

**Prosodic Focus in English vs. French: A Scope Account\***  
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**Abstract** In this paper, we compare the use of prosody in English and French to convey focus. While previous studies have found these languages to differ in their use of prosodic prominence to convey focus structure (e.g., Lambrecht 1994; Cruttenden 1997, 2006; Ladd 2008), exactly what underlies the difference remains an open question. We investigate two possibilities: The differences might be due to phonological differences between English and French, that is, differences in the means to convey a prominence shift; or alternatively there might be semantic and pragmatic differences regarding what a prominence shift conveys. We test these hypotheses in a production study in which we vary the type of focus context (corrective focus, contrastive focus, parallelism, cleft) to establish contextual distribution of prosodic prominence shifts; and at the same time we vary the phonological and syntactic size of the non-contrastive material, in order to test the hypothesis that the phonological conditions on prominence shifts differ. The results show that French and English use prominence very similarly to encode focus in certain contexts, such as corrective focus, irrespective of phonological factors. This similarity suggests that both languages have the phonological means to encode prominence shifts. They differ, however, with respect to the circumstances in which they use prosody, since French shows no evidence of prominence shift under parallelism, while English treats parallelism similar to corrective focus. Based on Rooth's (1992) alternatives theory of focus, we propose that the semantic/pragmatic differences between English and French are a result of different scope possibilities of the focus operator involved in prosodic focus.

**Keywords** focus, prosody, typology, scope

## 1. Introduction

In English, prosodic prominence is used to convey information status: a boost in prominence often indicates new or contrastive information, while a reduction in prominence indicates given information (Ladd 2008; and references therein). Accenting constituents which encode given information and unaccenting constituents which encode new information leads to increased processing difficulty (Terken and Nootboom 1987). Many previous approaches have tried to relate these prominence patterns directly to processing related notions such as predictability (e.g., Bolinger 1972; Aylett and Turk 2004; Jaeger 2010), the probability of the referent (e.g., Nootboom and Terken 1982; Lam and Watson 2010), or accessibility and salience of the referent (e.g., Terken 1984; Terken and Hirschberg 1994; Arnold 2008; Watson 2010). This perspective is appealing because it holds the promise of reducing prosodic prominence to an

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\* We would like to thank the audiences at MOT 2010 at Carleton University and at ETAP 2 2011 at McGill University for helpful comments, and to Caroline Féry and Fatima Hamlaoui for discussions. Also thanks to the International Laboratory for Brain, Music, and Sound Research in Montréal (BRAMS) for letting us use their labs to record some of our participants, and the members of prosody.lab for help with running participants. This research was funded through funds from a Nouvelle Chercheur Grant from FRQSC (NP-132516), a SSHRC Standard Research Grant (410-2011-1062), and funding through the Canada Research Chair program to Michael Wagner.

automatic consequence of prior activation of already salient information, and of explaining variation in prominence in terms of more general cognitive mechanisms such as underlying priming effects. However, languages differ dramatically in how their prosody interacts with discourse context. Thus, while there may be universal processing effects such as a reduction of repeated, predictable, or primed information, the pattern of contextual effects on prosody we observe varies widely between languages (cf. Ladd 2008; Büring 2009). By looking at these cross-linguistic differences, we might be able to better understand how prosody interacts with discourse in general and on what dimensions languages differ.

When languages vary in whether certain contexts lead to prosodic effects, one central question is whether this is due to differences in their phonological systems or because they differ in the semantic and pragmatic import of the prosodic cues involved. It has long been observed that Germanic languages like English consistently use prosodic prominence to convey information status (such as whether a constituent is focused or given); while Romance languages have been reported to not use prominence to convey information status, or to do so to a lesser extent (e.g., Cruttenden 1997, 2006; Ladd 2008; Swerts et al. 2002; Vallduví 1992). Instead of prosodic prominence, Romance languages have been argued to use syntactic strategies of focus marking such as clefting. For example, Cruttenden (1997:143) states that in Italian and Spanish, simple word order variation is often used instead of prosody. Lambrecht (1994:224-5) claims that while Italian can use word order variation, prosody, and other syntactic constructions as devices to express focus, French is generally restricted to using syntactic constructions such as clefting.

In an interesting cross-linguistic survey of the use of prominence to mark focus, Cruttenden (2006) found clear differences in the set of 12 languages investigated, which included English and French. The study looks at 10 dialogues involving different focus contexts which in English lead to a prominence shift. Each dialogue was translated and native speaker was recorded for each language. Each utterance was then classified for whether or not prominence was shifted. Certain dialogues led only to prominence shift in English, but not in French. For example in the following dialogue, all 7 English participants shifted prominence at least in the second conjunct to the name of the team and deaccented *one*, while in French, none of the 14 participants did and all of them always accented *un*.<sup>1</sup>

(1) *Prominence shift in English but not in French* (Cruttenden 2006:325)

- a. A: What was the score?  
B: Liverpool 1, Manchester United 1.
- b. A: Quel était le résultat?  
B: Paris St. Germain un, St. Etienne un.

In other dialogues, all 7 English speakers and 11 out of 14 French speakers shifted prominence to *your sister/ta soeur* (Cruttenden 2006:324):

(2) *Prominence shift both in English and in French*

- a. A: I did all the work.  
B: You mean your sister did all the work.
- b. A: J'ai fait tout le travail.

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<sup>1</sup> The contexts in French are not provided in Cruttenden (2006), so we added the presumable contexts for the French examples ourselves.

B: Tu veux dire que ta soeur a fait tout le travail.

The methodology used in Cruttenden's study raises various methodological questions. First, a range of very different cases were looked at based on a single dialogue, rather than looking at multiple different items for each case to establish the various data points. This is acceptable as a way of arriving at initial observations, but it means that it is not clear how well the results will generalize, as is noted in the paper. Another layer of questions is added by the method of analysis chosen, whereby a native speaker of only one of the languages (English) transcribed the prosodic pattern of twelve very different languages: this method could involve misinterpretations of the prosodic cues of individual languages.

That said, Cruttenden's study offers an invaluable typological glance at the variability between languages. Setting aside potential methodological worries and taking the results at face value, the following more fundamental question arises, which is the question we are most interested in here: Why do certain context-response pairs like the one in (1) lead to different results in English and French, while certain other cases like the one in (2) seemingly lead to very similar results? Cruttenden stops short of trying to address this question, as he is mostly concerned with showing the differing overall propensity across languages to make use of prominence shift.

In trying to address this question, it is essential to first introduce a vocabulary that allows us to identify the relevant factors that might distinguish the context-response pairs in (1) and (2). In the following section, we outline the grammatical underpinning of contrastive prosodic focus under the lens of Rooth's (1992) alternatives theory of focus, which provides a formalism in which current linguistic ideas about how focus works can easily be expressed. Based on it, we stake out possible ways in which languages might be different with respect to their focus structure, and make a concrete proposal about English and French. Specifically, we hypothesize that the focus-sensitive operator  $\sim$  involved in prosodic focus has a much narrower set of possible scopes in French compared to English. We contrast this hypothesis with alternative hypotheses that locate the difference between the languages in differences in their phonological systems.

## 2. Focus Structure and Potential Sources of Variability

Rooth (1992) introduces a theory of linguistic focus which has proven particularly useful in understanding the notions of 'focus' and 'givenness', and accounting for focus-related phenomena such as contrastive focus or question-answer congruence. The basic idea of this theory is that every expression in language comes with two associated semantic meanings: its regular denotation and a set of alternatives. Minimally, this set of alternatives comprises the expression itself. But if the expression or one of its sub-constituents is marked as focused (noted syntactically with an F-feature on that node), then contextually relevant alternatives to that constituent are introduced. Depending on which elements within a constituent are marked with an F-feature, the content of the corresponding alternative set changes. Consider the alternatives to a proposition, which vary depending on whether the subject (3a) or the object (3b) is marked as focused via F:

(3) A: *Mary read Moby Dick?*

- a. B: **John**<sub>F</sub> read Moby Dick  
Alternative set: { John read Moby Dick, Jane read Moby Dick, ... }
- b. # B: John read **Moby Dick**<sub>F</sub>  
Alternative set: { John read Moby Dick, John read Walden, ... }

One crucial assumption in Rooth's theory is that prosodic focus involves a focus-sensitive operator  $\sim$ , which has no overt segmental content, unlike focus operators like *only* or *even*.<sup>2</sup> Rather, the presence of  $\sim$  is only detectable through its effect on prosodic prominence within its scope. Simplifying somewhat, the  $\sim$  operator introduces the presupposition that some member of the alternative set to the constituent it takes scope over is salient in the discourse. The effect of  $\sim$  is essentially anaphoric: in order to use  $\sim$ , there has to be a salient antecedent that fits the alternative set that is evoked. In our examples in (3) above, the effect of  $\sim$  can be summarized as follows:

- (4) a.  $\sim$ [**John**<sub>F</sub> read Moby Dick]  
Focus Presupposition: There is an antecedent alternative of the form *x read Moby Dick*
- b.  $\sim$ [John read **Moby Dick**<sub>F</sub>]  
Focus Presupposition: There is an antecedent alternative of the form *John read x*

In this and the following examples, we mark F-marked material by **boldface**, non-F-marked material in the scope of  $\sim$  ('given constituents') by underlining, and the antecedent that  $\sim$  is anaphoric to by *italics*.

How does  $\sim$  affect prosodic prominence? According to Rooth (1992), there is a straightforward relationship between  $\sim$  and prosodic prominence in its scope, following ideas already implicit in Jackendoff (1972). Truckenbrodt (1995) makes this condition explicit in the following way:

- (5) **Focus Prominence:** An F-marked constituent in the scope of  $\sim$  receives main prominence.

This condition makes interesting predictions, since the scope of  $\sim$  is by no means fixed. For example, there could be prosodic focus marking within a subject, leaving the prominence of the VP intact (6a), or main prominence could fall within the subject (6b). The difference, in Rooth's theory, is one in scope:

- (6) a.  $\sim$ [The **old**<sub>F</sub> man] arrived YESTERDAY
- b.  $\sim$ [The **old**<sub>F</sub> man arrived yesterday]

Given the different scope possibilities of  $\sim$ , the expression in (6a) requires an antecedent of the form *the x man*, while the expression in (6b) requires an antecedent of the form *the x man arrived yesterday*. The two utterances thus differ in that only the second requires *arrived yesterday* to be old information that is already part of a salient antecedent. Within Rooth's theory, a constituent that is in the scope of  $\sim$  and F-marked is *focused*, a constituent which is in the scope of  $\sim$  and not F-marked is *given*, and a constituent that is not in the scope of  $\sim$  is neutral,

<sup>2</sup> Rooth (1992, 1996) specifically argues that all uses of focus alternatives involve  $\sim$ , and *only* and *even* are focus-sensitive operators only mediated by  $\sim$  and its effect on a variable that is anaphoric to the present context. This, however, is not crucial for the present article.

or could be called *discourse new*.<sup>3</sup>

## 2.1 The Nature of Cross-Linguistic Differences

Rooth's (1992) theory has been highly successful in accounting for a range of focus phenomena, and related theories such as Schwarzschild (1999) can readily be translated into Rooth's formalism (cf. Wagner 2006; Büring 2008). It is therefore constructive to try to make explicit possible points of cross-linguistic variation given the formal ingredients of Rooth's theory.<sup>4</sup> Essentially, a language could differ from another in at least one of the following ways:

(7)     **(i) Potential S-differences:**

- (a) Semantics: The semantic content of the operator  $\sim$  is different.
- (b) Syntax: The scope possibilities of  $\sim$  are different.

**(ii) Potential P-differences:**

- (a) A different principle relating focus and prosody applies other than Focus Prominence, where 'an F-marked constituent in the scope of  $\sim$  receives main prominence' (Truckenbrodt 1995).
- (b) Some property of the prosodic system of the language trumps the effect of Focus Prominence, and consequently focus is not marked, at least under certain circumstances.

We will call (7i) *S-differences*, since they locate the difference in either the syntactic scope possibilities of  $\sim$  or the semantic/pragmatic content of  $\sim$ . *P-differences* in (7ii) locate the difference in the phonological/phonetic component. We can test for S-differences by varying the context such that depending on the content and scope of  $\sim$ , focus/givenness marking should or should not be possible. We will refer to such manipulations of the context as manipulations of the *type of focus*, following the use of this term in the earlier literature (e.g., Gussenhoven 2007), even if Rooth's theory does not actually distinguish different types of focus other than through the potential syntactic and semantic differences between focus operators summarized in (7i).

It could be that languages vary in ways along the S-dimension that cannot be naturally expressed given the formal ingredients of Rooth's theory, in which case this would be a compelling reason to reject it, or would at least indicate that further complexity needs to be introduced. Rooth's theory does, however, give us a crisp starting point for our endeavor.

### 2.1.1. The Scope Hypothesis

The hypothesis we propose in this paper is that English and French differ in the syntactic scope

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<sup>3</sup> Various authors have proposed that in addition to this categorization, a notion of pure anaphoric givenness is needed (Reinhart 2006; Féry and Samek-Lodovici 2006; Katz and Selkirk 2011). We will not discuss the arguments in favor of such a complication of the theory here, and will stick to the stronger assumption that only the three cases outlined here have to be distinguished. For the purposes of this paper, the question as to whether this more restrictive theory is sufficient to account for all phenomena in question will not become relevant.

<sup>4</sup> With respect to cross-linguistic variation, Büring (2009) explores how a typology of focus realization can be represented through 'prominence theory of focus' (cf. Truckenbrodt 1995). We discuss this typology in section 7, and show that it cannot account for the French results in our experiment.

possibilities of  $\sim$  (i.e., a difference of the form (7i b)). In particular, we argue that  $\sim$  in French must scope over the root clause, while in English,  $\sim$  can attach at embedded nodes. One can summarize the predictions of the Scope Hypothesis as follows:

(8) ***Predictions of the Scope Hypothesis***

*Types of Focus:* In English, any type of focus will induce prosodic effects, while in French, only wide focus with antecedents that provide alternatives to the entire sentence (i.e., root clauses) can induce prosodic effects.

