is not just preferred, but actually required by the verb. This holds for example for the transitive verb *bijten* 'bite' in Dutch:

- (1) De gorilla heeft de vrouw gebeten.
the gorilla has the woman bitten
'The gorilla bit the woman.'

The verb *bijten* ‘bite’ requires an animate subject. In (1) the two arguments are both animate, so each could function as the subject of the verb *bijten* ‘bite’. Here, animacy cannot help us in determining what is the subject and what is the object. Since the object of a transitive clause can be fronted in Dutch, (1) would in principle be ambiguous between a subject-initial and an object-initial reading. However, unless a context is provided that would suggest otherwise, sentence (1) is not ambiguous. It is interpreted as subject-initial by default. Only an enriched context would allow for an object-initial interpretation of (1). The phenomenon that in the absence of other clues (such as case, agreement, or context/intonation), it is the word order preference which straightforwardly determines the interpretation of an ambiguous sentence, is called *word order freezing* (Lee 2003; Zeevat 2006; de Hoop & Lamers 2006; Bouma 2008). The following Finnish sentence (Seppo Kittilä, p.c.) illustrates word order freezing:

- (2) Poja-t näk-i-vät tytö-t.
 boy-PL.NOM/ACC see-PAST-3PL girl-PL.NOM/ACC
 ‘The boys saw the girls.’ **Not:** ‘The girls saw the boys.’

In (2) case morphology does not distinguish between nominative and accusative, since the case-suffixes are the same for the plural nominative and accusative arguments in Finnish. Clearly, the agreement suffix cannot unambiguously determine the subject either: both arguments are plural and there is plural inflection on the verb, hence both could be the subject. Therefore, word order, which is otherwise relatively free in Finnish, determines that the sentence-initial argument is the subject. In spite of the morphological ambiguity with respect to case and agreement, the sentence cannot be interpreted as an object-initial sentence without additional context.

In Dutch, object-fronting is rare, and occurs only if the speaker believes there can be no misunderstanding on the hearer’s side as to what is the subject and what is the object (Bouma 2008). If we replace the first constituent in (1) by a pronoun in its object (accusative) form, we get an instance of object-fronting, since the case of the pronoun ultimately determines its grammatical function in the sentence:

- (3) Haar heeft de gorilla gebeten.
 her has the gorilla bitten
 ‘The gorilla bit her.’

There could be a good reason to topicalize the pronominal Patient in (3), since the woman referred to is the victim in a newsworthy biting event. However, even though case marking excludes the possibility of misunderstanding in (3), Bouma's (2008) investigation of object-initial sentences in the Spoken Dutch Corpus shows that personal pronominal objects as in (3) hardly occur in sentence-initial position. Note that a passive sentence would be an alternative and perhaps better option to promote the Patient in this case (see section 5).

De Hoop & Lamers (2006) propose five violable and potentially conflicting constraints that help the hearer to determine what is the subject and what the object in a transitive clause. The constraints and their ranking (for Dutch and German) are given below (de Hoop & Lamers 2006):

DISTINGUISHABILITY constraints:

- a. CASE: the subject is in the nominative case, the object is in the accusative case
- b. AGREEMENT: the verb agrees with the subject
- c. SELECTION: fit the selectional restrictions of the verb (animacy)
- d. PRECEDENCE: the subject (linearly) precedes the object
- e. PROMINENCE: the subject outranks the object in prominence (animacy)

Proposed Dutch/German ranking of the DISTINGUISHABILITY constraints:

{CASE, AGREEMENT} >> SELECTION >> PRECEDENCE >> PROMINENCE

Different sources of information can thus be viewed as violable and potentially conflicting constraints that play a role in the optimization process of interpretation. In order to see how these constraints work, we provide an OT-semantic tableau for the Dutch sentences (3) and (1), respectively. We only distinguish between the two relevant candidate *interpretations*, SO (subject before object) and OS (object before subject), respectively. Consider first the optimization process of the interpretation of sentence (3), repeated in the upper left cell of Tableau 1, which gives the input for the optimization.

Tableau 1: Deriving the optimal interpretation of sentence (3).

Haar heeft de gorilla gebeten her has the gorilla bitten	CASE	AGR	SEL	PREC	PROM
SO	*				*
^{EP} OS				*	*

Both candidate readings (SO and OS) satisfy the constraints AGREEMENT and SELECTION, and both violate the constraint PROMINENCE. These three constraints can therefore not determine which reading comes out as optimal. The constraints CASE and PRECEDENCE do distinguish between the two readings, but in opposite directions. Since CASE outranks PRECEDENCE, the OS reading, which violates PRECEDENCE but satisfies CASE, wins the competition. That is, the second candidate interpretation is the optimal (and therefore only) interpretation. For sentence (1) we obtain a different result, as illustrated in Tableau 2.

Tableau 2: Deriving the optimal interpretation of sentence (1).

De gorilla heeft de vrouw gebeten the gorilla has the woman bitten	CASE	AGR	SEL	PREC	PROM
^{EF} SO					*
OS				*	*

In Tableau 2, the constraint CASE does no longer distinguish the two interpretations and only PRECEDENCE makes a difference. As pointed out above, this is called *word order freezing*: in the absence of any other clues (activated constraints), only word order (PRECEDENCE) distinguishes the subject from the object. Hence, the subject-initial reading comes out as the winning interpretation. A similar analysis would hold for the Finnish example (2) above.

De Swart (2007) proposes that a speaker takes into account the hearer's perspective when calculating the optimal form. More specifically, object-fronting is only possible if the grammatical functions remain recoverable. But even if the grammatical functions are recoverable, object-fronting is not always allowed. In her discussion of object-fronting (also called *subject object reversal*) in Bantu languages, Morimoto (2008) notes that in Kinyarwanda, object-fronting is permitted if the subject outranks the object in animacy, as shown in (4) and (5) below, but not if it is the other way around (examples (8) and (9), to be discussed below).

(4) Umuhuûngu a-ra-som-a igitabo.
1.boy 1-PRES-read-ASP 7.book
'The boy is reading the book.'

(5) Igitabo ki-som-a umuhuûngu.
7.book 7-read-ASP 1.boy
'The boy is reading the book.' **Not:** 'The book is reading the boy.'

In (4) the verb agrees with the subject, whereas in (5) it agrees with the fronted object, i.e. the topic (Morimoto 2008: 201). In other words, agreement cannot distinguish between the subject and the object in Kinyarwanda, since the verb agrees with the sentence-initial topic, which can be either the subject or the object. Case cannot help us either in determining the subject and the object in (4)–(5), since Kinyarwanda has no morphological case marking. However, based on SELECTION, the grammatical roles are recoverable since only a boy can read a book and not the other way around. Also, the boy outranks the book in animacy, which is an important prerequisite for object-fronting in Kinyarwanda (Morimoto 2008). If either PROMINENCE or SELECTION overrules the word order constraint PRECEDENCE, this will give rise to the object-initial reading in (5). Morimoto’s (2008: 218) descriptive generalization is that marked animacy relations (i.e. when the object outranks the subject in animacy) cannot be expressed in the marked syntactic construction (i.e. object-fronting).

