

Focus and Givenness Across the Grammar

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Abstract. This paper takes seriously the idea that a single expression can be simultaneously marked as given and as a focus, and works out some of the consequences of that assumption. I adopt Katz and Selkirk's (2011) suggestion that givenness is the flip side of newness rather than of focus, and argue that neither Rooth's semantics of focus nor Schwarzschild's analysis of givenness is by itself sufficient to account for a range of novel observations. I then show how both analyses can be maintained provided that the syntactic and phonological assumptions about focus/givenness marking and pitch accent assignment are appropriately revised.

Keywords: Focus · Givenness · Newness · Pitch accents

1 Introduction

In English, accentuation can affect the acceptability of a sentence in context. The standard approach to explaining these effects is to relate accent placement to identification of expressions as focused or given, provide a semantics for focus and for operators that are sensitive to focus, and place restrictions on discourse that are sensitive to the focal/given status of an expression. On the semantic/pragmatic side of grammar, three phenomena are standardly used for diagnosing focus: Contrast, Question-Answer Congruence (QAC), and Association With Focus (AWF).

(1) Contrast

A: John talked with Mary. Then,
B1: [BILL] *talked with Mary*.
B2: *John talked with* [SUE].
B3: *John KISSED Mary*.

(2) QAC

Q1: Who talked with Mary?	A1: [BILL] <i>talked with Mary</i> .
Q2: Who did Bill talk with?	A2: <i>Bill talked with</i> [MARY].
Q3: What did Bill do?	A3: <i>Bill</i> [talked with MARY]

(3) AWF

a. John talked with Sue. *Only* [BILL] *talked with* MARY.
b. John talked with Sue. BILL *only talked with* [MARY].
c. John asked Mary out to dinner. BILL *only* [TALKED with] MARY.

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In these examples, expressions identified as foci are placed in square brackets, capitals mark the location of a pitch accent, and italics indicate a lack of pitch accent. In the contrast examples, the foci are expressions that contrast semantically with something from the context sentence – *Bill* with *John* in (1a), *Sue* with *Mary* in (1b), and *kissed* with *talked with* in (1c). In the QAC examples, the focus is that part of the answer that corresponds to the *wh*-expression in the question. In the association examples, the focus is what gets substituted in generating a comparison class – *Bill* as opposed to *John* in (3a), *Mary* as opposed to *Sue* in (3b), and *talking with* as opposed to *asking out to dinner* in (3c).

On the phonological/phonetic side of grammar, a focus is typically pronounced with phonetic prominence: a pitch accent when new, lengthening when given. As can be seen by comparing A2 and A3 in the QAC examples, however, phonetic prominence is not in general sufficient to identify a semantic/pragmatic focus, as already noted in Chomsky (1971). Furthermore, while there is a tendency for prominence to be toward the right edge of a focus, as in A3, this tendency can be overridden by other considerations, as in the AWF example in (3c) where phonetic prominence shows up on the verb *talked* rather than on the equally in-focus *with*.

Givenness, like focus, affects how an expression relates to a discourse context. Schwarzschild (1999) argues that an expression is given iff it is entailed¹ by or coreferent with an antecedent. In the examples above, the italicized expressions outside of the foci all satisfy this requirement w.r.t. the context sentence/question that precedes them. On the phonological/phonetic side of grammar, givenness typically shows up as a lack of pitch accent. As can be seen in (2.A3), however, a lack of pitch accent does not by itself identify an expression as given. *Talked with*, in this example, bears no pitch accent and yet does not count as given in the context in which that example occurs.

The main challenge posed by examples like these is to provide a formal analysis that encompasses both the semantic/pragmatic side and the phonological/phonetic side of grammar and that predicts felicitous and infelicitous patterns of pitch accent assignment in different discourse contexts. In this paper I will examine in detail two analyses that aim to solve portions of this problem, those of Rooth (1992, 1995) and of Schwarzschild (1999). I will show that neither analysis on its own accounts for the full extent of what it sets out to explain, let alone what the other analysis does best. I show this by setting out four empirical challenges that any complete theory of focus and givenness needs to be able to account for, and showing that neither analysis can account for all four. I then propose to maintain Rooth's analysis of focus unmodified while making changes in the syntax and phonology of Schwarzschild's analysis to explain all four challenges. The solution to the problems will rely crucially on Katz and Selkirk's (2011) proposal that givenness is the complement not of focus but of newness.

In setting out the problems and the proposed solutions below, I will be implicitly assuming the following organization of grammar:

Pragmatics ↔ Semantics ↔ Syntax ↔ Phonology ↔ Phonetics

¹ See Schwarzschild (1999) for details and below for a somewhat simplified discussion.

The significance of this organization lies in the accessibility relations it licenses. A pragmatic restriction on appropriateness of a sentence in a given context, for example, can directly access the semantic interpretation of the sentence, but does not have direct access to the syntax, phonology or phonetics of that sentence under this assumption. If it is found that a certain phonetic aspect of a sentence correlates in some way with discourse appropriateness, under this organization of grammar that connection can only be explained by way of a chain of connections linking the phonetics to the phonology, the phonology to the syntax, the syntax to the semantics, and the semantics to the pragmatics. While not always made explicit, the analysis pursued in this paper obeys the restrictions implicit in this organization of grammar.

2 Previous Analyses

2.1 Schwarzschild (1999)

Schwarzschild adopts from Selkirk (1984, 1996) the idea that pitch accents in the phonology affect discourse felicity indirectly through their relation to F-marking in the syntax. While F-marking is given a direct phonological interpretation, however, in the semantics it receives no interpretation. Rather, only absence of F-marking is directly interpreted, as givenness. Summarizing and slightly simplifying,

- Schwarzschild’s Analysis of Givenness**
- If x is of type e , x is given iff it has a coreferential antecedent.
- If x is of a conjoinable type (i.e. $\langle \dots, t \rangle$), x is given iff its existential F-closure is entailed by an antecedent modulo existential type shifting.
- Givenness:** Non-F-marked expressions must be given.
- AvoidF:** F-mark as little as possible within the bounds of Givenness.
- Basic F-Rule:** An accented word is F-marked.
- Foc-Rule:** Foc-marked material must contain an accent.
(A Foc-marked node is an F-marked node that is not immediately dominated by another F-marked node.)

The existential type shift of an expression of conjoinable type closes any open arguments through existential closure, creating an interpretation of type t . Existential F-closure applies to the result, replacing F-marked expressions with existentially bound variables of the same type.² The result is of type t and hence something that can be entailed. To see how this applies, consider the contrast example (1A-B2), repeated here with F-marking made explicit:³

(1) A:	John talked with Mary. Then, B2: [<i>John</i> [<i>talked with</i> [SUE _F]]]	
	Non-F-marked expressions	Existential type shift
	John talked with SUE _F	John talked with Sue _F
	talked with SUE _F	$\exists y$ (y talked with Sue _F)
	talked with	$\exists x \exists y$ (y talked with x)
	John	----
		Existential F-closure
		$\exists x$ (John talked with x)
		$\exists x \exists y$ (y talked with x)
		$\exists x \exists y$ (y talked with x)

Since there is only a single F-mark in the sentence, that on *SUE*, every other constituent in the sentence is required to be given. With the exception of *John*, the result

² The ordering of existential type shifting before existential F-closure is unnecessary in the official formalization proposed in Schwarzschild (1999), which makes no explicit use of variables in interpreting F-marked expressions. The simplification used here (and by Schwarzschild himself) does not affect any of the arguments in this paper.

