

Deriving Pairedness in vP structure: Minimalist yet Optimal

Kyle Wade Grove

Mike Putnam

Cornell University

Carson-Newman College

Minimalist accounts lack a natural theory of markedness, whereas Optimality-Theoretical accounts fundamentally encode markedness. We think the duality of interfaces assumed in Minimalism is a step towards explaining pairedness behavior, where a given language exhibits a marked/ unmarked pair of items occupying the same niche. We argue that while Minimalism articulates the derivational aspect of language, and underlies grammaticality, an Optimality Theoretic articulation of PF and LF is conceptually natural and explains pairedness behavior. We adopt this ‘hybrid’ account, first, to explain the existence of marked (often termed ‘reflexive’) and unmarked anticausatives in German, recently studied in depth by Schäfer [2007].

1 Introduction

One of the hallmark features¹ that distinguish Optimality-Theoretical (OT) approaches from the family of approaches found within the Minimalist Program (MP) is the ease with which OT articulates a theory of markedness. OT features two types of constraints: faithfulness constraints, which favor candidates that are like the input over those that differ from it, and markedness constraints, which favor candidates that have some configuration or property over those that lack it, or vice versa. Following Moreton [2004, 145], OT employs markedness constraints to represent “the tendency of a grammar to prefer certain surface forms over others, while faithfulness constraints represent the tendency to keep the output like the input.”

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In contrast to the OT-framework, the MP lacks a natural notion of markedness. The assumption of discrete interfaces often dictates that the Sensori-motor (S/M) and Conceptual-intentional (C/I) do not independently vary; that a derivation must converge at both interfaces (e.g., namely, S/M and C/I); and that a form convergent at both interfaces is either grammatical, or not. As a result of the strictly derivational nature of structure building in Narrow Syntax, and the limited power of the representational components situated at the Interfaces, Minimalist approaches do not offer a theory of gradient markedness, nor do they permit correspondences between the interfaces.

In this respect, generalizations regarding correspondences between a form's phonetic manifestation and its semantic representation are difficult to couch in the MP, given that this approach holds to interfaces to be wholly separate, held in tandem by Narrow Syntax. However, Haiman [1983] and Haspelmath [1993, 2005] show that such correspondences are rife in the causative forms of languages: a causative form's relative phonological length is a predictor of its semantic yield. Haiman [1983] claims that in languages with multiple causative forms, relative phonological length of the causative is always seen to vary inversely with the causative's semantic directedness. Thus a language which possesses both a lexical causative and a periphrastic or syntactic causative form will realize the shorter form as the direct causative, with the requirement of an affected argument.

“If two causatives contrast within a given language...and they contrast semantically with respect to the conceptual distance between cause and result, then the conceptual distance between cause and result will correspond to the formal distance between cause and result” [Haiman, 1983, 783]

- (1) sa'â, ha na kee
cause NOM OPT eat

'Make him eat.' (=prepare food for him to eat).

- (2) s-kee
cause=eat
'Feed him' (= put the food directly into his mouth).
- (3) ni sa'â-de ha ni-nduu-kwa a-ri
PAST-cause-he NOM PAST-become-red-I
'He made me blush'
- (4) ni sa'â-kwa a-de
PAST-cause-red-he
'He painted (me) red.' [Haiman, 1983, 787].

Haspelmath [1993, 2005] observes, in fact, that the phonetic manifestation of the causative form corresponds with the productivity of the causative alternation.

Universal 24: [unrestricted] If the causal and the plain verbs have the same shape (=if a language has causal ambitransitives), the plain is always patientive/unaccusative, never agentive/unergative. [Haspelmath, 2005, 2]

- (5) The water boiled. We boiled the water.
The shirt dried. The sun dried the shirt.
The ice melted. The heat melted the ice.
The glass cracked. The high note cracked the glass. [Hale, 2000, 159]
- (6) The child laughed. *The clown laughed the child.
The baby cried. *The noise cried the baby.
Loretta sang. *We sang Loretta. [Hale, 2000, 159]

Minimalist approaches have no straightforward way of tackling these correspondences, because they maintain that S/M and C/I are discrete and wholly

separate, and that structures generated in Narrow Syntax much converge at both interfaces [Chomsky, 2000]. The assumption of discrete interfaces dictates that S/M and C/I do not independently vary, such that a form is either grammatical, or not; for instance, a crash at LF is assumed to crash the whole derivation.

Schäfer [2007] recently argued that reflexive *sich* marked anticausatives in German are not transitive, as opposed to *se/si* reflexive anticausatives in Romance. While both marked and unmarked anticausatives in German occupy essentially the same niche (expressing an event without a overt causer), according to Schäfer [2007], the two are markedly distinct; unmarked anticausatives are standard intransitive unaccusatives, but reflexively marked anticausatives are syntactically transitive with an expletive agent in the form of the reflexive marking. Expletive arguments would seem to represent a challenge for purely derivational syntactic theories; insertions of semantically null structure inherently seem to satisfy a representational opus. However, the Minimalist Program lacks the natural notion of markedness to express why the German marked anticausative form should exist at all; German marked anticausatives are assumed to be grammatical in Schäfer [2007]’s approach, even though they are vacuously transitive and receive extra phonetic manifestation. Likewise, the Minimalist desiderata of the interfaces do not readily permit explanations of what sort of special relationship marked and unmarked anticausatives might have, or more generally, explanations of Haspelmath [1993, 2005]’s observation that the phonetic manifestation of a causative form seems to affect its semantic properties as well.