*Phonological and Phonetic Predictions:* No focus-related differences predicted (i.e., no reason to expect different phonological conditions on the marking of focus, or different phonetic cues for the encoding of focus).

The scope hypothesis has the consequence that English and French should appear to differ in the semantics and pragmatics of scope since the restrictive scope of the focus operator in French severely limits the set of viable antecedents for focus marking. Here, we reconsider the two context-responses from Cruttenden's (2006) study:

- (9) a. A: What was the score?  
       B:  $\sim_1$ [*Liverpool<sub>F</sub>* *I*],  $\sim_2$ [*Manchester United<sub>F</sub>* *I*].  
       b. A: *I did all the work*.  
       B:  $\sim$ [ *You mean your sister<sub>F</sub> did all the work.*]

In the first example, two focus operators are involved which each take scope over a sub-constituent of the utterance. The antecedents for the focus marking are within the same utterance – in fact, they are respectively the complement of the other focus operator.

In the second example, the contrast that B evokes is one between at least two potential alternative utterances *You mean you did all the work* vs. *You mean your sister did all the work*, and the focus operator can attach to the root. Of course, the context only provides *I did all the work* as an antecedent. But this entails (from B's perspective) the proposition *You mean that you did all the work*. As is well known, entailed propositions can serve as the antecedent for focus marking (Rooth 1996; Schwarzschild 1999), so the presupposition of  $\sim$  is satisfied.

Since in French, according to the Scope Hypothesis, the squiggle operator ( $\sim$ ) can only attach to the root node, focus marking will only be possible in the first type of example—just as is actually observed in Cruttenden's (2006) study. Prior descriptions of differences in focus marking between Romance and Germanic languages have often observed that corrective focus<sup>5</sup> (as in 9a) seems to be special in allowing for prominence shifts even where other types of focus appear not to. The Scope Hypothesis is compatible with the intuition that the type of focus matters. Gussenhoven (2007:91) describes corrective focus as “a direct rejection of an alternative [assertion]”. In order to contrast assertions,  $\sim$  has to scope over the entire assertion—in other words, the syntactic claim that scope in French must be wide has semantic and pragmatic repercussions, in that only assertions can be contrasted prosodically. One could even consider the possibility that  $\sim$  in French subcategorizes for speech acts whereas in English it subcategorizes for propositions as a source of the scope differences.

### 2.1.2. The Phrasing Hypothesis

<sup>5</sup> Or ‘meta-linguistic correction’ in Ladd's (2008) terms.

A common assumption is that the difference between English and French with respect to focus and givenness is related to the considerably different prosodic systems of the two languages. The prosodic system of French is commonly analyzed as being based on phrasing rather than based on stress prominence (e.g., Jun and Fougeron 2000; Féry 2001). The question here, however, is not whether there are such prosodic differences, but whether they account for differences in how prosody is used to encode focus. For many researchers, the assumption is that the answer to this question is affirmative.

One explicit hypothesis about why French differs from English (and other languages like German) is proposed in Féry (2001, 2013) and Hamlaoui et al. (2012), who argue that while Germanic languages like English encode focus via stress, French only encodes focus via prosodic phrasing. The particular proposal makes two concrete claims. First, the phonetic correlates of focus/givenness marking should be the correlates of phrasing, such as pitch and duration, but not the phonetic correlates of stress boosts and reduction, such as increases or decreases in intensity. The second claim is that if the phrasing is already proscribed by syntax, then no focus/givenness distinction should be possible outside of phrasing. In particular, if a constituent is not at least the size of a phonological phrase, Hamlaoui et al. (2012) and Féry (2013) argue that it cannot be marked as *given* since the phrasing necessary would require it to form a phonological phrase. The evidence adduced to support this claim comes from Féry (2001), who argues that French does not have the ability to mark prosodic prominence by deaccenting a prosodic word within a phonological phrase, giving evidence from an experiment on Question-Answer congruence, and from two more recent studies looking at focus marking in noun-adjective combinations (Hamlaoui et al. 2012) and differences in focus marking between arguments and adjuncts (Féry 2013).<sup>6</sup> We summarize the predictions of the phrasing view as follows:

(10) ***Predictions of the Phrasing Hypothesis*** (Féry 2001, 2013; Hamlaoui et al. 2012):

*Types of Focus:* No differences predicted between French and English (i.e., independent of the type of focus, focus/givenness could be marked whenever phonologically possible, but only then).

*Phonological Difference:* In French, only entire phonological phrases can deaccent (but within a phonological phrase, focus/givenness cannot be marked), while in English, focus can shift within any domain.

*Phonetic Realization:* French mainly uses pitch compression in the post-focal domain to mark focus, while in English there should also be differences in intensity and duration on both focal and post-focal material.

Contrary to the predictions of the Phrasing Hypothesis, some previous experimental results seem to indicate that type of focus *does* play a role, and this is also the view of Ladd (2008). Jun and Fougeron (2000) present clear experimental evidence showing that French marks focus prosodically in some types of corrective contexts, specifically, when two entire utterances are contrasted. However, the examples involved constituents that are arguably mapped to phonological phrases (e.g., focus was placed on a subject with a deaccented following VP).

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<sup>6</sup> See Section 5.2 for a discussion and implications for the Phrasing Hypothesis vs. the Scope Hypothesis on possible differences for DPs with pre-nominal adjectives (one phrase) compared to post-nominal adjectives (can be two phrases).

These prior experimental findings therefore do not distinguish between the Scope Hypothesis and the Phrasing Hypothesis.

### 2.1.3. The Initial High Hypothesis

Another way in which French might differ from English is that French has been reported to show an additional prosodic strategy to mark the focal constituent, namely with an initial high or rising tone, which can but does not have to be accompanied by the final accent of the accentual phrase. If the final accent is missing, this initial high is sometimes called ‘accent d’insistance’ (cf. Delattre 1966; Garde 1968). Di Cristo (1998), for example, reports that an early high peak is the predominant realization of at least some types of foci.<sup>7</sup> Beyssade et al. (2009) present evidence in favor of a correlation between a phrase initial high and focus as a general strategy to mark focus. One question of interest to us is therefore whether there is evidence for this strategy across different focus types. These predictions are spelled out in (11).

#### (11) ***Predictions of the Initial High Hypothesis***

*Types of Focus:* Differing assumptions exist in the literature. Di Cristo (1998), for instance, claims that an initial high only happens in certain focal contexts.

*Phonological Difference:* Unlike in the Phrasing Hypothesis, there is no phonological constraint on marking focus, but there should often be an initial high tone in French at the beginning of the focused word, either instead of or in addition to prominence cues to focus.

*Phonetic Realization:* There should be an initial high pitch on the focused word in French, compared to the unfocused control condition, in contrast to English where no such phenomenon has been observed.

The Initial High Hypothesis is in principle compatible with both the Scope Hypothesis and the Phrasing Hypothesis.

### 2.1.4. Other Hypotheses

The Scope Hypothesis makes no predictions about phonological or phonetic differences between English and French, but it also does not preclude that other differences could exist in addition to the differences in scope possibilities. One difference between French and English might be the acoustic cues that are used to encode focus. A number of studies have examined the effect of pitch in focus contexts in French and found that the focused item has a final rise-fall contour, while post-focus constituents tend to be compressed in pitch and relatively flat (Di Cristo 1998; Jun and Fougeron 2000; Féry 2001). This post-focal pitch compression often described is not unlike that observed in English (Xu and Xu 2005; Breen et al. 2010; among others). Duration may also be used as a cue in French, but only through increased duration on the focused item (Dohen and Loevenbruck 2004), and not through reduced duration on the given item, at least according to Jun and Fougeron (2000). We know of no direct comparison of French and English with respect to the use of intensity for marking focus, but the assumption in the literature seems to be that intensity does not play a big role in marking focus in French (cf. Féry 2001; Dohen and

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<sup>7</sup> It is not entirely clear which, since the notion ‘objective focus’ that is used in Di Cristo’s paper and reported to correlate with this strategy is not fleshed out in detail.



Loevenbruck 2004; Hamlaoui et al. 2012). As for English, while many studies also consider pitch to be the most important cue, Kochanski et al. (2005) found that prominence is marked primarily by intensity and duration. It could be then that French and English differ in the types of cues they use to encode prosody, in addition to the contextual circumstances in which prosodic focus marking is used.

### 3. Our Experiment

One difficulty in making typological claims based on existing results in the literature is that due to conflicting frameworks, terminology, experimental methods, and/or speech materials, there are rarely directly comparable data available on which to base these claims (cf. Swerts et al. 2002:632, who make a similar point). With the notable exception of Swerts et al. (2002), Cruttenden (2006), Swerts (2008), and Féry (2013), different languages are not often examined directly in a single study. To address this issue, we compare the use of prosody in English and French in four types of focus.

If the difference between English and French pertains solely to S-differences, then we should see English and French patterning similarly in at least *some* focus conditions. Previous studies have shown that European French shifts prosodic prominence in a more limited set of contexts compared to English, such as in corrective focus (Jun and Fougeron 2000; Cruttenden 2006), answers to wh-questions (Féry 2001), and focus for ‘intensification’ (Di Cristo 1998). In addition to these differences in the types of context that lead to prosodic focus marking, the phonological reflexes of focus markers are also different from those in English. This correlation between different pragmatic distributions and different phonological means is the likely reason why prior accounts emphasized the explanatory role of the phonological differences between the two languages. And yet there is no prior study directly comparing English and French, which systematically varies the contextual conditions and phonological factors at the same time, in order to test the validity of this line of explanation. Our experiment was designed to do just that.

#### 3.1. Experimental Materials and Predictions

The Scope Hypothesis holds that French differs from English in that  $\sim$  must take scope over an entire root clause, while English allows for  $\sim$  to take scope over embedded nodes as well. If this is true, then we should only see the prosodic reflex of  $\sim$  in French when there is an alternative root clause that forms an antecedent for focus/givenness marking, while in English a contrasting sub-constituent should be sufficient. In order to test how this hypothesis fares compared to alternative views such as the Phrasing Hypothesis, our experiment looked at different types of focus: syntactic parallelism, contrastive focus, and corrective focus (e.g., Gussenhoven 2007 for a discussion of focus types). Rooth’s theory actually does not distinguish different types of focus in terms of their semantics/pragmatics—what we call types of focus here, following the convention in the field, are structures that simply differ in the scope of the  $\sim$  operator.

Our experiment furthermore included a corrective condition in which the response involved clefting in order to examine interactions between prosodic and syntactic means of encoding focus. Lastly, the experiment included a control condition in which no focus marking is motivated. Apart from varying the type of focus, we also varied the phonological size and the

syntactic size of the focused constituent, which we discuss in detail in section 5. In this section, we describe each type of focus in our experiment and their predictions for English vs. French for the Scope Hypothesis, the Phrasing Hypothesis, and the Initial High Hypothesis.

First, a prototypical context in which there is a root clause sized antecedent is a corrective statement or *corrective focus*, where one assertion directly contradicts a prior assertion that differs in one constituent, and hence the entire prior utterance serves as the antecedent for focus marking. In Roothian terms, the representation of corrective focus involves a  $\sim$  with widest scope:<sup>8</sup>

(12) ***Corrective Focus:***

- a. *Yesterday, Jordan bought a blue bike.*  
No,  $\sim$ [yesterday, he bought a red bike].
- b. *Pour le pique-nique de cet après-midi, Guillaume va apporter une salade froide.*  
'For the picnic this afternoon, Guillaume is going to bring a cold salad.'  
Non,  $\sim$ [il va apporter une soupe froide].  
'No, he's going to bring a cold soup.'

In other words, the focus alternative that serves as a contrast is an entire speech act, and syntactically comprises an entire root clause:

(13)  $\sim$  [(assert) yesterday he bought a red bike]

In order to control for word order differences between English and French, we included both pre-nominal and post-nominal adjectives in our French stimuli. In our experiment, the given item always followed the contrastive item, irrespective of whether it was the adjective or the noun that came first. We decided to only look at this relative ordering since a prominence shift away from the sentence end is much easier to perceive and provides a stronger cue for focus marking.

The predictions for corrective focus of the three accounts we consider are as follows. Note that across all types of focus examined here, only the predictions of the Scope Hypothesis will differ, while both the Phrasing Hypothesis and the Initial High Hypothesis make the same predictions.

(14) ***Predictions for Corrective Focus:***

*Scope Hypothesis:* English and French should pattern the same, and mark corrective focus prosodically.

*Phrasing Hypothesis:* For a case in which a constituent does not form a phonological phrase ( $\Phi$ ) of its own, no prosodic marking is expected; if the given constituent is at least  $\Phi$ -sized, it should show pitch compression in French.

*Initial High Hypothesis:* While English and French may pattern similarly with respect to prominence shifts, French should in addition tend to show an initial high on the focused constituent.

A corrective statement contrasts entire utterances with each other. We call any contrast between

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<sup>8</sup> We assume that 'No' actually constitutes its own speech act, and hence does not have to be within the scope of  $\sim$ , even in French.

two statements that are not direct contradictions between assertions but rather contrast constituents of smaller size *contrastive focus*. In cases of contrastive focus, only a sub-constituent is contrasted with linguistic material in an antecedent statement. For example, *a red bike* is contrasted with *a blue bike*, as shown in (15a).

(15) **Contrastive Focus:**

- a. Yesterday, Jordan bought a *blue bike*.  
Really? Yesterday, my friend bought a **red bike**.
- b. Pour le pique-nique de cet après-midi, Guillaume va apporter une *salade froide*.  
'For the picnic this afternoon, Guillaume is going to bring a cold salad.'  
C'est vrai ? Marie va apporter une **soupe froide**.  
'Really ? Marie is going to bring a cold soup.'