³ I treat *talk with* here as a single lexical item for simplification.

of applying existential type shift and existential F-closure is in all cases entailed by the context sentence *John talked with Mary*. These expressions thus all count as given in the context, as required. In addition, *John* counts as given since it has a coreferent antecedent in the context sentence. In addition to the requirements of givenness, AvoidF also requires that the F-marking assigned be minimal. This requirement too is clearly met. F-marking cannot be removed from *Sue* since there is no expression in the context that is coreferent with *Sue*, and any additional F-marking would violate AvoidF.

Schwarzschild shows how the above analysis can apply to cases of QAC like those in (2). The key to making the account work is to associate *wh*-questions like *What did Bill do?* with existential formulas like $\exists P(P(\text{Bill}))$ (or perhaps $\exists P(P(\text{Bill}) \ \& \ \text{action}(P))$) for the purpose of licensing givenness. This makes it possible to analyze the answer in (2.Q3-A3), for example, as follows:

(2) Q3: What did Bill do? Non-F-marked expressions Bill [talked-with _F MARY _F] _F Bill	A3: [Bill [talked-with _F MARY _F] _F] Existential type shift Bill [talked-with _F Mary _F] _F ----	Existential F-closure $\exists P (P(\text{Bill}))$ ----
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Note that existential F-closure here only substitutes a variable for the highest F-marked expression, i.e. the Foc, not for the F-marked sub-constituents contained inside that expression. This means that for givenness to be satisfied the context only needs to contain an antecedent that entails that some property holds of Bill, not that some relation holds between Bill and some individual. Given Schwarzschild’s analysis of questions this requirement is met. Since *Bill* also has a coreferent antecedent in the context, givenness is satisfied. It can further be seen that removing any of the F-marks would result in a violation of givenness, since there is no coreferring antecedent for *Mary*, and the context does not entail either that there was any talking or that Bill is related to something. Thus this analysis also satisfies AvoidF.

While Schwarzschild accounts well for the examples in (1) and (2), he does not account for the AWF examples in (3) for the simple reason that he does not provide an analysis of *only*. To see what is at issue, consider (3b) (= John talked with Sue. *BILL only talked with [MARY]*.) The pitch accent on *Mary* is required here because it lacks a coreferential antecedent in the context. However, nothing in Schwarzschild’s analysis predicts that this should result in *Mary* appearing to associate with *only*. F-marking is not given a direct interpretation, only lack of F-marking is, but even that is only related to discourse felicity and not to the semantics of associative particles like *only*. At the very least, then, Schwarzschild’s analysis will need to be supplemented with an analysis of *only* that can account for its apparent association with F-marked expressions. I will argue below that such an analysis can be given, but only by allowing F-marking to play a role in the semantics, and hence by giving up Schwarzschild’s assumption that only lack of F-marking is relevant to the semantics/pragmatics.

2.2 Rooth (1992, 1995)

Like Schwarzschild, Rooth assumes that phonological/phonetic focus is given a syntactic representation. Unlike Schwarzschild, Rooth takes the representation of focus to have a direct interpretation in the semantics. Formally, focus on an expression gives rise to a set

of type-identical alternatives to that expression, the focus semantic value (FSV) of the expression. The FSV of a non-focused expression is the set that results from pointwise composition of expressions in the FSVs of its daughters. In the case of an expression not containing any focus, its FSV is the unit set of its normal semantic value.

Rooth's Analysis of Focus Semantic Values

Terminal nodes:

$\llbracket x_F \rrbracket^f$ = the focus semantic value of x_F
 = the set of all alternatives to the normal semantic value of x (i.e. to $\llbracket x \rrbracket^o$)

$\llbracket x \rrbracket^f$ = $\{\llbracket x \rrbracket^o\}$

Non-terminal nodes:

$\llbracket x_{(F)} y_{(F)} \rrbracket^f$ = $\{x'(y') : x' \in \llbracket x_{(F)} \rrbracket^f \& y' \in \llbracket y_{(F)} \rrbracket^f\}$
 (where x is of type $\langle \sigma, \tau \rangle$ and y of type σ , order irrelevant)

While FSVs are properly semantic, they only affect truth conditions and discourse appropriateness for Rooth through their interaction with the \sim operator. This operator uses the normal and focus semantic values of an expression to place restrictions on a discourse variable. For an expression of the form $\llbracket [X] \sim C \rrbracket$, the variable C is presupposed to either be a member of $\llbracket [X] \rrbracket^f$ that is distinct from $\llbracket [X] \rrbracket^o$, or a subset of $\llbracket [X] \rrbracket^f$ that contains both $\llbracket [X] \rrbracket^o$ and one meaning distinct from $\llbracket [X] \rrbracket^o$. Since C is taken to be anaphoric, the \sim operator can account for the interaction between focus in a sentence and the discourse context it occurs in. To see how, consider again (1.A-B2), repeated with the required focus marking (F), indexing and \sim operator made explicit.

(1) A: $\llbracket \text{John talked with Mary} \rrbracket_1$, Then, B2: $\llbracket [\text{John talked with } SUE_F] \sim C_1 \rrbracket$

The \sim operator operates over the FSV of the expression it attaches to, making it necessary to calculate this value. The relevant calculations are given below.

x	$\llbracket x \rrbracket^o$	$\llbracket x \rrbracket^f$
SUE_F	Sue	$\{x : x \in D_e\}$
talked with	$\lambda x \lambda y. \text{talked-with}(y,x)$	$\{\lambda x \lambda y. \text{talked-with}(y,x)\}$
talked with SUE_F	$\lambda y. \text{talked-with}(y,Sue)$	$\{\lambda y. \text{talked-with}(y,x) : x \in D_e\}$
John	John	{John}
John talked with SUE_F	$\text{talked-with}(\text{John},Sue)$	$\{\text{talked-with}(\text{John},x) : x \in D_e\}$
$\llbracket \text{John talked with } SUE_F \rrbracket \sim C_1$	$\text{talked-with}(\text{John},Sue)$	$\{\text{talked-with}(\text{John},Sue)\}$

The value of C_1 is presupposed in this case to be a member of the set $\{\text{talked-with}(\text{John},x) : x \in D_e\}$ that is distinct from $\text{talked-with}(\text{John},Sue)$. Taking C_1 to be anaphoric on A in (1) (indicated by co-indexing) satisfies this presupposition.

While the analysis just given for (1.A-B2) does not mention givenness, it does indirectly impose givenness on *John talked with*. Every formula in the FSV of *John talked with SUE_F* will be of the form $\text{talked-with}(\text{John},x)$, with some individual substituted for x , and the antecedent for C needs to be a member of this FSV. The antecedent will thus have to contain *John talked with* under this analysis of (1.B2).⁴ However, Rooth does not impose any minimization conditions on focus identification, leaving open different possible identifications of focus. Adopting standard assumptions about the relation between pitch accents and foci, focus in this example could be on the PP *with SUE*, the VP *talked with SUE* or on the S *John talked with SUE*. Each of these

⁴ As we will see below, the focus antecedent can follow rather than precede the interpretation of focus, something that is not possible for givenness. This is problematic for an analysis like Rooth's that reduces givenness to focus.

alternatives effectively results in a weaker constraint on what must be given, the last requiring nothing to be given at all. This means Rooth's overall analysis of focus does not account for the intuition that *John talked with* in (1.B2) is felt to be given in the context in which it occurs. This shortcoming could be overcome by adding a preference for narrow focus over broad whenever appropriate, a charitable assumption I will make both here and below. (See Truckenbrodt 1995 and Wagner 2012 for related discussion.)

Rooth's analysis applies straightforwardly to the QAC examples as well. The analysis differs from that given above in that the variable introduced by \sim is taken to have a set of propositions as its value rather than a single proposition. The relevant analysis of the example in (2.Q3-A3) will be as follows:

(2) Q3: [What did Bill do?]₂ A3: [[Bill [talked-with MARY]_F] \sim C₂]

The value of C₂ here is presupposed to be a subset of the FSV of the sentence that \sim C₂ attaches to, i.e. $\{P(\text{Bill}): P \in D_{et}\}$. Identifying the question in Q3 as the antecedent of C₂ satisfies this presupposition, rendering the sentence felicitous.