Therefore, while AGREEMENT and CASE do not apply, we will demonstrate that PROMINENCE in Kinyarwanda is the most important constraint (see example (7) below). Unlike in Dutch and German, it is more important than SELECTION. The derivation of the object-initial interpretation is illustrated in Tableau 3:

Tableau 3: Deriving the optimal interpretation of sentence (5).

Igitabo kisoma umuhuŭngu book read boy	PROM	SEL	PREC
SO	*	*	
^{EP} OS			*

When the subject and the object are equal in animacy and the selectional restrictions of the verb cannot distinguish the two either, we get word order freezing, and only the subject-initial reading is available (Morimoto 2008: 217). In this case the constraint PRECEDENCE disambiguates the sentence. Thus, sentence (6) below from Kinyarwanda only allows for a subject-initial reading, which is also predicted on the basis of the three relevant constraints and their ranking (as illustrated in Tableau 4):

- (6) Umuhuŭngu y-a-som-ye umukoŭwa.
 1.boy 1-PAST-kiss-ASP 1.girl
 ‘The boy kissed the girl.’ **Not:** ‘The girl kissed the boy.’

Tableau 4: Deriving the optimal interpretation of sentence (6).

Umuhuûngu yasomye umukoôwa boy kissed girl	PROM	SEL	PREC
^{ESP} SO	*		
OS	*		*

Morimoto (2008: 217) notes that in some cases, however, even when there is equal animacy, the object-initial interpretation is available, as long as no ambiguity can arise. This can be explained by the given ranking in which SELECTION outranks PRECEDENCE. In (7) the object-initial reading wins the competition, since a knife can cut bread but not the other way around (cf. Rissman & Rawlins 2017 for a recent semantic approach to instrumental subjects). This is illustrated in Tableau 5.

- (7) Umugati w-a-kas-e icyuma.
 bread it-PAST-cut-ASP knife
 ‘The knife cut the bread.’ **Not:** ‘The bread cut the knife.’

Tableau 5: Deriving the optimal interpretation of sentence (7).

Umugati wakase icyuma bread cut knife	PROM	SEL	PREC
SO	*	*	
^{ESP} OS	*		*

So far, we have seen that in Kinyarwanda, object-fronting is only possible when the grammatical roles are still recoverable via the constraint SELECTION. Strikingly, however, the selectional restrictions of the verb *pierce* are not sufficient to allow for object-fronting, as can be seen in (9). Object-fronting is not allowed in this case, because the object outranks the subject in animacy (Morimoto 2008: 217). Therefore, (9) must be interpreted as a subject-initial sentence, even though this leads to a pragmatically odd interpretation.

- (8) Urushiinge ru-ra-joomb-a umwaana.
 needle it-AF-pierce-ASP child
 ‘The needle will pierce the child.’

- (9) Umwaana a-joomb-a urushiinge.
 child he-pierce-ASP needle
 # ‘The child will pierce the needle.’ **Not:** ‘The needle will pierce the child.’

Thus, object-fronting is permitted when the subject outranks the object in animacy, but not when the object outranks the subject in animacy. This is accounted for by the high ranking of PROMINENCE, as illustrated in Tableau 6:

Tableau 6: Deriving the optimal interpretation of sentence (9).

Umwaana ajoomba urushiinge child pierce needle	PROM	SEL	PREC
SO		*	
OS	*		*

As pointed out by Morimoto (2008: 218), only predicates that have an unmarked animacy relation between the subject and the object allow for object-fronting, in which case “DISTINGUISHABILITY is already guaranteed by their relative ranking on the animacy scale. (. . .) Therefore, even though argument linking in Bantu languages suggests that it is more important to identify the prominent (topical) argument than to distinguish between the subject and the object, this is only apparently so, since the preverbal object can only be marked as the topic if it is clear from its relative animacy that it is indeed the grammatical object.” In other words, PROMINENCE is ranked higher than SELECTION in Kinyarwanda, which makes the subject-initial interpretation the winning candidate. Although the proposed ranking correctly yields the right optimal interpretations (the ones that hearers indeed arrive at in sentences (4)–(9)), it only takes into account the hearer’s perspective, that is to say, the optimization from form to interpretation. However, the question arises why a speaker cannot use object-fronting when *the child* is the object and the topic of the clause, even though selectional restrictions of the verb *pierce* clearly distinguish between the subject and the object. We propose that the answer to this puzzle lies in markedness, which can be analyzed within bidirectional Optimality Theory (Blutner et al. 2006; Smolensky & Legendre 2006; de Swart 2007; Legendre et al. 2016).

3 Adding the speaker's perspective: Competing word orders in Kinyarwanda

Bidirectional Optimality Theory has been suggested as a framework that models how the speaker and the hearer co-ordinate their choices of (related) forms (alternative structures) and (related) interpretations (Blutner et al. 2006; de Swart 2007). As Legendre et al. (2016: 18) note, “[t]he fact that forms and meanings cannot be identical makes the directionality in OT syntax/semantics even more important [than in phonology] and raises the question whether speakers take the hearer’s perspective into account in production, and whether hearers take the speaker’s perspective into account in comprehension. The answer to this question requires a change in perspective from *unidirectional* to *bidirectional* optimization.” To illustrate, Blutner et al. (2006: 27–28) discuss the following two related forms, an active and a passive sentence:

(10) Volkert killed Pim.

(11) Pim was killed (by Volkert).

The two forms describe the same event, but from a different perspective. As Blutner et al. (2006: 27) argue, (10) will be used when Volkert is the most salient discourse entity, whereas (11) will be used in a context where Pim is the most salient one. However, as Blutner et al. (2006: 28) point out, “even if Volkert were the most salient discourse entity in the context, we could use sentence [(11)], with the effect that now Pim becomes the most salient discourse entity.” In other words, the choice of a certain form (active or passive) is not just constrained by the given context (either Pim or Volkert being discourse-prominent already), but also by the intention of the speaker, who wants to mark the fact that either Pim or Volkert should be interpreted as discourse-prominent (the topic) by the hearer. Sentence (10) would then be the best form in a context in which Volkert is to be interpreted as the topic, whereas (11) would be the best form in a context in which Pim must be interpreted as the topic.

This is illustrated by means of a simple bidirectional OT tableau with four competing form-meaning pairs that are subject to two relevant constraints, an ECONOMY constraint that penalizes the use of a marked (i.e. passive) structure, and a constraint MARK TOPIC, which requires the speaker to mark topicality, in this case by the use of a passive sentence to mark the Patient as topic.

Tableau 7: Bidirectional optimization of Pim being killed by Volkert.