In the contrastive condition, the focus operator takes a narrower scope than in the corrective condition. In the present case,  $\sim$  can scope over the VP or the DP:

- (16) a. My friend  $\sim$  [<sub>VP</sub> bought a **red<sub>F</sub>** bike]  
b. My friend bought  $\sim$  [<sub>DP</sub> a **red<sub>F</sub>** bike]

Based on our Scope Hypothesis, this type of representation should be possible in English but impossible in French. Another possible representation, however, would involve a  $\sim$  operator with wide scope with more material marked by F, where in principle  $\sim$  can scope over the entire sentence:

- (17)  $\sim$  [ **My friend<sub>F</sub>** bought a **red<sub>F</sub>** bike]

Since our stimuli were not created to rule out this possibility, the various scope options might actually be a source of variation in our experiment, since it is not clear that (17) should be ruled out in French under our hypothesis. We return to this caveat in the discussion in Section 4. At least based on (16a-b) above, the predictions are as follows:

(18) **Predictions for Contrastive Focus:**

*Scope Hypothesis:* There should be no prosodic marking of focus in French, while in English focus should be prosodically marked just like corrective focus.

*Phrasing Hypothesis:* Whenever a constituent does not form a phonological phrase of its own, no prosodic marking is expected; if the given constituent is at least  $\Phi$ -sized, it should show pitch compression in French.

*Initial High Hypothesis:* While English and French may pattern similarly with respect to prominence shifts, French should in addition tend to show an initial high on the focused constituent.

In cases of corrective focus, the entire speech act serves as an antecedent, and in cases of contrastive focus, it is some sub-constituent of a previous utterance; but in both, the antecedent for focus marking is in a separate utterance, introduced in the first part of the dialogue in our examples. There are also cases of prosodic focus marking in which a constituent within the *same sentence* serves as an antecedent. We included one such condition in our experiment called

*syntactic parallelism* whereby the focused item and its antecedent are conjoined by *and*. The contrastive item is not mutually exclusive with its antecedent (e.g. *red* vs. *blue*), as illustrated in (19).

(19) *Syntactic Parallelism*:

- a. I heard that Jordan is into cycling.  
Yeah, the other day, he bought a *blue bike* and a **red bike**.
- b. J'ai entendu dire que Guillaume irait à un pique-nique.  
'I heard that Guillaume will go to a picnic.'  
Ouais, il va apporter une *salade froide* et une **soupe froide**.  
'Yeah, he is going to bring a cold salad and a cold soup.'

This is the only condition in which both the focused item and its antecedent are within the same utterance. In Roothian terms, (20) would be analyzed as involving two  $\sim$  operators, with narrow scope over the contrasting DPs (Rooth 1992), which serve as antecedent for the focus marking on each other:

(20) He bought  $\sim$ [<sub>DP</sub> a *blue*<sub>F</sub> *bike*] and  $\sim$ [<sub>DP</sub> a *red*<sub>F</sub> *bike*].

Based on our Scope Hypothesis, a representation like (20) would be ruled out in French since  $\sim$  can only take widest scope over a root clause, but it would be possible in English. The Phrasing Hypothesis and the Initial High Hypothesis make the same predictions with syntactic parallelism as with corrective focus and contrastive focus shown earlier:

(21) *Predictions for Syntactic Parallelism*:

*Scope Hypothesis*: There should be no prosodic marking of focus in French (unless entire speech acts are coordinated in parallel structures), while in English it should be marked just like corrective focus.

*Phrasing Hypothesis*: Whenever a constituent does not form a phonological phrase of its own, no prosodic marking is expected; if the given constituent is at least  $\Phi$ -sized, it should show pitch compression in French.

*Initial High Hypothesis*: While English and French may pattern similarly with respect to prominence shifts, French should in addition tend to show an initial high on the focused constituent.

Parallelism gives us precise control over the scope of  $\sim$ . If there are differences in the scope of  $\sim$ , we might be able to detect them by varying the size of the parallel constituent that is coordinated in this focus condition. In order to test whether the phonological or syntactic size of a constituent matters, we varied both of these factors in our stimuli. We discuss these manipulations in detail when we provide the results in sections 5.3 and 5.4.

French and English might differ not just in their use of prosodic focus, but also in the trade-off between syntactic and phonological means of encoding focus as noted in the distinction between Romance and Germanic languages (Vallduví 1992; Lambrecht 1994; Cruttenden 1997; Ladd 2008; among others). One salient syntactic difference between the two languages is that clefts are used more frequently in French, in particular for subject focus as it provides clear phrasing (Clesh-Darbon and Rialland 1999; Féry 2001, 2013; Hamlaoui 2009). We therefore

included a *cleft* condition, with an *it*-cleft in English, (22a), and *c'est*-cleft in French, (22b). This is the only condition which uses syntactic manipulation to identify the focused item in this experiment. The focus manipulation in this condition is always a corrective focus context.

(22) *Cleft*:

a. *Yesterday, Jordan bought a blue bike.*

No, ~[it was a **red** bike that he bought yesterday].

b. *Pour le pique-nique de cet après-midi, Guillaume va apporter une **salade froide**.*

'For the picnic this afternoon, Guillaume is going to bring a cold salad.'

Non, ~[c'est une **soupe** froide qu'il va apporter.]

'No, it's a cold soup that he's going to bring.'

In order to evaluate whether focus was marked prosodically at all, we also included a *control* condition in which there is no potential antecedent for focus marking, as demonstrated in (23).

(23) *Control*:

a. *Jordan is always purchasing cycling stuff.*

Yeah, yesterday, he bought a red bike.

b. *Guillaume ira à un pique-nique.*

'Guillaume is going to a picnic.'

Ouais, il va apporter une soupe froide.

'Yeah, he's going to bring a cold soup.'

The five conditions in this study (corrective focus, contrastive focus, syntactic parallelism, cleft, and control) allow us to test how prosody is used across various types of focus contexts through analysis of read speech. By design of the experiment, as we outline in the following section, the participant is forced to respond with a particular sentence. Hence, at least in the conditions in which a cleft is not used, participants must either mark focus prosodically (i.e., by shifting prominence in an informative manner or perhaps by using an initial high) or not mark it at all.

### 3.2 Methodology

In order to address how English and French differ in how prosody may be used to convey information status, the structure of the English and French experiments was as parallel as possible given independent syntactic differences between the languages. The experiments each consisted of 30 test items and 30 fillers that were run latin-square. Each trial consists of a pseudo-dialogue with an auditorily presented context and a scripted response to be read aloud by the participant, followed by a response rating provided by the participant:

(24) *Auditorily presented context:* Yesterday, Jack bought a checkered shirt.

*Participant's response:* Really? The other day, I bought a striped shirt.

There were four practice dialogues before the start of the experiment to familiarize participants with the task. The instructions were written on the first computer screen (in English or French accordingly), and the experimenter also verbally went over them.

Participants were recruited via email invitations to participants of prior studies as well as

through online ads. A total of 35 English and 33 French speakers participated. The French participants were divided into 16 European French speakers and 17 Québec French speakers. We included this distinction under the hypothesis that Québec French speakers may display more English-like behavior in their use of prosody given their environment compared to European French speakers. We present the results of the two French groups separately as there are some differences between them.<sup>9</sup> Finally, before the study, participants were asked to fill out a consent form and a detailed language questionnaire.

In order to elicit the most natural conversation possible, the contexts were pre-recorded to simulate dialogue. There were three versions of the pre-recorded stimuli: an English, a Québec French, and a European French version. All the pre-recordings were done by a monolingual female native speaker of the respective language in her early twenties.<sup>10</sup> The procedure was as follows. Participants see the complete dialogue on the screen, and are first asked to read the dialogue silently. When they are ready, they press a key to start the dialogue. They hear the pre-recorded first part of the dialogue in their headphones, and then say the response out loud. A sample screen for English is given in (25):

(25)

Yesterday, Jack bought a checkered shirt.  
Really? The other day, I bought a striped shirt.

*Listen, then respond. Press any key when you are done recording!*

After the dialogue, participants see a second screen stating “Please rate how natural your response is given what the other person said. [1=completely unnatural, 5=completely natural]”. They enter a number from 1-5. There was no time limit given either for the preparation and recording of the dialogue or for the rating section. Reaction Time was measured in order to check for outliers, but no participants or trials were excluded in the end. The process was repeated 60 times for each dialogue (30 test items, 30 fillers). In general, participants took 15-25 minutes to complete the study.

For each language, of the 30 total test items, 16 involved adjective/noun sequences (cf. examples in section 3.1 above). The other items involved different syntactic configurations to which we return below. We manipulated context such that whichever one came first (noun or adjective) was either under focus (types of focus contexts) or not (the control). Our approach is

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<sup>9</sup> In order to check for influence of English, we categorized our French speakers into a high and a low English influence group. The ‘high English influence’ was determined following a global accent rating task performed by three English-speaking judges on English productions by the speakers, following criteria laid out in Akita (2005, 2006). We excluded 4 European French speakers and 1 Québec French speaker with very high influence of English from the results presented in this paper in order to focus on how French speakers without English influence use prosody. We did not, however, find systematic differences between our high-influence and low-influence groups. Second, within the Québec French group, we classified speakers as being from Montréal (speakers who grew up in this highly bilingual city) and speakers from elsewhere in Québec, on the assumption that the former would have had more English exposure. Yet we do not find striking differences between these groups with respect to the contrasts relevant to our hypotheses. We therefore did not include a more detailed discussion of individual variation in this paper.

<sup>10</sup> For English, the speaker was a Canadian from Ontario, the Québec French speaker was from Montréal (with low influence of English), and the European French speaker from Paris.

to look for quantitative differences in focus effects across conditions, and then to compare across the two languages to see whether there are any differences in the prosodic effects observed. For example, in the following dialogue for corrective focus, we would be interested in quantitative measures correlating with prominence on the target constituents *steel* and *knives*:

- (26) A: Last week Johanna polished the *silver knives*.  
B: No, she polished the **steel** knives.

To obtain measurements on the relevant target constituents, we automatically annotated the data by using the ‘prosodylab aligner’ (Gorman et al. 2011), which makes use of HTK hidden-Markov-Toolkit and is trained on data previously collected in our lab. Using Praat scripts (Boersma and Weenink 2011), we extracted duration, intensity, and pitch measurements on the **contrastive** constituent and the given constituent following the focus, in this case *steel* and *knives* respectively. Specifically, we calculated the duration, the maximum intensity, and the maximum pitch of the target constituents. We then computed measures of relative prominence by looking at the difference between the contrastive and the given constituent. The relative measure of pitch we used was semitones, and the relative measures of duration and intensity were the differences between the log values (equivalent to the logarithm of the ratio), assuming with much work in the psychoacoustic literature that perceptual dimensions such as pitch, intensity and duration are better modeled on a logarithmic scale.

### 3.3 Summary

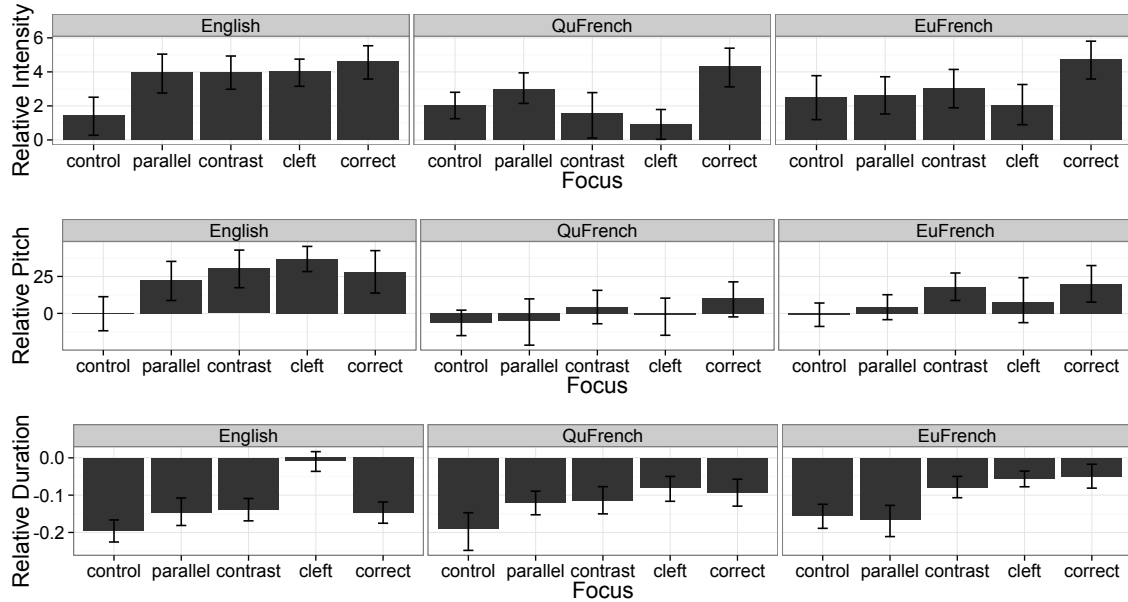
If S-differences are the key to why French and English differ in their use of prosody, we expect French and English to share similar relative measurements in at least some focus contexts (corrective focus, contrastive focus, or parallelism). If P-differences are the main reason why French and English differ in their use of prosody, we expect the relative measurements to be different in each language, yet consistent across all focus contexts. To be clear, it may be the case that French and English still differ in phonetic or phonological aspects, even if they show S-differences; however, if both languages shift prominence in some of the focus contexts in similar ways but not in others, then P-differences alone cannot explain the observed differences.