Unlike Schwarzschild's analysis, Rooth's analysis is specifically designed to be able to handle AWF examples. *Only* operates semantically over both the normal semantic value of its sister and a discourse variable, requiring that the normal semantic value of the sister be the only value in the value of the discourse variable that will make the sentence true. By identifying this discourse variable with the variable introduced by a \sim operator attached to the sister, the appearance of association follows, as illustrated below.

(4) John [kissed Mary and Sue]₃, Bill only(C₃) [[kissed MARY]_F] \sim C₃
 = [[only] (C₃) ([[kissed MARY]_F]^o) ([[Bill]]): presupposition: C₃ \subseteq [[kissed MARY]_F]^f
 Set C₃ = $\{\lambda y.kissed(y,m), \lambda y.kissed(y,s)\}$
 = [[only] ($\{\lambda y.kissed(y,m), \lambda y.kissed(y,s)\}$) ($\lambda y.kissed(y,m)$) (bill)]

The final line is true iff the only member of $\{\lambda y.kissed(y,m), \lambda y.kissed(y,s)\}$ that is true of Bill is $\lambda y.kissed(y,m)$, deriving the appearance of association with *Mary*.

3 Empirical Challenges

In this Sect. 1 examine four empirical challenges that any analysis of focus and givenness needs to account for. I will show that neither the analysis of Rooth nor that of Schwarzschild can account for all four of the challenges.

3.1 Given Foci

The first challenge is the existence of expressions that simultaneously qualify as given and as focused. Two subcases need to be distinguished: those in which the relevant expression is marked phonologically/phonetically only as focused, as in the case of (5), and those in which the expression is phonologically/phonetically identified as both focused and given, as in (6).

- (5) Contrast:
Mary's father saw Bill. Then *he* HEARD MARY/#Mary.

QAC:
Q: Who did Mary's father see? A: *He* saw MARY/#Mary.

AWF:
Mary's father saw many people. However, *he only* HEARD MARY/#Mary (& nobody else).

In all three cases in (5), the final occurrence of *Mary* counts as given, having a coreferent antecedent in the first sentence. However, it also qualifies as focused, contrasting with *Bill*, answering to *who*, and associating with *only*. In all cases it surfaces phonetically with an obligatory pitch accent. These cases contrast with those in (6). (Here *SMALL CAPS* indicate phonetic prominence in length and intensity but not pitch accent.)

- (6) Contrast:
John saw Mary and Sue saw Bill. Then,
ALICE saw #*er*/HER/#HER/MARY/#MARY and TOM saw #*'im*/HIM/#HIM/BILL/#BILL

QAC:
John saw Mary. Who did Bill see?
BILL saw #*er*/HER/#HER/MARY/#MARY

AWF:
John saw Mary. In fact, *he ONLY* saw #*er*/HER/#HER/MARY/#MARY.

In these latter cases, the object *Mary/her* once again qualifies semantically/pragmatically as both given and a focus. In contrast to the cases in (5), however, in these examples *Mary/her* cannot surface with a pitch accent, suggesting that it is obligatorily marked as given.⁵ Unlike other occurrences of given pronouns, however, *her* in these examples cannot be fully reduced, suggesting that it is also focused. (Cf. Rooth 1996, Beaver 2004, and Selkirk 2008 for further evidence of expressions that are both focused and given.)

These cases are problematic for both Rooth and Schwarzschild. Rooth can account straightforwardly for the pitch accents in (5). These pitch accents identify the accented expressions as focused, and in all cases they act as focused in the discourse. If Rooth were to take focus to be marked obligatorily in the syntax on an expression that qualifies as a focus in the semantics/pragmatics, he could furthermore account for the obligatory nature of these pitch accents. However, such an extension would land him in hot water with respect to (6). It would lead to a prediction of obligatory accenting in these examples as well, but accenting is infelicitous here. Since givenness for Rooth is simply a side effect of focus interpretation, he has no way of analyzing *Mary/her* in (6) as both focused and given.

Schwarzschild is in no better shape than Rooth. While Schwarzschild explicitly claims that being given does not preclude being F-marked and hence potentially accented,

⁵ For the QAC example, pronouncing *Mary* with a pitch accent is possible in the context given, though doing so gives the impression that the answerer is ignoring the first sentence and relating the answer exclusively to the question. Since *Mary* is not given with respect to the question, accentuation would be expected in this case. This same accenting option is not available for an anaphorically interpreted *her* in this context, presumably because the anaphora makes it impossible to exclude the first sentence from the relevant discourse context.

he has no way of distinguishing between the cases in (5) where F-marking wins out over givenness in the phonetics and the cases in (6) where both givenness and focus are given equal weight in the phonetics. Particularly problematic for Schwarzschild is the impossibility of deaccenting *Mary* in the Contrast and AWF examples in (5). Since *Mary* is given in these contexts and its givenness is compatible with all other accentless expressions being identified as given, lacking an F-mark should be a possibility, and so by AvoidF it should be the only possibility. Without an F-mark, however, *Mary* should at least be allowed to not be accented, but the pitch accent on *Mary* is obligatory.

3.2 Non-constituent Foci

The second empirical challenge comes from expressions that together appear to function as a single focus for the purposes of semantics/pragmatics but which do not form a syntactic constituent.

- (7) Contrast:
 a. A: John fell. B: [MARY TRIPPED] *him*.
 b. A: John saw pictures of Mary. B: BILL *saw* [SUE'S SCULPTURE] *of Mary*.
- (8) QAC:
 a. Q: What happened to John? A: [MARY TRIPPED] *him*.
 b. Q: What did John see relating to Mary? A: *He saw* [SUE'S SCULPTURE] *of her*.
- (9) AWF:
 a. Sue doesn't know that John cried. She knows only that [MARY TRIPPED] *him*.
 b. John didn't see Mary. *He saw* only [SUE'S SCULPTURE] *of Mary*.

Schwarzschild can give a straightforward account of the examples in (7) and (8) by F-marking not only the pitch accented words but also several of the constituents dominating these words. For example, the (a) cases can be analyzed as containing the structure [MARY_F [TRIPPED_F *him*]_F]. The F-marking on *Mary* and on *tripped* is needed since these are not given in the discourse context, while the absence of F-marking on *him* is justified by its having a coreferent antecedent. That the F-marking of the VP is necessary can be seen from the fact that eliminating this F would require the sentence to have an antecedent that entailed $\exists x, R (R(x, j))$. That is, the context would need to contain a two place predicate, one of whose arguments is *John*. This requirement is patently not met in these examples, making F-marking on VP a necessity, but also sufficient for accounting for the examples. Once again, since Schwarzschild does not analyze the phenomenon of AWF he has no account for the examples in (9).