English, examples (10) and (11)	MARK TOPIC	ECONOMY
✚ 1. Volkert killed Pim, kill' (Volkert, Pim); Volkert is topic		
2. Volkert killed Pim, kill' (Volkert, Pim); Pim is topic	*	
3. Pim was killed (by Volkert), kill' (Volkert, Pim); Volkert is topic	*	*
✚ 4. Pim was killed (by Volkert), kill' (Volkert, Pim); Pim is topic		*

Tableau 7 shows two related forms (an active and a passive structure) that each combine with two related interpretations (one in which the Agent is the topic, and one in which the Patient is the topic). The combinations of two forms and two interpretations constitute four form-meaning pairs. These are the four relevant candidates that enter the competition. Two of these pairs come out as winners. The first winning pair satisfies both constraints, and combines the unmarked structure (active sentence) with the unmarked interpretation (the Agent being the topic). The other winning pair (candidate 4 in Tableau 7) combines a marked structure (a passive sentence), which links ECONOMY, with a marked interpretation (the Patient being the topic). Both these winning pairs are indicated by the sign ✚; they are called *superoptimal* (Blutner et al. 2006). A form-meaning pair is called *superoptimal* if there is no other pair with the same form but a different meaning that is more harmonic, and no other pair with the same meaning but a different form that is more harmonic. Thus, there are two types of superoptimal form-meaning pairs: the ones that link an unmarked form to an unmarked interpretation, and the ones that link a marked form to a marked interpretation (Blutner et al. 2006: 23).

As illustrated below, bidirectional OT can account for the fact that object-fronting in Kinyarwanda is only possible when the hearer will arrive at the correct interpretation, that is, the meaning intended by the speaker. Consider the bidirectional optimization of the two competing forms presented in sentences (4) and (5) above, i.e. *boy reads book* and *book reads boy*. The verb *read* takes two arguments. In principle, unlike in English, word order does not necessarily identify the subject of the sentence.

The constraints that were used in the OT-semantics analyses in section 2 can be maintained. Lestrade et al. (2016) show that unidirectional constraints can be derived from a generalization over bidirectional optimization processes.

The speaker's (OT-syntactic) constraint MARK TOPIC is added to the constraint ranking, which requires the speaker to mark topicality. One way to satisfy this constraint is by topicalization or topic-fronting. In Kinyarwanda the topic can be marked by topicalization, i.e. starting the sentence with the topic. That means that we have four possible interpretations for each form. That is, the boy can be the subject and the topic, the boy can be the topic but not the subject, the boy can be the subject but not the topic, or the boy can be neither the subject nor the topic. However, only two different forms are available for these four potential interpretations. The first four candidates in the tableau combine the first form (*boy reads book*) with the four possible interpretations, and the last four candidates the other form (*book reads boy*) with the same four possible interpretations. Hence, we end up with eight candidate form-meaning pairs.

As can be seen from the violation pattern in Tableau 8, the first candidate is a winning pair of form and interpretation (indicated by the sign ♪) as it does not violate any of the constraints. This superoptimal form-meaning pair links the form *boy reads book* to the meaning 'boy reads book' with the boy being the topic. As a consequence, candidate pairs with either the same form (candidates 2, 3, and 4) or the same interpretation (candidate 5) are blocked, but candidates 6, 7, and 8 (with a different form and a different interpretation) are still in competition. The seventh candidate is the winner of this competition, and therefore the pair of the form *book reads boy* and the meaning 'boy reads book' in which the book is the topic, is the second superoptimal pair (again indicated by the sign ♪).

Tableau 8: Bidirectional optimization of *boy reads book* and *book reads boy*.

Kinyarwanda, examples (4) and (5)	MARK TOPIC	PROM	SEL	PREC
♪ 1. <i>boy reads book</i> , read' (boy, book); boy is topic				
2. <i>boy reads book</i> , read' (book, boy); boy is topic		*	*	*
3. <i>boy reads book</i> , read' (boy, book); book is topic	*			
4. <i>boy reads book</i> , read' (book, boy); book is topic	*	*	*	*
5. <i>book reads boy</i> , read' (boy, book); boy is topic	*			*
6. <i>book reads boy</i> , read' (book, boy); boy is topic	*	*	*	

Tableau 8 (continued)

Kinyarwanda, examples (4) and (5)	MARK TOPIC	PROM	SEL	PREC
7. <i>book reads boy</i> , read' (boy, book); book is topic				*
8. <i>book reads boy</i> , read' (book, boy); book is topic		*	*	

Tableau 9 provides a similar analysis of the possible form-meaning pairs of boy kisses girl and girl kisses boy in Kinyarwanda (see example (6) above). Since boy and girl are equal in animacy, all candidate interpretations violate prominence (the subject does not outrank the object in animacy) while no candidate interpretations violate selection (the verb *kiss* requires an animate subject, and both arguments satisfy this restriction). Therefore, the first and eighth pairs of form and interpretation win the competition and become superoptimal. This means that there are no forms left to be linked to the other potential interpretations. The form *girl kisses boy* cannot mean that the boy kisses the girl, not even when the girl is the topic (as in the seventh candidate). As pointed out above, this is a clear case of word order freezing: when no other constraints distinguish between the subject-initial or the object-initial interpretation, precedence does the job.

Tableau 9: Bidirectional optimization of *boy kisses girl* and *girl kisses boy*.

Kinyarwanda, example (6)	MARK TOPIC	PROM	SEL	PREC
1. <i>boy kisses girl</i> , kiss' (boy, girl); boy is topic		*		
2. <i>boy kisses girl</i> , kiss' (girl, boy); boy is topic		*		*
3. <i>boy kisses girl</i> , kiss' (boy, girl); girl is topic	*	*		
4. <i>boy kisses girl</i> , kiss' (girl, boy); girl is topic	*	*		*
5. <i>girl kisses boy</i> , kiss' (boy, girl); boy is topic	*	*		*
6. <i>girl kisses boy</i> , kiss' (girl, boy); boy is topic	*	*		

Tableau 9 (continued)

Kinyarwanda, example (6)	MARK TOPIC	PROM	SEL	PREC
7. <i>girl kisses boy</i> , kiss' (boy, girl); girl is topic		*		*
8. <i>girl kisses boy</i> , kiss' (girl, boy); girl is topic		*		

In sentence (7) above, we have seen that prominence is violated (the subject does not outrank the object in animacy) but in this case selection again helps to distinguish the subject from the object (the verb *cut* requires a subject that can cut, such as knife, but not bread). Tableau 10 shows the correct derivation of the two superoptimal form-meaning pairs.

Not surprisingly, the first candidate pair wins the competition, since it only violates PROMINENCE, which all candidates do. Hence, the form *knife cuts bread* gets associated with the interpretation that the knife is the subject as well as the topic. For the other form, *bread cuts knife*, the best remaining interpretation is that again, the knife is the subject (because of SELECTION), but now the bread is the topic (which is why PRECEDENCE is violated in order to satisfy MARK TOPIC). Hence, the seventh candidate becomes the second superoptimal form-meaning pair.

Tableau 10: Bidirectional optimization of *knife cuts bread* and *bread cuts knife*.