## 4. Parallelism is not Reliably Marked in French; Corrective Focus is

We now turn to the prosody results, starting with the effect of focus on the adjective/noun items. **Figure 1** shows the means for relative measures of prominence depending on the focus conditions for English, Québec French, and European French.<sup>11</sup> We observe the following pattern overall: in English, all four focus conditions are consistently distinguished from the control condition, while in French, only corrective focus is consistently different from the control across all acoustic dimensions, with occasional differences in other focus conditions (detailed below). We tested for significant differences and interactions across languages using mixed effects models.

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<sup>11</sup> All error bars indicate confidence intervals.



**Figure 1.** Relative intensity, pitch, and duration by focus condition in English, Québec French (QuFrench) and European French (EuFrench).

For the statistical analysis, we use a linear mixed model regression using R in order to control for subject and item effects (Baayen 2008).<sup>12</sup> To assess whether the languages marked the various focus conditions, we first fit models for each of the dependent measures – relative intensity, pitch, and duration – within each language.<sup>13</sup> The models included Focus as a fixed factor, and random effects and slope for both items and participants. Each model compared a focus condition to the baseline condition (the control). Any comparison with a t-value greater than |2| reflects a significant comparison (cf. Baayen 2008). The results of the relative measures of prominence of intensity, pitch, and duration are summarized in **Table 1**.<sup>14</sup>

<sup>12</sup> For the statistical analysis, we used the ‘lmer’ function of the lmer package in R. The model we used looked as follows:

[model.lm <- lmer(response~language\*condition + (1|item) + (1|subject), data = data.rhyme)] The models we fit looked as follows:

model=lmer(rpitch~focus+(focus|participant)+(focus|item),data=subsetEnglish)

In two cases the models did not converge, in which case we used a simpler random effect structure: ...+(0+focus|item)+(0+focus|participant). See Barr et al. (2013) for how to make decisions about the complexity of the random effects structure.

<sup>13</sup> In the statistical analysis, “Language” refers to English, Québec French, and European French.

<sup>14</sup> In this and all following tables, significant comparisons (i.e.,  $|t| > 2$ , following Baayen (2008)) are marked in bold.



<i><b>Intensity</b></i>	English	QuFrench	EuFrench
Parallelism	<b>t=3.9</b>	t=1.2	t=-0.1
Contrast	<b>t=3.7</b>	t=-0.3	t=0.3
Corrective	<b>t=5.0</b>	<b>t=3.0</b>	<b>t=2.2</b>
<i><b>Pitch</b></i>	English	QuFrench	EuFrench
Parallelism	<b>t=2.1</b>	t=-0.1	t=1.0
Contrast	<b>t=2.7</b>	t=1.6	<b>t=2.3</b>
Corrective	<b>t=2.5</b>	<b>t=2.2</b>	<b>t=2.7</b>
<i><b>Duration</b></i>	English	QuFrench	EuFrench
Parallelism	<b>t=1.7</b>	<b>t=2.3</b>	t=0.5
Contrast	<b>t=5.2</b>	t=1.3	<b>t=3.4</b>
Corrective	<b>t=4.0</b>	<b>t=3.9</b>	<b>t=4.8</b>

**Table 1.** Comparisons between foci and control condition based on mixed models within English, Québec French (QuFrench), and European French (EuFrench).

In English, focus under parallelism is marked along all acoustic dimensions, just as are contrastive and corrective focus. While corrective focus is also marked in French along all dimensions, parallelism is not. The only significant difference between control and parallelism is for duration in Québec French. Since prior mention alone (rather than a prominence shift) can effect a reduction of the duration of a word even without deaccentuation (cf. Bard et al. 2000; Wagner et al. 2010; Kahn and Arnold 2012), this difference alone is probably not reflective of a shift in prominence to the contrastive constituent. We will return to this effect when we discuss how relative differences are accomplished in the different languages below in section 6. With respect to European French, there is no indication that focus under parallelism is ever marked. It seems then that corrective focus is marked in French in a similar way as in English, but parallelism is not. In European French, there was also a significant difference between contrastive focus and control, at least with respect to pitch and duration, while in Québec French there was not.

To test whether the languages are really significantly different, it is not sufficient to test for the presence or absence of effects within each sub-experiment for each group of speakers. We also have to test whether the differences in the interaction of the focus conditions with language across experiments is significant. In order to do so, we fit a regression model to the adjective/noun data from English, Québec French, and European French pooled together. We fit mixed models for each of the three relative measures (intensity, pitch, and duration) with Focus and Language and their interaction as fixed effects, and random effects for items and participants that included random slopes for Focus.<sup>15</sup> **Table 2** illustrates these results:

<sup>15</sup> The random effects could not include a slope for ‘language’ since participant and item correlate with language (the items in French were different from the items in English). The models were thus as follows:  
model= lmer(dv~focus\*language +(focus |participant) +(focus |item), data=adjdata).

<i>English vs. French</i>	<i>Intensity</i>	<i>Pitch</i>	<i>Duration</i>
Parallelism.vs.Control*English.vs.French	<b>t=2.3</b>	<b>t=2.0</b>	t=1.3
Contrast.vs.Control*English.vs.French	<b>t=2.7</b>	t=1.7	t=-0.1
Corrective.vs.Control*English.vs.French	t=1.0	t=1.0	t=-1.9
<i>QuFrench vs. EuFrench</i>			
Parallelism.vs.Control*QuFrench.vs.EuFrench	t=0.9	t=-0.2	t=1.8
Contrastive.vs.Control*QuFrench.vs.EuFrench	t=-0.5	t=-0.4	t=-0.6
Corrective.vs.Control*QuFrench.vs.EuFrench	t=0.2	t=-0.5	t=0.1

**Table 2.** Interactions between Focus and Language.

The results in Table 2 show that English significantly differs from French in how it marks parallelism both in intensity and pitch compared to the control condition. We can therefore conclude that English differs from French in how parallelism affects prosody. This is also true for contrastive focus, at least with respect to the relative intensity measure. Only with respect to duration is the effect of parallelism in English not systematically different from French. But here, the difference between Québec French and European French is nearly significant ( $t=1.8$ ), and Québec French shows a pattern more similar to English as noted in Table 1 above, so it is not surprising that there is no overall difference between English and French along this dimension.

The second important point of these results is that English does not differ from French significantly on any dimension when it comes to how it marks corrective focus. In other words, both Québec French and European French mark corrective focus in the same way as English.

Finally, the apparent differences we observed in Table 1 between Québec French and European French in how contrastive focus is marked might not be indicative of a true difference between them, since the interaction between Contrastive focus effects and the difference between the two Languages were not significant (Table 2). That is, we cannot conclude that the two languages differ with respect to how they mark contrastive focus.

That focus is marked in the same way in French and English under corrective focus but not in the case of the other focus types shows that phonology alone cannot explain the differences between the two languages. Further, our results confirm previous findings that French can shift prominence at least under certain circumstances (e.g., Di Cristo 1998; Jun and Fougeron 2000; Féry 2001; Cruttenden 2006).

In fact, parallel results to our own study can be drawn from Cruttenden's (2006) cross-linguistic study on deaccentuation, which includes English and French. Of the ten examples tested in Cruttenden (2006), two items are clear examples of corrective focus (items 6 and 7) and two items are clear examples of parallelism (items 8 and 9).<sup>16</sup> For both corrective focus examples, Cruttenden observes that English and French behave the same in that shifting prominence is available in both languages: all English participants (7/7) shift prominence, and the majority of French participants also shift prominence (11/14 and 12/14 participants for Cruttenden's items 6 and 7 respectively).<sup>17</sup> For both parallelism examples, Cruttenden finds that

<sup>16</sup> Other items in Cruttenden (2006) such as morphological contrast (*correct* vs. *incorrect*) are not comparable to the types of focus examined in our experiment.

<sup>17</sup> One possible corrective focus example (Cruttenden's item (5): A: *He earns at least thirty thousand pounds.* B: *I think he earns nearly forty thousand.*) does not conform to these results: all English speakers shift prominence, but for the corresponding French example, only 3 speakers shift prominence (Cruttenden 2006:323). This result in fact

English and French diverge: all English participants (7/7) shift prominence while no French participants do so (0/14). Cruttenden (2006:328) notes that shifting prominence is obligatory in English, and an option in French, but does not explain why French is more limited.

Within Rooth's (1992) framework, we can make explicit how the grammars of English and French differ: the results of our study as well as those of Cruttenden (2006) are compatible with our claim that the scope possibilities of ~ are different between the two languages. The scope of ~ in French always seems to be at the root of the clause, that is, ~ always adjoins to a root clause; while in English, ~ seems to be able to adjoin to any constituent. This would account for why prosodic marking is possible with corrective focus in both English and French as in (27), but only possible with parallelism in English as in (28): ~ scopes over at least the root clause in corrective focus, but not in parallelism.

- (27) English: ~ [(assert) He bought a red<sub>F</sub> bike].  
 French: ~ [(assert) Il va apporter une soupe<sub>F</sub> froide].
- (28) English: He bought ~[a blue<sub>F</sub> bike] and ~[a red<sub>F</sub> bike].  
 French: Grammar disallows ~ to scope below the root clause:  
 \* Il va apporter ~[une salade<sub>F</sub> froide] et ~[une soupe<sub>F</sub> froide].

In other words, since ~ requires an antecedent of the size of whatever constituent it attaches to, this has the consequence that in French, prominence can only shift if the antecedent has the size of an alternative root clause, while in English antecedents of smaller sizes can license a prominence shift, as long as ~ attaches to a smaller constituent.

With respect to contrastive focus, we found that English is significantly different from French regarding the use of intensity in prosodically marking focus. With pitch and duration measurements, English and French seem to pattern similarly in prosodically marking focus at least to some extent. From the point of view of the Scope Hypothesis, that French shows a shift in prominence to a lesser degree in contrastive focus than in corrective focus may reflect the different scope possibilities of ~ available in contrastive focus. As shown in section 3.1 above, we hypothesized that in French, the scope of ~ is restricted to the root clause; embedded scope is not available, as illustrated in (30) for the example in (29). We suggest that this variability is reflected in the French results for contrastive focus: some speakers encoded a contrast using ~ with widest scope, while other speakers chose not to mark the contrast.

- (29) *Contrastive focus in French* (repeated from 15b):  
 Pour le pique-nique de cet après-midi, *Guillaume va apporter une salade froide*.  
 'For the picnic this afternoon, Guillaume is going to bring a cold salad.'  
 C'est vrai ? Marie va apporter une soupe froide.  
 'Really ? Marie is going to bring a cold soup.'

---

fits our proposal that French only allows ~ at the root clause (as explained below), and in this case, *I think* is outside the root clause, impeding ~ from attaching at the root clause. However, this explanation would require that in item (7) in Cruttenden's study (A: *I did all the work*. B: *You mean your sister did all the work*.), 'you mean' would crucially differ from '*I think*' in what constitutes a constituent outside the root clause. We believe that Cruttenden's item (5) requires additional research –languages that behaved similarly to French in other corrective focus examples such as Spanish also did not shift prominence in (5). Putting aside issues with (5), Cruttenden's corrective focus examples are compatible with the Scope Hypothesis put forward in this paper.

- (30) *Possible wide scope ~ for contrastive focus in French with double focus:*  
 a. ~ [**Marie**<sub>F</sub> va apporter une soupe<sub>F</sub> froide]

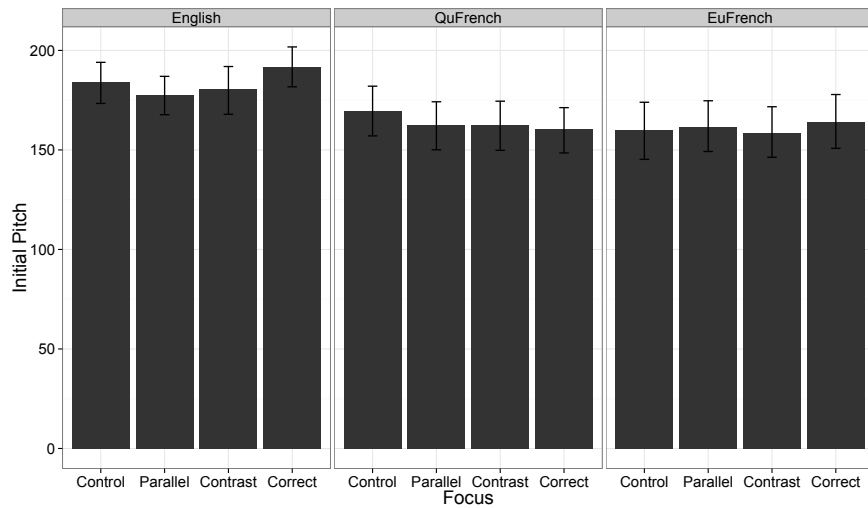
*Impossible narrow scope of ~ for contrastive focus in French:*

- b. \* Marie va ~ [apporter une soupe<sub>F</sub> froide]  
 c. \* Marie va apporter ~ [une soupe<sub>F</sub> froide]

In sum, our finding that French and English pattern together in at least some focus contexts (in this case, corrective focus) is expected under the Scope Hypothesis. Within Rooth's framework, ~ always adjoins to a root clause in French, but may take narrow scope in English.

The fact that French patterns with English under corrective focus is unexpected under the Phrasing Hypothesis: precisely for the case of a noun-adjective sequence, Hamlaoui et al. (2012) have argued that at least European French does not mark focus, since in this case the given constituent does not fit the size requirement on prosodic focus marking because it does not constitute a phonological phrase by itself.

If focus is not marked in two of our focus manipulations by a prominence shift, it could still be marked by an initial high at the beginning of the focused constituent, as per the Initial High Hypothesis. In an attempt to check for such an effect, we measured the average pitch in the first quadrant of the focus word. This measure should directly correlate with whether or not there is an initial high target at the beginning of the focused constituent, although it would also be affected by an overall pitch boost due to focus. So while a significant difference in this measure might not necessarily reflect an initial high, the absence of an effect would be an indication that there is no initial high on the focused constituent. Figure 2 plots the results.