In this paper, we approach the problem of formally distinguishing grammaticality from markedness by assuming the former to be a property of the operations in Minimalist Narrow Syntax and by assuming the latter to be a property of the operations at the Interfaces. As such, we propose a ‘hybrid’ OT-MP framework, in which a Minimalist Narrow Syntax over-generates structural representations which are filtered by gradient OT grammars at the S/M and C/I interfaces. These interface OT grammars are independent, such that a structure can be said to be C/I “marked” and S/M “optimal”, or, conversely,

S/M “marked” and C/I “optimal”. Thus, the framework naturally derives the marked/unmarked pair distinction, as derivationally related structures are independently evaluated at the interfaces. The framework also captures “impossible” correspondences [Haiman, 1983, Haspelmath, 1993, 2005] between SM and CI without assuming direct communication between the interfaces. Finally, the OT approach enables explanatorily adequate explanations of the nature of the interfaces; we are able to reduce the conceptual burden of representational filtering mechanisms by using OT to derive these representational filtering mechanism from the interaction of cognitively grounded constraints. This is congruent with the Minimalist desiderata [Chomsky, 2000] that Narrow Syntax is perfect, whereas the Interfaces are optimal solutions to requirements imposed on them, and are the locus of variation.

We assume the Distributed Morphology [Halle and Marantz, 1993, 1994] (henceforth, DM) underpinnings of the Schäfer account as our approach to Minimalist Narrow Syntax. DM rejects the Lexicalist approach of having a special lexical module, and instead argues that the various roles assigned to the Lexicon can instead be distributed to various derivational units. DM holds that the lexical component of intrinsic word meaning is syntactically instantiated with a derivational unit termed a “root”, noted with a \checkmark . This root corresponds roughly to what is often called the lexical verb in other areas of Minimalist inquiry. The root is essentially featureless, and thus free to Merge with other syntactic forms, although is not often thought of as being a possible target for feature checking or Movement. DM also holds that category is not a primitive, but is a derived notion; in the notation, the category-endowing environment is manifest as *v* or *a*, etc., and can be said to demarcate the division between l-syntax and syntax. Because the root is free in its ability to Merge, in the DM approach, subcategorization is policed primarily in a separate, non-syntactic module, known as the Encyclopedia, which matches the root’s syntactic instantiation, and the surrounding syntax, with its conceptual meaning. The Encyclopedia, particularly on Schäfer’s approach, can be seen as filtering out conceptually infelicitous

forms from an overgenerating Narrow Syntax.

The paper proceeds as follows. First, we present and examine the Schäfer data and analysis, and show that the data are part of a larger, potentially universal tendency [Haiman, 1983, Haspelmath, 1993, 2005] which Minimalist accounts have trouble articulating. After presenting Schäfer's account, we attempt to move past ad-hoc stipulation of the Encyclopedia, instead striving to employ our OT-interface approach to derive the Encyclopedia (particularly, Schäfer's compelling substantiation of it as a continuum of gradient knowledge) as an artifact of OT conflict resolution, from violable, grounded constraints. We motivate our own approach by first demonstrating how Sorace and Legendre used Power Hierarchies to derive other continua. Subsequently, we present our own approach, using tableau for each of the C/M and S/I interfaces to derive the correspondence between German marked and unmarked anticausatives, and show more generally how C/M and S/I can seem to correspond with each other without direct communication between the interfaces. Finally, we conclude by situating the Schäfer phenomenon in a larger context of generalizations Haiman [1983], Haspelmath [1993, 2005] regarding causative behavior crosslinguistically.

2 Marked and Unmarked Anticausatives in Germanic

Schäfer [2007, 199] presents data for a distinction between what he terms marked anticausatives, where an apparently intransitive verb manifests with a reflexive form, and unmarked anticausatives, which exhibit no such form.

German Marked Anticausatives

- (7) Die Tür öffnet *sich*
 the door opens REFL
 'The door opens'

German Unmarked Anticausatives

- (8) Die Vase zerbricht.
 the vase breaks
 ‘The vase breaks’

Italian Marked Anticausatives

- (9) La finestra si è chiusa.
 the window REFL are closed
 ‘The window closed’

Italian Unmarked Anticausatives

- (10) I prezzi sono aumentati.
 the prices are increased
 ‘The prices increased’

Schäfer argues that this *sich/si* form is not a true reflexive; he also refutes the analysis of the form as a telicity marker [Folli, 2001]. On Schäfer’s analysis, the form is syntactically transitive in German (and not Italian), and structurally akin, Schäfer [2006] argues, to a middle-voice construction. In Germanic, Schäfer argues, “sich” is an unbound pronominal which expletively fills the Agent role and external argument position, and thus permits vacuous causation to license anticausative meaning with a verbal root that is normally non-spontaneous. The intuition here is that a verb such as ‘destroyed’ or ‘opened’ may be difficult to use intransitively with anticausative meaning, by virtue of the inherently low spontaneity of destroying and opening events. The marked anticausative form, on Schäfer’s analysis, allows the expression of anticausative meaning with vacuously transitive syntax. For these reasons, Schäfer avoids use of the term *reflexive*, as well as the term *unaccusative*, as do we, so as to make clear the critical distinction between the transitive structure of German marked anticausatives, and the unaccusative structure of all other anticausatives under consideration in this paper.

Schäfer demonstrates that dative causer attachment to unmarked German and Romance anticausatives yields an ambiguity between affectedness and accidental readings of the dative causation.