Kinyarwanda, example (7)	MARK TOPIC	PROM	SEL	PREC
1. <i>knife cuts bread</i> , cut' (knife, bread); knife is topic		*		
2. <i>knife cuts bread</i> , cut' (bread, knife); knife is topic		*	*	*
3. <i>knife cuts bread</i> , cut' (knife, bread); bread is topic	*	*		
4. <i>knife cuts bread</i> , cut' (bread, knife); bread is topic	*	*	*	*
5. <i>bread cuts knife</i> , cut' (knife, bread); knife is topic	*	*		*
6. <i>bread cuts knife</i> , cut' (bread, knife); knife is topic	*	*	*	

Tableau 10 (continued)

Kinyarwanda, example (7)	MARK TOPIC	PROM	SEL	PREC
7. <i>bread cuts knife</i> , cut' (knife, bread); bread is topic		*		*
8. <i>bread cuts knife</i> , cut' (bread, knife); bread is topic		*	*	

Let us now turn to the most problematic case, the bidirectional OT analysis of sentences (8) and (9). We have seen that object-fronting is not possible in this case. This can be explained by the interaction of PROMINENCE and SELECTION. In this particular case, satisfaction of the high-ranked constraint PROMINENCE goes hand in hand with a violation of SELECTION. This means that, quite counterintuitively, the pragmatically odd interpretation in combination with the form *child pierces needle* (as in (9) above) is in fact the first superoptimal pair, as it only violates SELECTION. The second superoptimal pair is the form *needle pierces child* (as in (8)) with the interpretation that satisfies SELECTION. This is shown in Tableau 11.

Tableau 11: Bidirectional optimization of *needle pierces child* and *child pierces needle*.

Kinyarwanda, examples (8) and (9)	MARK TOPIC	PROM	SEL	PREC
1. <i>needle pierces child</i> , pierce' (needle, child); needle is topic		*		
2. <i>needle pierces child</i> , pierce' (child, needle); needle is topic			*	*
3. <i>needle pierces child</i> , pierce' (needle, child); child is topic	*	*		
4. <i>needle pierces child</i> , pierce' (child, needle); child is topic	*		*	*
5. <i>child pierces needle</i> , pierce' (needle, child); needle is topic	*	*		*
6. <i>child pierces needle</i> , pierce' (child, needle); needle is topic	*		*	
7. <i>child pierces needle</i> , pierce' (needle, child); child is topic		*		*
8. <i>child pierces needle</i> , pierce' (child, needle); child is topic			*	

This section has illustrated the general concept of speaker-hearer interaction for the phenomenon of object-fronting in Kinyarwanda. Speakers take into account the hearers' perspective in that they only front an object if they can be sure that the hearer will be able to determine the correct (intended) interpretation. As a consequence, a speaker who wants to say about a child, who is the topic, that a needle pierces the child, cannot use object-fronting. Similarly, a speaker who wants to tell about a topic, the girl, that the boy kisses her, cannot use object-fronting either. In these cases, only subject-initial sentences are possible, whether the object is a topic or not. The question arises whether speakers can mark topicality at all in these cases. Besides object-fronting, languages often have alternative strategies to mark topicality, for example dislocation, pronominalization, or passivization. The next section investigates the role of animacy in the choice between active and passive structures.

4 Animacy and the competition between active and passive in Biak

Passives are sometimes argued to be a better construction choice than actives when the Patient is more prominent than the Agent (or alternatively, when the Agent is less prominent than the Patient), that is to say, when the Agent is demoted and the Patient is the most prominent argument, or the topic (Legendre et al. 1993; Aissen 1999). Malchukov (2006: 349) also argues that shifting to a passive structure can sometimes be the optimal solution, even though a passive structure is more marked than an active structure.

Animacy is one of the features that contributes to an argument's prominence, with animates being more prominent than inanimates. Cornelis (1997: 121) finds that while 66 % of the Agents in active transitive sentences are animate in written Dutch, only 35 % of the Agents in *by*-phrases (which she calls *causers*) in passive sentences are. This means that the majority of (overt) Agents in passive sentences is inanimate. Further investigation of the *animate* Agents in passives reveals that they have two main characteristics. First, animate Agents within Dutch passive constructions can be Agents with whom the speaker (and the hearer) should not want to identify, because of negative evaluation of the event or the Agent. For example, sentences with transitive verbs of violence such as *rape*, *stab*, and *kill* appear to be often passivized in Dutch newspapers (Cornelis 1997: 124). Second, animate Agents may be demoted to passive *by*-phrases when they are newly introduced to the discourse, hence non-topical (Cornelis 1997: 123).

subjects (or oblique Agents), leading to the realization of a passive. Most of these constraints do not pertain to all passives in a certain language, but depend on the prominence features of the arguments in the discourse. For example, *OBJ/X penalizes active clauses with high-prominent objects (Aissen 1999: 684). The approaches of Legendre et al. (1993) and Aissen (1999) suggest that some independent mechanism of determining discourse prominence will in fact trigger the use of passive constructions. However, even in languages that allow passivization, this process is not obligatory in case of a low-prominent Agent and a high-prominent Patient, as (15) illustrates (de Hoop 1999: 101).

(15) Then someone hit Robert/him with a stick.

A bidirectional optimization approach does not need Aissen's (1999) mechanism of local conjunction with a constraint that requires structural marking of semantically marked configurations, to derive the fact that passives are used in unexpected contexts (namely when the Agent is low-prominent and/or the Patient is high-prominent). Marking should follow from the bidirectional optimization procedure itself.

In Biak, an Austronesian language of Papua, passivization is extremely rare (van den Heuvel 2006: 296). Example (16) is an elicited example of a passive construction that is considered grammatical (van den Heuvel 2006: 297)

(16) Sansun naine neve-sawek.
 clothes these 3PL.PASS-tear
 'These clothes are torn.'

Van den Heuvel (2006: 297) points out that not all transitive verbs allow for passivization in Biak. He mentions the verb *marisn* 'enjoy' as an example of a formally transitive verb that cannot passivize. This is illustrated in (17).

(17) *Sup ine vyeve-marisn.
 land this 3SG.PASS-enjoy
 'This land is enjoyed.'

As van den Heuvel (2006: 297) notes, "[t]he limited distribution of the passive probably has to do with the fact that the language also has alternative strategies to demote the Agent, like the use of impersonal 3rd plural", as exemplified in (18) below. Van den Heuvel's informant judges the passive construction in (17) ungrammatical and provides him with the object-fronted (18) instead.

- (18) Sup ine si-marisn i.
 land this 3PL.ANIM-enjoy 3SG
 ‘This land they like.’

Other transitive verbs that cannot passivize in Biak are *nan* ‘eat’, *inm* ‘drink’, *rowr* ‘hear, listen’, *mam* ‘see, look’, *swar* ‘love’, *sewar* ‘look for’, *ros* ‘kick’ (Hengki, p.c.). Transitive verbs that do passivize in Biak quite unexpectedly require the promoted object to be third person inanimate. A human subject in a passive construction is excluded (Hengki, p.c.). This runs counter to the common insight that high-prominent Patients (such as local pronouns or animate or specific noun phrases) trigger passivization (cf. Aissen 1999).