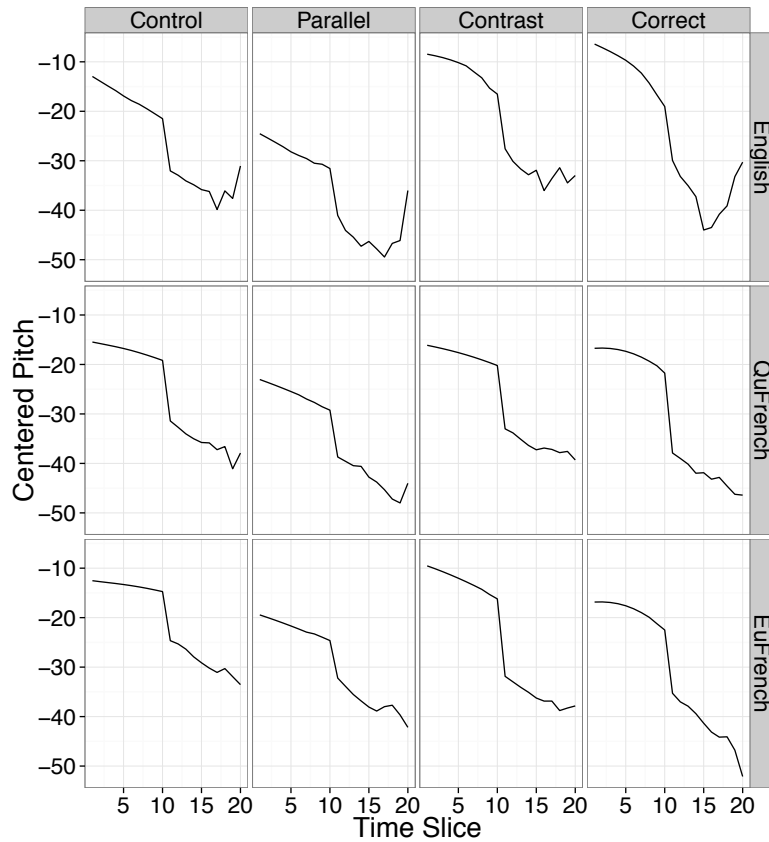


**Figure 2.** Maximum pitch in the first quadrant of the focused word across conditions in English, Québec French (QuFrench) and European French (EuFrench).

Based on the plots, the only comparison that is suggestive of a difference is the case of corrective focus vs. control in English. This difference was indeed close to significant ( $t = 1.96$ ). There was no evidence that an initial high was used to mark focus in Québec French or European French, or that French differed from English in making use of such an initial high in marking focus.

In order to check whether our very coarse grained measure might simply have failed to

detect the initial high or an initial rise, we created average pitch plots for our two words of interest by slicing each word into 10 parts, and computing averages for each time slice. Figure 3 shows pitch values over time for the two words. The plot shows average measures of pitch for every 10% slice of each word of interest, the first 10 slices pertaining to the focused word and the slices 11-20 to the given word. The reason the values are negative is that we centered pitch for each participant around the median, and the pitch is often already below the median due to downstep and declination by the time the focused and given word are pronounced. The plots show a clear downstep between focused and given words in all conditions including the control condition, with an even greater difference in pitch in some of the focus conditions. There is also some indication that pitch on the focused word is higher in English in the contrastive and corrective condition—we will return to this in section 6 where we discuss how a prominence shift is achieved for the various foci. We see no indication that there was an initial high to mark focus in French.<sup>18</sup>



**Figure 3.** Average Pitch Plots for 20 time slices (1-10 pertain to focused word, 11-20 to given word; pitch was centered around the median for each participant before averaging).

<sup>18</sup> The apparent final rises in English toward the end of the word are probably an artifact of the pitch extraction algorithm. The speech toward the end of utterances was often creaky.

The absence of an effect on initial pitch in our French data does not mean that there were no initial high tones in our data, but rather that the presence or absence of an initial high did not systematically correlate with focus. It could be that our averaged acoustic measures are still too coarse-grained to capture the presence of an initial high, but on the other hand it would be surprising if the systematic presence of a high target tone did not even lead to a numerical difference in pitch.

## 5. Ruling Out Alternative Explanations

Our results show an interaction between type of focus and language: English and French mark corrective focus similarly, but only English marks parallelism in the same way that it marks other foci, while in French this distinction is not consistently marked. This pattern is exactly as predicted under the Scope Hypothesis, while it is unexpected under the two alternative phonological hypotheses we considered, the Phrasing Hypothesis and Initial High Hypothesis. In the following, we discuss a number of alternative interpretations of our findings, and provide additional evidence against these alternative views and in favor of the Scope Hypothesis.

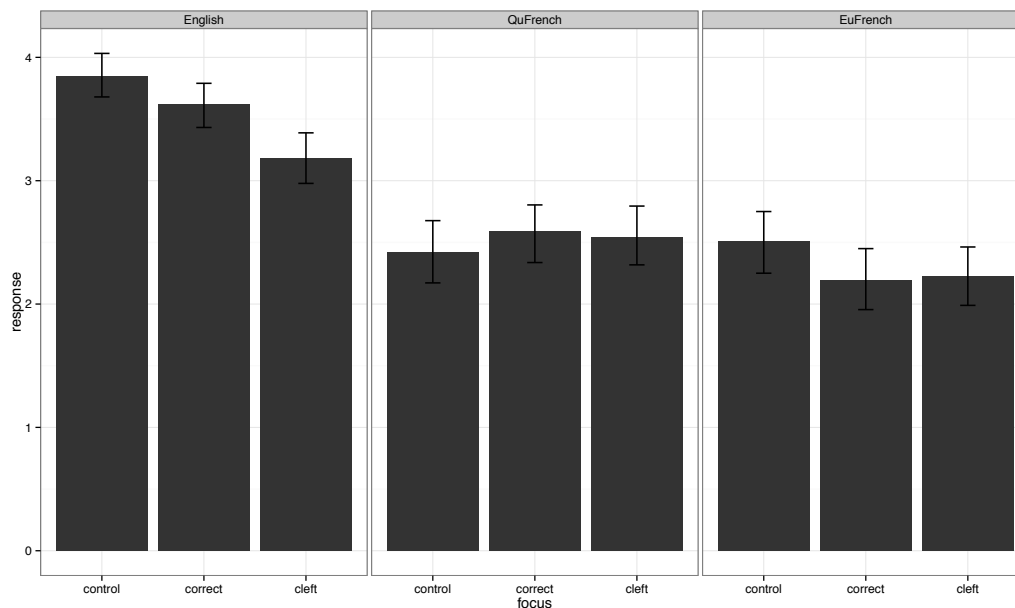
### 5.1 Prosodic vs. Syntactic Ways of Marking Focus

The goal of our experiment was to compare how focus affects prosody in comparable sentences in English and French. However, one might question the direct comparison of these languages, since, as noted above, alternative syntactic strategies such as clefting might be used to convey focus more commonly in French than in English (e.g., Lambrecht 1994; Féry 2001; Ladd 2008). For example, narrow focus might preferentially be conveyed using a cleft structure in French, meaning that our target non-cleft-sentences might simply be unacceptable or at least less acceptable than their clefted counterparts. This would weaken the validity of a comparison of the use of prosody in the non-clefted conditions across English and French.

In our adjective/noun stimuli, however, moving the focused constituent alone was not an option; for example, one cannot cleft the contrastive adjective to the exclusion of the given noun (e.g., *\*No, it was **red** that Jordan bought a bike yesterday*). There might, though, still be a preference to use a cleft, where the given constituent pied-pipes along (e.g., *It was a **red** bike that...*). In order to test whether there was such a preference in French, we examined the acceptability ratings that were included as part of the experiment. Since the cleft condition involved corrective focus, we were particularly interested in seeing how it compares with the unclefted corrective focus condition. The rating results in **Figure 4** below illustrate that in French, the non-cleft sentences are not rated as any worse than the clefted sentences, thereby justifying the comparison of these conditions in both French and English. (Recall that participants rated their responses on a scale of 1 to 5, where 1=completely unnatural and 5=completely natural.)

We tested for differences in acceptability ratings between English, Québec French, and European French using a mixed model regression with Response as the dependent variable, Condition and Language and their interaction as predictors, and random effects for Item and Participant that included slopes for Condition and Language. There were no interactions between the conditions and language. The only significant difference was that the ratings in the two French experiments were overall lower than in the English experiment, even in the control

condition. We do not know why this is the case. It could be a result of the slightly different wording of the acceptability question in French (*S'il vous plaît évaluer si la réponse est naturelle d'après ce qu'a dit l'autre personne* ‘Please evaluate if the response is natural given what the other person said’) vs. in English (*Please rate how natural your response is given what the other person said*), where the issue is that the French version says to evaluate *if* the response is natural in contrast to the English version which says to evaluate *how* natural your response is. Alternatively, it could be the case that our French stimuli were overall less natural.



**Figure 4.** Relative intensity, pitch, and duration in English, Québec French (QuFrench) and European French (EuFrench), comparing corrective focus in a non-cleft and a cleft with our control condition.

Crucially, the clefted structures were not rated as more acceptable than the non-clefted structures in French, and there was no French/English difference in how clefting compared to other conditions. Hence, it is not the case that not using a cleft in French was deemed less acceptable than using a cleft and it is therefore valid to directly compare the non-clefted structures across the two languages.

## 5.2 Pre-nominal vs. Post-nominal Adjectives

Most adjectives in English occur pre-nominally. In French, by contrast, most occur post-nominally, as in (31a), except for a restricted set of evaluative adjectives that occur pre-nominally (e.g., Androutsopoulou et al. 2008), as in (31b) below. In this section, we examine whether this could explain some of the differences we have observed between English and French. Specifically, under the Phrasing Hypothesis (Féry 2001, 2013; Hamlaoui et al. 2012), we might expect to see a difference in our results for DPs with pre-nominal adjectives (one phrase) vs. post-nominal adjectives (can be one phrase or two phrases). That is, assuming that speakers might have varied in how they interpreted and then phrased DPs with post-nominal adjectives (e.g., [une soupe froide] ‘a cold soup’ vs. [une soupe] [froide] ‘a soup which is cold’), we would

expect the results this type of DP to either be messy or show evidence of a prominence shift since one phrase would not allow for a prominence shift, but two phrases would.<sup>19</sup>

In order to be able to test for this, we included both pre-nominal and post-nominal adjectives in our experimental design for French. Out of 16 adjective/noun items, 12 contained post-nominal and 4 pre-nominal adjectival modifiers. In both types of items, the contrastive word was always the word that was linearly first (**contrastive word** > given word), in order to maintain structural parallelism. This manipulation is illustrated in examples from the contrastive focus condition in (31):

(31) *Post-nominal adjectival modification in French:*

- a. Hier soir, Natalie a nettoyé le *plafond bleu*.  
 ‘Last night, Natalie cleaned the blue ceiling.’  
 C’est vrai? Mireille a nettoyé les **murs** bleus.  
 ‘Really ? Mireille cleaned the blue walls.’

*Pre-nominal adjectival modification in French:*

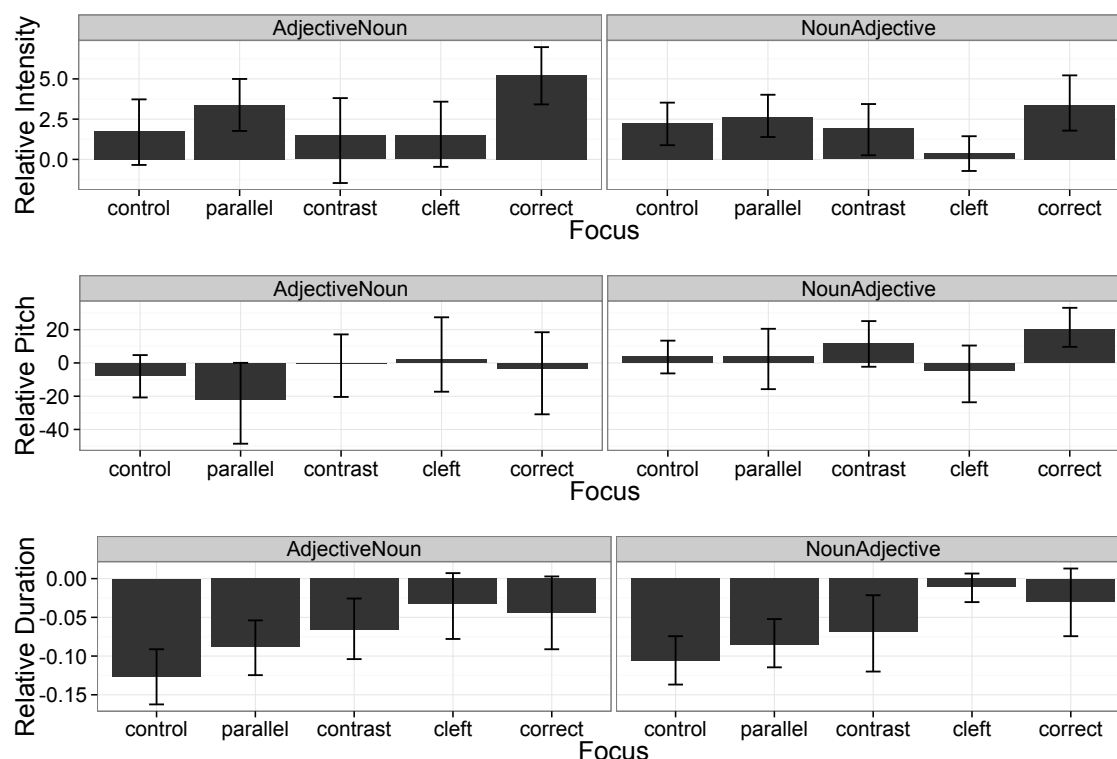
- b. Hier soir, Martin a joué avec son *vieux chat*.  
 ‘Last night, Martin played with his old cat.’  
 C’est vrai? Gabriel a joué avec son **jeune** chat.  
 ‘Really? Gabriel played with his young cat.’