German

- (11) Die Vase zerbrach dem Hans (aus Versehen)
 the vase broke the.DAT John (by mistake)
 ‘John was affected by the vase breaking’

‘John unintentionally caused the vase to break’ [Schäfer, 2007, 58]

Italian

- (12) A Franco sono appassite tutte le piante in giardino (per
 to Franco are.3.PL wilted.PL all the plants in.the garden (by
 errore)
 mistake)
 ‘All the plants in the garden wilted on Franco’

‘Franco accidentally caused all the plants in the garden to wilt’ (p.c. Roberta D’Alessandro and Chiara Frigeni as cited in Schäfer p. 84)

Schäfer submits that Germanic but not Romance marked anticausatives with dative causers do not exhibit affectedness readings, which Schäfer takes to be diagnostic of verb transitivity; on his account, Germanic marked anticausatives are syntactically transitive and block the structure yielding the affectedness reading, whereas their syntactically intransitive Romance counterparts permit this structure.

German

- (13) Die Vase zerbrach dem Hans (aus Versehen)
 the vase broke the.DAT John (by mistake)
 ‘John was affected by the vase breaking’

‘John unintentionally caused the vase to break’ [Schäfer, 2007, 58]

German

- (14) Der Maria öffnete *sich* die Tür (*aus Versehen)
 the.DAT Mary opened REFL the door by mistake
 ‘The door opened unintentionally and Mary was affected by this’

*‘Mary unintentionally caused the door to open’ [Schäfer, 2007, 58]

This evidence leads Schäfer to argue for the following typology of verb forms vis á vis verb transitivity, with active forms (including transitives and unergatives) as the most transitive forms, and unaccusative verbs as the most intransitive form. In the Schäfer analysis, anticausative-III represents the unmarked anticausative, with unaccusative structure, whereas anticausative-I and anticausative-II represent the German and Italian marked anticausative, respectively.

Interpretation:	Syntax:	Spell-Out:
active:	[Agent [VoiceD, agent [V [Root]]]]	(active)
passive:	[Voiceagent [V [Root]]]	(non-active)
anticausative-I:	[Expl. [VoiceD, [V [Root]]]]	(<i>sich</i>)
anticausative-II:	[Voice [V [Root]]]	(non-active, clitic- <i>si</i>)
anticausative-III:	[V [Root]]	(unmarked)

[Schäfer, 2007, 237]

That the typology situates the German marked anticausative between the polar extremes of transitivity renders the observation that German marked anticausatives are not intransitive, but in fact, vacuously transitive with an expletive external argument. This marking on the verb, Schäfer argues, reflects

the verbal root's lower event spontaneity; the transitivization on the verb vacuously satisfies the requirement that non-spontaneous events be caused. On his analysis, Romance and German both exhibit anticausative-3, as intransitive unmarked anticausatives. Where Romance and German differ is that Romance selects the intransitive anticausative-II as its marked form, whereas German selects the transitive anticausative-I as its marked form. That Germanic marked anticausatives are transitive suggests that the *sich* form is expletive, which is exactly Schäfer's conclusion. It also follows that the Romance *si* form is not an argument position, but the Spellout of *v*.

For Schäfer, event spontaneity is the main determinant of whether a given verb in the anticausative niche manifests as marked or antimarked anticausative. A highly spontaneous form can appear anticausatively without phonetic marking, but a less spontaneous verb root can only project in the anticausative niche as a marked anticausative [Schäfer, 2007] in German or as a middle voice construction [Schäfer, 2006]. On his approach, the conceptual knowledge of root-denoted event spontaneity is contained in the Encyclopedia, in the form of a continuum from highly spontaneous events to less spontaneous events.

Thus, the DM approaches of this type do uphold the Minimalist desiderata of locating variation at the interfaces: languages and their subcategorization preferences vary in the way the map this continua onto different root classes and their structural environments. What is less clear, however, is whether these continua can be explicated further.