The success of Schwarzschild's analysis in accounting for (7) and (8) comes from its ignoring F-marked expressions in determining the givenness of a non-F-marked type *e* expression. Rooth, on the other hand, assigns a central role to focus marking in calculating the FSV of an expression, and this causes problems. If we take pitch accent location to indicate F-marking, the (a) cases in (7)–(9) will have the following syntactic analysis: [[MARY_F [TRIPPED_F *him*]] ~ C]. This analysis will lead to the presupposition that C is a member of {R(x, j): R ∈ D_{<e, et>} & x ∈ D_e}, i.e. that C is a proposition constructed from a 2-place predicate and two arguments, one of which is *John*. There is no antecedent in any of the (a) examples of (7)–(9) that satisfies this

presupposition, however, leading to the incorrect prediction that these examples should be infelicitous. Adding F-marking to the VP and/or the S will potentially avoid this problem, but only at a cost. Adding F-marking to the VP will lead to C having to be a member of $\{P(x): P \in D_{et} \ \& \ x \in D_e\}$. Adding F-marking to S will lead to C having to be a member of $\{p: p \in D_t\}$. These presuppositions are easily satisfied in the contexts of (7)–(9). However, such an analysis would wrongly predict that *him* need not be given, since givenness for Rooth is an epiphenomenon that results from an expression being part of every alternative in an FSV introduced by a \sim operator. This would wrongly predict discourses like (10) to be perfectly felicitous, with the analysis given.

(10) [Sue fell]₄ [[MARY_F [TRIPPED_(F) John]_F] \sim C₄]

3.3 Connectedness of Givenness

As observed in Tancredi (1992), when a predicate and one of its arguments are both deaccented, it is not sufficient for the two words to have independent antecedents in the discourse context. Rather, there must be a single antecedent consisting of an entailing predicate standing in an identical thematic relation to an entailing/coreferential argument. I call this phenomenon *connectedness of givenness*: given expressions in a sentence act as if they are thematically connected, and require an antecedent that contains the same connectedness.⁶ This can be seen clearly in the examples below.

- (11) a. A: John saw Mary. B: Then, BILL saw Mary.
 b. A: John saw Mary. B: #Then, BILL saw John.

Rooth does not account for this observation. His failure to do so stems from the flexibility in where focus gets interpreted. Interpretation at the sentence level leads to both the acceptability of (11a) and the unacceptability of (11b), since in that case the VP will make a constant contribution to every member of the FSV of the sentence, one that occurs in the A sentence of (11a) but not of (11b). However, Rooth does not require focus to be interpreted at the sentence level, and if we interpret focus directly on the subject as in $[[BILL_F] \sim C] \text{ saw Mary/John}$, then the VP plays no role in determining any FSV relevant to the interpretation of the sentence in its context. The possibility of such local interpretation of focus means that the only requirement imposed by focus is for there to be a type *e* antecedent in the discourse context that is distinct from Bill, a requirement that is met in both (11a) and (11b). Under this analysis, then, both discourses are predicted to be felicitous, contrary to fact. We can overcome this problem by following Truckenbrodt (1995) and Wagner (2012) in requiring the domain/scope of focus interpretation to be as broad as possible, an assumption that I will again charitably adopt.

Like Rooth, Schwarzschild too correctly predicts the acceptability of (11a). Since the verb and object are each separately given, neither will be F-marked under his analysis. The subject, on the other hand, is not given, and so will have to be F-marked.

⁶ Below I will analyze connectedness of givenness in terms of Givenness Semantic Values. I thus use this term to refer to the semantic properties of a sentence being interpreted, not to the properties of an appropriate antecedent.

Since F-marking is not needed on VP or S, AvoidF requires its absence, as in (12a) below. This means that not only will the verb and object need to satisfy givenness separately, but the VP and S will need to as well. Since all these expressions do in fact satisfy givenness under Schwarzschild's analysis – there is an antecedent entailing $\exists x$ (x saw *Mary*) – the analysis correctly predicts the acceptability of (11a). Schwarzschild also accounts for the unacceptability of (11b). The formulation of AvoidF makes it impossible to impose the same F-marking in (11b) since AvoidF requires minimal assignment of F-marking *within the bounds of Givenness*, and such F-marking would not satisfy Givenness. However, (12b,c) below both satisfy Givenness, making them both competing alternatives.

- (12) a. [[BILL]_F [saw *Mary*]]
 b. [[BILL]_F [saw]OHN]_F]
 c. [[BILL]_F [saw *John*]_F]_F

(12b) contains less F-marking than (12c), making (12b) alone satisfy AvoidF. This in turn makes (12b) the only acceptable representation under Schwarzschild's analysis. However, the F-marking in (12b) leads to an obligatory accent on *John* since *John* counts as a Foc and every Foc needs to bear an accent, accounting for the unacceptability of (11b) where *John* fails to bear an accent.

3.4 Optional Accents

The fourth empirical challenge comes from the observation that, in cases like the (a) and (c) examples in (13)–(15), some pitch accents are optional.⁷

- (13) Contrast:
 a. John went dancing. THEN *he* [drank BEER] / [DRANK BEER] / #[DRANK beer]
 b. Mary's singing next door. ALSO, [JOHN's dancing] / [JOHN's DANCING] / #[John's DANCING]
- (14) QAC:
 a. Q: What is John doing? A: *He's* [drinking BEER] / [DRINKING BEER] / #[DRINKING beer]
 b. Q: What's happening next door? A: [JOHN's dancing] / [JOHN's DANCING] / #[John's DANCING]
- (15) AWF:
 a. Bill went dancing. John *only* [drank BEER] / [DRANK BEER] / #[DRANK beer]
 b. Mary said there's a party. Sue *only said* [JOHN's dancing] / [JOHN's DANCING] / #[John's DANCING]

The generalization that characterizes this phenomenon is that within a non-given expression, any word can optionally bear a pitch accent in addition to those words that do so obligatorily. This phenomenon is not explained by Schwarzschild's analysis. Schwarzschild takes pitch accents to correlate with F-marking by the Basic F-Rule and the Foc-Rule: every accented expression is F-marked, and every Foc-marked expression contains an accent. This means that a sentence with two pitch accents has to have

⁷ There are additional accenting possibilities here and in examples throughout the paper. In the discourse: *A: John went dancing. B: Then, HE drank BEER(, though everyone else drank wine)*, for example, the accent on *he* in the second sentence is perfectly acceptable. Since it does not contrast with anything that precedes, does not answer a wh-question and is not the associate of a particle like *only*, it is plausible to analyze it not as a focus but as a topic. Consideration of topics is not possible within the length limitations of the current paper, and so these possibilities are systematically set aside.

at least two F-marks in the syntax. This by itself is not problematic, since in all of the cases in (13)–(15) above, both of the accentable words need to be F-marked independently since neither qualifies as given. This cannot be the full extent of the F-marking, however, since this F-marking would violate Givenness. In (13a), for example, such F-marking would require there to be an antecedent entailing $\exists R \exists x (R(x, john))$, a requirement not satisfied. At a bare minimum, F-marking is also required on the VP. Givenness in such a case will then only require a coreferent antecedent for *John* and an antecedent entailing $\exists P (P(john))$. AvoidF will block any additional F-marking. The problem now is one of distinguishing obligatory accents from optional ones. In the (a) examples, *beer* is obligatorily accented and *drinking* only optionally so. In the (b) examples it is *John* that is obligatorily accented and *dancing* whose accent is optional. Nothing in Schwarzschild’s analysis, however, predicts this pattern. In particular, the third accent pattern in each example satisfies all of Schwarzschild’s requirements and yet is unacceptable.

An additional problem arises for Schwarzschild when these examples are embedded in a context in which F-marking is not required on anything beyond the lexical items in question, as in (16).

(16) John ate pizza. THEN *he* [*drank* BEER] / [DRANK BEER] / #[DRANK *beer*]

Here unlike in (13a), F-marking on *drank* and on *beer* is sufficient to satisfy Givenness since the context sentence entails $\exists R \exists x (R(x, john))$. AvoidF then blocks additional F-marking on the VP. For Schwarzschild this means that both words will be independently identified as foci by the Foc-Rule and will therefore have to be assigned a pitch accent. While this accounts for the dual accent possibility, however, it fails to allow for the single accent option or to distinguish the good single-accent pattern from the bad.