- (19) Ankrai-bon anya vyeve-pów.
 orange-fruit the 3SG.PASS-peel
 ‘The orange is being peeled.’

Example (19) is a description of film scene at which the researcher held his hand over the Agent, asking what was happening in the picture (van den Heuvel 2006: 296). Yet, whereas the passive sentence (19) is grammatical, the passive counterpart of the active sentence (20a) in (20b) is ungrammatical (Hengki, p.c.).

- (20) a. S-pam roma ya.
 3PL.ANIM-shoot boy that
 ‘They shoot that boy.’
 b. *Roma ya vyeve-pam.
 boy that 3SG.PASS-shoot
 ‘That boy is being shot.’

This pattern is clearly unexpected and cannot be accounted for in Aissen’s (1999) unidirectional OT-syntactic analysis. However, we will show that the pattern can be accounted for in bidirectional OT. In Biak passives occur predominantly with inanimate Patients (van den Heuvel 2006). Strikingly, the use of a formally marked passive construction is allowed in the unmarked context (i.e. when the Agent outranks the Patient in animacy) instead of in the marked case. Aissen’s (1999: 684) basic insight is “that the unmarked situation is for a more prominent argument to be subject and for a less prominent one to be non-subject”. Therefore, we predict the use of a marked passive construction if the Patient is animate rather than if it is inanimate. However, what is conceptually marked in (19) is the mere fact that

the inanimate Patient is the topic. An inanimate Patient is exactly the type of argument that we normally do not expect to be the topic.

The pattern in Biak can be explained as follows: because passivization is extremely costly (and therefore extremely rare) in Biak, it only applies if the Patient is not sufficiently prominent by itself to be able to be interpreted as the topic. Therefore, the speaker has to mark the fact that an inanimate Patient is the topic explicitly. Human Patients count as inherently prominent because of their rank in the animacy hierarchy, and therefore they can independently be interpreted as the topic. As a consequence, passivization is not allowed. If the Patient is inanimate and therefore typically low-prominent, the speaker can use a passive construction to mark its high-prominence (topicality).

Tableau 12 sketches the bidirectional OT derivation of sentence (19). Because subject-verb agreement in Biak distinguishes between animate and inanimate subjects, AGREEMENT is a relevant constraint to consider, and because it goes hand in hand with SELECTION, we have collapsed the two as the highest ranked constraint in Tableau 12. Crucially, the constraint *SU/PAT that penalizes passives outranks *OBJ/X that penalizes a high-prominent object in Biak. Following van den Heuvel (2006: 297), we assume that passivization is not the only way to mark a topic in Biak. Satisfaction of this constraint is also possible by the use of lexical means such as specificity markers or pronouns, or by object-fronting (see (18) above). Therefore, MARK TOPIC would not be satisfied in the active counterpart of (19) if *the orange* is the topic, but it would be if the third person animate marker is the topic. In (19), the third person animate marker is implied, but not overt, which is why MARK TOPIC is not satisfied if 3PL is to be understood as the topic.

Tableau 12: Bidirectional optimization of active and passive in Biak.

Biak, example (19)	AGR/SEL	MARK TOPIC	*SU/PAT	*OBJ/X
1. 3PL <i>peel orange</i> , peel' (3PL, orange); 3PL is topic				
2. 3PL <i>peel orange</i> , peel' (orange, 3PL); 3PL is topic	*		*	*
3. 3PL <i>peel orange</i> , peel' (3PL, orange); orange is topic		*		*

Tableau 12 (continued)

Biak, example (19)	AGR/SEL	MARK TOPIC	*Su/PAT	*Obj/X
4. 3PL <i>peel orange</i> , peel' (orange, 3PL); orange is topic	*	*	*	
5. <i>orange is peeled</i> , peel' (3PL, orange); 3PL is topic		*	*	
⚠ 6. <i>orange is peeled</i> , peel' (3PL, orange); orange is topic			*	

Because passive constructions are necessarily constructions in which the Agent is demoted to an oblique phrase or omitted altogether, while the Patient is the grammatical subject, we do not need to take into account interpretations in which the Agent is the grammatical subject and the Patient is demoted (as these would be antipassive constructions, cf. Legendre et al. 1993). Hence, the passive structure only combines with two candidate interpretations, one in which the Agent is the topic and one in which the Patient is the topic.

Tableau 12 shows that for the inanimate Patient that is the topic, the passive form becomes superoptimal. By contrast, we have seen that in (20) passivization was prohibited because the Patient is human. This can be analyzed as in Tableau 13:

Tableau 13: Bidirectional optimization of active and passive in Biak.

Biak, example (20)	AGR/SEL	MARK TOPIC	*Su/PAT	*Obj/X
⚠ 1. 3PL <i>shoot boy</i> , shoot' (3PL, boy); 3PL is topic				*
2. 3PL <i>shoot boy</i> , shoot' (boy, 3PL); 3PL is topic	*		*	*
⚠ 3. 3PL <i>shoot boy</i> , shoot' (3PL, boy); boy is topic				*

Tableau 13 (continued)

Biak, example (20)	AGR/SEL	MARK TOPIC	*Su/PAT	*Obj/X
4. 3PL <i>shoot boy</i> , shoot' (boy, (3PL)); boy is topic	*		*	*
5. <i>boy is shot</i> , shoot' (3PL, boy); 3PL is topic		*	*	
6. <i>boy is shot</i> , shoot' (3PL, boy); boy is topic			*	

The difference between (19) and (20) is that the constraint mark topic is already satisfied by the overt expression of the human object in the active sentence (20a). A human object is necessarily high-prominent, which explains why the low-ranked constraint *Obj/X gets violated by both optimal readings of the active sentence, independently of whether 3pl or the boy is the topic. Thus, the active sentence is not only the optimal form when 3PL is the topic, but also when the boy is the topic. It is impossible to distinguish between the two interpretations on the basis of the structure alone. We assume the question which argument will be interpreted as the topic may be answered in a broader discourse context, or is left undecided. Hence, the pair that links the passive form to the interpretation in which the boy is the topic does not become superoptimal at all. This explains why the use of a passive in this case would lead to ungrammaticality (van den Heuvel 2006: 297; Hengki, p.c.). The next section will deal with another example of the competition between passivization and object-fronting as two possible topic-marking strategies in language.

5 Object-fronting versus passivization in Dutch psych verbs

Reconsider the subject-initial sentence in (1), repeated below as (21).

- (21) De gorilla heeft de vrouw gebeten.
 the gorilla has the woman bitten
 'The gorilla bit the woman.'

We have seen that in the absence of further contextual clues, object-fronting is not possible in (21), because the sentence would be interpreted as subject-initial. However, if one would like to topicalize *the woman*, being the most prominent participant in the event, there is an alternative strategy to do so in Dutch, namely to passivize the sentence. This strategy is much more common than object-fronting. Thus, the object of the active sentence gets promoted to the grammatical function of subject and becomes the topic of the sentence, as in (22) or (23):

- (22) De vrouw werd gebeten door de gorilla.
 the woman became bitten by the gorilla
 ‘The woman was bitten by the gorilla.’
- (23) Zij werd gebeten door de gorilla.
 she became bitten by the gorilla
 ‘She was bitten by the gorilla.’