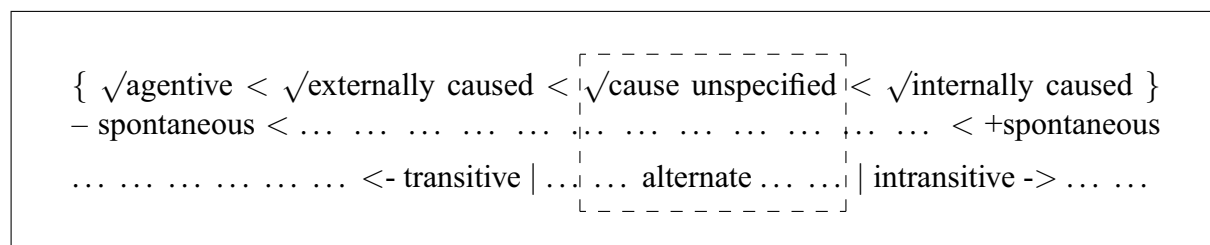


Figure 1: Schäfer 2007, Event Spontaneity Scale

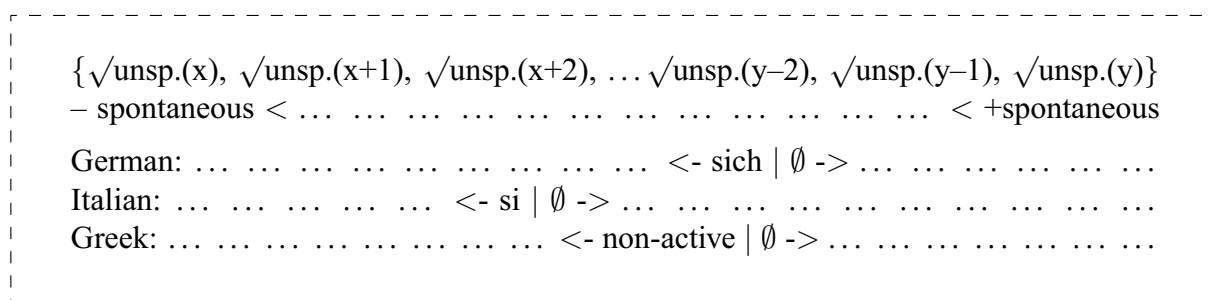


Figure 2: Schäfer 2007, Cross Linguistic Event Scale

3 The Limits of Minimalist Inquiry: PF/LF Independence, Conspiracy Effects, and Explanatory Adequacy

However, on Schäfer's DM approach, event spontaneity is necessarily not a fact about syntactic structure, but is an interface fact; in Distributed Morphology the Encyclopedia is seen to regulate which forms can correspond to a given concept. There are two problems here, however, both which stem directly from Minimalist desiderata regarding the interfaces.

First, correspondences between a syntactic item's phonological manifestation (reflexive marking on the anticausative) and its semantic manifestation (verbal event spontaneity) is not directly articulable in Minimalism, given that PF and LF are totally divorced from each other. Such a relationship, in fact, resembles a classic conspiracy effect of the type OT naturally accounts for. As pointed out by Kisseberth [1970], conspiracy effects, where multiple, but related, processes seem to converge towards or away from a target representation, emburden rule-based accounts. The problem conspiracy effects pose for rule-based accounts is that conspiracy effects involve multiple, related processes converging towards a representational onus, whereas the competing rule-based accounts of conspiracy phenomena are both redundant (as the multiple rules act separately on the same environment) and disjoint (as the multiple rules lack cohesive unity of purpose). We approach the German marked anticausative as a conspiracy effect. A highly spontaneous verb root is incompatible with an un-

accusative environment, so to express anticausative meaning, the structure must manifest as a vacuous causative with an oblique agent. This causative form in turn requires special phonetic marking in the form of an otherwise unbound pronoun; it is as if LF and PF processes were conspiring to save the anticausative construction as an expletive transitive, at the lesser cost of having an unbound expletive pronoun.

Second, the DM Encyclopedia is not derivational; as such, given the inventory of Minimalist tools, explanations from the Encyclopedia lack total explanatory adequacy (from the perspective of desiring explanatory adequacy for sub-categorization phenomena). We observe that Optimality Theoretic approaches have explanatory power to derive continuua such as those postulated in the Schäfer account in DM. For example, in the OT auxiliary selection literature [Sorace, 2000, Legendre and Sorace, 2003], continuua are shown to be derivable as a Power Hierarchy of violable constraints. Sorace [2000]’s Auxiliary Selection Hierarchy (ASH) (as cited in [3] [Legendre and Sorace, 2003, 3]), cross linguistically.

The Auxiliary Selection Hierarchy

CHANGE OF LOCATION Selects “BE” (least variation)

CHANGE OF STATE

CONTINUATION OF A PRE-EXISTING STATE

EXISTENCE OF STATE

UNCONTROLLED PROCESS

CONTROLLED PROCESSES (MOTIONAL)

CONTROLLED PROCESS (NON MOTIONAL) Selects “HAVE” (least variation)

The organizing principle of the scale is thematic agency, as the scale tends to map events with a proto-Agent [Dowty, 1979] onto unergative verbs, and events with a proto-Theme [Dowty, 1979] onto unaccusative verbs. Verbs in the categories at either end of this continuum consistently project as unaccusative or unergative, but verbs near the continuum’s center will be seen to vary cross - and intra-linguistically. However, though the scale is intuitive, it is purely descriptive, and thus ontologically onerous. Thus, Legendre and Sorace seek to

derive the ASH within the Optimality-Theoretical framework, grounding (in the OT sense of the term) this relationship within constraints of the cognitive niche. As such, they present the following constraint ranking, deriving the ASH.

**1/TE* >> **1/DIR* >> **1/ST* >> **1/-CON* >> **1/MOT*²

Likewise, we seek to derive the Schäfer event-root conceptual continua from cognitively grounded, attestable constraints. Whereas Legendre and Sorace derive the unaccusative/unergative structural dichotomy with constraints based on thematic agency, we explore the transitive/intransitive dichotomy by examining constraints based on event spontaneity.

4 Deriving Encyclopedic Constraints

Here, we endeavor to derive the typology of marked and unmarked anticausatives in a way that intuitively highlights the relatedness of the items of the pair, whether they be intransitive (as is the case in Romance) or vacuously transitive (as is the case in *sich* marked German anticausatives).

We adopt the following model: a feature driven, non-cartographic Narrow Syntax, permitting the operations Merge and Move; distinct interfaces to C/I and S/M, each represented as a gradient Optimality-Theoretical grammar; a Distributed Morphology approach to syntactic decomposition of predicates, with a locus as the *v*P shell. The model is also notable for what it does not contain: the derivational array within Narrow Syntax supplants (or is a notational variant of) GEN; LF constraints (including, but not limited to, the constraints proposed in Legendre and Sorace [2003] derive the Encyclopedia, and specifically, Schäfer's Event Spontaneity scale contained within; the Lexicon is a DM Lexicon, "distributing" the Lexical module across syntactic head environments (*v*), Roots

² **1/TE* bans the occurrence of [+TELIC] on the external argument, whereas **1/DIR* bans directed change (themehood) on the subject. **1/ST* prohibits the subject from being stative, while **1/-CON* prohibits non-controlling subjects (potentially, instrument subjects). **1/MOT* prohibits motion subjects.

within Narrow Syntax, and lexicon specific world knowledge into the interface to C/I.