The means of the relative measures of intensity, pitch, and duration for the French data are plotted in **Figure 5** below, which shows an apparent effect for word order. In order to test whether there were any significant interactions, we fit a model on the French data (both Québec French and European French) with Word Order and Focus as fixed effects and random effects and slopes for Participant and Item. The only significant effect in all models for the three acoustic measures was a main effect for corrective focus, confirming that indeed corrective focus is prosodically marked, irrespective of word order. These results are in line with our Scope Hypothesis. However, none of the interactions between focus and word order were significant. That is, there is no evidence that word order matters for how focus is marked prosodically in French, which may speak against the Phrasing Hypothesis. Further research which examines DPs with post-nominal adjectives as only being interpreted as a reduced relative clause (and therefore as two phonological phrases) is necessary to confirm this result. However, even if such results came to fruition, the Phrasing Hypothesis would not explain why French behaves similarly to English in corrective focus but not in parallelism for both pre-nominal and post-nominal adjectives.

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<sup>19</sup> This potential difference was not explicitly tested in Hamlaoui et al. (2012), which examined only noun>adjective types of an animal noun followed by a color adjective. However, Hamlaoui et al. (2012:1517) argue that their results show that the DP cannot be divided into two phonological phrases, suggesting that the DP is a minimal phonological phrase (cf. Féry 2001).





**Figure 5.** Relative intensity, relative pitch, and relative duration values for adjective-noun and noun-adjective word order in French (Québec French and European French)

### 5.3 Phonological Size

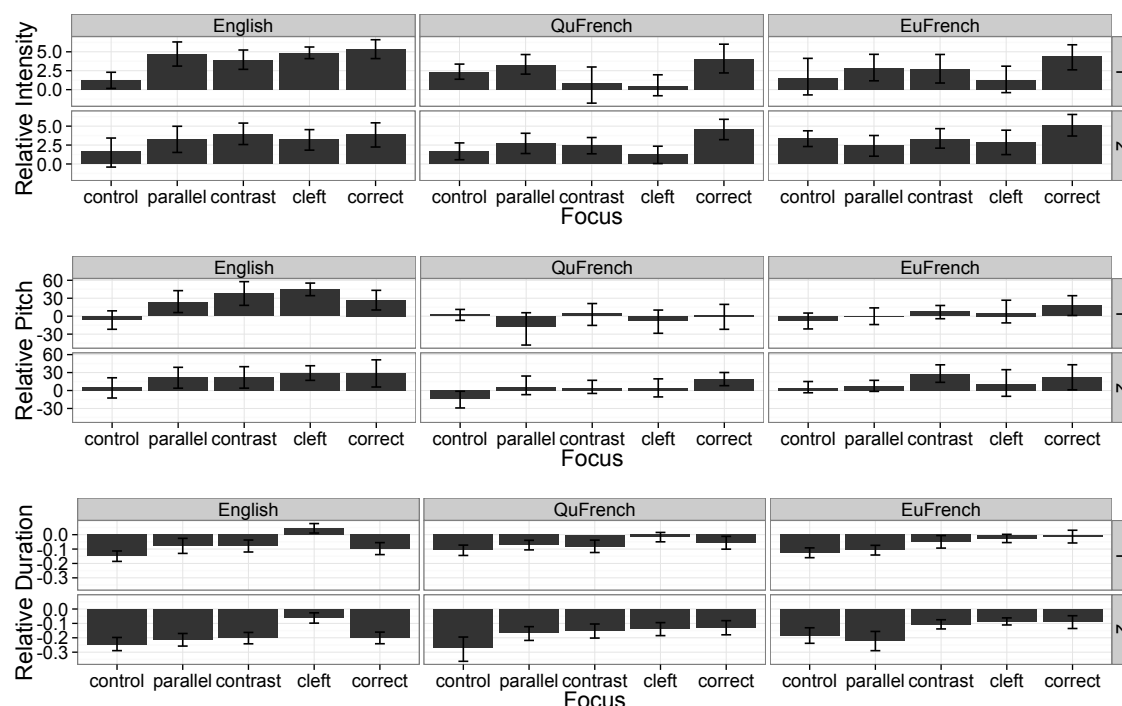
Ladd (2008:177) notes that larger constituents allow for deaccentuation more readily in Italian. A size effect of this type in French could potentially provide evidence for Féry's (2001, 2013) proposal that focus in French is mediated by phrasing, where only constituents of at least the size of a phonological phrase can be prosodically reduced. Could it be that in French, perhaps due to the different prosodic system it has compared to English, only larger constituents can be deaccented?

In order to examine whether there is a difference between English and French with respect to phonological size, we varied the phonological size of the given word between one and two syllables in our adjective/noun stimuli. Among the 16 adjective/noun items in each language, 8 items have a monosyllabic given word and 8 items have a disyllabic given word. In order for the disyllabic items in English to be comparable to French, these items always have final stress. Below are some examples in the corrective focus condition:

- (32) *Examples of monosyllabic given items:*
- a. Last week Johanna polished the *silver knives*.  
No, she polished the **steel** knives.
  - b. Hier soir, Natalie a nettoyé le *plafond bleu*.  
'Last night, Natalie cleaned the blue ceiling.'  
Non, elle a nettoyé les **murs** bleus.  
'No, she cleaned the blue walls.'

- (33) *Examples of disyllabic given items:*
- a. Rob owns a *cheap* hotel.  
No, he owns a **posh** hotel.
  - b. Hier, Lisette a acheté une *veste mignonne*.  
'Yesterday, Lisette bought a cute coat.'  
Non, elle a acheté une **jupe** mignonne.  
'No, she bought a cute skirt.'

As shown in **Figure 6**, the syllabic size of the given item does not have any obvious effect on shifting prominence for any of the acoustic measures. In order to test whether there was any size effect, we fit a mixed model to all adjective/noun data with fixed effects for Language, Size, Focus and their interaction. There was no effect of size, nor were any of the interactions involving size significant. There is thus no evidence that phonological size matters for the likelihood of a prominence shift in French (or English).



**Figure 6.** Relative intensity, pitch, and duration values for monosyllabic and disyllabic given items in English, Québec French (QuFrench), and European French (EuFrench).

#### 5.4 Syntactic Size: Complex Sentences

As mentioned in section 5.3, Ladd (2008:177) observes that larger constituents allow for deaccentuation more readily in Italian. Although we have observed that the syllable length of the given item does not have any effect on shifting prominence in French or English, it is not evident whether Ladd's observation is about phonological size or syntactic size. Another possibility is that syntactic size matters, and syntactic size might also correlate with the phonological status of being a phonological phrase. If so, then our findings might be compatible with an explanation in

terms of the Phrasing Hypothesis. Also, our manipulation of phonological size was very limited (one vs. two syllables), and one might wonder whether a greater difference in phonological size would yield an effect.

In order to test whether syntactic size matters, we included 6 items in which the potential contrastive item is the matrix subject of a subordinate clause, and the given material comprised the remainder of the clause, as illustrated in (34) in the corrective focus condition. We call this syntactic manipulation ‘complex sentences’. Note also that the given material now comprises many syllables, so if phonological size is relevant up and above two syllables, these stimuli would meet this requirement.

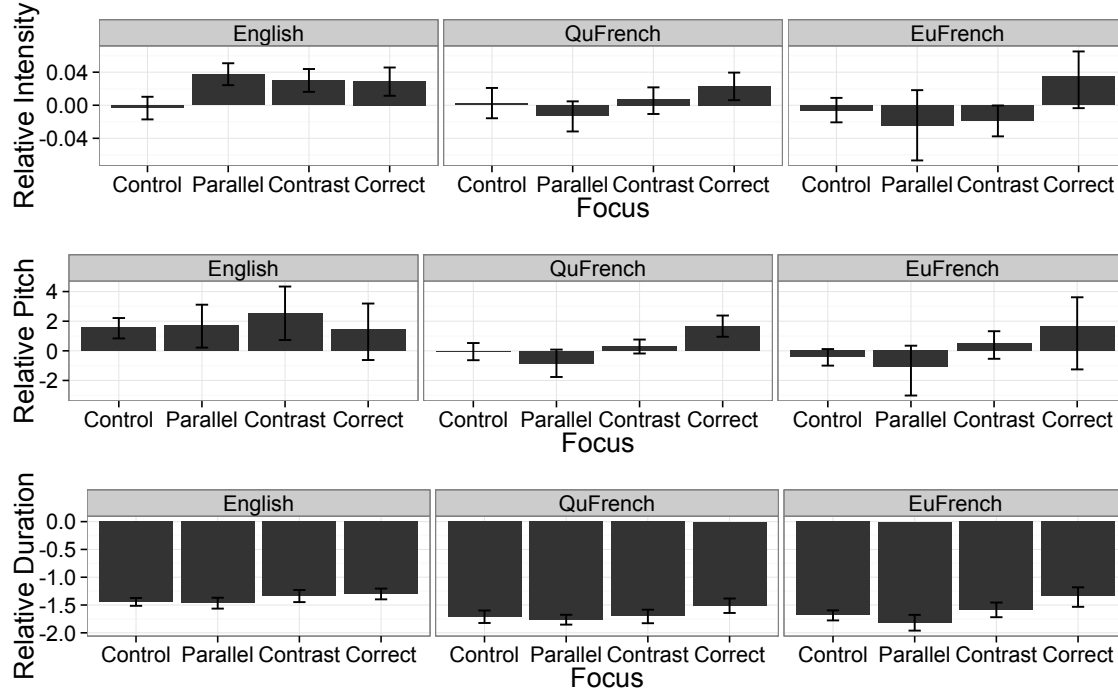
(34) *Examples of complex sentence items:*

- a. For the 2016 Summer Olympics, *Nick said that Brazil won the bid.*  
No, **Justin** said that Brazil won the bid.
- b. *David a mentionné qu’il promenait des chiens pour gagner sa vie.*  
‘David mentioned that he walks dogs for a living.’  
Non, **Bertrand** a mentionné qu’il promenait des chiens pour gagner sa vie.  
‘No, Bertrand mentioned that he walks dogs for a living.’

The Scope Hypothesis proposed in this paper and the Phrasing Hypothesis (Féry 2001, 2013) make different predictions for how complex sentences will be prosodically marked in English vs. French. The Scope Hypothesis predicts that these items should pattern in the same way as the adjective/noun items: If in French, ~ can only attach to root clauses, then no focus marking should be possible here unless the context gives rise to corrective focus as in (34). Since in English, ~ can attach to embedded nodes, we expect focus marking to be possible with complex sentences in all focus conditions. (Similarly, there is no expectation based on the Initial High Hypothesis for a difference from the pattern observed in the adjective/noun set of items.)

The Phrasing Hypothesis, on the other hand, predicts that the complex sentence items should radically differ from the adjective/noun ones. According to Féry (2001, 2013) since subjects are XPs they are mapped to their own  $\Phi$ , just as the following VP is. This means, however, that the French VPs can undergo pitch compression:  $\Phi$  phrases can be deaccented in French. This idea is motivated based on the observed pitch compression following subjects in wh-question contexts in Féry (2001), in contrast to the lack of an accent in the adjective/noun cases investigated in Hamlaoui et al. (2012). The manipulation of syntactic size is therefore crucial for testing the Phrasing Hypothesis: Since the bigger syntactic constituents involved map to  $\Phi$  phrases, we should see an interaction between syntactic size and focus in their effect on the prosodic marking of focus.

We analyzed the data in the same way as the adjective/noun data, comparing measurements on the matrix subject with measurements over the given item (i.e., the deaccentuation domain), which comprises the matrix verb to the end of the clause.



**Figure 7.** Relative intensity, pitch, and duration values for complex sentences in English, Québec French (QuFrench), and European French (EuFrench).

The data in **Figure 7** above look similar to the adjective/noun item results in that French consistently shows a difference between corrective focus and control just like English, but parallelism is not distinguished for the most part in French, while it is in English, at least in intensity. One notable difference is that pitch seems to be irrelevant as a cue to focus in complex sentences in English, in contrast to the adjective/noun data. Again, we tested for significance using mixed effects models within English, Québec French, and European French (**Table 3**).<sup>20</sup>

<i>Intensity</i>	English	QuFrench	EuFrench
Parallelism	<b>t=3.9</b>	t=-1.0	t=-0.1
Contrast	<b>t=3.2</b>	t=0.5	t=0.3
Corrective	<b>t=3.1</b>	t=1.7	<b>t=2.1</b>
<i>Pitch</i>	English	QuFrench	EuFrench
Parallelism	t=0.4	<b>t=-2.2</b>	t=-0.5
Contrast	t=1.2	t=1.1	t=0.8
Corrective	t=-0.1	<b>t=4.1</b>	<b>t=2.2</b>
<i>Duration</i>	English	QuFrench	EuFrench
Parallelism	t=0.3	t=-0.3	t=-0.9
Contrast	t=1.3	t=0.3	t=1.0
Corrective	<b>t=4.2</b>	<b>t=2.7</b>	<b>t=4.0</b>

<sup>20</sup> Since this subset of the data only consisted of 6 items we were not able to fit random slopes for these models.

**Table 3.** Comparisons between foci and control conditions based on mixed models within English, Québec French (QuFrench), and European French (EuFrench) for complex sentence items.

The results by and large confirm that English marks all foci whereas in French, only corrective focus is marked. One odd result in Table 3 is that we found an effect for pitch in the opposite direction than predicted for parallelism in Québec French.

To test whether the languages differ when we directly compare the results across experiments, we fit a model for all data looking for significant interactions between Language and Focus. As shown in **Table 4** below, the only significant interaction was that parallelism and contrastive focus are marked differently with respect to intensity in English compared to French.