The phenomenon of optional accents is only somewhat less problematic for Rooth, but only because Rooth does not give an independent characterization of the relation between focus in the semantics and pitch accent assignment in the phonology/phonetics. If each pitch accent is taken to identify a separate focus, then the problems that arise from cases of non-constituent foci will all arise here as well. In particular, *DRANK BEER* will then be treated as two separate foci, and each will need a type-identical antecedent. We see in (13)–(15) that this requirement is not met, and yet all of the examples are acceptable. Nothing in Rooth’s analysis prevents analyzing the VP as focus in these examples, of course. However, doing so leaves us without an explanation for why the pitch accent on *beer* is obligatory while that on *drank* is merely optional. The phenomenon of optional accents thus shows that Rooth’s analysis is at the very least incomplete.

3.5 Summary

In this Sect. 1 presented four empirical challenges to a theory of focus and givenness: given foci, non-constituent foci, connectedness of givenness, and optional accents. I showed that Schwarzschild’s analysis can handle non-constituent foci and connectedness of givenness, but that it does not explain given foci and is incompatible with optional accents. Rooth’s analysis, on the other hand, was seen to be compatible with given foci and with optional accents, but it does not explain either phenomenon, nor

does it explain the connectedness of givenness, and it is furthermore incompatible with non-constituent foci.

The very existence of expressions that are phonetically explicitly identified both as given and as focused shows that givenness and focus cannot be two sides of the same coin. Since both Rooth and Schwarzschild treat the phenomena of givenness and focus as complementary, it follows that simply combining their analyses, e.g. by adopting Schwarzschild's analysis for givenness and Rooth's analysis for focus, will not be sufficient. I propose instead to build on the insight of Katz and Selkirk (2011) that focus needs to be distinguished from discourse newness, and that discourse newness is the complement of givenness. I then modify the non-semantic parts of Schwarzschild's analysis and combine it with Rooth's analysis to account for all of the phenomena examined in this section.

4 Phonological Phrasing: A Possible Solution to Optional Accents for Schwarzschild?

The problem of optional accents was seen to be devastating to Schwarzschild's analysis. It is worth considering whether a minimal modification to his analysis that makes such optional accents possible would be viable. One potential place to look to make such a modification is to phonological phrasing. Truckenbrodt (1995) argues that pitch accent location is determined at the level of the phonological phrase (**P-phrase**), with one accent assigned per P-phrase. The relevance of P-phrasing to pitch accents can be illustrated with the following example.

- (17) What happened?
 a. #*Mary* kissed BILL.
 b. *MARY* kissed BILL.
 c. **MARY* (and this I know first hand) *kissed* (and it shocked me) BILL
 d. *MARY* (and this I know first hand) *KISSED* (and it shocked me) BILL

In a response to the discourse initial question *what happened?*, every expression in an answer will, under Schwarzschild's analysis, be F-marked. This should lead to the sentence containing a single Foc – the sentence itself – and hence a single pitch accent, presumably on the right-most expression *Bill*.⁸ What we find, however, is something more complicated. First, the predicted pattern given in (17a) is unacceptable: an extra accent is minimally required on the subject *Mary*, as in (17b). Second, we see that even this accent pattern can be made unacceptable through phonological phrasing as seen in (17c). Here the addition of parentheticals forces each word to constitute a separate intonation phrase (**I-phrase**) and hence an independent P-phrase as well. As we can see by comparing (17c) to (17d), it is not permitted in English for such a P-phrase/I-phrase to lack a pitch accent.

⁸ Schwarzschild does not give rules for how to locate a pitch accent within a focus, so in principle it would be possible under his analysis for the single pitch accent to surface on the subject as in #*MARY* *kissed* *Bill*, or on the verb as in #*Mary* *KISSED* *Bill*. The fact that both of these variants are unacceptable in the context of (17) shows that the problem with (17a) is not merely one of accent location.

If we add to Schwarzschild's analysis Truckenbrodt's proposal that pitch accents stand in a one-to-one relation with P-phrases, then the facts in (17c, d) follow directly. As a Foc, the sentence as a whole has to contain a pitch accent by the Foc-Rule, and it does. Each pitch accented expression is also F-marked as required by the Basic F-Rule. We can further account for the contrast in (17a, b) if we put a restriction on the size of a P-phrase, allowing it to contain no more than two prosodic words. Since the answers in (17a, b) contain three prosodic words, such a restriction will force them to be broken into two P-phrases and hence to contain a minimum of two pitch accents.

Can such an analysis of the relation between P-phrases and pitch accents be the solution to optional accents under Schwarzschild's analysis? The obvious way to analyze (13a)/(16) on that analysis would be as in (18), where set brackets are used to delimit P-phrases.

- (18) a. {He drank_F BEER_F}
 b. {He DRANK_F} {BEER_F}

Unfortunately, this analysis does not mesh with AvoidF. We saw earlier that AvoidF made it impossible to F-mark an expression [X_F Y_F] when the F-marks on X and Y by themselves are sufficient for satisfying Givenness. This is exactly the situation we have in (16), so AvoidF makes it impossible to F-mark the VP. Without such an additional F-mark, however, each of *drinking* and *beer* is a Foc, and so by the Foc-Rule needs to contain an accent. AvoidF and the Foc-Rule thus together rule out any representation like (18a) that contains only a single pitch accent.

5 Analysis

To handle given foci, I adopt the suggestion from Katz and Selkirk (2011) that givenness is the complement of newness. In principle this allows for either newness or givenness to be marked in the grammar, though Occam's Razor dictates that they not both be marked simultaneously. I opt for marking givenness, via syntactic G-marking. Assuming the structure of grammar outlined in Sect. 1, a full analysis then needs to do the following:

General Requirements

- Assign F-marking in the syntax that identifies semantic foci.
- Assign G-marking in the syntax that identifies discourse given and discourse new expressions in the semantics.
- Give rules for appropriate use of semantically identified foci, new and given expressions in the discourse.
- Use F- and/or G-marking to determine pitch accent distribution and relative prominence.

My proposal in outline for how to accomplish this is the following:

Focus

- All and only semantic foci are F-marked in the syntax.
- Semantic foci must contrast with an antecedent.
- F-marking increases phonetic prominence, but does not affect pitch accent location.

Givenness/Newness

Given and new expressions are complementary to each other w.r.t. a selected discourse context.

Expressions semantically interpreted as given must be discourse given.

Semantically given lexical expressions are G-marked in the syntax.

G-marking projects from a head to its syntactic projections.

G-marked lexical items lack a pitch accent.

The details of implementation are of course crucial to explaining all of the phenomena examined above. In the remainder of this Sect. 1 will spell out these details, with additional applications of the analysis given in Sect. 6.

5.1 Semantics

Givenness. I propose to maintain the semantic core of Schwarzschild's analysis. Schwarzschild's analysis of givenness, however, could not semantically identify expressions simultaneously as given and as focussed because givenness for Schwarzschild derived from the absence of F-marking and all foci are F-marked. By employing G-marking for givenness and F-marking for focus we can straightforwardly overcome this shortcoming: given foci can be marked with both F and G in the syntax, with F- and G-marking interpreted independently in the semantics. In order to maintain a strict separation of components in the grammar, I analyze every expression as having a Givenness Semantic Value (**GSV**) in addition to its normal semantic value and its FSV.

Givenness Semantic Values (GSVs):

For a non-G-marked expression, its GSV is a type-identical variable.

For a G-marked terminal expression, its GSV is its normal semantic value.

For a G-marked non-terminal expression, its GSV is the result of composing the GSVs of its daughters.

GSVs play two important roles in the grammar: they correlate with G-marking in the syntax, and they impose antecedence requirements on the discourse context. The antecedence requirement I call Givenness, following Schwarzschild. Givenness will be satisfied by an expression if its GSV counts as Discourse Given. Adding a rule that maximizes G-marking results in an analysis that is roughly equivalent to Schwarzschild's:

Givenness: A GSV must be Discourse Given.