We thus propose the following grounded constraints.

Constraints at the LF Interface

- (15) **DEP-Caus-: Non-spontaneous events lacking Causers are marked.**
- (16) **Express-Participant (E-Part): Event Participants must manifest morphosyntactically.**
- (17) **BindPro: Expletives are semantically marked.**
- (18) **DEP- θ : Maximize Thematic Distinctions (The Gradient Theta Criterion)**

These constraints are motivated accordingly. **DEP-Caus-** reflects the Schäfer intuition that absolutely non-spontaneous events, such as destruction and consumption events, are required in the Encyclopedia to have a causer. As such, the expression of these events in an agentless intransitive verb, is marked.

- (19) **“The chair destroyed”*

On a Distributed Morphology account of the Lexicon, the *particular* subcategorization facts regarding the \checkmark *appear* root are the responsibility of the Encyclopedia, and not the syntax per se³. **Express Participant (E-Part)** reflects the intuition that event participants should be structurally instantiated; structurally implicit event participants are a violation of faithfulness to the event expressed. Accordingly, a breaking event is more optimally expressed by a sentence such as “I broke the chair with a hammer” than a sentence such as “I broke the chair”. The same constraint tends to punish unaccusatives, which lack (both syntactically and semantically) a causing argument. Notably, this constraint bears similarity to a constraint we will propose in PF, **DEP-ARG**, with the distinction that the LF constraint is concerned with the mapping of prototypical event

³ As opposed to generalizations regarding subcategorization behavior, such as thematic roles or the general behavior of the causative alternation, which can be addressed under the DM model in syntactic, and not interface, terms. This again reflects the Minimalist desiderata that variation is an interface property.

participants in the Encyclopedia with structure, whereas the PF constraint **DEP-ARG** is concerned with the mapping of structure to Phonological Form.

BindPro observes that expletive unbound pronominals, such as in weather events—“it rained”,—are marked forms. Likewise, *sich* in German marked anticausatives is an expletive pronominal which is marked at LF. **DEP- θ** reflects that a structure’s thematic roles should be maximally distinct from each other. An intransitive verb is unmarked in this regard, by virtue of possessing only one argument. A transitive verb with canonically proto-Agent and proto-Theme [Dowty, 1979] represents a relatively unmarked form in this regard.

Constraints at the Phonetic Form Interface

- (20) **PRONOUNCE: Pronounce terminals. (Purely functional heads are marked.)**
- (21) **Express-Subevents (E-Sub):Complex events are denoted by multimorphemic forms.- (verbalizing heads are pronounced).**
- (22) **DEP-ARG:Argument positions are pronounced.**
- (23) **DEP-ROOT: Preserve lexical faithfulness to the root: (languages prefer to have ambitransitive causative pairs).**

With the adoption of a Bare Phrase Structure system and the abandonment of claims to special lexical modularity, no a priori distinction can be said to exist between lexical and functional heads. Rather, the distinction is an empirical one, and held to be a property of the interfaces, specifically PF. Thus, **PRONOUNCE** holds that non-overt morphemes, whether functional or lexical, are generally marked, and that nonviolation of this constraints entails pronouncing all merged elements.

Alas, the other constraints at PF give special emphasis to the relevant constituents of argument structure. **Express Subevents (E-Sub)** gives special emphasis to the functional-verbal aspect of argument structure, and its phonetic manifestation. Complex event structures (in the sense of their syntactic instantiation, and not the conceptual edifice itself) should be more phonologically instantiated than simple event structures. *Vis á vis* this constraint, “He broke the chair” is a complex event, a causing (sub)event and a breaking (sub)event, and

is unfaithful to the extent that the causation (*Voice*) and verbalizing (*v*) are not manifest at PF. **DEP-ARG** likewise holds that argument structures with covert arguments are marked. Despite the superficial similarity to the LF constraint **Express Participant**, we make a critical distinction: **Express Participant** is a mapping from the derivation to LF, requiring a conceptual event participant to have a structural manifestation, even if that structural manifestation is itself covert, whereas **DEP-ARG** is a mapping from the derivation to PF, requiring a structurally instantiated argument to have a manifestation at PF. Thus, for **DEP-ARG**, “The chair was dropped” should be less faithful than “the chair was dropped by Fred”. Contextually available arguments, such as agents in passives, should be pronounced. Finally, **DEP-ROOT**, often in conflict with **E-Sub**, requires faithfulness to root structure. As such, ambitransitive causative pairs, such as “He broke the chair” / “The chair broke”, are optimal with regard to **E-Sub**, as “break” is relatively faithful to the root “break” in both causative and anticausative.

There probably exists at least some redundancy in our PF constraints, and there may yet exist some overlap between our event spontaneity constraints and those in the Legendre and Sorace set. However, for the present purposes of deriving pairedness, we argue that the ends of the sets of constraints are orthogonal to each other; as our constraints specify the possible inventory of anticausatives, saying relatively little about which roots may map onto these specific forms, whereas the Legendre and Sorace set is much more explicit as to how a particular verb type maps onto one of these particular forms. Suffice it to say, we leave the task of mapping particular roots to the typology of anticausative structures for future work.