So, if the object of a transitive verb gets the status of topic, there is a good strategy available to topicalize it to the sentence-initial position without violating the constraint PRECEDENCE, which indeed appears to be a high-ranked constraint in Dutch (Bouma 2008 in a corpus study of spoken Dutch finds that around 70 % of all sentences start with the subject in Dutch).

Tableau 14: Bidirectional optimization of active and passive in Dutch.

Dutch, examples (21)–(22)	SEL	PREC	*Su/PAT	PROM	MARK TOPIC
‡ 1. <i>gorilla bites woman</i> , bite’ (gorilla, woman); gorilla is topic				*	
2. <i>gorilla bites woman</i> , bite’ (woman, gorilla); gorilla is topic		*	*	*	
3. <i>gorilla bites woman</i> , bite’ (gorilla, woman); woman is topic			*	*	*
4. <i>gorilla bites woman</i> , bite’ (woman, gorilla); woman is topic		*		*	*

Tableau 14 (continued)

Dutch, examples (21)–(22)	SEL	PREC	*Su/PAT	PROM	MARK TOPIC
5. <i>woman bites gorilla</i> , bite' (gorilla, woman); gorilla is topic		*		*	
6. <i>woman bites gorilla</i> , bite' (woman, gorilla); gorilla is topic			*	*	
7. <i>woman bites gorilla</i> , bite' (gorilla, woman); woman is topic		*	*	*	*
⚠ 8. <i>woman bites gorilla</i> , bite' (woman, gorilla); woman is topic				*	*
9. <i>woman bitten by gorilla</i> , bite' (gorilla, woman); gorilla is topic			*		*
⚠ 10. <i>woman bitten by gorilla</i> , bite' (gorilla, woman); woman is topic			*		

Tableau 14 shows the optimal form-meaning pairs of the Dutch sentences (21) and (22). The two competing forms are the active and the passive sentences, as in (21) and (22). In principle, object-fronting is a possible (grammatical) form in Dutch, but as illustrated in Tableau 14, this leads to word order freezing (i.e. a subject-initial interpretation). In order to account for the marked status of a passive form, we again adopt Aissen's alignment constraint *Su/PAT ("Avoid subjects with the grammatical role of Patient"). Note, however, that we do not necessarily consider this constraint to be the one and only reason for passives to be throughout languages (see e.g. de Hoop and Malchukov 2008 for a different account). In Aissen's (1999: 689) analysis this constraint is overruled by a constraint that penalizes low-prominent subjects in English, in order to derive the use of a passive in English when the Patient is high-prominent. High-prominence is taken to be equivalent to being the topic in our analysis. Note that high-prominence of the Patient goes hand in hand with low-prominence of the Agent. In the canonical (active, transitive) case, the Agent outranks the Patient in animacy, in topicality, and in grammatical function.

The first two winning form-meaning pairs, i.e. the first and the eighth pair in Tableau 14, are the active sentences in which the sentence-initial argument is the topic as well as the subject, one meaning ‘The gorilla bit the woman’ and the other one ‘The woman bit the gorilla’. Both candidates satisfy the constraints PRECEDENCE (hence, the sentences are subject-initial) and *SU/PAT (which means that a passive construction is avoided, and the Agent ends up as the subject of the sentence). The third superoptimal form-meaning pair (candidate 10) violates this latter constraint. The result is a passive construction in which the Patient becomes the grammatical subject and is identified as the topic. The constraint PROMINENCE cannot be violated in a passive sentence, because it deals with the relation between subject and object in a transitive clause.

Whereas causative psych verbs that take an Experiencer object, such as *overtuigen* ‘convince’, can passivize in Dutch, unaccusative psych verbs such as *bevallen* ‘please’, which also take an Experiencer object, cannot (Lamers & de Hoop 2014). This relates to the different thematic roles of the subject of these two types of verbs. We have seen that passive formation is cross-linguistically characterized as demotion of the Agent. The subject of a causative psych verb is a Stimulus, which has more proto-Agent properties than the subject of an unaccusative psych verb, which is a Theme (cf. Primus 1999, 2012). As a consequence, the Stimulus subject of a causative psych verbs gets demoted in a passive construction, while the Theme subject of an unaccusative psych verb does not. The difference between causative and unaccusative psych verbs is reminiscent of the well-known distinction between unergative and unaccusative intransitive verbs. In Dutch, in general only unergative intransitives such as *werken* ‘work’ which have an Agent subject can passivize, while unaccusative intransitives such as *zakken* ‘fail’ can only incidentally (Hoekstra 1984; Zaenen 1993; Beliën 2016). The subject of unaccusative intransitives is not an Agent, but rather a Theme or a Patient. In other words, both unaccusative intransitive verbs and unaccusative psych verbs resist passivization, because there is no argument with sufficient proto-Agent properties to be demoted.

Lamers & de Hoop (2014) conducted a production experiment and found that object-fronting is relatively frequent in case of unaccusative psych verbs, while causative psych verbs give rise to the use of more passive sentences. Because a speaker cannot use a passive construction in the case of an unaccusative psych verb (as these verbs do not allow passivization), object-fronting is produced more easily and therefore also understood more easily. They claim that this can also account for the higher acceptability of object-fronting in the case of unaccusative psych verbs compared to causative psych verbs, that was found in Lamers (2001, 2007).

Lamers (2001) investigated how speakers of Dutch judge object-fronting in sentences with three different types of verbs, agentive verbs that select an animate subject, and the two types of psych verbs, which both require an animate object. She found an overall preference for subject-initial sentences (satisfaction of PRECEDENCE), but also that for the unaccusative psych verbs, the difference in rating between the subject-initial and object-initial sentences was smallest. Recall that there is no difference in animacy requirements between the two types of psych verbs. There is, however, another difference between the two: while causative psych verbs can passivize, unaccusative psych verbs cannot. The difference between the two types of psych verbs is shown in (24) and (25).

- (24) a. De foto overtuigde de man.
 the photo convinced the man
 'The photo convinced the man.'
- b. ??De man overtuigde de foto.
 the man convinced the photo
 'The photo convinced the man.'
- c. De man werd overtuigd door de foto.
 the man became convinced by the photo
 'The man got convinced by the photo.'
- (25) a. De foto beviel de man.
 the photo pleased the man
 'The photo pleased the man.'
- b. De man beviel de foto.
 the man pleased the photo
 'The photo pleased the man.'
- c. *De man werd bevallen door de foto.
 the man became pleased by the photo
 'The man got pleased by the photo.'

Because speakers of Dutch do not have the possibility to produce a passive form in the case of an unaccusative psych verb, fronting the animate object is the only option to start the sentence with the animate argument if it is the topic of the sentence.

Tableau 15 below shows that while in principle both object-fronting and passivization are possible with causative psych verbs, the passive structure is the optimal form used to express the interpretation in which the Patient (or rather, Experiencer) is the topic. This leaves the interpretation in which the man convinced

the photo, hence satisfying PRECEDENCE but crucially violating SELECTION, for sentence (24b) which would also explain the low score this order receives in the rating studies (Lamers 2001, 2007).