<i>English vs. French</i>	<i>Intensity</i>	<i>Pitch</i>	<i>Duration</i>
Parallelism.vs.Control*English.vs.French	<b>t=3.4</b>	t=1.0	t=0.9
Contrast.vs.Control*English.vs.French	<b>t=2.2</b>	t=0.5	t=0.2
Corrective.vs.Control*English.vs.French	t=-0.1	t=-1.6	t=-0.5
<i>QuFrench vs. EuFrench</i>			
Parallelism.vs.Control*QuFrench.vs.EuFrench	t=0.1	t=-0.3	t=0.4
Contrastive.vs.Control*QuFrench.vs.EuFrench	t=0.7	t=-0.4	t=-1.3
Corrective.vs.Control*QuFrench.vs.EuFrench	t=-1.2	t=-0.3	t=-1.0

**Table 4.** Interactions between Focus and Language for complex sentence items.

The results from complex sentences confirm the predictions of the Scope Hypothesis, and replicate the results obtained based on the adjective/noun data: English and French mark corrective focus similarly, but differ in that there is no prosodic effect of focus under parallelism and contrastive focus in French. The differences observed in the individual analyses with respect to the use of pitch and duration did not reach significance when compared across experiments.

The results speak against the Phrasing Hypothesis, which would predict no focus marking in any condition in the adjective/noun cases and focus marking in all conditions in the complex sentence cases.

### 5.5. More on Syntactic Size: Relative Clauses

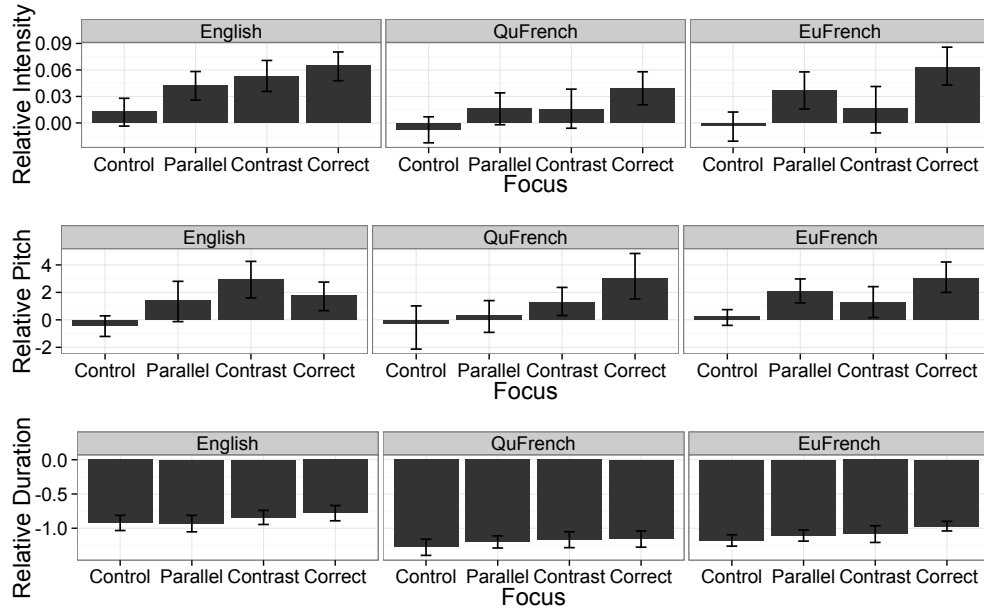
We included a further manipulation in syntactic size in our experiment by way of relative clause modifiers. There were a total of 8 items in which the potential contrastive item is the relative clause noun head and the given item includes the relative complementizer (e.g., *that*) followed by the rest of the relative clause. Examples for English and French are given in (35) in the corrective focus condition:

(35) *Examples of relative clause items:*

- a. Yesterday, John cut down an *oak that was rotten*.  
No, he cut down an **elm** that was rotten.
- b. Émilie a rencontré un *Brésilien qui était végétarien*.  
'Emily met a Brazilian who is vegetarian.'

Non, elle a rencontré un **Russe** qui était végétarien.  
 ‘No, she met a Russian who is vegetarian.’

Again we submitted the relative clause data set to the same analysis, comparing the contrastive item (the relative clause noun head) to the given item (relative complementizer and the rest of the clause). The means of relative intensity, pitch, and duration are illustrated in **Figure 8**.



**Figure 8.** Relative intensity, pitch, and duration values for relative clause items across conditions in English, Québec French (QuFrench), and European French (EuFrench).

One similarity in the results in Figure 8 to the results from adjective/noun items and complex sentence items is that Québec French and European French consistently show a difference between corrective focus and control just like English. Again, we tested for significance using mixed effects models.

One unexpected finding in our results, summarized in Table 5 below, is that European French shows a difference in intensity between control and parallelism. The difference in pitch between control and parallelism is also significant in European French.

<i>Intensity</i>	English	QuFrench	EuFrench
Parallelism	<b>t=2.8</b>	t=1.5	<b>t=2.8</b>
Contrast	<b>t=3.5</b>	t=1.3	t=1.0
Corrective	<b>t=4.8</b>	<b>t=3.1</b>	<b>t=3.4</b>
<i>Pitch</i>	English	QuFrench	EuFrench
Parallelism	t=1.8	t=0.3	<b>t=2.8</b>
Contrast	<b>t=3.5</b>	t=1.4	t=1.5
Corrective	<b>t=2.7</b>	<b>t=2.0</b>	<b>t=4.5</b>
<i>Duration</i>	English	QuFrench	EuFrench

Parallelism	t=0.8	t=1.2	t=1.1
Contrast	<b>t=4.2</b>	t=1.4	t=1.6
Corrective	<b>t=3.6</b>	t=1.7	<b>t=4.3</b>

**Table 5.** Comparisons between foci and control conditions based on mixed models within English, Québec French (QuFrench), and European French (EuFrench) for relative clause items.

The intensity and pitch differences observed in parallelism in European French might be an indication that the type of syntactic constituent that is given matters. To test whether the languages really differ, we again fit a model for all data looking for significant interactions between Language and Focus. These results are shown in **Table 6**:

<i>English vs. French</i>	<i>Intensity</i>	<i>Pitch</i>	<i>Duration</i>
Parallelism.vs.Control*English.vs.French	t=0.0	t=0.5	t=-1.0
Contrast.vs.Control*English.vs.French	t=1.3	<b>t=2.0</b>	t=0.1
Corrective.vs.Control*English.vs.French	t=-0.2	t=-0.5	t=-0.2
<i>QuFrench vs. EuFrench</i>			
Parallelism.vs.Control*QuFrench.vs.EuFrench	t=-0.7	t=-0.8	t=0.3
Contrastive.vs.Control*QuFrench.vs.EuFrench	t=0.0	t=-0.3	t=-0.0
Corrective.vs.Control*QuFrench.vs.EuFrench	t=-1.2	t=0.4	t=-1.5

**Table 6.** Interactions between Focus and Language for relative clause items.

The results in Table 6 for relative clause items suggest that there is again no difference with respect to how English, Québec French, and European French mark corrective focus (as we have seen with adjective/noun items as well as complex sentence items). But this time as compared to the results in Table 5, there is also no evidence that English and French differ with respect to parallelism, although there is some indication that contrastive focus is not marked as reliably in French as it is in English, as seen by the difference in pitch.

One possible reason why the relative clause data differed in that we did not find the expected differences between English and French is that relative clauses include their own clause node. In fact, non-restricted relative clauses have been argued to count as a separate root clause (Ross 1967), and have been claimed to be set off by an obligatory prosodic break (Downing 1970; Emonds 1970). If some of our relative clauses were at least occasionally interpreted as non-restrictive, then the result that their focus prosody was more similar in English and French would be as expected based on the proposal that ~ in French can only attach to root clauses. Non-restrictive relative clauses therefore simply allow for the placement of an additional ~ operator at the root of the relative clause. In this way, the head of the relative clause can be interpreted as in the scope of ~, despite of the fact that it is an argument of the matrix clause:

- (36) Elle aime manger ~[**des pommes<sub>F</sub>** qui sont mûres].  
‘She likes to eat apples that are ripe.’

Of course, this idea does not explain why there would still have been a significant difference in the contrastive condition between English and French.

The relative clause data might be amenable to an analysis along the lines of the Phrasing Hypothesis: If the relative clause *des pommes qui sont mûres* is mapped to a separate phonological phrase, then it would be predicted by the Phrasing Hypothesis that it can be reduced for focus-marking purposes. Under this analysis one would have to find reasons that none of the other manipulations such as the complex sentence data lead to such an effect, in contrast to what would be expected based on Féry (2013).

There remains much to be explored with respect to potential interactions between the Scope Hypothesis and different syntactic constructions, which could be used to further test this hypothesis. We will leave deeper exploration of the prosody of relative clauses to a future occasion.

## 5.6 Discussion

The results reported in this section show that the differences observed between English and French to mark focus do not reduce (i) to the fact that French speakers might be more prone to use syntactic focus-marking strategies such as clefting compared to English speakers; (ii) to a difference between pre-nominal and post-nominal adjectival modifiers; (iii) to the phonological size of the constituent that is to be deaccented; or (iv) to the syntactic size of the constituent that is to be deaccented.

In particular, the hypothesis inspired by Ladd (2008) that a larger phonological or syntactic domain of the given item (i.e., deaccentuation domain) would facilitate focus realization in French is not borne out in our data, although the relative clause data shows that syntax does interact with the realization of focus.

Overall, our results show that syntactic and phonological size is not predictive of when focus is marked in French. The data from relative clauses, however, constitute a remaining puzzle for the Scope Hypothesis.

## 6. How is a Prominence Shift Achieved?

We have shown that French and English differ in the types of focus contexts in which prominence shifts occur. Do these languages also differ in how a prominence shift is achieved? There are at least three ways to shift prominence from the given constituent to the contrastive constituent: boosting the contrastive constituent, reducing the given one, or both. Which strategy or strategies is/are used in which language? Does the strategy depend on the type of focus? In the following, we seek answers to these questions by examining the absolute values for maximum duration, intensity and pitch for the given and the contrastive constituents respectively.<sup>21</sup>

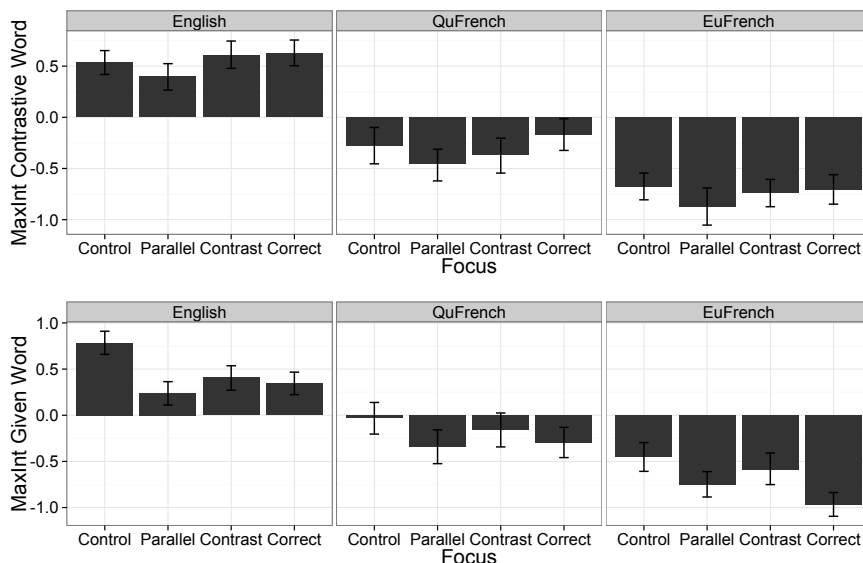
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<sup>21</sup> In this section, we only discuss the data involving adjectival modification. The results from the other syntactic conditions show some variation on the same pattern; therefore, they are ultimately not insightful enough to warrant a lengthy discussion. We chose to look at one syntactic data point (adjective/noun items) rather than pooling all the data (which also leads to consistent and very similar results) since otherwise we might be averaging over cases that, at least according to our discussion in the previous section, might ultimately not be equivalent in how focus is encoded.



## 6.1 Absolute Intensity

Results on relative intensity have shown an effect across all focus contexts in English, and only in the case of corrective focus in French. The maximum intensity on the contrastive and given constituents in each language are illustrated in **Figure 9** below.



**Figure 9.** Maximum intensity on the contrastive and given constituent by Language.

As shown in **Figure 9**, most of the difference in intensity between the control condition and the focus conditions is seen on the given constituent in English. Similarly, the difference between corrective focus vs. the other conditions is mostly apparent in the intensity measure on the given constituent in European French.

A mixed effects regression was conducted with Focus and Language as factors and random effects for Item and Participant that included a random slope for focus; these interactions are given in **Table 7**. There was a main effect of intensity due to Language, which might reflect slightly different recording conditions for the different speaker groups since most French participants were run in a different lab setting. There were significant interactions between focus conditions and language such that the difference between parallel and control as well as the difference between contrast and control were significantly different in English compared to French, both for the given and the contrastive constituents. There was no statistical evidence that intensity was used differently to convey corrective focus between English and French.