As previously stated, in our approach to the interfaces, we locate grammaticality as a syntactic property and markedness at the interfaces. We maintained the Minimalist desiderata that LF and PF are separate, and are both interpretive only of the output of Narrow Syntax. We gained the ability to express what appears to be communication between the interfaces by reconceptualizing them

as gradient, allowing a single grammatical output to be differentially optimal at PF and LF. As such, with two OT grammars at the interfaces, we have to slightly reinterpret what an optimal form is: an optimal form, for the purposes of the analysis here, is a form that is both grammatical in syntax and emerges as the optimal candidate in one of the two interface grammars. In actuality, a form which is highly marked in PF or LF would probably not be admissible by the system in general. For our purposes, this level of split markedness is dampened by the scale of the constraints themselves, which tend to be connected to the number of arguments, subevents, and the like, and thus tend not to incur gross violations at one interface while emerging as optimal at the other.

Our first tableau correctly derives predicts that English exhibits a single, ambitransitive, anticausative form by generating a form which is optimal in both the LF and PF tableau. The structures are represented first by their natural language phonetic form, then their syntactic structures, with *v* representing the DM verbalizing element, the root represented with the \checkmark symbol, and θ indicating the internal argument. Notably, the candidate sets for LF and PF are slightly different, as the English-type unmarked anticausative and the Italian-type marked anticausative are only distinct at PF, and are identical structurally and at LF. Winning candidates are indicated in italics.

Tableau 1: EnglishLF: BindPro >> Exp-Participant >> DEP-Caus- >> DEP- θ

PF: DEP-ROOT >> PRONOUNCE >> E-Sub >> DEP-ARG

LF	\checkmark BREAK	BindPro	E-Part	DEP-Caus-	DEP-θ
<i>The chair broke</i>	$[v [\checkmark$ BREAK $\theta]]$		*		
The chair self broke	$[\text{sich} [\text{CAUS} [v \checkmark$ BREAK $\theta]]]$	*			
PF	\checkmark BREAK	DEP-ROOT	PRON	E-Sub	DEP-ARG
<i>The chair broke</i>	$[v [\checkmark$ BREAK $\theta]]$		*	*	
The chair self broke	$[[(v \text{ si}) [\checkmark$ BREAK $\theta]]]$	*		*	
The chair self broke	$[\text{sich} [\text{CAUS} [v \checkmark$ BREAK $\theta]]]$		**		*
LF	\checkmark OPEN	BindPro	E-Part	DEP-Caus-	DEP-θ
<i>The door opened</i>	$[v [\checkmark$ OPEN $\theta]]$		*	*	
The door self opened	$[\text{sich} [\text{CAUS} [v \checkmark$ OPEN $\theta]]]$	*			
PF	\checkmark OPEN	DEP-ROOT	PRON	E-Sub	DEP-ARG
<i>The door opened</i>	$[v [\checkmark$ OPEN $\theta]]$		*		
The door self opened	$[[(v \text{ si}) [\checkmark$ OPEN $\theta]]]$	*			*
The door self opened	$[\text{sich} [\text{CAUS} [v \checkmark$ OPEN $\theta]]]$		**		*

At PF, **DEP-ROOT** is violated only when v is pronounced (as *si*), as occurs in the Romance intransitive marked anticausative. **PRON** is unviolated when v is pronounced as *si*. It is violated once in the unmarked form, as unaccusative v goes unpronounced, while in the transitively marked, vacuous-causative case, it is violated twice, as both the verbalizing element v and the causative head *CAUS* are silent.

At LF, our ranking for English ranks **BindPro** higher than **DEP-Caus-**. This, coupled with the high ranking in PF of **DEP-ROOT**, prevents the vacuous causation strategy from applying; the LF constraints ban vacuous transitivization to give a non-spontaneous event an anticausative structural instantiation, whereas the PF constraints penalize expletives in general. As such, we predict that English does not exhibit a German-type marked anticausative. In PF, the high position of DEP-ROOT also requires that intransitives be faithful to the root, preventing v from manifesting phonologically (as it does in Romance anticausatives, according to Schäfer).

As for German, we argue that at the LF interface, it ranks **DEP-Caus** constraint higher than the **BindPro** constraint. At the PF interface, German ranks **E-Sub** high. The tableau correctly predicts that a German intransitive must be

phonetically unmarked; a marked anticausative can however be produced by vacuously transitivity the verb, with an expletive external argument position (made relatively cheap by the low relative ranking of **BindPro**).

Tableau 2: German

LF: DEP- θ >> DEP-Caus- >> BindPro >> Exp-Participant

PF: E-Sub >> DEP-ROOT >> DEP-ARG >> PRONOUNCE

LF	\checkmark OPEN	DEP-θ	DEP-Caus-	BindPro	E-Part
Die Tür öffnet	[v [\checkmark OPEN θ]]		*		*
Die Tür öffnet sich	[sich [CAUS [v \checkmark OPEN θ]]]			*	
PF	\checkmark OPEN	E-Sub	DEP-ROOT	DEP-ARG	PRON
Die Tür öffnet	[v [\checkmark OPEN θ]]				*
Die Tür öffnet sich	[(v si) [\checkmark OPEN θ]]		*		
Die Tür öffnet sich	[sich [CAUS [v \checkmark OPEN θ]]]			*	**
LF	\checkmark BREAK	DEP-θ	DEP-Caus-	BindPro	E-Part
Die Vase zerbricht.	[v [\checkmark BREAK θ]]				*
Die Vase zerbricht sich	[sich [CAUS [v \checkmark BREAK θ]]]			*	
PF	\checkmark BREAK	E-Sub	DEP-ROOT	DEP-ARG	PRON
Die Vase zerbricht	[v [\checkmark BREAK θ]]				*
Die Vase zerbricht sich	[(v si) [\checkmark BREAK θ]]		*		
Die Vase zerbricht sich	[sich [CAUS [v \checkmark BREAK θ]]]			*	**