Tableau 15: Bidirectional optimization of causative psych verb in Dutch.

Dutch, examples (24)	SEL	PREC	*SU/PAT	PROM	MARK TOPIC
⚠ 1. <i>photo convinced man</i> , convince' (photo, man); photo is topic				*	
2. <i>photo convinced man</i> , convince' (man, photo); photo is topic	*	*			
3. <i>photo convinced man</i> , convince' (photo, man); man is topic				*	*
4. <i>photo convinced man</i> , convince' (man, photo); man is topic	*	*			*
5. <i>man convinced photo</i> , convince' (photo, man); photo is topic		*		*	*
6. <i>man convinced photo</i> , convince' (man, photo); photo is topic	*				*
7. <i>man convinced photo</i> , convince' (photo, man); man is topic		*		*	
8. <i>man convinced photo</i> , convince' (man, photo); man is topic	*				
9 <i>man convinced by photo</i> , convince' (photo, man); photo is topic			*	*	*
⚠ 10. <i>man convinced by photo</i> , convince' (photo, man); man is topic			*	*	

If we assume that unaccusative psych verbs in Dutch cannot passivize because they lack an Agent, then this form does not compete with the active forms. Tableau 16 shows how in that case object-fronting becomes the optimal expression of the interpretation in which the man is the topic.

Tableau 16: Bidirectional optimization of unaccusative psych verb in Dutch.

Dutch, examples (25)	SEL	PREC	*SU/PAT	PROM	MARK TOPIC
↳ 1. <i>photo pleased man</i> , please' (photo, man); photo is topic				*	
2. <i>photo pleased man</i> , please' (man, photo); photo is topic	*	*			
3. <i>photo pleased man</i> , please' (photo, man); man is topic				*	*
4. <i>photo pleased man</i> , please' (man, photo); man is topic	*	*			*
5. <i>man pleased photo</i> , please' (photo, man); photo is topic		*		*	*
6. <i>man pleased photo</i> , please' (man, photo); photo is topic	*				*
↳ 7. <i>man pleased photo</i> , please' (photo, man); man is topic		*		*	
8. <i>man pleased photo</i> , please' (man, photo); man is topic	*				

Lamers & de Hoop's (2014) explanation of the unexpected difference in rating between the two classes of psych verbs thus builds upon the fact that unaccusative psych verbs cannot passivize in Dutch. Hence, the only way in which the speaker who uses an unaccusative psych verb can satisfy MARK TOPIC when the Experiencer is the topic, is by object-fronting. In the case of causative psych

verb, however, passivization is an alternative strategy and a better (superoptimal) option to promote the topic.

6 Conclusion

This chapter used bidirectional Optimality Theory to analyze the interplay between competing structures and competing interpretations pertaining to the prominence (topicality) of (in)animate arguments. Several rather unexpected or even counter-intuitive patterns in different languages could be analyzed with a small set of independently motivated constraints that seem to hold across languages.

First, we analyzed the pattern in Kinyarwanda, in which object-fronting is allowed as long as the two arguments are distinguishable, but not if the object outranks the subject in animacy (Morimoto 2008). We showed that in the latter case bidirectional optimization over form-meaning pairs will lead the hearer to an infelicitous interpretation.

Second, we examined the puzzling pattern of passivization in Biak, where the subject of a passive has to be an inanimate Patient (van den Heuvel 2006). Usually, animate, or generally high-prominent, Patients are more likely than inanimate ones to end up as the subject in a passive sentence. We accounted for this by assuming that inanimate Patients are normally not interpreted as topics, but a speaker can mark their topicality by using a passive. By contrast, animate Patients can be interpreted as topics on the basis of other lexical or syntactic cues, and hence, they do not need (nor allow for) passivization.

Finally, based on Lamers & de Hoop (2014), we presented a bidirectional OT analysis of the interaction between the speaker's choice and the hearer's interpretation of object-fronting in case of Dutch Experiencer object verbs. We accounted for Lamers & de Hoop's (2014) finding that object-fronting is relatively frequent in case of unaccusative psych verbs, while causative psych verbs give rise to the use of more passive sentences. Because a speaker cannot use a passive in the case of an unaccusative psych verb (as these verbs do not allow passivization), object-fronting becomes the optimal structure in a context in which the animate object is to be interpreted as the topic.

Thus, we have formalized Lamers & de Hoop's (2014) insight that both the speaker's and the hearer's perspectives constrain object-fronting and passivization. Not only does the speaker take into account the hearer's perspective, taking into consideration the question whether the hearer will arrive at the intended interpretation on the basis of a given form, but the hearer takes into account the speaker's

perspective as well, taking into consideration the structural options the speaker has at their disposal to express a certain interpretation.

References

- Aissen, Judith. 1999. Markedness and subject choice in Optimality Theory. *Natural Language and Linguistic Theory* 17(4). 673–711. <https://doi.org/10.1023/A:1006335629372>.
- Beliën, Maaïke. 2016. Dutch impersonal passives: Beyond volition and atelicity. *Linguistics in the Netherlands 2016*, 1–13. <https://doi.org/10.1075/avt.33.01bel>.
- van Bergen, Geertje. 2011. *Who's first and what's next? Animacy and word order variation in Dutch language production*. Nijmegen: Radboud University Dissertation.
- van Bergen, Geertje & Helen de Hoop. 2009. Topics cross-linguistically. *The Linguistic Review* 26(2–3). 173–176. <https://doi.org/10.1515/tlir.2009.006>.
- Bickel, Balthasar, Alena Witzlack-Makarevich, Kamal K. Choudhary, Matthias Schlesewsky & Ina Bornkessel-Schlesewsky. 2015. The neurophysiology of language processing shapes the evolution of grammar: Evidence from case marking. *PLoS ONE* 10(8) e0132819. <https://doi.org/10.1371/journal.pone.0132819>.
- Blutner, Reinhard, Helen de Hoop & Petra Hendriks. 2006. *Optimal communication*. CSLI Lecture Notes (177). CSLI Publications, Stanford.
- Bouma, Gerlof. 2008. *Starting a sentence in Dutch. A corpus study of subject- and object-fronting*. Groningen: University of Groningen dissertation.
- Broadwell, George Aaron. 2006. Syntactic valence, information structure, and passive constructions in Kaqchikel. In Leonid Kulikov, Andrej L. Malchukov & Peter de Swart (eds.), *Case, valency, and transitivity*. 376–392. Amsterdam: Benjamins.
- Brunetti, Lisa. 2009. On the semantic and contextual factors that determine topic selection in Italian and Spanish. *The Linguistic Review* 26(2–3). 261–289. <https://doi.org/10.1515/tlir.2009.010>.
- Comrie, Bernard. 1989. *Language universals and linguistic typology*. Chicago, IL: University of Chicago Press.
- Cornelis, Louise H. 1997. *Passive and perspective*. Amsterdam: Rodopi.
- Dahl, Östen & Kari Fraurud. 1996. Animacy in grammar and discourse. In Thorstein Fretheim, Jeanette K. Gundel (eds.), *Reference and referent accessibility*, 47–64. Amsterdam: Benjamins.
- Dryer, Matthew S. 2013. Order of subject, object and verb. In Matthew S. Dryer & Martin Haspelmath (eds.), *The World Atlas of Language Structures Online*. Leipzig: Max Planck Institute of Evolutionary Anthropology. <http://wals.info/chapter/81> (2018-14-12).
- Fauconnier, Stefanie. 2011. Differential Agent marking and animacy. *Lingua* 121(3). 533–547. <https://doi.org/10.1016/j.lingua.2010.10.014>.
- Givón, Talmy. 1984. *Syntax: A functional typological introduction*. Amsterdam: Benjamins.
- van den Heuvel, Wilco. 2006. *Biak. Description of an Austronesian language of Papua*. PhD dissertation, Free University of Amsterdam. Utrecht: LOT.
- Hoekstra, Teun. 1984. *Transitivity: Grammatical relations in Government-Binding theory*. Dordrecht: Foris. <https://doi.org/10.1515/9783112327241>.