Discourse Givenness:

A semantic value is Discourse Given iff:

It is a variable; or

It is a type *e* expression and has a coreferring antecedent; or

The existential closure of its existential type shift is entailed by (the existential

closure of) an antecedent.⁹

MaximizeG: G-marking is maximized within the limits of Givenness.

Note that Discourse Givenness is a general property that can hold of any kind of semantic value. The normal semantic value of *Mary* in the answer to the QAC example in (5), for instance, will be Discourse Given despite not being analyzed as Given. The Discourse Givenness of *Mary* in this case plays no role, however, in the sentence it's contained in satisfying Givenness.

To account for the connectedness of givenness, I propose to supplement the semantic core of Schwarzschild's analysis with the following syntactic constraint on G-marking:

ProjectG : A lexical head is G - marked iff its syntactic projections are.

To see how this constraint works, consider once again (11b), the example showing connectedness of givenness. Here I will consider four separate options for lexical G-marking: on both *saw* and *John*, only on *saw*, only on *John*, and on neither. In all four cases I take the verb to be the head of both VP and S and so by ProjectG these expressions will have the same G-marking as the verb.¹⁰

- (11b) A: John saw Mary. Then,
 i. B: [BILL [*saw*_G *John*_G]_G]
 ii. B: [BILL [*saw*_G *John*]_G]
 iii. B: [BILL [*saw* *John*_G]]
 iv. B: [BILL [*saw* *John*]]

Each of *saw* and *John* are Discourse Given and so can, but need not, be analyzed semantically as given as well, i.e. as having non-variable GSVs. They will be G-marked if and only if so analyzed, and then by ProjectG this G-marking will obligatorily project. However, (i) fails to satisfy Givenness (and so also violates MaximizeG) since there is no antecedent entailing the GSV $\exists x(x \text{ saw } John)$ of the VP and S. (ii) satisfies both MaximizeG and Givenness. However, *John* is not G-marked, and under plausible phonological assumptions, this will require it to bear a pitch accent, which it does not do (see Sect. 5.3 for details). (iii) satisfies Givenness. Whether it also satisfies MaximizeG depends on how we interpret maximization. Since G-marking on *saw* projects to VP and S and that on *John* does not project, the G-marking in (ii) could conceivably be taken to be greater than that in (iii) for the purposes of MaximizeG making (iii) fail to satisfy MaximizeG. Formalizing such a notion of MaximizeG, however, would be far from straightforward. Alternatively and more plausibly, (iii) could be taken to satisfy MaximizeG but be ruled out because of the lack of an accent on the verb *saw*. MaximizeG on such an approach would only compare two

⁹ Parallel to Schwarzschild's analysis, existential closure (Schwarzschild's existential F-closure) binds variables substituted for non-G-marked (Schwarzschild's F-marked) expressions, whereas existential type shifting binds unsaturated argument positions.

¹⁰ A more plausible assumption would be that the verb only heads the VP, with the subject generated within the VP and raised to its surface position. Adopting this assumption would require relating Givenness to traces/copies. Though I do not see any inherent problems with doing so, I put off consideration of movement effects for a separate occasion.

representations if the G-marking of one completely subsumes the G-marking of the other, and not if their G-marking only partially overlaps or fails to overlap at all. Finally, (iv) satisfies Givenness trivially, but clearly fails to satisfy MaximizeG. This leaves (ii) as the only possible representation of (B). If (ii) is as hypothesized incompatible with a lack of pitch accent on *John*, then the unacceptability of (11b) follows. Note crucially that ProjectG blocks a representation containing G-marking only on *saw*, *John* and S, but not on VP. Such a representation would satisfy Givenness and plausibly MaximizeG as well, and so in the absence of ProjectG would be wrongly predicted to be acceptable.

Focus. Rooth gave a compositional semantics for focus based on the assumption that focus can be identified in the syntax. Givenness on this analysis was seen to be a mere side effect of focus. Non-constituent foci were seen to be problematic on these assumptions. On that analysis, the only way to account for the givenness of the object of a sentence when both the subject and verb are accented is to take the subject and verb to each be independent foci. In some cases, though, these two foci act as one, but treating them as one would require a non-compositional step in the interpretation. We have seen, however, that focus and givenness are not in fact complementary. This opens up an alternative solution to the non-constituent focus problem: take the focus in the apparent non-constituent foci cases to be some single constituent that contains both pitch accented expressions. In the case of (7a) this would lead to the following syntactic representation.

(7a) A: [John fell]₃ B: [[MARY TRIPPED *him*]_F~C₃]

This representation satisfies Rooth's semantics as well as our revised semantics of givenness. The sole G-marked expression *him* has a coreferring antecedent in *John* as required by Givenness, and there is an antecedent for C₃ that is a member of the FSV of the sentence (= the set of all propositions) as required by the ~ operator. Note, however, that givenness of *him* under this analysis does not follow from the interpretation of focus alone.

If focus and givenness come apart as suggested, it should in principle be possible for a focused expression in a sentence to take a different antecedent than a given expression in that same sentence, regardless of what syntactic relation holds between the two expressions. In (19), where I have included Rooth's focus interpretation operator and the requisite accompanying variables and indices, we see that just such a possibility exists.

(19) A: Many people know that John₁ fell.
 B: Most of them, however, only(C₅) [[know that [MARY TRIPPED *him*]_{1,6}]_F~C₅]
 C: They don't also [know that that was an accident]₅.

Here the G-marking of *him* in (B) is licensed by *John* in (A). The VP sister of *only*, on the other hand, cannot be taken to contrast with the matrix VP of (A) on pain of contradiction. On the non-contradictory interpretation of (B), the VP sister of *only* contrasts instead with the matrix VP of (C). Since (C) contains no potential antecedent for *him*, this example clearly shows the separability of focus and givenness. The important consequence of these observations for the semantics is that accounting for apparent non-constituent foci no longer requires a revision to Rooth's semantics of

focus. It just needs to be accepted that focus semantics does not also account for givenness.¹¹

Given foci pose a greater challenge to Rooth's analysis. In the contrast case in (5), both *he* and *Mary* have coreferent antecedents, and *heard* is not discourse given. MaximizeG thus requires that both *he* and *Mary* be G-marked. In this regard, the contrast case in (5) is parallel to the non-contrast example in (20). The fact that (20) is acceptable shows that the problem with the contrast case in (5) is not (or at least not exclusively) a problem of Givenness.

(20) *Mary's father is a good person. He LOVES Mary.*

This suggests that the problem with (5) derives from contrast, which by assumption relates to the semantics of focus. At a minimum on this view, it needs to be shown that absence of any focus as in (21a) is acceptable, while presence of focus as in (21b) is not.

- (21) a. [he_G [LOVES $Mary_G$]]
 b. [[he_G [HEARD_F $Mary_G$]]~C]

This much is relatively straightforward. The variable C in (21b) requires an antecedent whose semantic value is a member of the set $\{R(\textit{Mary's father}, \textit{Mary}): R \in D_{\langle e, e \rangle}\}$. While the NP *Mary's father* does presuppose a proposition of the requisite form (namely that *Mary's father* is the father of *Mary*), the NP itself does not have such a proposition as a value and so plausibly cannot be the antecedent to C. The only potential antecedent of the right semantic type is the entire first sentence *Mary's father saw Bill*, but the interpretation of this sentence is not of the required form.

While the impossibility of analyzing (5) as in (21b) can easily be accounted for under Rooth's semantics, more challenging is eliminating the possibility of representing (5) as (22a) or (22b).