We correctly predict that the more spontaneous “break” event is optimal at LF and PF without expletive marking, similar to the English unaccusative anticausative. We also derive the prediction that the German marked anticausative strategy of vacuous causation is optimal at LF for the less spontaneous “open” event. However, the model overpredicts that “Die Tür öffnet” is a productive anticausative, as it is optimal at PF. We have no economical way of preventing this on the current model, other than to stipulate some weight of LF markedness relative to PF markedness. We admit that this is a shortcoming of the current model. However, we note that this is consonant with the intuition that violations in PF, such as those seen in the German marked anticausative, are more acceptable than violations at LF, such as “The chair destroyed”. We leave the resolution of this issue for future work.

However, in Italian, the relative high ranking of BindPro makes the vacuous transitivity strategy intractable; the high ranking of the PF constraint E-Sub permits the intransitive marked anticausative.

Tableau 3: ItalianLF: DEP- θ >> BindPro >> DEP-Caus- >> Exp-Participant

PF: E-Sub >> DEP-ROOT >> DEP-ARG >> PRONOUNCE

LF	\checkmark CLOSE	DEP-θ	BindPro	DEP-Caus-	E-Part
<i>La finestra si é chiusa.</i>	[<i>v</i> [\checkmark CLOSE θ]]			*	*
<i>La finestra si é chiusa.</i>	[<i>sich</i> [<i>CAUS</i> [<i>v</i> \checkmark CLOSE θ]]]		*		
PF	\checkmark CLOSE	E-Sub	DEP-ROOT	DEP-ARG	PRON
<i>La finestra é chiusa.</i>	[<i>v</i> [\checkmark CLOSE θ]]	*			*
<i>La finestra si é chiusa.</i>	[[<i>(v si)</i> [\checkmark CLOSE θ]]]		*		
<i>La finestra si é chiusa.</i>	[<i>sich</i> [<i>CAUS</i> [<i>v</i> \checkmark CLOSE θ]]]	*	*		**
LF	\checkmark INCREASE	DEP-θ	BindPro	DEP-Caus-	E-Part
<i>I prezzi si sono aumentati.</i>	[<i>v</i> [\checkmark INCREASE θ]]				*
<i>I prezzi si sono aumentati.</i>	[<i>sich</i> [<i>CAUS</i> [<i>v</i> [\checkmark INCREASE θ]]]]		*		
PF	\checkmark INCREASE	E-Sub	DEP-ROOT	DEP-ARG	PRON
<i>I prezzi sono aumentati.</i>	[<i>v</i> [\checkmark INCREASE θ]]	*			*
<i>I prezzi si sono aumentati.</i>	[[<i>(v si)</i> [\checkmark INCREASE θ]]]		*		
<i>I prezzi si sono aumentati.</i>	[<i>sich</i> [<i>CAUS</i> [<i>v</i> [\checkmark INCREASE θ]]]]	*	*		**

Again, we witness the same overgeneration problem as in German: although a marked anticausative form emerges as optimal at LF, the nonmarked form emerges at PF. Here, though, we fail to capture the distinction between the marked and unmarked forms in Italian, because on the current constraints, nothing is contingent in LF on the pronunciation of *v*. In general, we find that the unmarked forms in Italian and German reflect harmony between PF and LF, whereas the marked forms in the languages are LF optimal, but PF marked. We also capture the German strategy of vacuous causation, as the PF-marked candidate is made optimal at LF. German, resolves the conflict between the anticausative meaning and the inherent non-spontaneity of an “open” root by becoming vacuously transitive, and phonetically marking this with an expletive pronoun.

Our derivational approach to GEN as Narrow Syntax, intuitively articulates that a common derivational item can ship out to the OT interfaces, and can differentially manifest as an unmarked or marked form. On the other hand, a transitive, *sich* marked Germanic anticausative is derivationally related to the unmarked form; they are read off of different Spell-Outs, which allows our account to provide explanations for markedness pairs which bridge across the

intransitive/transitive divide. In order to motivate a Faithfulness-constraint approach to the same problem, we would be forced to argue for either the transitive or intransitive form as more natural, to serve as the input. This approach is not only stipulative, but empirically problematic given the convergence of recent work [Alexiadou et al., 2005, Pylkkänen, 2000] which suggests that neither the transitive or intransitive is a 'base' form for the derivation of the other, but rather that both transitive and intransitive verbs are derived structures.

5 Conclusion

5.1 Deriving the Interfaces

We showed that a revisualization of the interfaces as gradient, and moreover, as OT grammars, could account for two main problems in Minimalist approaches. First, representational constructs at the Interface, such as the continua posited by Schäfer, can be derived as OT grammars. The reason to adopt continua as opposed to a dichotomy is motivated by corner-case phenomena which behave as *x* for one diagnostic but not *x* for another. To this end, Legendre and Sorace examined cross-linguistic variation in split transitivity, by arguing that although the conceptual continua were universal, different languages map this continua onto structure differently. Subsequently, they achieved greater explanatory adequacy by deriving this descriptive continua from motivated, grounded constraints, centered around the concept of thematic agency. Similarly, we took Schäfer's continua as given, but sought to derive it from grounded constraints centered around event sponaneity.