- de Hoop, Helen. 1999. Optimal case assignment. *Linguistics in the Netherlands 1999*, 97–109. <https://doi.org/10.1075/avt.16.10hoo>.
- de Hoop, Helen & Monique J. A. Lamers. 2006. Incremental distinguishability of subject and object. In Leonid Kulikov, Andrej L. Malchukov & Peter de Swart (eds.), *Case, valency, and transitivity*, 269–287. Amsterdam: Benjamins.
- de Hoop, Helen & Bhuvana Narasimhan. 2005. Differential case-marking in Hindi. Mengistu Amberber & Helen de Hoop (eds.), *Competition and variation in natural languages: The case for case*, 321–345. Amsterdam: Elsevier. <https://doi.org/10.1016/B978-008044651-6/50015-X>.
- de Hoop, Helen & Andrej L. Malchukov. 2008. Case-marking strategies. *Linguistic Inquiry* 39 (4). 565–587. <https://www.jstor.org/stable/40071453>.
- Lamers, Monique J.A. 2001. *Sentence processing: Using syntactic, semantic, and thematic information*. Groningen: University of Groningen dissertation.
- Lamers, Monique J.A. 2007. Verb type, animacy and definiteness in grammatical function disambiguation. *Linguistics in the Netherlands 2007*, 125–137. <https://doi.org/10.1075/avt.24.13lam>.
- Lamers, Monique J.A. & Helen de Hoop. 2014. Animate object-fronting in Dutch: A production study. In Brian MacWhinney, Andrej L. Malchukov & Edith Moravcsik (eds.), *Competing motivations in grammar and usage*, 42–53. Oxford: Oxford University Press.
- Lee, Hanjung. 2003. Parallel optimization in case systems. In Miriam Butt & Tracy Holloway King (eds.), *Nominals: Inside and out*. Stanford, CA: CSLI Publications.
- Legendre, Géraldine, William Raymond & Paul Smolensky. 1993. An Optimality-Theoretic typology of case and grammatical voice systems. *Berkeley Linguistics Society (BLS)* 19. 464–478. <https://doi.org/10.3765/bls.v19i1.1498>.
- Legendre, Géraldine, Michael T. Putnam, Henriëtte de Swart & Erin Zaroukian. 2016. Introduction. In Géraldine Legendre, Michael T. Putnam, Henriëtte de Swart, and Erin Zaroukian (eds.), *Optimality-Theoretic syntax, semantics, and pragmatics: From uni- to bidirectional optimization*, 1–31. Oxford: Oxford University Press.
- Lestrade, Sander, Geertje van Bergen & Peter de Swart. 2016. On the origin of constraints. In Géraldine Legendre, Michael T. Putnam, Henriëtte de Swart & Erin Zaroukian (eds.), *Optimality-Theoretic syntax, semantics, and pragmatics: From uni- to bidirectional optimization*, 179–199. Oxford: Oxford University Press.
- Malchukov, Andrej L. 2006. Transitivity parameters and transitivity alternations. Constraining co-variation. In Leonid Kulikov, Andrej L. Malchukov & Peter de Swart (eds.), *Case, valency, and transitivity*, 329–357. Amsterdam: Benjamins.
- Morimoto, Yukiko. 2008. From topic to subject marking: Implications for a typology of subject marking. In Helen de Hoop & Peter de Swart (eds.), *Differential Subject Marking*, 199–221. Dordrecht: Springer.
- Øvrelid, Lilja. 2004. Disambiguation of syntactic functions in Norwegian: Modeling variation in word order interpretations conditioned by animacy and definiteness. *Proceedings of the 20th Scandinavian Conference of Linguistics*, Helsinki.
- Perlmutter, David M. 1978. Impersonal passives and the unaccusativity hypothesis. *Proceedings of the Annual Meeting of the Berkeley Linguistics Society* 38. 157–189.
- Primus, Beatrice. 1999. *Cases and thematic roles: Ergative, accusative and active*. Tübingen: Niemeyer. <https://doi.org/10.1515/9783110912463>.

- Primus, Beatrice. 2012. Animacy, generalized semantic roles, and differential object marking. In Monique J.A. Lamers & Peter de Swart (eds.), *Case, word order and prominence: Interacting cues in language production and comprehension*, 65–90. Dordrecht: Springer.
- Rissman, Lilia & Kyle Rawlins. 2017. Ingredients of instrumental meaning. *Journal of Semantics* 34(3). 507–537. <https://doi.org/10.1093/jos/ffx003>
- Smolensky, Paul & Géraldine Legendre. 2006. *The harmonic mind: From neural computation to Optimality-Theoretic grammar*. Cambridge, MA: MIT Press.
- de Swart, Peter. 2007. *Cross-linguistic variation in object marking*. PhD dissertation, Radboud University Nijmegen. Utrecht: LOT.
- de Swart, Peter & Helen de Hoop. 2007. Semantic aspects of differential object marking. In Estela Puig-Waldmüller (ed.), *Sinn und Bedeutung* 11, 598–611. Barcelona: Universitat Pompeu Fabra.
- de Swart, Peter & Helen de Hoop. 2018. Shifting animacy. *Theoretical Linguistics* 44(1–2). 1–23. <https://doi.org/10.1515/tl-2018-0001>.
- Verhoeven, Elisabeth. 2014. Thematic prominence and animacy asymmetries. Evidence from a cross-linguistic production study. *Lingua* 143. 129–161. <https://doi.org/10.1016/j.lingua.2014.02.002>.
- Zaenen, Annie. 1993. Unaccusativity in Dutch: Integrating syntax and lexical semantics. In James Pustejovski (ed.), *Semantics and the Lexicon*, 129–161. Dordrecht: Kluwer.
- Zeevat, Henk. 2006. Freezing and Marking. *Linguistics* 44(5). 1095–1111. <https://doi.org/10.1515/LING.2006.035>.