- (22) a. [[he_G [HEARD_F $Mary_{F,G}$]]~C]
 b. [[he_G [HEARD $Mary_G$]]~C]

(22a) differs from (21b) only in analyzing *Mary* simultaneously as a focus and as given, while (22b) differs from (21b) only in having focus on the VP rather than on the V. Neither difference in focus has an effect on Givenness, with both representations in (22) satisfying Givenness just like (21b) does. However, they do make a difference for satisfying the presupposition of the ~ operator. By analyzing *heard* and *Mary* as two separate foci as in (22a), Rooth's analysis requires an antecedent for C that is a member of the set $\{R(\textit{Mary's father}, x): R \in D_{\langle e, e \rangle} \ \& \ x \in D_e\}$, and this requirement is clearly satisfied in the context in which the sentence occurs. Similarly, by analyzing the VP as

¹¹ If focus is interpreted at a higher constituent than where it is marked, then the semantics of focus will in effect still give rise to a kind of givenness effect since the focus antecedent will still have to contain the non-focused parts of the higher constituent. However, this effect differs from that derived from G-marking in that it can in principle be cataphoric and need not result in deaccenting, as in the second sentence in: *John came to my party. He only MET MARY there, though. He didn't meet TOM.* To get *only* to associate intuitively with *Mary*, *Mary* has to be analyzed as the focus, with *met* being new and focus interpreted at the level of the VP. Such an analysis requires an antecedent for the VP that includes *meeting*, though *met* in the second sentence does not thereby count as given. Only the third sentence satisfies the antecedent requirement for the focus.

a focus as in (22b), Rooth's analysis requires an antecedent for C that is a member of the set $\{P(\text{Mary's father}): P \in D_{ei}\}$, and again the context sentence satisfies this requirement. If G-marked expressions surface as unaccented, then with either of these representations the contrast example in (5) is predicted to be acceptable without an accent on *Mary*, contrary to observation.

I do not see a way of formally blocking the representations in (22) by adjusting either the semantics of givenness or that of focus. I instead propose an ad hoc solution of requiring maximum parallelism between focus antecedence and givenness antecedence when a single expression is subject to both requirements. This forces adoption of the analysis in (22a) over that in (22b) since only (22a) requires a focal antecedent for *Mary*, which independently requires a givenness antecedent. It also forces *Mary* in (22a) to have a givenness antecedent that is the same as its focus antecedent *Bill*, however, which imposes the contradictory requirements on *Bill* of being coreferent with *Mary* and semantically distinct from *Mary* at the same time.

That some extra-semantic explanation is needed to account for the contrast example in (5) is independently suggested by the difference between that example and (20): in (5) we seem pushed toward interpreting the second sentence as contrasting with the first, while in (20) we do not, and yet intuitively it is this need to contrast that causes the problems in (5). The fact that there is a formal analysis of (5) that does not impose contrast and that satisfies all givenness and focus requirements – (21a) with *heard* in place of *loves* – makes no difference. The context seems to lead us down a garden path requiring contrast and resulting in unacceptability rather than allowing a non-contrasting understanding that would be acceptable.

If the contrast example in (5) can be explained by appeal to maximizing parallelism, then this example does not require us to make any changes to Rooth's semantics of focus. While acknowledging that the ad hoc analysis proposed needs further investigation and deeper justification, I will thus accept Rooth's semantics unmodified.

5.2 Syntax

The syntax of F-marking I take to be trivial: F-marking is assigned to all and only those expressions identified in the semantics as foci. The syntax of G-marking cannot be made trivial in the same way, however. If it were, we would have no way of explaining the connectedness of givenness illustrated in (11b), repeated here.

(11b) A: John saw Mary. B: #Then, BILL saw John.

In this example, assignment of G-marking based on Discourse Givenness would dictate G-marking on *saw* and on *John*, but would not predict any further connectedness between these expressions, leading to the incorrect prediction that the discourse should be felicitous. To account for the connectedness found, minimally the VP must be required to be Given as a whole. Since this requirement cannot come from Discourse Givenness, the only other plausible source is syntactic restrictions on G-marking: G-marking must be required to project to the level of the VP.

The examples of non-constituent foci show that G-marking cannot be taken to project automatically from just any G-marked expression. In (7a), projection of

G-marking from *him* to the VP would lead to a requirement that the discourse context contain a 2-place predicate with *John* filling one of the argument positions.

(7a) A: John fell. B: [MARY TRIPPED] *him*.

Since this requirement is not met in (7a) and yet the discourse is felicitous, it follows that such projection must not be imposed. The obvious way to navigate the opposing requirements of (11b) and (7a) is to take G-marking to project obligatorily from a syntactic head to its projections, but never from a non-head, as codified in ProjectG.

5.3 Phonology¹²

Truckenbrodt (1995) accounts for the location of pitch accents based on the assumption that every P-phrase bears a unique accent, located on the head of that P-phrase. He adopts the following constraints on P-phrases:

- (23) Truckenbrodt’s Constraints on P-phrases
- i. Every P-phrase has a unique head, x_{ϕ} . (inviolable)
 - ii. x_{ϕ} The head of a P-phrase is the rightmost expression bearing an asterisk on the ω level. (= Align(ϕ, R, x_{ϕ}, R) or Align ϕ , violable)¹³
 - iii. Every lexically headed XP must be contained in a P-phrase. (= Wrap-XP, violable)
 - iv. Every lexically headed XP must contain a phrasal stress x_{ϕ} . (= Stress-XP, violable)

While these constraints adequately generate what could be considered the default pronunciations of all-new sentences, they do not account for optional accents. This can be seen by considering examples like (13), modified slightly below to eliminate G-marked expressions and with P-phrasing made explicit.

- (24) (*) (*) (*) (*) (*) (*) (*) (*)
 JOHN *likes* BEER JOHN LIKES BEER JOHN’s DANCING JOHN’s *dancing*

Truckenbrodt’s analysis generates the first and third structures in (24), but not the second or fourth. The second structure violates Truckenbrodt’s Wrap-XP (= (iii)) since the VP is not contained in a single P-phrase, while the fourth violates his Align ϕ (= (ii)) and Stress-XP (= (iv)) since the head of the P-phrase is on the left and the VP fails to contain a P-phrase level asterisk. While these violations are in principle allowable if all other candidate representations have either equally severe or more severe violations, in the present case this situation does not obtain. The first and third representations satisfy all of the constraints in (i)–(iv), and there are no obvious additional constraints to propose whose violation would balance the first and third cases out with the second and fourth.

¹² While adequate to the task of explaining the examples in this paper, the phonological analysis given here is insufficient for handling other problems of accent location. Addressing the inadequacies, however, is not possible within the length limitations of this paper, so I address them instead in a companion paper, Tancredi (2015), where I give a more comprehensive phonological analysis of accent location.

¹³ Here and below, ω is the level of prosodic words and ϕ the level of P-phrases, and x_{ϕ} is the head of a P-phrase.

To overcome the challenges proposed by the sentences in (24), I propose that P-phrasing is based primarily on a lexical difference in metrical phonology between verbs and names. I analyze both names and verbs as prosodic words, i.e. as having an inherent ω -level asterisk. I analyze names, however, as having a lexically specified ϕ -level asterisk as well. Default pitch accent assignment is the result of constructing P-phrases without any modification to lexically determined asterisks, subject to the following constraints:

(25) Proposed Constraints on P-phrases

- i. Every P-phrase has a unique head. (inviolable)
- ii. P-phrases are at most binary, i.e. they contain at most two asterisks on the ω level. (inviolable)
- iii. A non-head prosodic word is to the left of the head in its P-phrase when possible within the constraints in (i) and (ii).