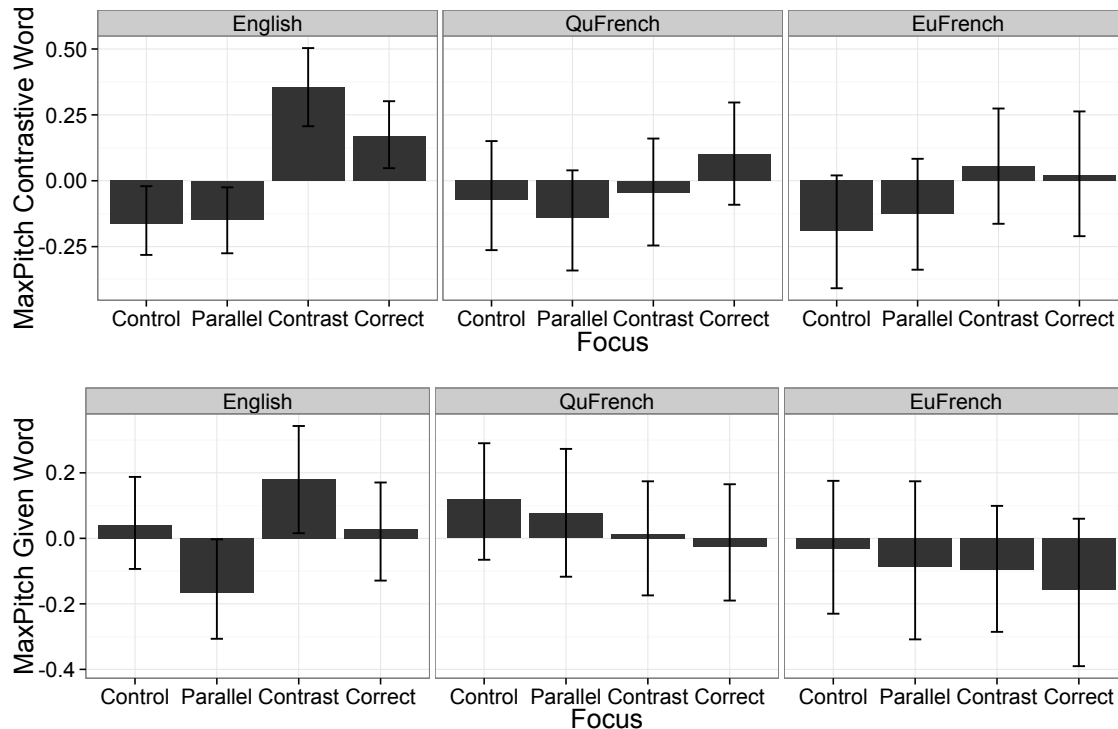
<i>English vs. French</i>	<i>Contrastive constituent</i>	<i>Given constituent</i>
Parallelism.vs.Control*English.vs.French	<b>t=2.0</b>	<b>t=-3.2</b>
Contrast.vs.Control*English.vs.French	<b>t=2.0</b>	<b>t=-3.1</b>
Corrective.vs.Control*English.vs.French	t=1.8	t=0.1
<i>QuFrench vs. EuFrench</i>		
Parallelism.vs.Control*QuFrench.vs.EuFrench	t=0.3	t=0.9
Contrastive.vs.Control*QuFrench.vs.EuFrench	t=1.1	t=-0.3
Corrective.vs.Control*QuFrench.vs.EuFrench	t=0.7	t=1.56

**Table 7.** Interaction effects on maximum intensity of the contrastive and given constituent.

These results suggest that corrective focus was indeed encoded by intensity in essentially the same manner across English, Québec French, and European French, a novel finding since earlier studies on Focus in French have not reported differences in intensity.

## 6.2 Absolute Pitch

The plots for maximum pitch in **Figure 10** suggest that pitch is not a good cue for focus in French, which importantly includes corrective focus. In English, pitch is a good cue for all focus contexts: the pitch on the contrastive constituent is boosted for contrastive focus and corrective focus, while the pitch on the given constituent is at least numerically lower in the case of parallelism.



**Figure 10.** Maximum pitch on contrastive and given constituent by Language.

Statistical analysis in **Table 8** shows that there is a significant interaction between focus and language such that pitch on the contrastive constituent is realized differently in English compared to French for both contrastive focus and corrective focus. Otherwise, none of the differences between the two languages was significant.

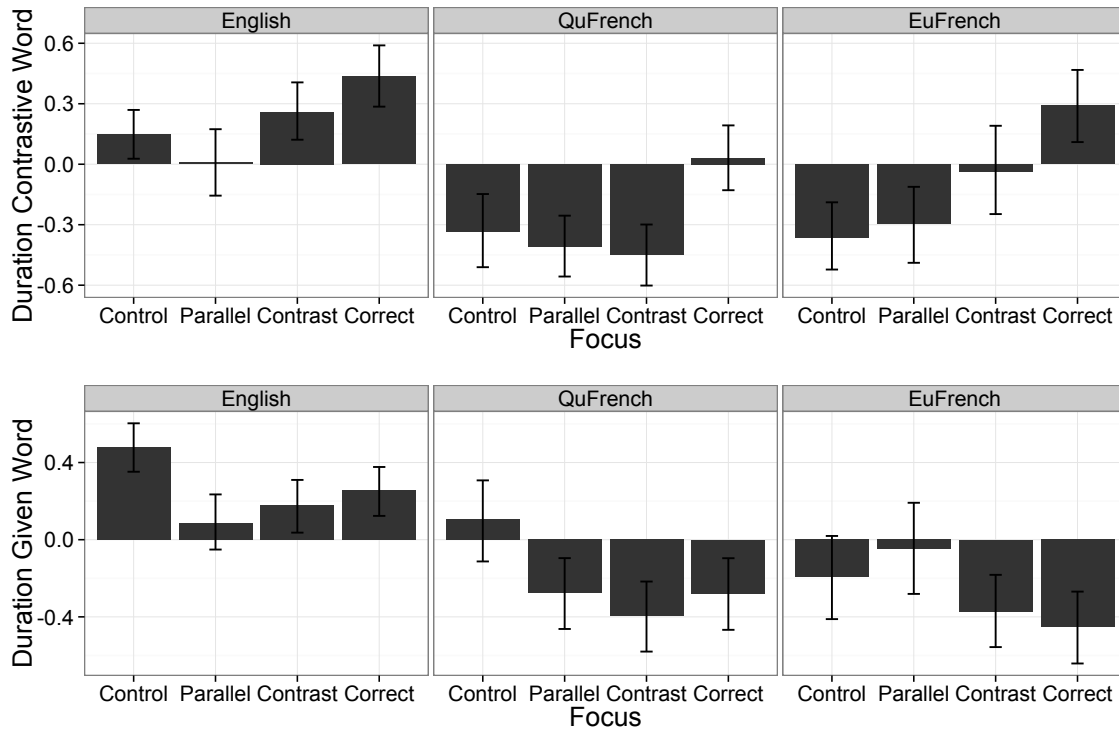
<i>English vs. French</i>	<i>Contrastive constituent</i>	<i>Given constituent</i>
Parallelism.vs.Control*English.vs.French	t=0.4	t=-0.9
Contrast.vs.Control*English.vs.French	<b>t=3.8</b>	t=1.7
Corrective.vs.Control*English.vs.French	<b>t=2.2</b>	t=0.8
<i>QuFrench vs. EuFrench</i>		
Parallelism.vs.Control*QuFrench.vs.EuFrench	t=-0.4	t=0.2
Contrastive.vs.Control*QuFrench.vs.EuFrench	t=-1.0	t=0.1
Corrective.vs.Control*QuFrench.vs.EuFrench	t=0.5	t=0.2

**Table 8.** Interaction effects on maximum pitch of the contrastive and given constituent.

Since we found much more solid results when looking at relative pitch, it seems likely that there was a lot of between-speaker variability with respect to the strategy in how pitch cues were employed; some speakers adjusted pitch by boosting the contrastive constituent while others reduced pitch on the given constituent.

### 6.3 Absolute Duration

**Figure 11** visualizes the effect of focus on duration. In English, the contrastive constituent is lengthened mostly in corrective focus, similar to the pattern in Québec and European French. As well, the given constituent is shorter compared to the control condition in all focus conditions. Québec French seems similar to English in this regard (in contrast to European French).



**Figure 11.** Duration of the contrastive and given constituent by Language.

Statistical analysis summarized in **Table 9** shows that, indeed, Québec French differs from European French: first, parallelism is marked on the given constituent; and second, contrastive and corrective focus are marked more clearly on the contrastive constituent in Québec French.

<i>English vs. French</i>	<i>Contrastive constituent</i>	<i>Given constituent</i>
Parallelism.vs.Control*English.vs.French	$t=-0.5$	$t=-2.1$
Contrast.vs.Control*English.vs.French	$t=0.9$	$t=-0.1$
Corrective.vs.Control*English.vs.French	$t=-1.5$	$t=-0.4$
<i>QuFrench vs. EuFrench</i>		
Parallelism.vs.Control*QuFrench.vs.EuFrench	$t=-1.1$	$t=-2.4$
Contrastive.vs.Control*QuFrench.vs.EuFrench	$t=-3.1$	$t=-0.9$
Corrective.vs.Control*QuFrench.vs.EuFrench	$t=-2.6$	$t=0.1$

**Table 9.** Interaction effects on duration of the contrastive and given constituent.

Our findings differ from Jun and Fougeron (2000) who observed no effect of duration on the given item for European French, but the fact that the durational effects were stronger in Québec French suggest that the cue is less important in French. Our findings are similar to Doven and Loevenbruck's (2004) claim that duration plays a role in European French in that the focused constituent is lengthened.

The fact that Québec French shows a reduction on the duration of the given constituent

across all focus conditions similar to English might suggest that parallelism and contrastive focus are marked after all. However, a durational reduction could be due to the repetition of the word rather than reflecting a general shift in prominence. Bard et al. (2000) found that in English even accented constituents were sometimes durationally reduced when they were repeated. In other words, durational differences were present even when accentuation status was not affected. Under this view, it is crucial that this pattern is observed with respect to the duration of the given constituent, as we find in **Figure 9** above. This result makes analysis in terms of repetition shortening plausible. A durational boost on the contrastive constituent would have unambiguously indicated that focus is marked. Therefore, finding some durational differences does not necessarily speak against our hypothesis that focus prominence does not encode parallelism, since the durational difference might not reflect an actual prominence shift.

While durational reduction on the given constituent in Québec French (and English) is plausibly due to the fact that this constituent has been repeated, this view does not explain why the effect is not observed in European French as well. Does the effect of repetition hold cross-linguistically or is it a language-specific phenomenon? Our results suggest that languages differ with respect to the effect of repetition. Bard et al.'s (2000) experiments are on English, which robustly shows the reduction of duration of a repeated word. Since Québec French is spoken in an environment where English is more prevalent than is the case for European French, this could explain why we only observe durational reduction in Québec French.

## 6.4 Discussion

Our results further confirm that French and English are very similar when it comes to how they encode corrective focus, at least with regards to pitch and intensity cues. We found some interesting durational differences between Québec French and European French in general, and in the corrective focus condition in particular, suggesting finer distinctions between these two varieties of French that are not apparent when looking at relative measures.

Overall, an examination of absolute acoustic measures does not reveal any systematic distinctions that would point to clear P-differences between English, Québec French, and European French. Both English and French employ cues on the contrastive and given constituents to achieve the relative prominence differences we observed earlier and there is no clear overall difference between the languages in which strategy (boost, reduction, or both) is used to convey a prominence shift.

## 7. Conclusion

In this study, we have investigated differences in the use of prosody to mark focus between English and French from a semantic/pragmatic perspective, by including various types of focus contexts such as syntactic parallelism, corrective focus, contrastive focus and a cleft construction and from a phonological perspective, by controlling the size of the given item.

We have shown that French allows for a shift in prominence to realize focus in only some of the contexts that English does. Specifically, French shifts prominence in corrective focus and, with lower frequency, in the case of contrastive focus, confirming that this language can shift prominence in some contextual circumstances. Crucially, we have also found evidence that French does not shift prominence in the case of syntactic parallelism, when the antecedent for

focus marking is necessarily smaller than an entire clause. We have argued that this distinction between English and French can be attributed to S-differences, compatible with the claim that these languages have different scope possibilities for the focus operator  $\sim$ : in particular, whereas  $\sim$  is restricted to the root clause in French, English has no such restriction.

These results have implications for understanding focus realization cross-linguistically. We have shown above in section 4 that Cruttenden's (2006) results for English and French are in line with the predictions of our Scope Hypothesis. Our approach as couched in Rooth's (1992) theory of focus can be a useful tool in better understanding the cross-linguistic differences within Germanic and Romance languages. For instance, Cruttenden (2006) finds that Spanish speakers behave similarly to French speakers in only shifting prominence in a limited number of contexts, while Italian speakers tend to shift prominence in a wider range of contexts. Closer examination of these contexts with respect to the scope or content of  $\sim$  seems to be a promising avenue for further research to shed light on these differences.

In a different approach to the typology of focus realization, Büring (2009) explores how such a typology can be represented through 'prominence theory of focus' (cf. Truckenbrodt 1995). He classifies languages into 'boundary', 'edge', and 'mixed'. Boundary languages, such as English or Japanese, are those in which focus is marked by the insertion of a prosodic phrase boundary to the left or right of the focused elements. Edge languages are exemplified by Spanish or Italian, where focus is indicated by non-standard constituent order with the focus in a left- or right-peripheral position. Mixed languages are those such as German, Finnish, or Slavic in which either prosodic or syntactic structure may be used to mark focus.

Our results cast some doubt on whether this type of approach is correct. French, Spanish, and Italian have been described as marking corrective focus in the previous literature (e.g., Ladd 2008). If the Scope Hypothesis is correct, then the difference between these languages and English might not be reflective of whether or not they are 'edge'-based, but rather whether or not they differ in their syntax of  $\sim$ .

Another way in which our results bear on previous typological work is that while many authors assume a trade-off between the use of prosodic means and syntactic means for focus marking (e.g., Lambrecht 1994; Büring 2009), our results have not provided evidence for such a trade-off between the use of prosodic focus and clefting in English vs. French. Of course, we did not directly test the clearest case for such a trade-off: the use of clefting in order to mark subject focus in French (Hamlaoui 2008, 2009). Our results also do not put into question the observation that subject focus (as opposed to object focus) tends to be marked with clefts in French. However, our results do suggest that such local differences might not be indicative of a broad difference in terms of language type. In other words, it is not the case that *in general* French uses word order where English uses prominence.

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