5.2 Impossible Correspondences between LF and PF

Also, we showed how our hybrid approach could explain "impossible" correspondences between PF and LF. Given Minimalist recieved wisdom, if the derivation is to converge at both interfaces, it stands to reason we should never

seen derivations ‘inversely vary’, as both PF and LF share in the burden of determining grammaticality, via the ‘Crash’ mechanism. Yet exactly such a phenomenon seems to be operant in the Schäfer data. In German marked-anticausatives, a non-spontaneous event, at the conceptual level, is expressible as an anticausative iff: the event is mapped onto a transitive structure; this transitive structure has an expletive argument in the form of the reflexive marking; this expletive reflexive is manifest phonologically.

This relationship is not articulable in Minimalism, given that Minimalism holds that the derivation must converge at both interfaces. Yet, the Schäfer data is not epiphenomenal, but part of a much larger trend. In the literature on causatives [Haiman, 1983, Haspelmath, 1993, 2005], exactly such a relationship exists: in languages with multiple causative forms, the forms seem to vary inversely in phonological and semantic requirements.

Our approach naturally deals with impossible correspondences of this type. By actualizing the interfaces as gradient OT grammars which filter output from Narrow Syntax, the right correspondence between marked and unmarked pairs is achieved by allowing the constraints at the separate interfaces to be in conflict with each other—the very factors that mark a form more LF optimal will often serve to make it marked at PF, and vice versa. In German, marking the anticausative form for a nonspontaneous event solves the Encyclopedia problem in LF—the high degree of event spontaneity is mitigated by the transitivization of the verb. At the same time, the marking is ‘marked’ at PF—the expletive reflexive is highly marked. Thus, on our approach, markedness is an interface property, and can vary with the interfaces: a form can be optimal at PF but marked at LF, or marked at LF and unmarked at PF.

One of the innovations of our hybrid framework is that it is well-situated on conceptual grounds. We distinguish in a natural way grammaticality from markedness; it is a property of the computational system—any form which is optimal is grammatical, but not vice versa. Gradient variation is treated at the interfaces, as part of the distributed Lexicon; Narrow Syntax employs no more

than Merge and Move; and lexical factors can be addressed without resort to a distinct module with special generative operations, but rather, as filtering effects over syntactic products. We also move towards increased groundedness; Merge and Move are grounded within the recursive computational system, thought to be ‘perfect’, whereas our PF and LF constraints are grounded within the general cognitive niche, thought to be optimal and imposed on the syntax by the demands of language.

Bibliography

- A. Alexiadou, E. Anagnostopoulou, and F. Schäfer. The properties of anticausatives crosslinguistically. In *Phases of Interpretation*. Mouton, 2005.
- N. Chomsky. Minimalist Inquiries: The Framework. In J. Uriagereka R. Martin, D. Michaels, editor, *Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik*. MIT Press:Cambridge, MA, 2000.
- D. Dowty. *Word Meaning and Montague Grammar*. Reidel, Dordrecht: The Netherlands, 1979.
- R. Folli. *Deriving Telicity in English and Italian*. PhD thesis, Ph. D. thesis, Oxford University, Oxford, 2001.
- J. Haiman. Iconic and economic motivation. *Language*, 59(4):781–819, 1983.
- K. Hale. A Uto-Aztecan (’O’odham) Reflection of a General Limit on Predicate Argument Structure. *Uto-Aztecan: Structural, Temporal, and Geographic Perspectives: Papers in Memory of Wick R. Miller by the Friends of Uto-Aztecan*, 2000.
- M. Halle and A. Marantz. Distributed morphology and the pieces of inflection. *The View from Building*, 20:111–176, 1993.
- M. Halle and A. Marantz. Some key features of distributed morphology. *MIT working papers in linguistics*, 21:275–288, 1994.
- M. Haspelmath. More on the typology of inchoative/causative verb alternations. In M. Comrie, B. & Polinsky, editor, *Causatives and transitivity.*, volume 23, chapter Studies in Language Companion Series, pages 87–120. Amsterdam: Benjamins., 1993.

- M. Haspelmath. Explaining Syntactic Universals: Universals of Causative Verb Formation. Unpublished manuscript, LSA Institute, August 2005.
- C. Kisseberth. On the functional unity of phonological rules. *Linguistic Inquiry*, 1(3):307–322, 1970.
- G. Legendre and A. Sorace. Split intransitivity in French: an optimality-theoretic perspective. *Les langues romanes: problmes de la phrase simple*. Paris: CNRS ditions, 2003.
- E. Moreton. Non-computable functions in optimality theory. In J.J. McCarthy, editor, *Optimality Theory in Phonology: A Reader*. Wiley, 2004.
- L. Pykkänen. Representing Causatives. In B. Jackson and T. Matthews, editors, *Proceedings of SALT X (Semantics and Linguistic Theory)*, 2000.
- F. Schäfer. Middles as Voiced Anticausatives. *Proceedings of NELS*, 37, 2006.
- F. Schäfer. *On the nature of anticausative morphology*. PhD thesis, University of Stuttgart, 2007.
- A. Sorace. Gradients in auxiliary selection with intransitive verbs. *Language*, 76(4):859–890, 2000.

Kyle Wade Grove
Cornell University
Linguistics Department
203 Morrill Hall
Ithaca, NY 14850
kwg33@cornell.edu

Michael T. Putnam, Ph.D.
Carson-Newman College
Department of Foreign Languages
341 Henderson Hall
Jefferson City, TN 37760
mputnam@cn.edu