In addition to these constraints, I assume that the distribution of asterisks can also be modified in two ways. First, any word can be promoted to the head of a P-phrase, i.e. it can have asterisks added at the ϕ level and, if necessary, at the ω level as well. Second, G-marked phrases get demoted, i.e. they have all ϕ -level and ω -level asterisks removed.

To see how these constraints apply, consider the four representations in (24). All the words in (24) come with ω -level asterisks (not shown), and the names all have ϕ -level asterisks as well, as specified in the lexicon. Each P-phrase (indicated with parentheses) has a unique head (indicated by an asterisk) as required by (25.i). Furthermore, no P-phrase has more than two prosodic words, satisfying (25.ii). If no words are promoted to P-phrase heads, (25.iii) dictates the P-phrasing in the first and fourth examples, and blocks placing the subject and verb in a single P-phrase in the first example. The second and third examples result from promoting the verb to a P-phrase head.

Optional accents under the analysis proposed come from the optionality of supplementing lexically determined metrical asterisks with additional ϕ -level (and if need be ω -level) asterisks. The deaccenting associated with Givenness derives from removal of all ω -level and ϕ -level asterisks. Since G-marked expressions cannot be optionally accented, under a rule-based phonology the removal of asterisks will have to follow supplementation of asterisks so that any supplementation gets undone. Under an Optimality Theoretic approach, the same effect can be had by ranking deaccenting of G-marked expressions higher than faithfulness for lexically specified metrical asterisks, with faithfulness requiring presence of all such asterisks but not prohibiting addition of extra asterisks. Under either approach, optional accents will be correctly limited to non-G-marked expressions.

6 Application

In this Sect. 1 apply the analysis from Sect. 5 to select data from Sect. 3 not yet covered.

6.1 Given Foci

The remaining cases of given foci are straightforward. The obligatory accent on *Mary* in the QAC case in (5), repeated as (26a), comes from the impossibility of simultaneously analyzing the verb and the object as G-marked, while the AWF case repeated in (26b) is given the same treatment as the Contrast case.

- (26) a. Q: Who did Mary's father see? A: *He saw MARY/#Mary*.
 b. Mary's father saw many people. However, *he only HEARD MARY/#Mary* (& nobody else).

In the examples in (6), G-marking *Mary* is compatible with all other G-marking required by MaximizeG and so is necessary, and its F-marking is compatible with constraints on focus. If we additionally assume that focus is marked when possible, we also account for the residual prominence found in these examples. Their analysis is given below.

- (27) a. [John saw Mary and Sue saw Bill]₁. Then, [ALICE_F [saw_G HER_{F,G}]₂~C₃ and_G TOM_F [saw_G HIM_{F,G}]₃~C₂]~C₁
 b. John saw Mary. [Who did Bill see?]₂ [[BILL saw_G HER_{F,G}]₁~C₂]¹⁴
 c. John saw Mary. In fact, *he ONLY* [saw HER_{F,G}]₁~C

6.2 Non-constituent Foci

The phenomenon of non-constituent foci has already been accounted for in its essentials in Sect. 5.1. The phenomenon itself was argued to not be real – what appeared to be multiple foci turned out to be multiple pitch accents assigned within a single focus. We have not yet seen how these multiple pitch accents get assigned in the phonology, however. To do so, consider once again the example from (7a), repeated here.

- (7a) A: John fell. B: [MARY TRIPPED him_G]_F.

Lexically, *Mary* comes with both ω -level and ϕ -level asterisks, while *tripped* has only an ω -level asterisk. The G-marking on *him* results in its having no asterisks on either prosodic level. If we make no additions to the metrical structure, we predict that the sentence should surface with a single P-phrase and hence a single pitch accent, on the subject *Mary*. This pronunciation is indeed possible, though perhaps not preferred. Recall, though, that we also allow any non-G-marked word to be promoted to a P-phrase head. Promoting the verb *tripped* will result in *tripped* heading a P-phrase including the object *him*, and hence receiving a pitch accent along with the subject *Mary*. We thus predict the accenting in (7a) to be one of two possible pronunciations of this example, which is exactly what we find.

¹⁴ The accent on *Bill* in (27b) comes from its not being able to be marked as given when both *saw* and *her* are so marked. It need not be analyzed as a focus or as a topic. Formally, absence of either F- or G-marking identifies *Bill* as discourse new. I take that here to mean that it is new with respect to its givenness antecedent (i.e. the first sentence), not necessarily with respect to the focus antecedent (the second sentence).

7 Conclusion

In this paper, I have examined the analyses of Schwarzschild (1999) and Rooth (1992, 1995) and shown both to be inadequate to the task of accounting for a range of focus and givenness effects. Importantly, not only was each analysis found to be inadequate on its own, but the combination of the two analyses was also shown to be inadequate, since neither analysis accounted for the behavior of given foci or for the range of optional accents observed. Rooth's analysis additionally could only account for connectedness of givenness if focus was required to be as narrow as possible and its domain of interpretation as wide as possible. Finally, Rooth's analysis failed to account for (apparent) non-constituent foci. I then showed that it is possible to account for all of these phenomena by adopting Rooth's semantics of focus and a slightly modified version of Schwarzschild's semantics of givenness while making major adjustments to the syntactic and phonological analyses of givenness and of pitch accent assignment.

The most important adjustment made was to separate the representation of givenness from that of focus in both the syntax and the semantics, a separation argued for independently by Katz and Selkirk (2011). Given foci are analyzed as being simultaneously F-marked and G-marked in the syntax, and as having non-trivial FSVs and GSVs in the semantics. This separation makes it possible to maintain Rooth's analysis of focus, though that analysis is thereby limited to accounting only for focus effects, not givenness effects. Schwarzschild's analysis, on the other hand, required substantive changes. Trivially, the semantics of givenness had to be re-cast to relate to syntactic G-marking rather than F-marking. To highlight the semantic nature of givenness, I accomplished this by proposing Givenness Semantic Values that relate simultaneously to the syntax (through G-marking) and the discourse (through Givenness). Though superficially different from Schwarzschild's analysis, this aspect of the proposal is in essence only a different technical implementation of the same core semantic idea. The syntactic and phonological parts of the proposed analysis, on the other hand, differ from those in Schwarzschild's analysis in ways that are not merely superficial. ProjectG imposes identity of syntactic G-marking between a head and its projections, and plays a central role in accounting for the connectedness of givenness under the proposal presented. Also, pitch accent location is analyzed as related to newness (non-Givenness), not to focus, and the rules generating pitch accents are unrelated to those proposed by Schwarzschild for connecting F-marking with pitch accents. The proposed rules build on lexically specified metrical structure, and allow for optional accents on any discourse new expression. This same analysis also accounts for the appearance of non-constituent foci. That appearance derived from the presence of independent pitch accents on expressions that do not by themselves form a syntactic constituent, a subject and a transitive verb in the case examined in most detail. This pattern of pitch accent location was seen to derive from promotion of the verb to a P-phrase head, an operation that is independent of focus. The apparent non-constituent foci examples could then be analyzed as containing only a single broad focus at the sentence level, with the contained object identified as Given and accents assigned to the subject and verb as one option in the phonology.

To get the analysis to account for certain subcases of given foci, it was necessary to supplement the core analyses of focus and givenness with a separate analysis of contrast. The ad hoc nature of the added proposal clearly constitutes a weakness in the overall analysis that needs to be addressed. Additionally, while the proposal made determines what expressions can and cannot be analyzed as given, and it also determines which expressions must, which can and which cannot bear a pitch accent, it does not determine which expressions get analyzed as foci or what pragmatic effects follow from analyzing an expression as a focus, and neither does it say anything about the pragmatic effects of optional accenting. Filling in these gaps I leave as a task for future research.

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